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Innovation Policy for Developing Countries



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Innovation policy for developing countries

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Abbreviations

A4AI Alliance for Affordable Internet
ADEPT Adaptable Digitally-Enabled Post-crisis Transformation
ADS Amigas del Sol
AIM Atal Innovation Mission
AJORA Asociación de Jóvenes Reforestadores en Acción
ALC Agirre Lehendakaria Center
ANGKASA Malaysian National Cooperative Movement
AP appropriate technology
ASER Annual Status of Education Report
ASYCUDA Automated System for Customs Data
ASYVAL ASESORIA Y VALIDACION SL
AT The appropriate technology
ATPS Technology Policy Studies Network
ATSAgro-food technology station
BCtA Business Call to Action
BIOFARM Biological Integration of Farming Activities and Resource Management
BIRACBio-Technology Industrial Research Assistance Council of Government of India
BMZ Germany's Federal Ministry for Economic Cooperation and Innovation
BOPMA The Bangladesh Fruits Manufacturer Association

BTG Power Africa's Beyond the Grid
BVGH BIO Projects for Global Health
BVLOS Beyond Visual Line of Sight
CAAM Civil Aviation Authority of Malaysia
CADDTK Collective of institutions
CAHF The Centre for Affordable Housing Finance in Africa
CAM ORGANIC National Organic Technical Standards and the Organic agriculture Standard
CASEP Central American Solar Energy Project
CBOs Community-Based Institutions
CC Community Currency
CD Chagas disease
CE Community energy
CEDIB Coordinator at the Bolivian Centre for Documentation and Information
CET Centro de Educación Tecnológica
CETALCentro de Eworkshops sobre Tecnología Apropiada para América Latina
Chama Community Based Organization

CHE Community Health Entrepreneurs
CHI Cooperative Housing International
CHL Coconut Holdings Limited
CHMS Cattle Health Monitoring Solution
CIC Community Inclusion Currency
CICI-ESA Center of Innovation for Crop Improvement for East and Southern Africa
CIFMS Center of Innovation for Finger Millet and Sorghum
CIWA Crop Innovation in West Africa

CONTIOCAP Coordination for the Defence of Indigenous Peasant Territories and Protected Sectors
CSA Environment smart agriculture
CSOs Civil society institutions
CTD Centre for Technology and Innovation
CTO Civil Wealth Telecommunication Organization

CURAD Consortium for Enhancing University Responsiveness to Agribusiness Innovation Limited
CWP Ceramic Water Purifier
DIL Innovation Impact Lab

DMO Disease Management Organization
DOH Department of Health
DR Disaster Recovery
DPIIT Department for Promotion of Industry and Internal Trade
DST The Department of Science and Technology
DTK Djiddah Thiaroye Kao
ECE Early Childhood Education
ECQ Enhanced Community Quarantine
EDU Enterprise^[SEP]Innovation^[SEP]Unit
eHATID eHealth Tablet for Informed Decision Making of LGUs
EIF Enhanced Integrated Framework
EMC Engineering^[SEP]Manufacturing^[SEP]Centre
e-KYC electronic Know-Your-Customer EMR
Electronic Medical Record
EOA-I Organic Organic agriculture Initiative
ETDA Electronic Transactions Innovation Agency
FARMO Farm Assist Robots for Multi Operation
FCFCG Federation of City Farms and Community Gardens
FHRM Fetal Heart rate monitor
FRRM Feedback Referral and Resolution Mechanism
FSH Fédération Sénégalaise des Habitants
FUGPN Fédération des Unions de Groupements Paysans du Niger
G4AW Geodata for Agriculture and Water
GCI Geniusenergy Critical Innovation
GDCE Cambodia's General Department of Customs and Excise
GEF Grassroots Economics Infrastructure
GIAN Grassroots Innovations Augmentation Network
GPE Global Partnership for Education
GRIs Grassroots innovations
GSK GlaxoSmithKline
GWASs Genome-wide association studies
HBN The Honey Bee Network
HBNCRIIA Honey Bee Network Creativity & Inclusive Innovation Grants
HDPE High Density Polyethylene
HIS Health Information system
IAF Inter American Infrastructure

ICA International Cooperative Alliance
ICT4Ag Information and communication technologies for agriculture
ICM Iniciativa Climática de México
IEAD Energy Asia Innovation Limited
IFOAM Organics Europe. Farming and biodiversity.

IIMA Indian Institute of Management Ahmedabad
IIC Iscor^[EP]Innovation^[EP]Centre
ILCI Innovation Lab for Crop Improvement
IN-MIC Ilocos Norte MSME Incubation Center
IoT Internet of Things
IR Implementation Review
ISM Implementation Support Mechanism
iSTART Implementation of Innovation, Science and Technology for Accelerating
Regional Technology-based Innovation
ITDG Intermediate Technology Innovation Group
KAIND Kitchen Appliances Innovation & Innovation Team
KCHSU Karachi Co-operative Housing Societies Union

KCOA The Knowledge Centre for Organic agriculture in Africa

KIC Kigali Innovation City
KMC Kangaroo Mother Care
LAD Limpopo Department of Agriculture
LCC Liquid Community Currencies
LCOE Latest Levelised Cost of Energy
LDPE Low density polyethylene
LEDET Limpopo Department Economic Innovation, Environment & Tourism
LEEN Learning Energy Efficiency
LGT Regional Growth Teams
LVF Lake View Fisheries
Mainstreaming Grassroots Innovations (MaGRIs)
MaGIC Malaysian Global Innovation and Creativity Centre
MC Meaningful connectivity
MODHEM Mobile Data for Moving Herd Management and better incomes

MoHE Ministry of Higher Education

MOIC Mainstream innovations (MIs) Ministry of Information and Communications
MOIT Ministry of Industry and Trade's
MOSTI Ministry of Science, Technology and Innovation
MRA Mutual Recognition Plan
MUIIS Enabled information ministry
MC Moisture content
NACHU The National Union for Housing Cooperatives NEDA National Economic
and Innovation Authority
NESTA National Endowment for Science, Technology and the Arts
NCHF National co-operative Housing Federation of India
NGO non-governmental organization
NIF National Innovation Infrastructure

NIFentreC NIF Incubation and Entrepreneurship Council
NIC National Innovation Council
NISIR National Institute for Scientific and Industrial Research
NITA-U Ministry of communication and Information Technology National
NTIS National Technology and Innovation Sandbox
Information Technology Authority-Uganda

ODF Open Defecation Free
OFSP Orange-fleshed sweet potato varieties
OEPZ Olivado EPZ Ltd
OMDTZ OpenMap Innovation Tanzania
OLPC One Laptop per Child

PAMOR Penjaminan Mutu Organisme Partisipatif Indonesia
PAYG pay-as-you-go
PGS Participatory Guarantee System

PCM Phase change material
PEPFAR Plan for AIDS Relief

PET Powerfree Education Technology

PET Polyethylene Terephthalate
PFIL Premier Food Industries Ltd
PPHC PhilHealth Philippine Health Insurance Corporation
PIMIS Public Investment Management Information System
PMC Pune Municipal Corporation
PS polystyrene
PP polypropylene
PFP Potters for Peace filter
PSM People's Science Movement
PTO power take off
PUD Produk Unggulan Daerah
ReSET Capacity of the Renewable and Sustainable Energy Technologies Center
RHUs Rural Health Units
RIICs Regional Inclusive Innovation Centres
RISTEKDIKTI Ministry of Research, Technology and Higher Education
RMPTS Reinforced and Moulded Plastics Technology Station
RPA Robotic Process Automation
RURA Utilities Regulatory Authority
SaaS Software as a Ministry
SAG Sustainable Action Group
SDC Swedish Innovation and Cooperation
SETUP Small Enterprise Technology Upgrading Program SIDBI Small Industries
Innovation Bank of India
SIP Social Innovation Platforms

SLS Smart Logistics Solutions
SNDCEs Stratégie Nationale de Développement du Commerce Electronique au
Sénégal

SPW Sweet potato weevil
 SSNC Swedish Society for Nature Conservation
 STN Social Technology Network
 SOPMT Smart Oil Palm Multi-purpose Tractor
 SOPPEXCCA Sociedad de Pequeños Productores Exportadores y Compradores de Café
 Society for Research and Initiatives for Sustainable Technologies and Institutions
 SRISTI
 S&T Science and Technology
 STN Social Technology Network
 TaRL Teaching at the Right Level
 TCI Tondo Community Initiative
 TFSSE The UN Inter-Agency Project Force on Social and Solidarity Economy
 TIA Technology Innovation Agency
 TNSF Tamil Nau Science Forum
 TPS Technical Plumbing Solutions
 TI transit documents
 TTC Text to Change

TRSD Technology station in rural sustainable innovation
 UCC Uganda communication Commission
 UNCST Uganda Nation council of science and Technology
 USAID United States Agency for International Innovation
 USF Universal Ministry Fund

USSD Unstructured Supplementary Ministry Data
 UNDP United Nations Innovation Program
 UNRIC UN Regional Information Centre
 VIA Visual Inspection with Acetic Acid
 VL Visceral leishmaniasis
 VNPT Vietnam Posts and Telecommunications Group
 VOCs Volatile Organic Compounds
 VUT Vaal University of Technology
 WCO World Customs Organization
 WIR (an abbreviation of “economic process” and the word “we” in German)
 WBR World Bicycle Relief’s mission
 WPOs Waste picker organisations
 Wsp Whole-sporozoite
 YIC Yangon Innovation Centre
 YIM Yayasan Inovasi Malaysia
 YTIP Youth technology innovation programme
 ZINAHCO The Zimbabwe National Association of Housing Cooperatives

Abstract

Grassroots innovations are innovative products or processes produced for and by the low-income group, normally aimed toward conquering the hardships and difficulties of life.

Inclusive innovations improve the supply of fundamental necessities by offering higher added benefits. Some are restricted in their point of view to small applications executed locally with not many opportunities to be updated and adapted to regional or global markets. Others open new markets in other developing nations and may likewise compete in developed nations. Some grassroots or inclusive innovations are social innovations that further develop the well-being of society using innovations to address social needs.

High-tech innovations are imported from developed nations by developing nations and adapted to the necessities of the local market. A part of those adaptations could be reverse innovations applicable for the low-hand market or professional in developed markets requiring less costly good enough solutions for their necessities.

Reverse innovations open new markets in developed nations, since they arrive at the cost-value level for certain applications, for example, mobile scanning or blood pressure frameworks in ambulances.

Introduction

Growing new technologies is primarily the initiative of developed nations that have the market prepared to implement it. They choose what to create as indicated by the necessities of their populace.

Developing nations are engaged with the innovation process when the technologies are fully developed sufficiently to be adapted to their local necessities and can be integrated in the local environmental and economic conditions.

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Grassroots and inclusive innovation showed up as of late in developing nations and propose solutions for local needs.

Which grassroots innovations can improve their economic and social conditions and which institutional initiatives are expected to advance them?

Which innovation policy could advance inclusive innovations for the regional market?

Which new technologies can be effectively adapted to the necessities of non-industrial nations?

How can we figure out which inclusive innovations and high tech transformations can create reverse innovations, in the energy, communications, and health, food, and agriculture sectors?

How can the education system adjust to the innovative era to improve the financial and social environment?

The answers to those questions will provide tools for non-industrial nations to decide the applicable innovation policy for their economic innovation.

Grassroots innovation movements

Grassroots innovation movements are the response to social injustice and environmental problems frequently developing from conventional innovation initiatives. Are introduced herewith the Appropriate Technologies (AT) school, the innovation for socially valuable production, UK, the New England grassroots environment fund, the AT innovation in South America, The People's Science Movement (PSM), India, the PSM is carrying out the All India, the Coordinated Programme of the Community energy (CE) innovations, the Community Currency (CC) innovations, and the Cohousing innovation.

Defining Grassroot Innovation

Grassroots innovations (GRIs) have arisen as a method for driving sustainable innovation and improvement in developing nations, embracing social, cultural, and moral values.

The most utilized meaning of GRI (Hossain, 2016a) characterizes it as an organization of activists and institutions creating novel bottom-up solutions for sustainable innovation, , solutions that answer the local conditions and the interests and values of the communities in question (Seyfang and Smith, 2007).

GRIs looks for innovation processes that are socially inclusive towards local communities in terms of the knowledge, processes and outcomes involved (Fressoli et al., 2014).

In the field of GRI, there are two principal areas of research (Meatham Hasan Al-Tewaj and Tünkers, 2019). One is normative, focusing on motivations and values. This area has been studied a great deal in both affluent and low-income nations, and consolidates both research from Gupta (2014), Seyfang and Smith (2007), and Pansera and Sarkar, 2017).

The second area of research classifies GRIs alongside frugal innovation, which is conceptualized by the OECD as innovation by low- and middle-income groups (OECD, 2012). Frugal innovation is perceived as products that look to minimize the use of material and financial resources with the target to decrease the cost of possession while satisfying or surpassing pre-characterized measures of satisfactory quality standards (Khan, 2016).

This conceptualisation can be named bricolage, for instance, the capacity to solve problems with what is at hand (Pansera and Sarkar, 2016). The bricolage can be connected to the fundamental requirements approach that provides the need to meet people's necessities (Papaioannou, 2014).

Gupta portrayed GRIs as innovations that arise while existing systems and practices fail to serve people's requirements (Gupta, 2013). Gupta (2014) distinguishes between grassroots innovations, innovations for the grassroots, and innovations at the grassroots.

Grassroots innovations are restricted to the informal sector. Innovations for grassroots are centered on improving financial conditions for communities by external actors.

Innovations at the grassroots are developed mutually by NGOs, the formal sector, people in the informal sector, or institutions in a joint effort with local individuals.

Hossain (2016, 2018) features that there are conflicts on the degree to which GRIs stem just from the community level; however, there is a consensus that GRI is a bottom up perspective for sustainable development.

GRIs are a symbiotic network of mostly like-minded people, NGOs, and informal groups to provide customized solutions for local needs (Boon Kwee et al, 2022)

Considering the nature of GRIs, there ought to be a specific policy and institutional settings for legislatures to successfully craft and execute GRIs plans, where projects can be designed and developed away from the pressures of standard frameworks (Smith and Raven, 2012).

Appropriate Technologies (AT)school

Born during the 1960s, Appropriate Technologies (AT) school of thought started as a response against entirely outline improvements including large-scale Western innovations, whose industrial settings were not supporting poor people (Carr, 1985).

People from this school of thought are especially keen on connecting science and technology (S&T) with the essential requirements of socially and economically marginalized groups. They scrutinized existing R&D systems for being seriously separated from social realities and for neglecting to draw on domestic capacities, while likewise pointing out environmental worries (Herrera, 1973).

This began with only a few centers of experimentation in AT during the 1960s developed during the 1970s until it turned into a worldwide grassroots innovation during the 1980s, with thousand of institutions around the world (Whitecombe and Carr, 1982).

The early AT centers were independent institutions, with an NGO-like status that relied upon external financing to carry on their activities. These centres included engineers, financial analysts, sociologists, and social workers. At times they likewise incorporated the work of volunteers and students and had a couple of connections with scholarly institutions.

A part of the regional social actors and centres of AT was associated with the worldwide AT innovation and went about as a hand-off between local innovations and global opportunities. Herewith we present the evolution of these movements in the UK, New Britain, Latin America, and India.

Movement for socially useful production, UK

This innovation arose during the 70s with regard to economic decay and loss of manufacturing jobs in industrial communities in the UK (step-centre site).

It included a mix of engineers, workers, activists and emerged out of a combination of different social movements, including grassroots trades unionism, peace, community activism, radical science, and less significantly, environmentalism and feminism.

Lucas Aerospace

In January 1976 workers at Lucas Aviation in the UK published an Alternative Corporate Plan for the future of the organization. This was an innovative reaction to the executive declarations that thousands of positions were to be cut even with industrial restructuring, worldwide competition, and technological change in design and manufacturing.

The workers argued their right to socially cooperative production and in this manner generated grassroots innovation. Industrial restructuring and migration by the proprietors of capital undermined many manufacturing livelihoods and communities in industrialized nations during the 1970s (Coates, 1981). Through cautious research of their skills, machinery, work association, and financial potential, the workers proposed innovative alternatives in contrast to closures in manufacturing.

Incorporated in the Lucas Plan was the proposition to develop a transport that could run on both street and rail. These sustainable vehicles expanded the adaptability with which public vehicles could involve infrastructure in both developed and developing nation conditions (Lucas Aviation Join Shop Stewards Board, 1978).

Similarly, as with different propositions in the Lucas Plan, the transport went to model on 'acquired' organization time and equipment. Street rail transport was not developed further in the UK. Nor were a significant number of different models. It demonstrated challenging to adjust investor interest in returns on capital with the social objectives that activists were acknowledging in their models. (Palmer, 1986; Rustin, 1986).

Learning Energy Efficiency (LEEN) communities

Quite possibly the earliest organization, beginning in 1983, was LEEN. As different communities and energy institutions became engaged with the network.

LEEN gave energy audit and advice services for people, which included creating cooperative energy monitoring and modelling devices and manufacturing packages of energy-moderating technologies for installation in homes. The mission caused to notice specific necessities in apartment blocks and coordinated community energy initiatives centred on work production through the execution of energy upgrades (Greater London Enterprise Board, 1984).

New England grassroots environment fund

In 1996 four New England foundations met to analyze environmental needs in New England (Grassroots Fund, 2021).

The Grassroots Fund is positioned to help innovation at the local level alongside strategic partners. These inventive ad hoc groups frequently find it almost difficult to get financial support beyond the Grassroots Fund's grant programs. With well over 300 applications every year - more than 2,500 grantee groups beginning around 1996 - the Fund is in a novel situation to guarantee models from across the region are enhanced and motivate reflection and replication.

The Hero Hope Garden

The Hero Hope Garden incorporates fruit trees, plants, and raised bed gardens; a garden for community and instructive use and a community meeting and manufacturing space with a small group of tables, seats, and umbrellas (Sheehan, 2020).

Community gardening provides great physical activity, increases admittance to sustainable healthy fresh produce, and brings the residents closer together.

ACORN project

ACORN project is a non-profit platform whose mission is to advance the growth and health of local food in partnership with Porter Medical Center, the VT Department of Health, Rise VT, and the Middlebury Organic Foods Co-op.

Huneebee Project

Huneebee Project was begun in 2018 by a Medical social worker and beekeeper. From that point forward, they have graduated four partners from their 15-week Beekeepers in Residence cooperative work skills education program, introduced 25 honey bee colonies in New Shelter's community gardens, established four pollinator gardens, and utilized graduates in positions including junior garden site supervisors, honey bee students, and peer teachers.

In November 2019, launched an online marketplace, which incorporates honey harvested from the garden sites, vases and planters made by craftsmen who epitomize comparative values and morals, and beeswax candles from the wax cappings of the honey frames.

All continue fund programming, installation of bee colonies in under-resourced regionals and community nurseries, and work of regional youth.

Huneebee Project looks to address the huge number of needs that accompany the progress to adulthood for frameworks including youth - joblessness, vagrancy, and physical and mental health conditions - while at the same time expanding the presence of honey bee hives, pollinator gardens, and their related advantages inside the city and, especially, among disinvested sectors.

Huneebee works a web-based marketplace with honey and beeswax products, has free community-based workshops on backyard beekeeping, regional honey bees, and planting for pollinators, and supervises a hive and pollinator plot sponsorship drive.

The Project looks to cultivate community building, cooperation, and family relationship for motivations behind environmental preservation and environmental justice.

Edible Brattleboro

The purpose of Edible Brattleboro is to improve accessibility to healthy food. Transforming spaces in and out of town into edible landscapes, interplanting greens, spices, and fruits among the ornamentals. The association replaces lawns with help-yourself edible gardens and tree plantings and inspires the community and neighbors to do likewise, while further developing biodiversity and recovering the soil to help life. Food security and access to nutritious food are provided by free new produce at the Offer the Harvest stand, which works from July through October.

AT movement in South America

During the 1980s, most Latin American nations were experiencing a general retreat of state social policies. In this setting of expanding disparity across the sector, AT centres expected to provide solutions to the earnest needs that the populace was facing regarding food security, energy, healthcare, and social housing by creating straightforward, accessible technologies. In certain nations, for example, Argentina, Chile, and Uruguay, this methodology additionally fitted well with the need to find new types of commitment amid the deactivation of prior friendly activism and the progressive innovation of new respectful society institutions.

Brazil, Bolivia, Colombia, Ecuador, Paraguay Peru and Venezuela, have also AT movements.

Development interventions involving AT in the region were widely varied, including: alternative energy generation in rural areas; productive urban communities; livelihood generation; nutrition and food-harvesting and -processing technologies; and water and sanitation.

One of the more extreme methodologies was that of Grupo Talpuy in Peru which understood the need to adjust its technologies and correspondence procedures to the

native populace through its bilingual (Spanish and Quechua) magazine *Minka* which ran between the mid-1980s and the last part of the 1990s. Its substance was chosen and developed in a joint effort with local communities (Paucar Santana and Zambrano, 1991).

Among a more extensive scope of innovations, there is a certain pattern connected with the perceived environmental problems and needs of the poorest population (Fresoli and Arond, 2015). These incorporate energy (specifically sun-oriented energy), disinfection, and agroecology.

Solar technologies

The plan and execution of solar technologies are connected with the cost of fuel and the lack of access to energy for housing and production in rural regions. The utilization of a few solar innovations gave a wellspring of energy that could be supplemented with different sources like biomass. A portion of the solar technologies developed in the region incorporates solar heaters and solar dryers for fruit or solar cookers. These were for the most part founded on basic designs that attempted to utilize accessible material and keep away from costly sources of info. For example, a solar heater designed by Centro de Estudios sobre Tecnología Apropiaada para América Latina (CETAL) is portrayed as a temporary, low cost artefact that could endure as long as two years and could be made utilizing disposed of water bottles, wood, and glass (Serrano 1985).

In Colombia, the Gaviotas Center was able to install solar water heaters in big urban developments and hospitals. Variations of these designs are broad in South America and they have been adapted to different purposes like water purification (Fressoli et al. 2013). Another heating technology that was genuinely normal in the district was the purported witch cooker (in Spanish: *Cocina bruja*) which is essentially an insulated capsule that insulates a cooking vessel previously warmed to a particular temperature, yet with but with the heat source stopped, and the witch stove blanketing the pot in order to conserve its heat. Contingent upon its attributes and the food arranged, the witch cooker keeps up with the intensity and proceeds with the

concocting system for an hour and a half. It was particularly utilized in getting ready stews, a famous and economic staple in the region.

Sanitation

Sterilization was a specific issue because of the absence of a framework in shantytowns and country regions. AT centres like CETAL developed a composting toilet design as a solution. It was based on a 200 litres recycled tank that allowed for anaerobic fermentation. The tank gave a controlled environment that following three months could be harvested for protected, dry fertilizer prepared to use in the organic garden of the house. With variations, the design of the composting toilet was also promoted in Argentina and Uruguay and later in Brazil.

Agro-ecology

The innovation of agro-organic techniques set the AT vision is between its scientific-rational background and the need to connect with local and indigenous knowledge. AT groups attempted to connect this space in two stages. To start with, there was methodical work to recover indigenous information in agroecology including information about old yields, alternative seeds, and medicinal plants. This work was pointed toward keeping and recovering useful indigenous knowledge and stopping it from being methodically lost. The second stage was to test plants looking for their substance properties, as in the case of herbal plants carried on by CETAL, or chose a few cases for scholastic exploration, as the case of Centro de Educación Tecnológica (CET). Simultaneously, retrieving indigenous knowledge was viewed as an instrument to empower local communities by featuring the social value of their practical knowledge. Agroecology subsequently turned into a movement of its own surpassing interest in AT technologies.

The Social Technology Network (STN), Brazil

Starting in Brazil in the early 2000s and suspended in 2012, the STN involved a scope of members, from academics to activists, unions, government delegates, financing institutions, and particularly, NGOs and community groups.

Farming and food production methods

The STN has upheld a wide assortment of agro-organic farming and food production methods (Faria et al., 2011). Notwithstanding, one of the most amazing known and boundless instances of ST has been the PAIS Programme.

It is a low-cost technology intended to be executed on small farms up to 2ha and favors the utilization of local materials and knowledge while staying away from the utilization of pesticides and external inputs. Farmers who utilize the technology get a pack for reapplication that incorporates parts of a water system, wire walls, seeds, small plants, and even hens, alongside a client's manual and a training course. The thought is that the plan of the garden permitted farmers a straightforward daily schedule of flow from the henhouse through the other crops, while likewise promoting a sane utilization of land, water, and organic manures.

One Million Cisterns Programme

The 1,000,000 Cisterns Programme was expected to fabricate several water cisterns in a large, semi-arid region in Northeast. This region is described by low precipitation and scant groundwater sources. Water shortage and poverty were usually an instrumental state approach that favored huge infrastructure projects for massive agriculture schemes combined with aid solutions, such as water-tank trucks (caminhões-pipa), for the poor.

These aid schemes ultimately reinforced local patronage and increased inequalities (Alves da Silva, 2003), since water, food and money have traditionally been used to buy votes for politicians

These aid schemes reinforced local patronage and expanded disparities (Alves da Silva, 2003), since water, food, and cash have generally been utilized to purchase votes in favor of legislators

For very nearly 10 years this model was exceptionally effective in building countless cisterns and enabling the number of inhabitants in the semi-dry district. However, they kept on introducing a few plastic reservoirs for quite a while, in the end, the program was changed into a public policy through the program Water for Everyone of the Ministry for Social Development (Costa and Dias, 2013).

STN impact

STN assisted with making an elective outlining economic innovation and social incorporation which featured the job of technology.

The diffusion utilized mechanisms like the STN Gateway, the electronic bulletin "Notícias da Rede", the National Forum, regional workshops, the events carried out, the media workshops, the advisory services, and the media and printed distributions of the institutions that integrated the Network (Lemos and Dechandt, 2019; STN, 2011).

The Open Space coordinated social innovation records into topics like family, farming, communication, culture, economy, education, energy, microfinance, housing, promotion of rights (gender, race and disabilities), and water resources. In Open Space, more than 30 social technologies were enlisted, for example, Country Improvement, AgroOrganic Production, Cashew nuts Processing mini plants, Small Dams, Rural Basic Sanitation, Extraction of Vegetable Oil with Total Use of the Product (babassu, carnauba, Brazil nut, and so on) and Income Generation. The suspension of the STN showed the hardships and the constraints of this sort of technique and the troubles STN extended the restrictions of social improvement to incorporate the technological aspect, and proposed social technology as a new agenda for science

The People's Science Movement (PSM), India

The PSM is executing the All India Coordinated Programme of the Department of Science and Technology (DST) on Biological Integration of Farming Activities and Resource Management (BIOFARM), a particular methodology in the circle of execution of agro-organic methodologies, with the expectation to make a sustainable and fitting model in India for agrarian change to manageable farming (DST, 2012). The University of Kolkata began a six-month course in agroecology with the assistance of the Society of Agro-ecology, India, wherein the PSM leadership is effectively involved.

A significant drive in health has been that of the Tamil Nadu Science Meeting (TNSF) called "Arogya lyakkam ", a program that covers around 1,000 towns in 17 blocks all over Tamil Nadu, where a regional health volunteer is prepared in the fundamentals of child nutrition, maternal and child care, first aid and preventive and curative health needs youngster nourishment, maternal and kid care, emergency treatment and preventive and corrective health needs.

PSM groups have participated in developing and encouraging people-centered technologies that are less capital concentrated and empower a large number of people, workers, crafts persons and artisans.

A few instances of such initiatives are remote in the local circle for local loop for telecommunications, the computer and village information software, biomass as replacement for cement/concrete in civil construction, windmills and biomass based energy systems, small-scale oil presses and other food processing units, and mechanised black smithy.

The Centre for Technology and Development (CTD) plays filled the role of a nodal association for the DST in its several All India Coordinated Programmes, namely leather tanning, carcass recovery, fruit and vegetable processing and non-edible oilseed processing. The CTD has been perceived for the improvement of skill in a wide range of squashes, spices, pickles, preserved fruit products, murraba and massage oil. It has been promoting this scope of products under the farmers' brand.

When at regular intervals, the PSM groups come together at the All India People's Science Congress (AIPSC) to survey their activities, collaborate with specialists, gain from their encounters, and plan ahead.

The semiannual AIPSC was held in Bhopal on June 6-9, 2022 (peopledemocracy site). The AIPSN is a league of similar free state-level part institutions that met up in the last part of the 1980s on a typical plan and understanding, with different institutions joining occasionally.

The key topics were running strings through the technical meetings regarding the matters of scientific temper, self-reliance, education, health, environment & climate change, agriculture, livelihoods, and gender & social justice.

Community energy (CE) movements

CE innovations are pervasive, particularly in urban settings (Hosseini, 2018b; Smith et al., 2014). They are acquiring developing consideration as a promising wellspring of sustainable energy (Hargreaves et al., 2013). CE is characterized as locally claimed, locally cited sustainable power with the community commitment parts that go beyond mere investment of shareholding relation (Klein and Coffey, 2016). CE alludes to energy projects where the community has a serious level of ownership and control (Seyfang et al., 2014).

Procurement and installation of the mini-grid are frequently contracted out to a third party, either from the community itself or by means of a nongovernmental organization (NGO) or improvement accomplice. Through ongoing training, the cooperative is then capacitated to assume O&M for the mini grid.

CE in Europe

There are thousands of CE in Europe, which are promoting renewable energy and reduce energy consumption (Oteman et al., 2014). There are over 700 CE movements in Germany, and around 500 in the Netherlands (de Vries et al., 2015). A few other European nations, like the UK, Italy, France, Spain, Denmark, and Sweden are

additionally at the community energy practice. Hargreaves et al. (2013) found no less than 94 intermediaries are active in the UK to help CEs.

CEs in developing countries

CE model has been executed successfully in Burkina Faso, Indonesia, Peru, and the Philippines (World Bank, 2022). This model requires large cooperatives that work like an expert organization in that they have satisfactory management and technical capacity.

Private Initiatives in the Philippines

In the Philippines, the populace runs mini-grids parallel to their main grid business like a utility model than a typical cooperative model. CEs are free in the Philippines. The cooperatives are dependent upon small management from the local government or on the other hand, in the event that few cooperatives are in one country, they report to a committed power. Cooperative-led mini grids can be completely subsidized by grants or can rely in whole or part on the cooperative's own equity or debt.

Government Initiatives in Ethiopia

In Ethiopia, the Ministry of Energy, or a different ministry for cooperatives starts the lead from the government side.

Public-private initiatives in Rwanda

In Rwanda, presently, 11 micro hydropower plants MW exist as isolated networks (minifra site). These plants were initially evolved by the GoR and given over to private sector management to build the private sector commitment in the energy age. GoR has rented out these sites for private investors to more readily work, redesign and interface them to the network. There are likewise Pico-hydropower plants in the scope of 1-10 kW which are either freely owned or operated by the local communities or altogether private.

Totota Co-op in Liberia

Totota Co-op in rural Liberia started working on a solar small network in 2018 (Nadeau, 2019). Under an agreement from the US Agency For International Development, the National Rural Electric Cooperative Association (NRECA) and Bandera Electric Co-op, one of NRECA's part cooperatives, helped the town to sort out the community and introduce solar panels, a battery-storage unit, and other equipment (Chapa, 2018). NRECA is additionally working with 12 Liberian beachfront towns to extend the community solar model to them.

Village Electric Committees in India

In rural India, in spite of dependability needs and contrasting evaluations of the number of families that are presently energized, the almost-full electrification of India is a major accomplishment. It is also worth noting that many communities have formed Village Electric Committees to oversee the operation of their solar facilities (Pearce, 2016).

Caribbean Environment-Smart Accelerator

27 island nations and other territories, alongside private-sector partners, shaped the Caribbean Climate-Smart Accelerator in 2017 to make more independent and practical innovation, including an increased emphasis on renewable energy.

Islands face extraordinary difficulties in meeting their electrical needs (Slope, 2018). Most don't have local wellsprings of energy, albeit some utilize wood, different sorts of biomass, hydroelectric, and geothermal energy. Bringing in fuel, like diesel, is costly and contaminating. Solar smaller than normal communities and single-building solar installations in hospitals, provide protection against catastrophic damage and loss of life in the event of national weather and other emergencies in island communities.

Community Currency (CC) movements

CC is a type of paper scrip given by private entities or community institutions for use at local participating businesses (Liberto, 2022). Its fundamental objective is to

empower spending at local businesses, thereby promoting local ownership of businesses and capital. Community currency is sometimes also referred to as local currency.

CC depends on private connections as such the community may not develop to a fully developed stage (Seyfang and Longhurst, 2016).

BerkShares currency

One of the most discussed community currencies available for use in the US is BerkShares, launched in September 2006 in the Berkshires district of Massachusetts (berkshares site). Today, more than 400 businesses acknowledge the currency.

BerkShares can be gotten at any of the regional bank offices of Salisbury Bank and Trust Company, Lee Bank and Pittsfield Cooperative Bank in return for US dollars at a rate of 1 US Dollar for every BerkShare and spend a hundred of area businesses like cash. The federal dollars stay on the fund at the BerkShares Trade Banks, permitting clients to reclaim BerkShares for US Dollars at a similar conversion scale, less a 1.5% fee.

For many small businesses, the fees from credit card processing are costly, and can add up to tens of thousands in lost revenue every year. And even with newer mobile payment platforms, fees and cash balances benefit a handful of big corporations at the expense of the main streets. BerkShares provides a home-grown, more cost-effective alternative. It's the community-minded way to shop local and pay local

Gesell currency

A little-known amateur German economist, Gesell was inspired by a libertarian spirit: to create currencies independent of national governments and central banks (Adriano, 2021). He believed communities could grow faster with money that would boost local activity and not be spent elsewhere.

Brought into the world in 1862, Gesell had a fairly while moving between Germany, Switzerland, and Argentina. In 1891, while enduring one of Argentina's continuous economic emergencies, the self-trained market analyst started to develop his convention of *Freiwirtschaft*, German with the expectation of a complimentary

economy. It depended on three support three pillars: Freigeld (free money), Freihandel (free trade), and Freiland (free land).

Wörgl currency

In 1931, a year after Gesell's passing, the Austrian town of Wörgl tried his thoughts out. Local infrastructure investment financed with Freigeld Freigeld created jobs and boosted economic activity without stoking inflation. Despite, or because of, strong interest from other localities, and fearing political fragmentation, Austria's national bank shut down the alleged wonder of Wörgl following two years.

WIR franc

The largest alternative currency is the WIR franc, launched in 1934 in Switzerland despite everything being available for use. The WIR (an abbreviation of “economic cycle” and the word “we” in German) bank is a credit cooperative in which individuals loan to one another, and the currency is backed by real assets. Yearly turnover is around \$7 billion.

The WIR franc is a Swiss community currency that is coursed and supported by the WIR Bank, a Swiss financial cooperative settled in Basel.

It is one of the most generally involved community economic standards in Switzerland. The WIR Bank flows WIR francs fundamentally through the the provision of affordable loans in WIR francs to small and mid-sized businesses, which then use these loans to make purchases from other businesses which accept WIR francs.

The community is made up basically of the WIR Bank's business client base. Notwithstanding, businesses and individuals which purchase goods and services from WIR Bank customers also form part of the WIR franc's user base.

The WIR franc has a proper value of 1 Swiss franc, in spite of the fact that demand for the WIR franc is not as high as demand for the Swiss franc.

The basic role of the WIR franc is to empower exchange between Swiss businesses and to provide a sustainable alternative in contrast to business credits designated by Swiss francs.

Good4Trust currency

Good4Trust.org is a framework that was established by Dr. Uygur Özesmi without precedent for Turkey to carry out a prosumer economy (good4trust.org site).

It is a community where ecologically and socially just producers come together with the prosumers purchasing these products for their needs.

As Good4Trust is a non-profit social project shielding nature and people that are being consumed chasing benefit boosts, and adding to the mending of both the human and environmental health as a community.

Local producers are delivering harmony with nature, with practically no harmful materials or waste, with clean energy and fair working conditions. Simultaneously, the prosumers are determining their necessities through their inclinations and support, taking part in the governance, and ensuring the transformation of the system. They are all working together in a genuine community they have been longing for.

Good4trust.org proposes another economic framework shaped by ecologically and social makers and prosumers who centre on looking for their necessities from these makers.

Brixton currency

The Brixton Pound was made in 2008, because of the worldwide financial emergency, as a way for local communities and businesses in the Brixton sector of London to build a sustainable local economy (brixtonpound site). This guaranteed that cash spent in local Brixton businesses, stayed in Brixton and contributed to the sustainability and development of Brixton's unique community and heritage. What can be compared to over £500,000 in Brixton Pounds has entered the course, with the remarkable and

striking plan of the Brixton Pound notes themselves being profoundly respected globally.

In January 2021, it declared the arrival of the release of a digital version using blockchain from Algorand, a Singapore company (algrand site).

The Algorand Foundation entered into a grant partnership with the Brixton Pound to support the development of a tokenized version of their innovative Complimentary Local Currency, called the Brixton Pound. The team at the Brixton Project chose the Algorand blockchain due to its unmatched speed, scale, security and, critically, finality.

Grassroots Economics Infrastructure (GEF) and Sarafu (Kiswahili for “currency”) network

The leaders

Will Ruddick, the American physicist turned financial expert and social business person, first launched paper-based community cash in Kenya in 2010 (Kimani, 2022). He established the Grassroots Economics Foundation (GEF), a non-profit association that looks to engage underestimated communities to assume responsibility for their jobs and economic future (Daniel, 2023). Caroline Dama is a fellow benefactor and chief at GEF. Dama is energetic about ladies' and kids' privileges and loves to work in programs that improve their social and financial government assistance.

Together they have presented Community Inclusion Currency (CIC) to more than 4,400 institutions and schools across Kenya.

The Sarafu Network, operated by GEF, is among the first community currency programme in the world to pilot liquid community currencies (LCC).

CIC principles

The GEF is giving liquidity in light of a voucher, a commitment against future production. So a community is meeting up. They are committing their future production to a voucher. The currency is 100 percent backed socially by goods and services. They're making a credit that is uniting the community to conclude how they

can want to make this credit, how would they back it, however at that point how can they want to manage it? Some of it goes to individuals who are placed in responsibilities, and some of it goes into community projects. They can express that a portion of this goes to assisting the older, and a portion of this will with going towards establishing trees. A portion of this will go toward supporting children's schooling. Thus they spend it then into the course, they do crediting, they do a wide range of activities with those tokens. It flows among the whole community. Anytime, somebody could essentially take advantage of that security behind it.

History

In 2010 ECO_PESA program was launched as an upheld cash model with 75 businesses taking part in three informal settlements near Kongowea, Mombasa. The currency was backed by donor funds and accomplished environmental goals in partnership with Green World Campaign while increasing local. On average profits increased in 20%, 20 tons of trash collected 1000's of trees were planted.

In 2012 Banglades is an informal settlement of approximately 20,000 occupants situated external Mombasa Kenya. Here a program that was not completely subject to contributor reserves was sent off. BANGLA-PESA at present holds 87,200 (ksh same) vouchers available for use vouchers in circulation and a network of 218 businesses.

In 2014 Gatina-Pesa in Kawangware Nairobi was quick to send off and the first to recreate the Bangla-Pesa model. Right now the organization is comprised of 258 businesses and a **strong wholesale shop that backs the system**. In 2015, three greater community economic standards joined the organization: Kangemi-Pesa; Lindi-Pesa, and Ng'ombeni-Pesa.

In August 2018, the association cooperated with Bancor to move its community money network from actual vouchers to LCCs on the blockchain.

Today all community currencies on the Sarafu Network are 100% digital and transactions occur through US dollar codes sent between members' feature phones and the local telecom network.

Will accumulate similar regional pioneers like Deborah Achieng, a local volunteer, and moved toward the the elders of the Kongowea community with a radical proposal to create a paper voucher to be used as a community inclusion currency for seasonal fluctuations.

The group enrolled members from local enterprises to form a trading network, a self-governing community of micro-businesses who accepted to trade with each other using Eco-Pesa vouchers.

Each Eco-Pesa voucher was supported by a cash pool of funds donated by the Green World Campaign, which fronted the initial reserves of the community currency. Consistently, the business community coordinated events where individuals would be paid in vouchers for public help work like waste assortment or tree planting.

The Sarafu system at first enveloped a few regional, actual community economic standards, which started progressing to a feature-phone mobile interface in 2017. One unit of "Sarafu" is generally comparable in value to Kenyan peddling. The published data includes anonymized account information for around 55,000 users. Transactions totaling around 300 million Sarafu capture various economic and financial activities such as purchases, transfers, and participation in savings and lending groups.

In Kenya, the Sarafu was utilized by 41,000 individuals across 60 towns, which in 2020 spent what can be compared to \$2.5 million in more than 335,000 transactions,, all through cell phones.

This stage permits a meeting of farmers to meet up and make their cash and a strong financial framework from the bottom up, its maker,

This platform allows a group of farmers to come together and create their own currency and a resilient economic system from the bottom up, its creator,

The Danish Red Cross, one of the project's funders, utilizes it to concentrate on the impact of its projects. The Sarafu example of overcoming adversity has inspired humanitarian organisations like the World Food Program, UNICEF,

GIZ, and Red Cross to leverage the use of alternative currencies as a viable alternative to cash transfers.

Candidates can get 400 CC starting credit if they are locally employed or have a local business and have the endorsement of a Community Based Organization (Chama).

GEF has carried out community cash programs in over 45 locations across Kenya and helped with 2 in South Africa and aided in excess of 60,000 small businesses, churches and schools take an active role in their own economy and development.

The CC of GEF is a new financial service: one for low-income communities that builds capacity and develops credit ratings prior to being in formal banking.

On average, CC members are more likely to participate in a CC programme if they received municipality support, if they are female, older and had schooling, *ceteris paribus*.

Impact

The dataset of Sillen et al research (2019) comprises overviews collected in 2017 for the accompanying five CC projects: Bangla-Pesa and Ng'ombeni-Pesa; Gatina-Pesa, Kangemi Pesa and Lindi Pesa (Nairobi District) (Sillen et al, 2019). The dataset incorporates 530 participants and 863 non-participants.

The first dependent variable was related to the Through being part of the CC network contribution to the environment by for example tree planting, waste collection and agroforestry.

The second reliant variable 'giving in proficient labor and products' is an ordinal variable that responds to the accompanying question: "Over the course of the past month what amount did you provide in your business' labor and products to help individuals or groups without anticipating remuneration?"

CC is emphatically connected with aiding the environment and giving. This evidence supports the hypothesis that community currencies as a tool for the sustainable development of informal settlements go beyond traditional development programmes and their focus on productive outcomes.

Long-term improvement with community economic forms depends on cooperative resources (for example maize plants, discount shops, and coconut oil). Long-term improvement on account of money moves is by all accounts problematic as a result of its reliance on benefactor reserves. To make the most out of the money provided to them, they should have the alternative to buy affordable and high-quality services and products such as quality education, food, healthcare (Starr and Hattendorf, 2014).

Cohousing movement

The cohousing model was created in Denmark in the early 1970s as an innovative form of collective housing and later spread to other northern European countries, the USA (Hagbert et al, 2019-2020) and other latitudes such as Uruguay (Bredenoord, 2017).

A cohousing is a community intended to foster connection (cohousing site). Physical spaces permit neighbors to collaborate with others just outside private homes. Common areas including kitchens, eating spaces, and gardens unite individuals. Cooperative dynamic forms connections.

Cohousing as a community improvement model comprises six fundamental values: participatory process, community-focused design, common facilities, resident management, non-hierarchical structure, and separate income sources (Boyer, 2017).

Cohousing models

Cohousing is related to a developing craving for a feeling of having a place, to encounter more connection with the community, and an increasing rejection of dominant consumption patterns (Jarvis, 2019).

It has been helped by the absence of sustainable housing and poor rental conditions and has been introduced as a likely alternative in contrast to conventional tenure arrangements (Ruiu, 2015; Hagbert et al, 2019-2020; Larsen, 2019).

Research on the co-housing model takes care of subjects like the design highlights and actual format of structures (Williams, 2005; Marcus, 2000 Sanguinetti).

Scarcely any studies have investigated the different residency modalities (Larsen, 2019; Jacobsen, 2019), their capacity to advance social capital (Ruiu, 2019), and whether social housing could be a chance for regions to advance socially inclusive metropolitan innovation (Drost, 2015). The cohousing model has additionally drawn into consideration of public health (Lubik and Kosatsky, 2019).

The cohousing model is attributed to the capacity to improve the affordability of housing (Hagbert et al, 2019) which is known to be valuable to the well-being of the populace.

In spite of the fact that there is just a humble number of concentrates on cohousing and health, well-being, or personal satisfaction, research in this field is gradually expanding. Carrere et al, (2020) accumulated and combined all the known evidence of the connection between cohousing and health and well-being.

The most widely recognized property technique for cohousing is a housing cooperative with a right of use. This implies that the buildings belong to the community, yet their tenants have the privilege to reside in them and utilize the communal areas forever. This long-lasting usufruct can be left in a will or sold through the cooperative, consequently making moving simple.

As a rule, cohousing communities procure some land and build, however, not every one of them does it like that. Some lease void properties and agree with the proprietors to live in them. In the two cases the agreeable bears every one of the costs developing from the Project — like the residence loan, the lease, and the support of the sectors — with commitments from the partners.

Cooperative Housing International (CHI), Belgium

CHI is an economic and social answer for the issue of giving shelter (housinginternational site).

Housing coops come in many structures. A few coops are condos and small structures with only a modest group of units. Others are huge condo-style structures with many units. Coops are not quite the same as private rental housing on the grounds that the occupants conclude how the coop is operated. Each part gets a vote in endorsing yearly spending plans, choosing chiefs, and setting policies on the coop's general course.

CHI facilitates networking opportunities among existing and upcoming cooperative leaders via panel discussions and symposiums. Highlighting good practices from around the globe and discussing key issues is ensuring that cooperative housing remains an innovative and flexible housing model that is adaptable to local housing needs.

CHI is not engaged with the innovation of cooperative housing yet through its global organization, it provides connections to technical aptitude. A joint effort with the CoHabitat Network's digital platform with cooperative housing partners on each mainland.

Housing cooperatives are operated by and for the inhabitant individuals and not with the end goal of individual or corporate benefit. Their true capacity for making flourishing and caring communities is accomplished through coexistence in a democratic habitat.

Cohousing in other developed countries.

As of late, cohousing has reappeared in the USA, Europe, Australia, New Zealand, and Japan (Ruiu, 2015; Lang et al, 2018, Tummers, 2015).

The German Medici Living Group with over 35 activities operated in Europe and the US, or the American WeLive, Normal, and Ollie. At a global level, there are models

for cooperative living and engineering patterns that fluctuate as per country and mirror the requirements of every general public.

In Denmark most normal is cohousing with centralised communal services in a single block which may be separate or may be built into the other buildings.

In Spain, most normal is cohousing for the older with homes no bigger than 80 m² equipped with a room, kitchen and bathroom.

In the US, community life ordinarily happens in a different structure away from the others.

In United Kingdom, most of the communities are mixed, varying in size between 10 and 40 homes, and the communal use areas are all together in a separate building.

In Sweden, typically areas are on one or more floors in different height blocks.

UrbaMonde in developing countries

UrbaMonde's main goal is to help coordinated communities in doing community-led housing projects and carrying out the right to the city and to satisfactory housing (urbamonde site). UrbaMonde works in Switzerland and France, by offering technical help to public actors in participative metropolitan improvement projects, as well as to groups of occupants implementing community-led housing plans while promoting innovation in non-theoretical land management and admittance to sustainable housing finance. The affiliation likewise upholds groups of weak occupants regionally led housing projects, through worldwide collaboration projects in Africa and Latin America.

Support programme for the Fédération Sénégalaise des Habitants, Dakar suburbs, particularly in the commune of Djiddah Thiaroye Kao (DTK).

For very nearly 20 years, some housing regions stayed overflowed for quite a long time of the year, driving pieces of the populace to leave their residences, to remake them, or to reside in especially problematic conditions with huge health chances.

From 2007 onwards, urbaMonde united with regional actors - with local actors - residents organized in a collective of associations (CADDTK), as well as Senegalese urban professionals who had been looking for sustainable solutions to recurrent floods since 2005 - to strengthen the planning, prevention and flood risk management capacities of the inhabitants of precarious districts.

This coordinated effort brought about a participatory arranging process for the community of DTK and the rise of a resident's innovation coordinated in the Fédération Sénégalaise des Habitants (FSH) and its technical help NGO, urbaSEN.

This federation of residents now has nearly 13,000 members organised in 580 savings groups, mostly women (96%), and is established in some fifteen communes in the suburbs of Dakar and in the regions of Thiès, Louga and Ziguinchor.

The innovation lies in the pooling of reserve funds at the level of the organization. This pooling makes it conceivable to take care of the rotating reserve for remaking, which intends to be sustainable.

Beginning around 2015, the FSH has been a member of Slum Dwellers International (SDI) network, a voice for the urban poor in 32 countries, organised in federations of savings groups. The "SDI model", which consists of mobilising the urban poor to improve their housing through solidarity savings rituals, data collection and political advocacy, has strongly inspired the creation of the FSH and the vision of urbaSEN as a technical assistance organisation at the service of the inhabitants

Promoting peace and reconciliation in Colombia through a housing cooperative

UrbaMonde is giving technical help with the participatory arranging plan and innovation of two community buildings. The target of this project is to reinforce cooperative values and improve the maintainability of the structural units.

As peace also depends on successful reintegration, the project supports peaceful and cooperative cohabitation. In concrete terms, about 30 people will participate in the summer school and eventually about 350 people will live in these houses.

The open data platform Inondations-Dakar, Senegal

Launched in 2019 as a team with urbaSEN and GRET, the open data platform Inondations-Dakar.org gathers, makes available and popularises the knowledge of the different actors involved in flood risk management in Dakar (inondations-dakar site)

Repetitive flooding is a significant gamble in Dakar and especially in its rural regions. For quite a long time, many projects have been executed to forestall this gamble and decrease its effects. In this specific circumstance, a great deal of information is being collected and various exploration projects and distributions are being done.

The platform Inondations-Dakar.org is cooperative and targets making a community of clients, participating in flood risk management, and sustainable urban development.

This platform is made accessible by a group of NGOs that want to work together better on this issue. It is open to all types of organisations.

Support to the participatory project to improve housing in informal regions of Boassa, in Burkina Faso

In Burkina Faso, Yaam Solidarité upholds weak communities of the Boassa region in suburbs of the country's capital Ouagadougou, in the restoration of their homes, while promoting the use of local and sustainable construction materials.

Inside the structure of the Project “living and living better in the nonhoused areas”, funded by AFD and the Abbé Pierre Foundation, AFD and the Abbé Pierre Foundation, urbaMonde supports Yaam Solidarité in the development of a partnership strategy, and its consolidation as a player in urban development and the production of dignified and sustainable housing in Burkina Faso.

The Federation of inhabitants of Burkina Faso, which was formalized in 2020, presently deals with a revolving fund, which is funded is financed in particular by residents’ savings.

The company Amiscus Horizon (AH) and the concept of cement block banking, the Gambia

The concept, “Cement Block Saving Scheme” is a “pay-as-you-go-model” by which clients save and purchase concrete blocks consistently (housingfinanceafrica site).

As a component of the saving plan, the clients get month-to-month explanations that show how many blocks they saved. At the point when they have saved an adequate measure of cash for their housing project, the concrete blocks are conveyed to them. Toward the start of their projects, AH purchased the blocks consistently from a production line. Presently, the organization changed to delivering the blocks in-house, where there is nearer monitoring and appraisal of the nature of the blocks. On the off chance that the quality doesn't meet the prerequisites, the client gets repaid their aggregate sum of blocks at the market cost.

AH provides standard housing plans and packages for two, three, and four-room houses and different estimated walls. Clients can begin putting something aside for a bundle as low as 7,81 EUR to 93,72 EUR each month, over a two to five-year era. The additional money tools make it workable for clients to have a standard house at the cost of 17,65 EUR to 37,82 EUR each month inside a 6 to long-term era. Every client that took part in concrete block banking for one year without defaulting, was offered an 8% premium by AH. This urged clients to routinely pay. Toward the year's end, the interest was paid in blocks to the clients.

Supporting the empowerment of the regional participatory housing network in Asia

In June 2019, urbaMonde and CoHabitat Network partner Asian Alliance for Housing Rights (ACHR) launched a three-year international cooperation project fully supported by the Geneva Cooperation Federation.

Situated in Thailand, the Alliance was established in Bangkok in 1989 and unites housing experts, NGOs, and community institutions from 20 Asian nations.

This new Project plans to reinforce the Asian regional organization and public institutions of social classes' and cooperative housing experts in the 13 partaking nations: Bangladesh, Cambodia, India, Indonesia, Japan, Mongolia, Burma, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam. The Asian district has many motivating activities in aggregate, inclusive, and non-economic housing.

Whether it is the construction of affordable and safe housing or the improvement of informal settlements and neighbourhoods, these activities are arranged and overseen by low-income populaces with sufficient technical support.

Cohousing in Asia

In Asia, such as Hmlet, which launched in 2016, now has operations in Singapore, Hong Kong, Tokyo and three Australian cities (Hmlet site). When Prospects interviewed founder Yoan Kamalski in 2018, Hmlet has just raised \$1.5m of funding, this year it raised \$40m and brought in Mitsubishi Estate as an investor.

Chinaco-living

China co-living enjoys the benefit of government backing as Beijing is quick to lay out a rental private market.

Lejia Apartments, which failed, leased individual pads from proprietors and afterward rented them to new occupants. Notwithstanding, in endeavoring to develop its business by offering great rents to property managers and limited rents to occupants, it hit rock bottom financially.

Harbor Apartments, upheld by Gaw Capital and Far East Skyline, offers shared offices including kitchens, rec points, and front rooms. With its supporters, it is raising \$2.6bn by means of new Funds to purchase more properties for transformation and to procure land for innovations.

Beijing-based Danke Apartment raised \$500m from investors including Alibaba's Jack Mama. It has a somewhat unique system, taking huge family apartments and partitioning them for youthful experts. It additionally offers shared Services and encounters for its occupants.

National co-operative Housing Federation of India (NCHF)

The co-usable housing innovation in India is a four-level design: housing co-agents, region leagues, state-level institutions, and the public alliance.

Set up in 1969, NCHF is the cross-country association for co-usable housing innovation in India. Established by 6 state-level alliances, NCHF starts to lead the pack in promoting, coordinating, and working with the improvement of housing co-agents, alongside giving direction to housing co-agents and their leagues.

NCHF has set up an insurance program to help housing co-agents in a joint effort with the Unified India Insurance Agency and Bajaj Allianz General Insurance Agency. It works intimately with the Government of India and State Legislatures to find ways of giving better housing to all and goes about as a contact between housing co-agents and economic institutions.

The Pondicherry Co-usable Housing Federation has set up a Pondicherry Co-operative Building Centre whose fundamental goals are to "set up manufacturing units of building materials, purchasing bulk quantity of materials for construction of buildings and sell them off to members and public at fair and reasonable price". A plan to advance the utilization of ensured minimal-cost materials assists them with carrying a more practical policy to the innovation interaction. The Centre has gotten a few honors for its work.

Roughly 30,000 out of the 100,000 housing co-agents in the nation are individuals with state-level institutions. Non-associated housing co-agents can get support from different sources.

Malaysian National Cooperative Movement (ANGKASA)

ANGKASA is a zenith cooperative perceived by the government to address the Malaysia Cooperative Movement nationally and internationally. ANGKASA executes cooperative transformation programs through its cooperation in high-value economy projects. ANGKASA keeps on doing its center assistance which is giving compensation allowance services to government servants, cooperatives statutory bodies, clubs, cooperatives, unions and GLC companies.

Karachi Co-operative Housing Societies Union (KCHSU)

KCHSU is a league of housing cooperatives in Pakistan. The association is made up of 24 cooperative housing social orders with over 100,000 individuals. The Karachi Co-operative Housing Societies Union (KCHSU), was enrolled in 1949

The KCHSU is made out of 24-members societies and has over 100,000 members.

Cohousing in Africa

The Centre for Affordable Housing Finance in Africa (CAHF)

CAHF has been working as an autonomous organization in South Africa since May 2014, chasing after its central goal of making Africa's housing finance markets work (urbamonde site). CAHF's work stretches out across the mainland, and it is upheld by and teams up with a scope of funders and partners. CAHF carries data to the marketplace to empower partners in people in the general and private sectors to go with policy and project choices for further developed admittance to sustainable housing.

UrbaSEN in Senegal

Established in 2009 UrbanSEN creates participatory planning and neighborhood improvement projects in the suburbs of Dakar and in the regions of Thiès and Louga. It works here as the technical help structure for the Fédération Sénégalaise des Habitantes, a grassroots community association made out of in excess of 500 saving groups. Its activities center around housing restoration in deprived metropolitan regions, and the help and empowerment of female saving funds groups to advance cooperation in the services of public needs. The work completed on the ground worries specifically the innovation of individual sanitation facilities for families, such as the installation of toilets or the construction of cesspools, as well as the (re)construction of housing. UrbaSEN technologies participatory preparation is in a joint effort with the districts and adds to the reproduction of housing for the weak to improve their living environment.

Memel Organics Cohousing, South Africa

Memel cohousing shares a great deal of standards with African cultures (Alexander, 2017). Most African cultures spin around the benefits of sharing and togetherness. Families have developed increasingly more individualistic as they tend towards a Western model of family unit values. Reestablished values through cohousing would bring about better ways to deal with community security, saving funds, leadership, amusement, and kid and senior care in the African community.

The National Union for Housing Cooperatives (NACHU) in Kenya

Cooperative movement in Kenya is a key player in the economy, controlling around 43% of Kenya's GDP (Gross domestic product). Cooperative Societies in Kenya employs more than 300,000 people, other than giving opportunities for independent work to many more (housing.international, Kenya site)

NACHU began activities in 1987 (nachu site). It is a main sustainable housing supplier, conveying strong growth in housing solutions. Herewith are some projects (nachu site)

Riverline Bridges

The project is located approximately 6KM from Thika Rd, Along Mugutha -Murera Rd, The project is located in close proximity to major projects such as Amani Ridge(Optiven), Oaklands , Tatu City, Zaria (Safaricom Investments).

Prestige park development, Machakos county

Prestige Park, along Mombasa Road is within the Mlolongo Township and forms part of the Nairobi Metropolis. It's South East of Nairobi, 20 Km from the Nairobi.

Malaa Housing Project, Machakos County.

The project is situated in the green rural sectors of the Malaa region which is 30 km east of Nairobi town along Kangundo Street in the Mavoko sub-district.

Mloathi I Housing Project, Machakos County

The project is found 25 km east of Nairobi town along Mombasa Street in Mavoko sub-district.

The Zimbabwe National Association of Housing Cooperatives (ZINAHCO)

Established in 1993, ZINAHCO membership today incorporates 190 primary housing co-operatives addressing around 10,000 individual members and 5 District Unions.

There are at present 3 new District Unions in line.

The services presented by ZINAHCO include lobbying and advocacy, training, housing finance facility and construction management services.

ZINAHCO works in partnership with Rooftops Canada, Abri International, Homeless International (UK), SIDA and the Swedish Cooperative Center (now called We Effect) Regional office for Southern Africa.

Agriculture and Organic food movement

Organic farming is the name provided to diverse agricultural production systems that mean to work "with nature" instead of conquering it.

Organic food began with the idea to have healthy, local food economies in place of food industrialization (Seyfang and Smith, 2007).

"Organic" is generally usually connected with food production, both yield and domesticated animals. Organic policies are additionally utilized in the production of numerous different merchandise, leading to products as diverse as timber and clothing being labelled as organic.

The central distinctions between organic and ordinary farming are the utilization of pesticides, fertilizers, and other agro-chemicals; its hostility toward the farming use of biotechnology; its rejection of the routine use of pharmaceuticals on livestock; its attention to animal welfare; and its focus on crop rotation, soil quality and maintaining biological diversity as alternatives to chemicals.

The "Organic Movement" is a deeply grounded and genuinely effective strand of the more extensive organic movement. Organic food is felt by a developing number of customers to be more secure, more nutritious, taste better, and to be less destructive to the environment and animal welfare than conventionally produced food.

There are various organic food movements including countless people, straightforwardly and in a roundabout way (Kirwan et al., 2013).

Social innovations in organic farming incorporate all initiatives that are processes coming about because of cooperation between different actors that should be visible as a course of aggregate learning and knowledge creation which requires the cooperation of clients and that mediate or bring changes (Canwat and Onakuse, 2022).

Grassroots Innovations in agribusiness are the collaborative initiatives of small farmers, land managers, researchers, and civil societies (Hosseini, 2018). They expect to find solutions for sustainable improvement by testing the current agrarian system (Hart et al., 2016; Hermans et al., 2016). Agricultural Grassroots Movements focus on alternative innovation movements initiated by small farmers (Kirwan et al., 2013). Innovation is significant for sustainable farming to provide satisfactory food, diminish unfavorable impacts on the environment, and further develop agriculture in rural regions (Kirwan et al., 2013; Odegard and van der Voet, 2014). Many small firms lack the resources and skills to make their innovations for commercialization. Grassroots agribusiness projects, in the meantime, face trouble in securing finance from conventional institutions because of needs like a dry spell, flood, and regulations of standard financial mechanisms (Cabannes, 2012). Pintadas Solar in Brazil, for instance, accomplished a twofold expansion in farmers' livelihoods through new irrigation system (Creech et al., 2014).

European policies

The EU Green Deal, together with the Farm to Fork and Biodiversity Strategies, has placed significant emphasis on securing European biodiversity and climate goals. The EU's Biodiversity Strategy 2030, published in May 2020 (eea.europa.eu site), means

to secure and upgrade biodiversity in rural and nonagricultural settings, with an emphasis on: 30% of land, some of which will be farmland, in protected areas; Increasing organic farming and biodiversity-rich landscape features on agricultural land; Halting and reversing the decline of pollinators; Restoring at least 25,000 km of EU rivers to a free-flowing state; Reducing the use and risk of pesticides by 50% by 2030; Planting 3 billion trees by 2030.

The EU became associated with promoting organic farming during the 1990s. It presented sponsorships for organic farming and control principles for organic farming and food production, to which part states were obliged to consent (Lynggaard, 2006). Part states can offer extra help for organic farming and form public policies to develop the organic business. There is critical variety in the manner by which the part states have utilized this adaptability to plan their organic food and gardening policies (Daugbjerg and Schwartzman, 2022). Denmark, Finland, Norway, and Sweden have embraced policies to advance organic food and gardening. They have presented a variety of regulatory, subsidy and information dissemination measures and have provided financing to explore organic gardening techniques to build the production and utilization of organic food. The Danish policy is the most extensive among the Nordic nations and lays on two support centres. It incorporates supply-side approach measures pointed toward making conditions for farmers to reverse over completely to and keep up with organic farming and demand-side Plan measures intended to expand the interest in organic food. Such an organic policy model has been coined dynamic market development policy (Daugbjerg and Sønderkov 2012; Halpin et al. 2011).

Denmark

The EU policy has provided conditions that empower Denmark ceaselessly to lead worldwide concerning expanding organic food utilization. It has shown innovative policymaking by planning and carrying out approach tools that were new and concealed inside the farming plan space. It has coordinated both regular and organic interest relationships in policymaking and manufactured an agreement that organic farming is an essential piece of the Danish farm industry. It has produced a novel approach limit. At long last, it has set the plan on persevering through the course of promoting the organic food and gardening sector.

The Danish government became associated with supporting organic gardening in the last part of the 1980s when parliament adopted the Act on Organic Farming in 1987 (Lov no. 363, 1987). The point was to advance organic food production, yet no particular goal was expressed. Preceding the Act, a report ready inside the Ministry of Agriculture underlined that the extension of Organic food production ought to be driven by the improvement of the market for organic produce (Landbrugsministeriet 1986). Denmark arose very right on time as a leader in creating and developing the Organic food sector. It has a place with a meeting of four front-running nations likewise including Austria, Switzerland, and Sweden. By 1997, 2.5 percent of the food bought in Denmark was Organic, situating Denmark as the leading country (Willer and Yussefi 2000). By 2019, Denmark was all the while driving with 12.1 percent of the food sold by retailers and online outlets being Organic, trailed by Switzerland with 10.4 percent and Austria with 9.3 percent. Accomplishing 9.0 percent, Sweden positioned fourth. Finland and Norway were well behind with 2.6 and 1.7 percent (2016) individually (Schlatter et al., 2021).

U.K.

In the UK, the Federation of City Farms and Community Gardens (FCFCG) has upheld around 1,000 community gardens (White and Stirling, 2013). A small sustainable food NGO called East Anglia Food Link actively promotes local organic food sources in spots like schools and medical clinics (Seyfang and Smith, 2007).

In 2020 it was assessed by the UK government that 489,0000 hectares of land were cultivated organically in the UK (legislative needs site). There were supposed to be around 5,800 organic operators in the UK, with the incomes from Organic food and drink deals said to surpass £2.6 billion. Organic movement emerged as a feature of a flood of Environmentalism that jumped up contrary to the industrialisation of English agriculture that happened in the quick post-war years.

The Association, which has for quite some time been at the top of English Environmental movement, was established in 1946, by a meeting of farmers, researchers, and nutritionists who set direct institutions between gardening practice and plant, animal, human, and Environmental health.

The movement had its scholarly roots in mainland speculations of "biodynamic agriculture" developed by Rudolph Steiner (biodynamics site) and the work of Sir Albert Howard during the 1920s (Barton, 2001). In Walk 2011, the Scottish government launched the Organic Action Plan which was ready in association with the Scottish Organic Forum. The Organic Action Plan sets out the meaning of Organic food and drink and provides an outline of the sector and its future.

Africa

The Organic Organic agriculture Initiative (EOA-I)

EOA-I, subsidized by the Swiss Agency for Development and Cooperation (SDC) and the Swedish Society for Nature Conservation (SSNC), keeps on contacting smallholder farmers (Amudavi et al, 2022). In light of 2020 data, around 1.76 million farmers got data and correspondence materials to improve their organic farming data and uptake. 13'852 farmers embraced EOA practices. Around 35'000 partners were prepared, with the greater part being farmers.

The Knowledge Centre for Organic agriculture in Africa (KCOA)

KCOA is part of the Germany's Federal Ministry for Economic Cooperation and Development (BMZ) Special Initiative ONE WORLD – No Hunger-. The project is coordinated by GIZ, which means to reinforce actors of the the knowledge hubs and their networks in Eastern, Southern, West, North, and Central Africa in promoting organic agribusiness and agroecology. Western Africa has Senegal, Benin, Gambia, Mali, and Nigeria; Eastern Africa has Uganda, Kenya, Tanzania, and Rwanda. Southern Africa has Zambia, Namibia, South Africa, and Malawi; Northern Africa has Egypt, Morocco, and Tunisia; Central Africa's center is situated in Cameroon.

African Organic Network (AfrONet)

AfrONet, a caretaker of African organic movements and organic sector development, means to reinforce and uphold public, provincial, and mainland institutions, directing the innovation and innovation of EOA-I for Africa. AfrONet has been uniting every one of the institutions, partners, and different partners under the African Organic Group's infrastructure.

The Innovative Institutions for Ecological Organic Agriculture in Africa (IIABA) project has successfully assembled innovative markets inside the project areas in light of the consequences of the exploration embraced.

Network of Organic agriculture Researchers in Africa (NOARA)

NOARA is working on spearheading organic agriculture research, extension, training and value chains and market development; undertaking lobbying and advocacy on organic and ecological agriculture research at high level; supporting capacity building for key players in organic and ecological agriculture across the continent; activating funds for NOARA's projects in promoting organic agribusiness on the continent; giving services and regulatory consultancy to likeminded projects and partners on organic agriculture research; and Project some other functions as important to address NOARA's targets.

Kenya

In light of production activities, the organic subsector can be as categorized as collection and cultivation. Collection activities involve, gathering honey, essential oils, and other products, which are processed into cosmetic and pharmaceutical products.

Cultivation activities are profoundly assorted concerning crop assortments and editing designs. Crops range from perennials like macadamia, coffee, coconuts, avocado, and essential oil yields to yearly and horticultural crops like vegetables and flowers. Frequently crop production happens in a correlative blend with different yields, trees, poultry, and livestock. Production for the domestic market includes fundamentally fruits and vegetables.

Asia

In China 85.9 percent of purchasers expanded their consumption of fruits (Hossain et al, 2022).

In Bangladesh, there was a noticeable eagerness of the purchasers to pay something else for organic food. Regional policymakers are seeing the need to provide more nutritious, secure, and organic food from "Farm to fork". This was upheld by multiplying deals of numerous organic institutions in the country.

The Bangladesh Organic Products Manufacturer Association (BOPMA) is a great assemblage of various institutions and business visionaries managing fruits. As per BOPMA, from Walk 2020 to February 2021, the sales value of organic products doubled among 63 companies out of the total 81 companies dealing with organic food, while the rest of the companies recorded sales which more than tripled organic products during the current pandemic.

In India, interest in fruits expanded, driven by a developing number of buyers who accept fruits and can improve their resistant frameworks. There was an observable expansion in the utilization of organic products from top-of-the-line buyers, prompting the multiplication of specialty organic stores all through the huge urban communities in India.

In Indonesia, the government has arranged the Mutual Recognition Arrangement (MRA) on organic standards with the Relationship of the Association of Southeast Asian Nations (ASEAN) members. They agreed to harmonise their national organic standards and create the opportunity of trading organic products among the members.

In Indonesia in 2020, there was a rising interest in organic herbs, essential oils,, coconuts, and entities for beauty care products. The Indonesia Public Norm on Organic agriculture (SNI 6729-2016) is under correction and has incorporated extra animals, mushrooms, and honey bees sections. The government has additionally pre-arranged the Mutual Recognition Plan (MRA) on Organic principles with ASEAN individuals.

The Indonesia Organic Partnership has started the Penjaminan Mutu Organik Partisipatif Indonesia (PAMOR), Participatory Assurance Framework PGS framework to assist limited-scope farmers with naming their products as Organic.

In the Philippines, the Division of Farming, through the Public Organic Agribusiness Program, fortified the Organic agriculture Demonstration of 2010, which has been changed to the Republic Act (RA) 11511.

Cambodia has been the concentration for mediations of worldwide innovation actors since the mid-1990s. In 2020, the Minister of Agriculture, Forestry and Fisheries issued the National Organic Technical Guidelines and the Organic Agriculture Standard “CAM ORGANIC”. The Ministry will deal with the confirmation interaction and its logo.

Sri Lanka harmful case

In the spring of 2021, President Rajapaksa pursued an uncivil choice: he prohibited engineered fertilizer and pesticide imports essentially for the time being, forcing Sri Lanka's millions of farmers to go organic (Torrella, 2022). It demonstrated deplorable, collectively of Sri Lankan researchers and agriculture specialists had cautioned.

The agrochemical boycott made rice production drop 20% in the six months after it was executed, prompting a country that had been independent in rice production to burn through \$450 million on rice imports — significantly more than the \$400 million that would've been saved by prohibiting manure imports.

The production of tea, Sri Lanka's exacting money crop, it's the country's greatest commodity, fell by 18%. The government has needed to burn through many millions on sponsorships and remuneration to farmers with the end goal to compensate for the deficiency of efficiency.

Close to five months into the boycott, farmers were permitted to start utilizing engineered fertilizers on tea and a couple of different harvests while saving the boycott set up for other people, however by that point, a large part of the harm was finished.

Manufactured fertilizer causes yields to become quicker and greater than Organic manure like animal manure and pesticides control insect infestations and infections that can annihilate crops.

Regional material recycling and waste management movement

Waste collection and recycling services are probably the most fundamental entities of government to keep urban communities clean, save the environment, and advance general health. The systems have grown and changed in ways that are not environmentally or economically sustainable (NLC, 2021).

For a long time, recyclables harvested all over the planet were bought by China where makers wanted to reuse anything that they can rescue, with small respect for quality. Yet, in 2017, the Chinese government passed a progression of policies generally and on the whole alluded to as "National Sword" that put forth severe lines on contamination, really finished the importation of numerous wares, and declined worldwide markets.

These Waste Picker Organisations (WPOs) are essential as platforms for working on working conditions, improving personal satisfaction (by raising confidence, health, and so on), upholding political power, and expanding responsiveness to their demands from state-run services and different actors (Dias, 2016).

WPOs could get various types of economic or framework backing and technical guidance at fire-up (Rutkowski and Rutkowski, 2015), many keep on contingent upon legislative or NGO backing to get to operating space, machinery, equipment and professional training, or on advertising campaigns to promote source separation of recyclables in households (Zapata and Zapata, 2013; Tirado-Soto and Zamberian, 2013).

Environment domains

Argentinean and Nicaraguan initiatives center around paper, cardboard, plastic, metal, and glass. Brazil is comparable yet additionally incorporates white paper and multi-facet Tetra Pack as fundamental things. In Argentina and Brazil, and somewhat likewise in East Africa, every class incorporates an extraordinary assortment of subcategories; e.g., plastic is isolated into high density polyethylene (HDPE) and polypropylene (PP), low density polyethylene (LDPE), polystyrene (PS), and polyethylene terephthalate (PET, arranged into three distinct tones). In Argentina and Brazil, a large portion of the recuperated plastics feeds local businesses and makers,

as opposed to being sent out abroad as is typically the situation in East Africa. Both Kenyan and Tanzanian groups principally center around plastic and metal, with paper as a third primary material, and much goes for sending out. Looking at the two landmasses, the market for various kinds of reused paper appears to be more grounded in Latin America while in East Africa plastic and metal are the main resources generating income

Mutual regional learning by sharing

In April 2018 waste pickers from Tanzania, Kenya, Argentina, Brazil, and Chile coordinated a organized a peer-to-peer workshop in Kisumu to share ideas and technologies between continents (Barinaga et al, 2019). That's what the thought behind was, as opposed to embracing hierarchical thoughts developed by huge partnerships, improvement offices, or analysts, advance civil regional promoting by sharing, creating, and adjusting waste innovations.

Grassroots waste management at Kibuye market, Kisumu, Kenya

Waste Management CBO

The Kibuye market in Kisumu in Western Kenya is quite possibly the biggest external market in East Africa (Field Study of the World, 2016). Kisumu district's waste assortment framework is deficient and the brokers likewise need direction and familiarity with legitimate garbage removal. Rather than trusting that things will change at the district level, a portion of the market's brokers has assumed control over the matter.

These brokers have shaped institutions and groups that eliminate waste from the market as well as create a gain out of it. One of these groups is Kibuye Market Waste The board CBO is a dealers co-activity that was established in 2014 to handle the issue of organic waste.

When the organic waste has been collected and arranged, it is taken to a site at Kibuye market that was provided for the meeting by the Kisumu region. This site is where the Organic waste has been treated in the soil in manure heaps. The heap is covered to

keep it wet and hot which speeds up the process. Following three weeks the fertilizer is prepared, and during this time the heap is turned once to make a more equitably treated soil product. No new waste is added to the heap during the process.

The damp fertilizer is dried before it is ground into manure. The crushing was recently finished the hard way, yet the meeting has of late gotten another technological processor that makes the process more straightforward and speedier. This machine crushes the fertilizer into fine particles, making the last fertilizer that is then offered to farmers. The processor can likewise make animal feed from food waste.

Today Kibuye Market Waste Management CBO has 85 members in two subgroups, and the amount of members and subgroups is growing.

The association is likewise extending its activities into new domains. Assortment of family waste and reusing of plastic is a portion of the new activities that are beginning or under arranging.

A significant piece of a group's work is the means by which they handle their funds such that advantages its members. The benefits from the deals (alongside small commitments from the individuals from the meeting) form a Fund from which the members can then apply credits for various projects. In this manner, the members benefit from the collective effort of the group more than if people were all selling their own manure.

Kiwan (Kisumu Waste Actors Network Sacco)

Waste pickers from Kisumu, coordinated under the umbrella of the grassroots association called Kiwan (Kisumu Waste Actors Network Sacco), along with waste pickers from the the Cooperativa Recycling in Buenos Aires, Argentina, Nova Glicério cooperative in São Paulo, Brazil and the Latin American Waste Picker Network, developed and produced during the workshop several grassroots, low-cost and low-tech innovations: a light push cart adapted to waste collection in informal settlements, simple to move, simple and modest to create, solid, and proficient to take weighty burdens; a repairman press; and a limited scale biogas production unit.

Other technological grassroots innovations

Many groups have set up handling machines for transforming materials to add value or for delivering new materials, for example becoming charcoal residue into briquettes and plastics into wall posts in Kenya; children playgrounds equipment (Reciplazas) in Argentina; and jewellery production from recyclables in Nicaragua. On a further developed level in Brazil, the cooperative Coreso, along with 13 different groups, has framed the organization Rede Solidária Cata-Vida, running a polymer handling unit and a handling plant for cooking oil.

In Argentina, the cooperative Reciclando Sueños, along with university researchers has made research and innovation projects to change non-attractive recyclables, at present neglected by the regional recycling industry regardless of unloaded in landfills, into attractive materials. Successful examples from this cooperative of materials now conceivable to recycle include expanded polystyrene, multi-layered plastics and beer labels.

Towards a policy framework for GRIs

Strategic and targeted public-initiated programmes provide direct support and incentives and broad and generic programmes leverage community social innovation, which indirectly implies grassroots implementation. The first approach is exhibited in the case of India, Malaysia, Kenya, whereas the cases of the Philippines and Thailand generally utilize the second approach.

GRIs policy prepares innovation results for societal benefits, particularly for the underserved ailing in current innovation policy systems (Schot and Steinmueller, 2016; Klauer and Phye, 2008). The economic performance of GRIs stays slippery (Pansera and Sarkar, 2016).

The standards which assist with speeding up grassroots innovation and making a future for all are dynamic regional government as a partner, dynamic active citizen participation as an effective method to educate citizens and eliminate obstructions to propelling the SDGs and preparing the scholarly community and youth to to keep driving the momentum forward (Kwok, 2021).

The National Innovation Infrastructure (NIF), India

The Division of Science and Technology (DST) has taken several initiatives to promote innovation, support state-of-the-art research, draw in the young towards science, further develop the ease of doing science, and encourage globally coordinated efforts (Nova, 2019).

NIF India was laid out by the DST in 2000 with the primary objective of offering institutional help in exploring, bringing forth, maintaining, and increasing grassroots green innovations and aiding their change to self-supporting activities.

India encountered an expansion in its economic growth rate after the execution of the GRIs policy (Yun et al., 2018). There is a possible bigger societal impact of the commercialization of GRIs (Sharma and Kumar, 2019). It is trusted that the endeavors in promoting GRIs would lead numerous communities in a country to share and mix

local knowledge (Yun et al., 2019) contributing to the emergence of space-makers for new technology and entrepreneurship at the grassroots (Ensign and Leupold, 2018).

The Grassroots Innovations Augmentation Network (GIAN)

GIAN set up by the SRISTI in 1997 assists with commercializing grassroots innovations (gian site). Innovators get help from the GIAN to make their businesses.

The goal is to generate novel models of poverty alleviation, rural development, employment generation and conservation of natural resources without impairing the ecological balance

GIAN established the Indian's first technology business incubator focused on incubating and commercialising grassroots innovations.

The Honey Bee Network (HBN), India

HBN arose in India among a group of researchers, farmers, academics and others interested in documenting and disseminating traditional knowledge and local innovation in local languages (sro.sussex site). They focused on guaranteeing the innovators would get benefits from their local ingenuity.

The HBN was laid out in India by Professor Anil Kumar Gupta of the Indian Institute of Management Ahmedabad (IIMA) in 1988-89, as a social justice initiative to fix the failures of top-down development initiatives led by the government (teleadership site).

The endeavors of the HBN picked up speed with the establishment of the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) in 1993. For SRISTI, the primary point of the association stays to help in the protection of the intellectual property of grassroots inventors and innovators. Scouted and patented grassroots innovations based on traditional knowledge have grown, as far as

the quantities of patents from only two in 2001 to 557 in 2012 (Ustyuzhantseva, 2015).

At that point, the prevailing assumption was to centre on government and civil society to provide poverty alleviation solutions. Gupta rather saw through his original work that creativity and knowledge dwelled with individuals living in the most serious conditions. Individuals were innovative in their way to deal with the different needs they were confronting. People knew best how to manage their needs, whether they were living in flood-inclined areas, woods, or deserts. The scarcity of resources did not stop people from figuring out solutions.

In the field of grassroots innovation, the spot of the HBN is unmistakable, since it points around the commitments of non-formal uneducated innovators. For the HBN, grassroots innovation is the innovation of uneducated individuals, without an expert degree, who are self-employed outside the formal sector and develop their innovation with next to no external assistance from formal institutions. The HBN considers the exclusion of these innovators from the formal sector to be the main characteristic of grassroots innovation.

HBN principles are first, when new knowledge is collected, it must be shared back with the sources and the communities in their local languages. The second principle is that the source of the knowledge must be acknowledged. Finally, the knowledge holders should profit from the outcome of their work and productions in both acclaim and compensation.

Since its establishment, HBN's database of original inventions, presented through illustrations and with direct attribution to the original inventor, has grown to more than 100,000. The data set is intended to be simple for regional communities to utilize, secure, and in various local dialects. Grassroots effort imparts the solutions for the community and empowers sharing of their thoughts and knowledge, and distributes a newsletter in eight dialects and disseminated to 75 nations.

All the drive that started in a small manner in the territory of Gujarat today has the acknowledgment and backing of the central government for the organization of a

separate mainstream system of innovation to promote grassroots innovators to advance grassroots innovators identified by the HBN from across India's states (Ustyuzhantseva, 2014).

In 2003, the HBN was able to set up a Micro Venture Innovation Fund (MVIF) with the help of the Small Industries Development Bank of India. MVIF is the head financial hotspot for the GIAN. This Fund is being effectively used to help innovations that have market potential at the public and worldwide levels. The MVIF provides risk capital help to just those business visionaries and institutions that are keen on commercializing grassroots innovations. The MVIF is not a grant but a loan.

NIFientreC and Amazon, India

NIFientreC and Amazon India have signed a MoU for online distribution of product of grassroots innovations, student innovations, and outstanding traditional knowledge-based products (AIR News, 2022). The MoU will make innovations from rural India accessible all around.

Amazon plans to make a storefront to boost the discoverability of these rural innovations among clients (pib.gov.in site).

Through this MoU, both NIFientreC and Amazon would ensure a capacity building of grassroots innovators consistently through masterclasses, workshops, and other intuitive preparation programs by drawing in industry and educated authorities so they can walk ahead at the beginning of innovation of the country at standard with rest of the country. They will be intermittently prepared on basic parts of being a fruitful e-commerce member so that after getting on-boarded, they can be confident, make visibility for their products, create demand, and answer it to have them arrive even at the last mile.

Geniusenergy Critical Innovation (GCI), saving energy in boilers with Amazon support

Shri Subhash Ola, an innovator from Rajasthan who has developed the technology of saving energy in boilers by reusing steam, has won the first grant for the Amazon Smbhav Business Challenge 2022 and his project GCI, has won the the start-up of the Year grant (Best Current Needs, 2022). The technology

-/ was first evolved to make khoya and other milk products, and the portfolio of applications were later extended to textile, milk and food, pharma, plywood, paper mills, leather industry, chemical industry, hot water boiler generator, plastic recycle, laundry, hospitals and so on.

The Notion Technocrats India with Amazon support

Notion Technocrats is manufacturing and exporting premium quality Water Coolers and Solar Based Water Cooler equipment. The company is focused on the corporate and business market to the necessities of different industries, institutions, restaurants, banks, hospitals, theatres, shopping malls and boutiques.

The enterprise owned by Shri Arvindbhai Patel from Ahmedabad has developed a low cost, energy-efficient, environment friendly natural water cooler based on the principle of heat exchange.

The Natural Water Cooler is a device through which the water is cooled by a natural mean of Heat Transfer. It works on the principle of natural evaporation of water.

The device has previously been tested by GEDA (The Govt.of Gujarat Agency) & Sardar Patel Renewable Energy institute, V.V.Nagar,Gujarat and has accomplished the appreciable complements.

Yayasan Inovasi Malaysia (YIM)

YIM was established in 2008 with the ultimate aim of promoting GRIs programmes (Syah et al, 2021).

GRIs Scouting

GRIs Scouting's central goal is to add to the instruction of children through a value framework in view of the Scout Commitment and Regulation.

The scouting programme was first launched in 2011 with a group of Innovation Scouts consisting of researchers, scientists, patent experts and officials from the Ministry of Science, Technology and Innovation (MOSTI). YIM visits target rural communities and assists them to move up the economic value chain.

Malaysia has its own scouts and guides affiliations. Furthermore, there are a couple of global scout groups including the Boy Scouts of America and The Scout Association (UK). British Scouting Overseas has four groups in Kuala Lumpur itself.

The groups centre on giving an entire scope of activities focusing on community services with a home for abused and neglected girls while likewise uplifting activities, for example, spearheading, setting up camp, woodlands cooking, climbing, wide sports, policy for real-life adaptations and any remaining necessities to get the test identifications and segment grants.

Mainstreaming Grassroots Innovations (MaGRIs)

MaGRIs program was launched in 2017 to facilitate competitions that call for and distinguish potential GRIs that can be additionally formed into economically sustainable products. Through MaGRIs, YIM works with the interpretation of significant value-loaded rural projects into financially sustainable and replicable innovations. For winners who decide not to engage in any commercialisation plan, YIM links them with local entrepreneurs as potential partners.

As far as public funding for GRIs-related research, the Community Innovation Fund (CIF) is made accessible by MOSTI to help regional groups in translating knowledge into products, processes, or services that can improve the quality of life of the community. Innovators from enrolled community affiliations, groups, NGOs, and cooperatives are qualified to apply for a research grant of up to USD 113,000 for a project that will be executed for no longer than a year and a half. Furthermore, the Malaysian Social Enterprise Blueprint — a three-year guide to developing the Malaysian enterprise sector — is likewise considered pertinent to GRIs (Enchantment, 2015).

The critical group of technologies include technologies for meeting basic needs (food, water, and shelter), quality of life (schooling, healthcare and environmental stability), wealth creation in support of economic growth and competitiveness, and good governance in the public and private sector (Rahman, 2013). Have been identified 1,786 innovations.

Generic programme, the Philippines

In 2019, the Philippines adopted the Grassroots Innovation for Inclusive Development (GRIND) Framework Plan 2019-2022 which recognizes grassroots innovation valuable opportunities and sets out a vision, targets, and procedures to help their innovation and an empowering environment. The program is adapted to regional or sector needs and plans to engage underestimated communities by creating and fortifying its current grassroots innovations.

In 2023, the National Innovation Council (NIC) endorsed a few project recommendations outfitted towards creating innovative Plans including the prolongation of the GRIND program. The National Economic and Development Authority (NEDA) is in charge of executing the new innovation policy (Leyco, 2023).

Project SciNing

In coordination with MOST of the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), the province of Basilan was selected as the inaugural site for the project given its geographical isolation, its different and distinct cultural assets, and the potential for science and innovations with its youth sector (tapi-dost site). Herewith some of the supported projects (apctt.org).

Biotek-M Dengue Aqua Kit was developed by Dr. Raul V. Destura of the University of the Philippines.

The unit accommodates early and exceptionally precise recognition of dengue sicknesses. It is a part of the "Lab-in-a-Mug Project" wherein all symptomatic kits are coordinated and miniaturized in an isothermal unit as small as a mug.

Vigormin: Organo Mineral Products for Effective Waste Water Treatment and Septic System Management developed by Dr. Merlinda A. Palencia of Adamson University

The technology of Vigormin is a white powder combination of normally occurring organominerals that essentially stimulate the growth of the indigenous aerobic microorganisms in waste water and boost the degradation of organic pollutants. The blend can retain critical measures of weighty metals and other suspended solids in the water. The utilization of the product is additionally compelling in sectors of health for neutralizing strong wastewater or septic odor, decomposing/rotten odor from organic waste in landfills or material recovery facilities.

Leak Sealing Valve (LSV) for Brake System of Motor Vehicle Developed by Mr. Melchor L. Heñosa of Heñosa.

An anti-loose brake device attached along the brake fluid pipes of each brake assembly of the wheels particularly for Posterior urethral valves (PUV). It has an automatic lock system for damaged assembly, avoiding loss of brake, and maintaining driver's directional stability and control over steering.

Coffee Roasting Machine Developed by Mr. Carlos Basilio Victor O. Reyes of Bote Central, Inc.

This is a roasting apparatus with programmable settings that can rapidly broil coffee beans, corn, and different nuts. The innovation provides a collecting chamber that can be easily used for coffee making and had been useful to a number of coffee shops. This machine is viewed as more energy productive when contrasted with other business simmering machines.

Pilot Testing and Commercialization of Micro Impeller Rice Mill (coursehero site)

Portable, low cost, locally manufactured, and easy to use, the brown rice micro mill, answers the need for accessible rice mills in the country. This will assist in supporting the rice providing of the nation, empowering food security and accessibility. The project will assist with moderating the impacts of the coronavirus pandemic in the nation by guaranteeing accessible food through the brown rice miniature factory. Besides, it advocates for the utilization of brown rice, a more nutritious nourishment for Filipinos, contrasted with white rice. This issue of the bulletin and the impending needs will handle the Coronavirus response Projects of PHilMec.

Installation and Operationalization of Ilocos Norte MSME Incubation Center (ilocosnorte.site)

Salt producers in Ilocos Norte territory, one of the necessary coastal sectors, improve the levels of salt production.

216 salt producers in the towns of Currimao, Badoc, Pasuquin, Vintar, Pinili, and Burgos got very nearly 2,000,000 pesos value of help, including their salt-production materials.

Mr. Heavenly messenger Padron, an 83-year-old organic farmer from Brgy. Libtong, Bacarra, and Ilocos Norte, effectively elevated organic farming for many youthful farmers.

He initially started farming in 1956. In 2014, he became keen on organic farming. He was the primary organic farmer in Bacarra and the first to lay out the province's School of Practical Agriculture.

Improvement of the Single Row Push-type Plot Seeder with Mechatronic Seed Feeding Device for Corn Field Breeding Experiment

The machine was outfitted with a mechatronic seed feeding device to provide an efficient way of sowing for every plot (ui.adsabs.harvard.edu site). Field testing and cost research between the Corn plot seeder and two different seeders were directed to determine the performance and economic viability. Results showed that the Corn plot seeder can plant seeds at 0.49 ha/day with a field effectiveness of 42.46 %. It had the Alternative to plant 1 + 1 seeds for each slope and developed a 93% establishing productivity with a 7% missed slope.

Generic programme, Thailand

Social Innovation Platform (SIP)

Thailand is one of the three "early adopter" nations (Thailand, Indonesia, Pakistan) to try the Social Innovation Platform (SIP) at the subnational level. Upheld by UNDP Bangkok Regional Hub (BRH) and Agirre Lehendakaria Center (ALC), UNDP Thailand beginning around 2019 has been carrying out a stage with an emphasis on transforming regional food systems in the southern boundary regions of Thailand- Yala, Narathiwat, and Pattani.

In the three southernmost territories, SIP of the South further develops the regional food framework by empowering new types of coordinated efforts and supporting innovative activities between local farmers, fisherman, SMEs, municipalities, customers, academic institutions, youthful inventive groups, local business associations and marketing managers. SIP slowly changes the local food systems in through practical production and consumption at the subnational level.

ALC and SIP use a portfolio way to deal with upgrading the manageability of local food systems. The platform uses a listening interaction to assemble experiences on local entities and intricacies, the interface needs across sectors and topical regions, and

use the innovativeness and expertise of all of society to co-create a portfolio of solutions.

In partnership with local governments, local academic institutions, young creative groups, local incubators, schools, food entrepreneurs, and market managers, the first batch of solutions (prototypes) is currently being co-created in three southern border provinces of Thailand, namely Narathiwat, Pattani, and Yala.

Digital Policies for Traceability

Yala Region has joined forces with UNDP to co-plan advanced strategies for traceability and related innovative projects in its local new markets. Traceability can assist with making mindfulness and demands of food security, safety, and sustainability among consumers and makers which thusly add to the outcome of participatory guarantee systems (PGS) for local food producers to be promoted in the localities.

A brilliant city project with the furthest down-the-line metropolitan computerized stage to further develop access and nature of public Services and lift the regional economy guaranteeing nobody is abandoned. This incorporates an e-taxpayer-supported initiative that includes an e-marketplace for regional makers and specialist co-ops called "Yala Marketplace (Lad Yala)".

Swachh Bharat Mission (SBM), India

SBM is a massive mass movement launched that seeks to create an Open Defecation Free (ODF) India in five years (swachh site). The mission covers generally rural and urban regions. The mission acknowledged more than 100 million family latrines built, helping 500 million individuals across 630,000 towns (sdgs, site). The Mission's model is currently being mirrored by other public missions and has impacted comparable policies in nations like Nigeria, Indonesia, and Ethiopia. It has likewise made ready for putting resources into the whole process under SBM Stage II beginning around 2020.

The urban part of the mission is carried out by the Ministry of Urban Development the rural component by the Ministry of Drinking Water and Sanitation.

The programme includes elimination of open defecation, the transformation of unsanitary latrines to pour flush latrines, eradication of manual scavenging, municipal solid waste management and bringing about a behavioural change in people regarding healthy sanitation practices.

All ministries developed yearly work plans for smoothing out disinfection programming inside their sectors. This guaranteed that schools and preschool points, medical care offices, government and private sector structures, farms, and different sectors were additionally building a satisfactory number of latrines; in schools, government standards guaranteed that there were enough for both young men and young ladies, and that young ladies were provided fundamental protection and materials to practice safe feminine cleanliness.

The normal help for innovation of community latrines - Central Government will contribute up to 40% of the cost of innovation of community latrines as a VGF/by and large grant.

In its first phase, the Swacch Bharat Mission aimed to provide a toilet in every rural household and claimed to have achieved its goal in 2019 ([insightsonindia site](http://insightsonindia.com)).

SBM was shared financially between the central and state governments, which built local ownership over the results, and was supported by key development partners.

According to the parliamentary standing committee report on water resources just 12% of the villages that should get infrastructure for fluid waste services have accomplished their objective under the second phase of the Swacch Bharat Mission. The implementation of solid waste management infrastructure also lagged behind, with only 22% of target villages covered during 2021-22.

HBNCRIIA grant, India

HBN and GIAN have mutually coordinated the first International annual competition for creative & Innovative ideas or traditional knowledge practices, which solve day-to-day problems faced by society including animals, the environment, or us (HBN, 2022).

HBN Creativity & Inclusive Innovation (HBNCRIIA) award accepts entries from parents, teachers, professionals, college students, or any other adult in the formal or informal sector. This grant intends to provide global acknowledgment to the innovations which are from/for grassroots and address neglected social necessities.

In 2021 were evaluated around 2500 passages from 87 nations. These were screened by famous researchers/professionals at the essential stage followed by a master jury audit.

Grassroots projects in selected programs

Agribusiness is the primary sector wherein happen grassroots innovations. India is the main nation supporting grassroots innovation first in quite a while connected with the farming and food industry. Malaysia and Vietnam laid out comparative institutions supporting grassroots innovations. South Africa and Kenya are driving this grassroots innovation policy in Africa

NIF India

Mansukhbhai Jagani, Motorbike-polycultivator

Mansukhbhai Jagani a grassroot innovator from Gujarat proposed to develop a motorbike poly-cultivator. The NIF requested the National Institute of Design to develop a product plan. The Sloan School of Management at MIT developed the business plan. In May 2008, NIF and GIAN stepped up to to test and improve Jagani's design. This motorcycle-based tractor is costing generally \$ 318, and is eco-friendly. It can plow an acre in a short time with two liters of fuel. The 'super plough' called Bullet can do different activities like furrow opening, sowing, inter-culturing and spraying operation (Charanji, 2022). In 2003, Jagani got a US patent for his innovation. Almost 10,000 Santis and its adaptations, Sanedo and Handiyo, are sold every year. The ongoing Santi model doesn't utilize a motorcycle chassis. Instead, new chassis are made for three-wheel and four-wheel ploughs or small tractors. Today there are around 400 fabricators who make variations of his tractor and a large number of Santis ply the roads in Saurashtra.

Bissu Hang Limbo, Noha Selroti-maker

Limbo from Geyzing, Sikkim learned at the local Industrial Training Institute. He is an innovator since the age of 16, and he has formulated 10 products. One such products is his two-in-one Shena broom which has a pincer-like attachment at the bottom to easily rake up garbage. The Shena broom has been recognized by the Department of Science and Technology's NIF (Charanji, 2022).

Limbo's selroti-producer has a selroti-maker has a food-grade stainless steel cup which looks like a ship, with a hole to spread the batter evenly. a food-grade stainless steel cup which looks like a ship, with a hole to spread the batter evenly. It has a wooden handle to prevent the user's hand from getting burnt, a common hazard in making selroti manually. Thus far, Limbo has sold 200 pieces of his selroti-maker in Sikkim, West Bengal, Bhutan, Assam and Nepal.

Mushtaq Ahmed Dar, Making walnut processing easier, (nif 540 site)

Mushtaq Ahmed Dar, a grassroots trend-setter from the Anantnag region of Jammu and Kashmir, has drawn out a progression of innovations for making the handling of pecans simpler and more effective.

The innovations for pecan handling incorporate a Pecan Breaking Machine' and the Pecan peeler, washer, and sorter to smooth out pecan production and assist with diminishing the drudgery of individuals associated with pecan handling, a craft livelihood principally in the Union Territories of Jammu, Kashmir and Ladakh. The innovation is accessible in the market through Anventa Gadgetix Pvt Ltd, a start-up incubated by NIFentreC NIFentreC (NIF Incubation and Entrepreneurship Council), a Technology Business Incubator (TBI) hosted by NIF and supported by DST.

Vinisha Umashankar, Solar Ironing Cart, (nif 537 site)

Vinisha Umashankar a 15-year-old girl from Tamil Nadu was recognized Earth Day Network Rising Star 2021 (USA) for her idea of Solar Ironing Cart.

A critical advantage of the solar ironing cart is that it takes out the requirement for coal for ironing bringing about a welcome shift towards clean energy. End clients can move around and offer services at their doorstep for expanding their daily earning. The ironing cart can likewise be fitted with a coin-operated GSM PCO, USB charging points and mobile recharging which can fetch extra income.

Shri Sundaram Verma, Water saving technique, (nif 535 site)

Shri Sundaram Verma grew over 50,000 trees in the arid Shekawati region of Rajasthan using a water saving technique.

The method uses just a single liter of water through the lifetime of the plant and provides the most ideal answer for preserving water in the parched, semi-bone-dry regions as well as roads of agroforestry prompting land management, revenue generation and sustainable livelihood.

Prafulla Meher, Textile weaving machine

Prafulla Meher (56) is a weaver and material machine maker. He left his studies due to a financial crisis and joined his family business of weaving Sambalpur Sarees (nif award site). Weaving a 6 feet saree requires 8 kg of cotton and three processes viz. spinning, winding and threading are involved. Spinning is done for the purpose of dying and making designs in sarees, and winding is done to make a suitable package for both woven and knitted fabric production. Prafulla has developed Purra bed (uniform thread distribution system), automatically changes its direction of movement.. This Purra bed has two cycle hubs for easy movement over the frame track There is a small vertically placed thin rod attached with the chain loop and Purra bed is placed over this rod. So when it turns around quickly subsequent to finishing half process, the Purra bed consequently alters its direction of motion. The second Purra bed goes on the reverse finish of this drum as both Purra beds are associated through a square pipe. Along these lines, both the t h r e a d circulation frameworks w o r k consequently and help in further developing efficiency. The machine has the limit of winding 10 heaps of yarn over the drum within an hour.

Lakshmanbhai, a Bloat remedy

Lakshmanbhai (53) has been treating different domesticated animals' diseases for the beyond 30 years, which he has gained from his dad. Bloat is a clinical condition wherein animals suffer from enlarged abdomen, pain, lack of motility of abdominal organs and respiratory distress. For treating bloat about 125 ml of liquid preparation made from two herbal ingredients has to be fed to bloat affected animals once a day. During the validation, the drug showed a critical effect by decreasing abdominal

girth, improving rumen motility from 30 minutes onwards, and supporting such therapeutic function up to 2.5 hours among the treated goats, thereby indicating its efficacy.

Jyotsna Mayee Patra, Bearing fruits against insects

Jyotsna Mayee Patra (18) is a youthful pioneer, studying for Political Science Honours course for her graduation. In her home garden, she noticed that the rose supports were seriously pervaded by insects and were not bearing blossoms. She noticed a climber bearing fruits was developing near the sector of the roots zone of the rose plants. The products of the climber rotted and decayed in the root zone and the insects overrunning the rose vanished soon. The growth of the rose plants improved and they started bearing flowers. She looked through comparable fruits from the town pastures and put them in the root zone of other insect-plagued plants in her garden and rice fields and noticed the control of a wide range of insects including soil insects. She has been involving the education in rice fields and garden (vegetables) throughout the previous four years. The preparation is very effective in low volumes and can be used for the control either in the form of a solution/juice or powder or can directly be buried equidistant in the soil, spread across the rice fields for maximum control. Care while handling, spraying of preparation and use of protective gear is required due to its poisonous nature. The approval operated by NIF-India at the Department of Entomology and Horticultural Zoology Institute of Agricultural Sciences, Banaras Hindu University, Varanasi against insect pests of Okra reported the efficacy against borer and sucking insect pests. The preparation was most effective against leafhoppers in both the sprays at all the doses tested providing control in the range of 50 – 56%. The readiness at the farmer's dose was extremely powerful in charge of fruit drill pervasion giving a 50.6% decrease in pervasion when contrasted with control and a 52.6% decrease in the populace of whiteflies. In the event of parasites, the planning diminished 54.6% and 52.7% vermin populaces when contrasted with control at around 50% of the farmer's portion and farmer's portion separately. An in general 62.58% - 59.8% increase in production as compared to control was reported at the three doses tested and none of them caused any harm to the crop.

Mansukhbhai, Mitti cool refrigerator

Mansukhbhai could use his skills as a potter to design a clay chiller which is cooled using water and thus expand his product line (nif.org.in/innovation). This was the point at which he embraced the brand 'Mitticool' from the Hindustani word "Mitti" which implies mud or mud and the English word 'cool' to mean cool. An earth chiller designed on such a straightforward logical standard would have none of the disadvantages of a conventional refrigerator which was costly and required power.

Mitticool is a characteristic cooler made completely from clay to store vegetables, fruits and also for cooling water. It provides regular coolness to the put-away material without requiring any power or some other fake type of energy. Water from the upper chambers dribbles down the side, and moves vanished removing heat from within, leaving the chambers cool. The top upper chamber is utilized to fund clean water. A small lid made from clay is provided on top. A small faucet tap is also provided at the front lower end of chamber to tap out the water for drinking use. In the lower chamber, two shelves are provided to store products.

Incubation and Entrepreneurship Council (NIFientreC), India

NIFientreC is an Innovation Business Incubator facilitated by NIF India and laid out with help from the DST, Government of India. It is setup for incubation of grassroots innovators and students nationwide. Herewith some of the supported projects.

Mushtaq Ahmed Dar, Climbing poles device

Mushtaq Ahmed Dar has likewise concocted one more innovation for climbing shafts that could determine the needs presented by the perplexing topography of Kashmir Valley while repairing electricity and telecom connections. With the new device named Pole-Pro, workers could clamber up electricity, telecom poles, and rectify any faults without having to carry bulky ladders. The technology has been made accessible in the market through a start-up called Anventa Gadgetix Pvt Ltd.

Pandharinath Sarjerao Tractor Driven Onion Transplanter

Pandharinath Sarjerao developed a work vehicle drawn semi-programmed onion transplanter. It can carry out three roles all at once viz. relocating the onion, applying the fertilizer, and making the water system channels. At the point when the farm truck pushes ahead, the star wheel-type metering component gets the drive to deliver the fertilizer in the tubes. The seedlings are delivered manually in the delivery chutes for planting.

Maibam Deben Singh, Cooking Cum Drying Stove

Maibam Deben Singh designed the oven in agreement with the conventional food inclination of Manipur, Nagaland, where individuals dry different things like fish, meat, certain vegetables, and so forth over the hearth. The dried things get the kind of smoke. In any case, with the presentation of Liquefied Petroleum Gas (LPG) -based stoves, cooking design has changed presently individuals utilize separate biomass/charcoal dryers. Drying fish/meat in the LPG stove is not preferred as the dried things neither have the flavor nor the Structural Insulated Panel (SIP) as in the conventional process.

Rai Singh Dahiya, Bio-mass gasifier system

Rai Singh Dahiya from Hanumangarh, Rajasthan has changed the conventional design of gasifiers uniquely the filters and cooling units to get clean gas and ensure smooth operation of engine at low operational cost. It is a down draft type bio-mass gasifier, a smaller and more effective framework for converting Bio Mass into producer gas which is used as a fuel in running Diesel Engine by making little modification on engine.

Grassroot Innovations, Bangladesh

Mangrove ecosystem

Mangroves are among the most useful environments on the planet and are critical in providing a large number of ecosystem services and benefits, including protection from flooding, cyclones, and tidal surges; carbon storage and sequestration; and support for local livelihoods through the provision of food, fuelwood, timber, and construction materials (World Bank, 2020). In Bangladesh, it is assessed that a segment of mangroves 100 meters wide can lessen storm flood speed by up to 92 percent, saving embankment maintenance costs (Dasgupta et al. 2019). Situated on the active delta of the Ganges-Brahmaputra River system, the Sundarbans constitute the world's largest single tract of mangrove forest covering around 10,000 square kilometers (Mukul et al. 2020). This exceptional mangrove ecosystem assumes a significant part by acting as a bio-shield against typhoons and tidal surges beginning in the Bay of Bengal, consequently decreasing the vulnerability to such outrageous climatic events (Halder et al. 2021).

Fish farming in floating cases

Rural families in Jessore have adopted a thought of fish farming in drifting cases (Rokonuzzaman, 2021). In this part of Bangladesh, high level of salt in the water, lopsided precipitation, and flooding cause extraordinary vulnerability for the entire farming community. Thus, because of this thought, fish not just vary and fill in a solid region yet additionally in the event that water levels rise, the cases will as well.

Floating beds

Managing eccentric water levels has been the reception of farming policies like drifting beds. This thought includes planting crops onto drifting islands made of the quickly developing water hyacinth.

Farmers have been developing cucumbers, gourds, and eggplants on these drifting islands. Coincidentally, since the preindustrial stage, individuals have been utilizing this thought. In spite of showing beginning victories, these rural farmers have been failing to scale up these ideas to keep improving their quality of living standards.

Grassroots innovations initiatives in Davao de Oro region, the Philippines

Edmund Jacalan, Innovation of Foot-Operated Handwashing Kiosks

Edmund Jacalan, a local business visionary from Nabunturan, Davao de Oro has manufactured a foot-operated handwashing booth fitted with a fluid cleanser device and a water tap, each associated with two distinct pedals. As the client presses the pedal by foot, the cleanser device will administer the fluid cleanser and the water tap will provide water. This works with a non-contact means of handwashing which relieve the spread of the infection.

Askedwell, Inc., Production of Breadfruit “Mirakol” Health Tea.

With the phenomenal nature of the pandemic, there is a need to keep our immune system strong. Askedwell, Inc. has developed a new product from the fruit and leaves of the Breadfruit plant, the Breadfruit “Mirakolo” Heath Tea. Breadfruit is known as a nourishment for the poor for utilization just in crises. As per the native Indigenous Peoples (IPs) in the region, Mirakolo fills in as a food supplement which improves the resistant framework and antibodies of the buyer.

Innovation of a Motorized Corn Sheller.

A pedal-type corn sheller has been overturned into a fuel-operated corn sheller. The mechanized corn sheller can deshell 500 kilograms of corn input in 60 minutes. It guarantees real-time inventory and production of corn.

Production of Honey with Pollen as Food Supplement to Boost Immune System.

A consumption of honey with pollen was shown to be useful to the respiratory and stomach-related system. As a food supplement can be cooperative to support a resistant system and keep the respiratory tract healthy.

The case of Smokey Mountain

Smokey Mountain is an enormous landfill that has operated in Tondo, Manila for a long time. There are many individuals living in and around the landfill as scroungers, collecting food and fundamental things and necessities that can in any case be eaten or sold for cash. As the place was seen as representative of extreme poverty in the Philippines, the government shut the landfill for good in the last part of the 1990s (Nikkei Asia, 30 Walk 2021). Be that as it may, while certain scroungers moved to others alongside landfills to look for anything of significant value, regional individuals are searching for recyclable things at Smokey Mountain. Thusly, individuals at the landfills on the whole made their institutions to keep social control for living. In Smokey Mountain, an informal market for trading collected consumable food and useable recycled items. There are volunteers appropriating donations to fabricate houses, schools, and clinics regional, and different workers who make fundamental security frameworks in the landfill to battle off dangers from hoodlums and other savage powers. In such an environment, numerous sorts of practical innovations are operated from useable reused things. For example: meeting clear fiberglass as rooftop pieces; utilizing 'liter of light' - a jug loaded up with water and fade fitted to the rooftop to refract daylight for illuminating houses, and improvised light railroad carriages to ship travelers along train tracks for small costs. Volunteers have been assuming various parts in completing innovation initiatives in Smokey Mountain and others alongside landfills. These include volunteers with engineering knowledge, university academics working closely with NGOs, teaching science to children, Gawad Kalinga sharing farming knowledge, doctors and nurses training community leaders.

Tondo Community Initiative (TCI), The Philippines

TCI is a collaborative initiative drive in Tondo, Manila, working with Stairway Infrastructure, Starfish Education, and various community institutions. TCI is a

Filipino non-profit organization that is at present completely funded by Firetree Philanthropy (Wilkinson, 2021).

Firetree Philanthropy subsidizes individuals, grassroots institutions, and institutions that are constructing more inclusive, evenhanded, and only prospects in the communities in which they collectively work.

TCI key program areas for 2020 can be ordered into the accompanying (Wilkinson, 2021): Disaster and Fire Response, COVID-19 Response, Educational Programs, Livelihood Programs, Direct Services, Networking Building. Herewith are a few insights concerning grassroots innovation in some of those projects.

Drop-in Centre

The drop-in centre gave a place of refuge to children where they can play, learn, and connect with peers. It likewise filled in as a space where they can practice legitimate cleanliness, get rest, and eat nutritious feasts. Children age 5 or more came to the Centre for arranged activities and associated with their peers with the help of staff. Activities in the Centre included indoor sports, open-air sports, sports, music, and innovation. Children were likewise ready to get to a library where they can peruse, compose, study, or make workmanship.

Continuous Learning during Community Quarantine (Children)

The program has two stages: home based learning (stage 1) and small meeting learning meetings (stage 2).

In stage 1, the kids and their parents were provided learning packs that contained a drawing book, composing and shading materials, and activity plans that focused on proper hygiene and freehand/structured composition. A meeting visit on Facebook Courier was set up in the event that they have any inquiries, or can want to share their children's results. A "dropbox" system for sending in assessment and criticism

questions was put up together to consistently get input from the parents with with minimal to no contact involved.

Stage 2 gave children learning amazing opportunities through conversations on Coronavirus, expressions, and artworks, and kids sharing their encounters. The small meeting learning meetings followed health conventions, for example, temperature perusing, hand disinfecting, and physical removing.

Livelihood Programs

TCI cooperated with Chaotic Bessy to provide available business education valuable opportunities to Tondo youth and lift their seriousness. Muddled Bessy is a social Project. Through the program, youth members get close enough to full or fractional grants to education schools where they can develop professional skills like culinary expressions, food and drink, and housekeeping.

Birth certificates processing

TCI has likewise straightforwardly helped with handling 233 birth authentications, of which 87 have proactively been effectively delivered. By assisting families with getting birth testaments, kids have had the alternative to practice their entitlement to secure their names and ethnicity and appreciate public services.

Yayasan Inovasi Malaysia (YIM) grassroots innovations

Nakutip: collection of the oil palm fruit

The oil-winning process, in a rundown, includes the meeting of new fruit packs from the farms, cleaning and sifting of the packages to free the palm fruit, and pounding the leafy foods out of the crude palm oil. The crude palm oil is additionally treated to sanitize and dry it for storage and export.

The change from rough palm oil to refined oil involves removal of the products of hydrolysis and oxidation, colour and flavour. In the wake of refining, the oil can be

separated (fractionated) into liquid and solid phases by thermo-mechanical means (controlled cooling, crystallization, and filtering), and the liquid fraction (olein) is used extensively as a liquid cooking oil in tropical climates, competing successfully with the more expensive groundnut, corn, and sunflower oils.

Endeavors to automate and further develop conventional manual methodology have civilly centred on eliminating the monotony and drudgery from the crushing or beating stage (assimilation) and working on the proficiency of oil extraction. Small technological, mechanized digesters have been developed.

Cervisafe - LaDIY

Cervical cancer growth is the fourth frequent cancers in women with an expected 570,000 new cases in 2018 addressing 6.6% of all female tumors as per the World Health Organization Health Organization (app.ata-in addition to site). Early recognition, screening, and vaccination can diminish the gamble of getting malignant growth by 70%.

The current methods of detection are the Papanicolaou (Pap) tests and the more specific Human Papillomavirus (HPV) tests that are conducted in clinics and hospitals.

Current brands are on the lookout, however simply ready to direct either the Pap or HPV tests, while our product, the Cervisafe (today LaDIY), is pointed toward leading the two tests in a single unit. Also at present, tests must be led by means of meetings with clinics or hospitals.

The product addresses the aspects of privacy and convenience issues for women to get these tests done on a regular basis, which accounts for late detection or inadequate detection frequency.

The product addresses the aspects of privacy and convenience issues for women to get these tests done on a regular basis, which accounts for late detection or inadequate detection frequency.

Cervisafe is a 'DIY' Pack that provides food for 'Protection and Comfort - use at home', to test for both Pap and HPV. The device separates cell tests for both Pap and HPV tests in the comfort and security of the client's home. In the future, the test pack

will be able to provide initial prognosis of conditions that can be followed up with a more detailed analysis at clinics or hospitals.

LaDIY aims to be a perceived worldwide leader in conveying quality and comprehensive healthcare and medical solutions, comprehensive healthcare and medical solutions, comprehensive healthcare and medical solutions to improve personal satisfaction fundamentally.

Nano maker kit

Telekom Malaysia Berhad (TM) under its Corporate Responsibility (CR) initiatives leads a program called TM Nano Producer Unit, including a few schools around Kuala Lumpur and Selangor. what's more, upheld by Faculty of Creative Multimedia to advance and upgrade the schooling community particularly educators who are showing STEM subjects, for example, Math and Physical science utilizing multi-sensors PocketLab. That occasion occurred in Manchester Metropolitan University (MMU) to show instructors how to utilize that new estimating device to teach science subjects (tm site). It's a device for learning to measure force, weight, mass, distance. multi-functional tools through stem, teaching tool. This innovation-situated program is a drive-by TM to inculcate interests in science and technology among the students. The program additionally denoted its proceeded with responsibility in promoting education excellence and engaging the learning of STEM in the classroom. The TM Nano Producer Unit saw interest in excess of 300 students from 10 schools around Kuala Lumpur and Selangor. The schools in question, which filled in as the pilot group were SMK Dato' Onn, SM Sains Banting, SMK Keramat Wangsa, SMK Batu Laut, SMK Bandar Tasik Selatan, SMK Bandar Seri Putra, SMK Bukit Kucing Tengah, SMK Saujana Impian, SMK Dengkil and MRSM Sungai Besar.

Asmawati Anifiah, Banana d'craft paper

Pn Asmawati Anifiah, who at first was selling banana chips, produced herself and thought of making a container utilizing banana stems as her native place, Kota Marudu is the greatest banana fabricating district in Sabah (facebook site). This thought was started through a video on YouTube of making papers utilizing banana

stems. In any case, the result unsatisfied Pn Asmawati as the crate concocted was not strong.

New expectations flushed inside Pn Asmawati when she joined the MaGRIs competition facilitated by Yayasan Inovasi Malaysia. YIM recognized the innovation on banana stems as an incredible chance to move her towards a more elevated level. Among the help provided by YIM is to provide skills from local universities to improve the innovation.

Beforehand, the paper imagined was dusty and torn without any problem. By adding impetus fixings, the paper delivered is tougher and has great quality. This led Pn Asmawati to deliver more product varieties, for example, treats sacks, and boxes of various shapes and sizes.

Ez efinity, water filter

Efinity Ez Water Channel Cap is an innovative product that interfaces water channels, drink vases, and hand siphons (fortomorrow site). With the strain of the hand siphon, the water in the jug is driven into a ceramic filter and the filtered water can be drunk instantly. The filter system can produce up to three liters of filtered water in one minute. The activity of the water filter system is as follow: Fill the container with unfiltered water, close the jug with Efinity Ezy water filter cap, connect the vacuum apparatus pipe into the cap tube inlet and ceramic water filter pipe into the cap tube outlet, start pumping to filter the water. This technique is appropriate for use where there are no power and faucet water supplies. This product has previously been used by a few communities in Malaysia and has likewise gotten consideration from good causes abroad in Sri Lanka, Cambodia, and Bangladesh.

Grass-cutting Machine for Pineapple Farming

A retired soldier and presently pineapple farmer from a small town who enhanced a basic grass-shaper that empowers quicker cutting of grass weeds without harming the pineapple (Help Kwee, 2019). A basic grass-cutting machine, with the sharp edge and metal plate of a typical grass shaper, has been changed to cut grass without harming

pineapple fruits in the manor. Expanded effectiveness of grass cutting at pineapple manors, for example, quicker and less difficult contrasted with the regular act of utilizing a sickle blade. Until now, the designer has delivered nine different machines for working on the efficiency of pineapple manors.

Mini Hydroelectric Dam for Rural Electrification

A villager designed a small hydroelectric dam to provide a less expensive power supply to his village (Shelter Kwee, 2019). A small hydro dam for rural electrification use scrapmetals and spare parts of unused vehicles. It is based on a simple turbine connected to an engine, gear box and dynamo. Enabled 24-hour electrification for several households and provided a cheaper way of generating electricity compared to electric generators. There have been solicitations to duplicate the innovation in different sectors.

Paddy-Dispensing Machine for Paddy Plantations

A welder and later a paddy farmer who concocted a paddy dispensing machine produced using scrap metals and spare parts from unused vehicles (Help Kwee, 2019). The paddy dispensing activities in the town changed from a labour-intensive manual process to a motorized one, expanded the efficiency of paddy-farming activities from 2 weeks to 2 days. The inventor sold over 100 units of the machine to nearby districts.

Social Innovation Platform (SIP), Thailand

A-chieve, to support students

There are a lots of students who aren't able to confidently decide their own future because the lack of understanding about themselves and career guidance in school. By offering the vocational data and direction as well as creating education curriculum, A-chieve expects to help students across Thailand to have the alternative to pick and lay out their objective and future vocation with certainty that matches with their talents and life value.

A-chieve offers free web-based data on profession direction, and vocation manuals, as well as leading workshops with the mean to provide students with genuine involvement in different livelihoods in real working places.

Local Alike community-based tourism

Voyaging is one of the most amazing ways of seeing the world from new viewpoints. Local Alike is an alternative tour operator that offers a socially mindful travel industry that respect to local cultures and traditions (regionalalike site). Around 70% of the net benefits of the visit go to a community fund for different improvement projects. Local Alike works with regional communities and institutions to make the best encounters for everyone.

Local Alike coordinates the clients with local communities and responsible tour operators instead of simply matching them to one tour guide. This is called the community-based tourism, a type of tourism that permits local residents to be involved while underlining community improvement.

Asiola, online herd funding platform

Asiola is an online crowdfunding platform organized for Thailand, where inventive and community-centered thoughts can be rejuvenated with contributions from a community of supporters (asiola site).

The platform launched in 2015, is operated to help innovative and community-driven thoughts in Thailand. The point of the pioneers was to provide a way for juvenile plans to accumulate consideration and get financed. Through Asiola, it is sustainable to help the innovative and making creators who want to make a positive impact in Thailand.

Asiola offers a platform for artists, creators, innovators and entrepreneurs alike. Asiola's vision is to provide a platform to thoughts value supporting and interface makers of thoughts with a group of people. Allies get prizes as a trade-off for their commitment towards the mission's financing worldwide and on the off chance that a mission is effective, rewards are conveyed and the mission is executed.

Change Fusion, support social enterprises

ChangeFusion is a Bangkok-based organization that grows social business people for inventive and practical change (changefusion site). The organization reinforces the ecosystems of social enterprises in Thailand and Asia. Its portfolio of enterprises is working in various areas like web and mobile tech, sustainable farming, manageable the tourism industry/community-based tourism, sustainable medical care, community-scale renewable energy and fair trade. ChangeFusion is a non-profit organization under the Thai Rural Reconstruction Movement Foundation under the Royal Patronage.

ChangeFusion's model spotlights offering help to social projects in the space of mentoring, investing, and networking. Under 'mentoring', the organization advises and coaches social enterprises on their business strategies, social impact measurements, marketing including branding and design, and partnership development among others. As far as investing, the organization upholds the social projects economically through suitable subsidizing programs in light of the transformative phase of the singular social Project.

Inter American Infrastructure (IAF), Pennsylvania USA

IAF is an autonomous U.S. assistance agency made by the Congress in 1969 that straightforwardly puts resources into community-led grassroots innovation across

Latin America and the Caribbean (IAF site). The IAF grants small grants to civil society institutions that advance inclusive economic flourishing. The agency engages local leaders, innovators, and entrepreneurs in underserved areas to make their communities more prosperous, peaceful, and democratic.

Craft Coffee, Nicaragua

The best coffee grows in remote areas at high altitudes. The ready cherries are hand-picked over a four-month harvest period (Walsh, 2008). Farmers eliminate the thick tissue before the beans are moved to a factory for additional handling, research, reviewing, arranging, and sale. Coffee as a commodity is most valuable when it is sold in the wake of having been handled, evaluated, and arranged.

IAF grantee Sociedad de Pequeños Productores Exportadores y Compradores de Bistrot (SOPPEXCCA), comprising 15 coffee cooperatives in the department of Jinotega in northern Nicaragua, is assisting its 650 farmers with climbing the value chain by further developing their coffee quality and their capacity to handle top-notch beans and sell straightforwardly to the commodity market. As well as promoting better farming techniques, SOPPEXCCA has put resources into a state-of-the-art laboratory which tells farmers how their coffee measures up to international standards and address any imperfections that may reduce the value. The quest for quality has previously procured a few SOPPEXCCA farmers' good grades in the yearly Nicaraguan Cup of Greatness competition. In the community of La Perla, SOPPEXCCA constructed an "Organic" wet plant, which shields beans during depulping, subsequently settling a huge issue in quality control. The factory additionally diminishes pollution in the local water sources caused by the traditional depulping and fermentation process.

Cooking under the Sun, Guatemala

A small group of women most of them of Quiche or Kaqchikel ethnicity, organized as Amigas del Sol (ADS) to confront the daily challenges of rural life (Toasa, 2012). They centred on cooking fires that consume up to 18 percent of the family spending plan, cause consumption, speed up deforestation, and open whole families to

respiratory sicknesses that incorporate pneumonia, real-time bronchitis, and even cellular breakdown in the lungs. Families in need of money frequently send kids to harvest firewood when they ought to be in school. ADS helps community groups build ovens fueled by a more abundant source of energy—the sun. First developed by Siam Nandwani, a Costa Rican college teacher, the design was improved in the late 1980s by Bill Lankford, an American physicist. He constructed a solar broiler, confirmed that it worked and founded the Central American Solar Energy Project (CASEP) to promote its use.. Word of the invention spread after Lankford manufactured a second broiler at the encouragement of Jan Gregorich, a pious devotee doled out to a ward on Guatemala's southern coast. The primary broilers, developed by master craftsmen, were ignored by the very individuals for whom they were expected. The important point: Clients must put resources into them, meaning the actual cooks needed to construct the stoves. Women learn about ADS through word of mouth. The people who need to present the innovation in their communities should persuade ADS of their commitment during a mandatory six-month trial period. As a group, they receive an oven on loan and learn to cook with it, confirming in the process that local climate conditions are suitable. Workers from ADS visit unannounced to check that the broiler is being utilized. The groups that go on with the program endure fourteen days constructing their stoves. During this time, women ace the utilization of saws, screwdrivers, glass cutters, and paint brushes. Women in the program tweaked the design, adding a storage compartment, a sliding shelf for their pots, and wheels and handles that let the oven move like a wheelbarrow. They likewise expanded the size to accommodate an entire meal for a typical indigenous family.

Covid-19 inclusive innovation Viet Nam

Coronavirus inclusive innovation in Viet Nam is highlighted by cooperation (UNDP Viet Nam, 2020). Here, we present four of these coronavirus innovations, the NCOVI application, test units, rice ATM, and the pink pastry kitchen innovation.

NCOVI application

Vietnam Posts and Telecommunications Group (VNPT) helping out the Ministry of Data and Communications (MOIC) and the Ministry of Health to send off the NCOVI

application which provides the most recent and official data on Coronavirus cases in Viet Nam and overall and shows the sectors of Coronavirus diseases in Viet Nam.

Test kits and antibacterial masks

The combination of state-led, academic and entrepreneurial efforts resulted in three research teams developing affordable Covid-19 test-kits by early March 2020. Also, the amalgamation of the government's timely approval of non-medical anti-bacterial masks and textile firms changing production came together to ensure sufficient supply of personal protective equipment.

Antibacterial veils In the midst of the Covid pandemic in Viet Nam, numerous textile businesses shifted to producing antibacterial masks to serve market demand.

Since early February 2020, Vinatex and its members cut part of their clothing production lines to produce antibacterial masks. By April 2020, Viet Nam had delivered over 415.7 million cloth masks, fine dust masks, and two-layer fiber masks worth US\$63.2 million to US and Europe according to the General Department of Viet Nam Customs. With an annual garment export worth US\$39 billion, Viet Nam is projected to become a leading face mask exporter. As per the Ministry of Industry and Trade, there are around 50 firms proficient together in creating up to 8,000,000 antibacterial cloth masks per day. Viet Nam has additionally provided a large number of masks to numerous nations since the pandemic, including China, the US, the UK, Russia, Myanmar, Laos, and Cambodia.

Rice ATM

In April 2020, a Ho Chi Minh City-based business visionary, Hoang Tuan Anh, set up the first "Rice ATM", which provides free food to Vietnamese individuals jobless, in grassroots work to facilitate the financial effect of joblessness because of the Coronavirus. The ATM provides 1.5 kilograms of rice to every individual in the line when their advanced cell demand is handled. The primary sector is accounted for to have apportioned 5 tons of rice in its initial two days of activity and had more than 1000 individuals holding up in the line. Since its creation, different business people and charities over laid out comparable rice ATMs the nation over.

Pink bakery

Pink pastry shop in light of the call by the Ministry of Industry and Trade (MOIT), both businesses and citizens joined the work to save farming products - mostly dragon fruits and watermelon - that were stuck at the line of China after Viet Nam shut down a lot of its trade with China due to Covid concerns. Subsequently, a pastry specialist, Kao Sieu Luc from ABC bread shop, made the “pink bakery” movement, which utilizes mythical dragon fruit in the production of bread, so the product does not go to waste. This made a recent fad of baking "pink food" in the country, from KFC mythical dragon fruit pizza bases and so on, is assisting farmers with selling their produce. The pink bread was a moment sensation in Viet Nam and its notoriety constrained ABC bakery increase production to 20,000 loaves of dragon fruit bread a day.

HBNCRIIA grant, India

Dogs against gender violence, Andrea Mosquera, Ecuador

Andrea lady with a handicap (cerebral paralysis) was attacked in a park by a man who had followed her. At the point when she was carried down to the floor, unexpectedly a dog moved toward them and woofed stubbornly to the point that the assailant needed to let her go. From this experience, Andrea financed ARNV (Non-violence Rapid Action), a foundation that trains street dogs to protect battered women who have a restraining order.

Caza Mosquitos, mobile application to identify mosquitoes, Joaquín Cochero, Argentina

Caza Mosquitos helps prevent vector-borne diseases transmitted by mosquitoes such as dengue, zika and yellow fever.

Anybody can send photographs of insects through the mobile application or the project's website; a group of specialists will assist with distinguishing it, and contact

the client to provide any proposals. The application contains data on the most proficient method to perceive *Aedes aegypti*, the primary vector for dengue, yellow fever, and zika.

The application likewise directs the member to inspect their organic entities for any potential mosquito-rearing spots, to make direct moves on their end, and to impart their experience to the remainder of the community. Members can likewise collaborate to direct aggregate systems to decrease mosquitos in their sectors.

Since its underlying send-off in 2017, the Caza Mosquitos mobile application has had over 3500 enrolled clients that have contributed with more than 600 reports of mosquitos from everywhere in the country.

Dharambir Kambo, Machine to extract kernels, India

Dharambir Kambo designed a machine that assists individuals to extract corn kernels and corn milk easily. One needs to simply place the corn into the machine and the kernels will be ready at the other end. Likewise, there is a grinder related to the setup which crushes the kernels to milk if needed. to the set up which grinds the kernels to milk if needed. One person can extract kernels from nearly 200 corns in an hour.

Grassroot innovation programme, South Africa

Siphiwe Zuma, Reinforced and Moulded Plastics Technology Station (RMPTS)

Siphiwe Zuma from Inanda, in KwaZulu-Natal, was upheld through the RMPTS at the Durban University of Technology.

His idea developed from a car accident, which left him disabled. This experience motivated his innovation of a wheelchair fitted with an umbrella holder. The retractable umbrella can be retrofitted to a wheelchair, shielding the client from the downpour or hurtful UV beams. The umbrella's system permits the client to pull a tie to open the umbrella and change its level and withdraw the gadget back into the holder connected to the wheelchair.

Thulani Khumalo, Prev Leak Plumbing mobile application

Thulani Khumalo from Soweto, founder of Technical Plumbing Solutions (TPS), developed an innovative answer for recognizing and reporting sewage blockages and missing sewer vent covers. His Prev Hole Plumbing mobile application encourages easy reporting, improving service delivery in the provision of clean water and proper sanitation.

Philasande Bongo, a Digital platform to trace lost or stolen appliances and devices

The digital helps families and institutions to follow lost or taken apparatuses and devices was developed by Philasande Bongo of Johannesburg.

The digital platform provides gives appliances and devices a unique online profile and history that permanently links it to the owner. The ink makes it workable for these things to be followed and recovered on account of misfortune or robbery.

Alton junior Maropeng, S-Fund, an online grocery shopping platform for students

Alton junior Maropeng from Johannesburg, developed S-Fund, an online grocery shopping platform for students to remotely buy their food and have them conveyed straightforwardly to their doorstep, giving them sufficient opportunity focus on their studies.

Sisanda App Universe

Sisanda Application Universe permits students to perform science tests utilizing the camera of their cell phone or tablet. This was developed by Mbangiso Mabaso, a 30-year-old from Botshabelo in the Free State. This heap of science applications can be utilized by grade 4 to 12 students and makes science drawing, for entertainment only and available to a large number of students.

TerraClear Ceramic Water Purifier (CWP)

CWP is a zero-emissions, place-of-purpose ceramic water cleansing framework (terraclear site). The product comprises a pot-formed ceramic filter set in a plastic repository tank with a cover and nozzle to shield sifted water from repeated pollution. Ceramic filtration is the utilization of permeable ceramic (terminated soil) to filter microorganisms or different impurities from drinking water. Crude water leaks through the clay channel component by gravity at a post-production of 1.7 to 3.5 liters each hour delivering edible water.

The CWP can filter up to 55 liters each day and store up to 36 liters of safe water in the repository tank. Upkeep comprises scouring the ceramic filter component to unclog pores and washing the container tank to forestall bacterial growth. The filter is taken care of by gravity and the replaceable spigot is the only moving part.

The actual filters are kiln-fired clay impregnated with colloidal silver. TerraClear makes the filters components at a reason-constructed plant close to Pakse, Lao PDR. Regionally obtained clay and rice husks are ground to a particular size and blended at exact levels. This exact earthenware combination of clay and rice husks is then formed into pots and terminated in a furnace. During the firing process, the rice husk burns and creates the extremely small pores which, due to size exclusion, act as physical barriers to micro-organisms, making the filter effective at removing bacteria, protozoa, helminths, turbidity and other suspended solids. After firing the filters are brushed with colloidal silver, mixing the soil pores to provide a super durable, alternative guard, which when utilized accurately eliminates more than the vast majority of bacteria. The earthenware filter component has a possible valuable existence of 7 years or longer. Life expectancy mostly relies upon the nature of the info water and the consideration taken to stay away from breakage.

The Honey Bee Network in Kenya

Herewith adaptations of honey bee network grassroots innovations to Kenyan environment (Gupta, 2019).

The Bullet Santi from India to Kenya

Mansukhbhai Jagani is a mechanic from the district of Saurashtra in Gujarat.

Draft animal power was becoming an unviable way to complete farm chores such as weeding, making ridges, spraying pesticides and hauling loads.

The Bullet Santi started out as an attachment behind a motorcycle used for the light farm work listed above. Though his innovation was patented with the help of GIAN and SRISTI in both India and the USA, Mansukhbha.

The innovation for the Slug Santi was moved to farmers through Jomo Kenyatta University of Agriculture and Technology (JKUAT) Kenya under a USAID-funded project.

The Slug Santi was developed for the level, sandy topsoil soils of Saurashtra. Reversely, the district of Kenya where the innovation was centred had heavier, more profound soils and undulating landscapes, which demanded higher force, more prominent security, and more noteworthy ground leeway for the equipment.

Training visits were coordinated with the assistance of the Network for Kenyan engineers, producers, mechanics and other stakeholders to collaborate with Indian innovators. The Santi was eventually adapted into a small tractor and the design was approved by the Kenya Bureau of Standards.

Kenyan mechanics learnt to assemble the Santi and were shown supply chain management, including sourcing, assembly, maintenance and repairs.

The host institution, JKUAT registered a local enterprise, Kilimo Tech Machineries, to produce and market cost and labor-saving innovations to farmers.

A council of regional partners working together, including the JKUAT and the authorities of the Kenya Department of Norms (KEBS), was set up to develop a principles system to create and sell the small work vehicle utilizing funding from business banks. When the norms were provided, a demand for 20 farm tractors was put to SRISTI to acquaint the product with the market. The farm truck was provided a regional name, the Shujaa, mirroring its Kenya-specific plan.

The tractors were imported from Saurashtra in India while courses of action were made to produce and source parts locally.

Jua Kali

The word Jua Kali in a real sense deciphers as 'warm sun' in Swahili and Kenya is utilized to allude to the informal sector of brokers and entrepreneurs running shops in the city or open market sectors (ILO, 2022). The sector provides work to 83 percent of the functioning populace of the country.

Jua Kali is a group of brokers and craftsmen with a large number of skills, including carpentry, metal work and welding, shoe fixing, fitting, vehicle fixing, plumbing, and numerous others. In the Jua Kali sector, the execution of work and movement of information additionally follows an informal methodology. In Kenya alone, they provide work to around 10 million individuals.

Here certain grassroots innovations are distinguished by the SRISTI group.

Simon Chelegoi, a Jua Kali, from Bomet

Following 25 years of tedious work, Mr. Chelogoi has had been able to come up with different machines. Among them is the grinding machine which he uses to grind scrap metals.

Mr. Chelogoi additionally saw an open door in the field of carpentry. This inspired him to make a wood-moving machine that is utilized by the craftsmen inside the sector to smoothen and move their wood prior to utilizing them. Different innovations incorporate the regionally made posho-mill, water siphoning machine that siphons water from 40 feet deep.

James Kitolo, Bicycle parts

James Kitolo,

farmer and mechanic from Machakos, Kenya, developed farm attachments for the larger Shujaa county developed multiple innovations using bicycle parts. His machines include a carving machine, a flour mill, a chaff cutter, a knife sharpener and a drilling machine.

Eric Ronoh, kiln for smelting aluminium.

Eric Ronoh heused the cycle mechanism to develop a kiln for smelting aluminium. In this arrangement a large bicycle wheel turns an air pump that provides air pressure for the furnace to smelt aluminium. He has been trying to increase the furnace temperatures to smelt other metals.

Berkeley-Darfur Stove, Darfur, Ethiopia

The Berkeley-Darfur stove is designed through a partnership with the Lawrence Berkeley National Laboratory, Oxfam America, and Shri Hari Enterprises, an Indian parts maker, to produce stove flat-kits, which are then transported to Port Sudan (techxlab site).

The local partner, Sustainable Action Group (SAG), a registered Sudanese charity, collects the flat kits and brings them overland to El Fasher, Darfur, where they manage stove assembly, distribution, training and. Local assembly creates business opportunities for SAG, economic opportunities for local Community-Based Organizations (CBOs) and Women's Development Associations (WDAs), and employment opportunities for local displaced people.

Specialists have found that giving a protected, energy-efficient wood-consuming cookstove to those in the creating scene can straightforwardly further develop health by lessening smoke inward breath, and mitigate destitution by decreasing how much time is expected to assemble wood consistently. The Berkeley-Darfur Oven achieves this with an enhanced design featuring a tapered wind collar, small fire box opening and nonaligned air vents and ridges. Potential Energy, a nonprofit organization that specializes in adapting technology for developing countries, has distributed more than 25,000 Berkeley-Darfur Stoves in Darfur and Ethiopia.

The Potters for Peace (PFP) filter (PFP), Nicaragua

Consistently 1.7 million individuals, basically kids younger than five, kick the bucket from looseness of the bowels which is brought about by drinking debased water (pottersforpeace site). The target of the PFP Water Filter Project is to make safe drinking water accessible by aiding set up workshops that utilize local materials produce ceramic water filters. These filters are low-tech and minimal cost and eliminate approximately 99.88% of water-born disease agents.

Beginning around 1998, Potters for Peace has been aiding in the production of a low-tech, low-cost, colloidal silver-enhanced Ceramic Water Purifier (CWP) throughout the world and ceramic water purifiers based on the Potters for Peace technology package are now produced at over 50 independent factories in over 30 countries. These filters are the highest-rated product for rural point-of-use water treatment (Smart Disinfection Solutions, 2010).

PFP is a US and Nicaragua-based NGO that technologies the window box-fired filter configuration by giving technical help to institutions keen on laying out a filter plant. PFP has helped with laying out filter making plants in numerous nations. When the filter production line is laid out, the industrial facility markets the filters to NGOs who then, at that point, integrate the filter into their own water and disinfection programming.

The main PFP filter plant, in Managua, Nicaragua, was built utilizing private donations. One of the biggest clay filtration programs is in Cambodia, where two NGOs both operated with PFP to lay out filter production lines.

Most ceramic filters are successful at eliminating microscopic organisms and the bigger protozoans, yet not the viruses. Studies have shown significant bacterial contamination when poor-quality locally produced filters are used, or when the receptacle is contaminated at the household level. Ceramic filtration programs have been implemented in over 20 countries.

A 60-70% decrease in diarrheal sickness occurrence has been reported in clients of these filters.

Associação Ashaninka do Rio Amônia Apiwtxa (Apiwtxa), 3D-mapping technology, Brazil

For some groups who live in the Amazon rainforest and experience deforestation and Fund double-dealing, that frequently implies their ways of life are threatened (McCarthy, 2017).

The Ashaninka nation of Northwestern Brazil has adopted an innovative policy to protect its property and culture. To shield their 87.205 hectares of land, Apiwtxa utilizes 3D- mapping technology to comprehend what regions are in danger and where Funds ought to be conveyed. The group additionally utilizes more old fashioned techniques for protection. Educational centers throughout the region help to promote respect for indigenous culture and the land and instill a sense of activism into the youth. The group has also developed a robust trading network for non-timber forest products to sustainably harvest the Amazon.

Public Infrastructure “Zhassyl Azyk, soil degradation, Kazakhstan

In Kazakhstan, soil degradation was representing a danger to livelihoods in rural regions. So five farming communities met up to restore degraded lands by sustainably growing alfalfa.

Alfalfa improves nutrients and water take-up inside the soil counters the impacts of chemical-heavy monoculture farming and provides livestock an additional source of food. In general, the methodology has further developed soil quality, supported local income, made in excess of 200 jobs, and propelled the public government to carry out an national program.

Inclusive Innovation policy

Inclusive innovation offers the prospect of creating broad based economic prosperity within places, drawing wider sections of society into productive and valuable work.

We present selected cases in Asia and Africa. The institutional inclusive innovation initiatives are focused on funding Tech-Enabled SMEs and entrepreneurial/innovation ecosystem capacity. The main areas covered by those programs are productive and market-integrated smallholder agriculture and end malnutrition.

Large segments of the populace face infrastructural obstructions to beginning innovative firms, working in innovation serious sectors, or profiting from the utilization and dissemination of innovations (Lee and Metro Entities, 2022).

Past grassroots innovations and inclusive innovation are an amazing chance to extend market reach by taking advantage of underserved markets with better designated and customized products.

Inclusive innovation offers the possibility of creating broad based economic prosperity within places, bringing more extensive sectors of society into useful and significant work and guaranteeing they benefit, both straightforwardly and by assisting with guiding innovation action to shared challenges.

The National Endowment for Science, Technology and the Arts (NESTA), the UK agency for social goods, suggests that innovation approaches are inclusive when they are worried about who benefits from innovation, who partakes in the making of those innovations, and who settles on the needs and deals with the results of innovation (nesta site; Lee, 2019).

In 1998, was launched a statutory transmit to advance ability, imagination, and innovation in science, innovation, and human expression. NESTA 's attention was generally on empowering supported individuals to develop unique thoughts and popularize them.

In 2012 NESTA focus moved towards innovation for the public advantage. This saw an extension of Nesta's work in the public and voluntary sectors, including the creation of initiatives, for example, Neighbourhood Challenge, Social Venture Intermediary Fund, and People Powered Health programme.

Over the course of the final part of the ten years, the NESTA procedure centred on five key areas: Health, Government Innovation, Education, Arts and the Creative Economy, and Innovation Policy.

Institutional inclusive innovation initiatives in Asia

Regional Inclusive Innovation Centres, the Philippines

In July 2019, the Philippines Innovation Act was endorsed into regulation. One of its lead policy initiatives is a planned set of new Regional Inclusive Innovation Centres (RIICs), which connect government with industry and academic institutions across all regions of the Philippines to carry out market-oriented R&D and develop new products, business models and processes.

The Department of Trade and Industry has started laying out RIICs in four pilot regions, in particular Bicol, Cebu, Cagayan De Oro, and Davao (innovate.dti.gov.ph site). Every one of the pilots has an identified focused product/service to improve, to be specific: Pili for Bicol, Electronics & ICT for Cebu, processed food for Cagayan De Oro, processed fruits and functional food for Davao.

RIICs are empowering networks or platforms, either physical or virtual that intend to interface government, academy and industry together.

The RIICs assist with laying out an inclusive innovation an entrepreneurship ecosystem in the country, in the quest for the government's Inclusive Innovation Industrial Strategy.

Pasar Sejahtera waste mangement, Indonesia

The Pasar project is managed by Yayasan Danamon Peduli (YDP), a foundation created by the Indonesian private bank, Danamon (Yanuar et al, 2015). YDP endeavors to intervene in traditional markets with a cleanliness improvement program, and along with the government, particularly the Ministry of Health and Ministry of Industry and Trade, they consolidate a waste services program called Pasar Sejahtera across chosen regions in Indonesia. Making them comprehend the

essential idea of traditional markets and thens of regional trade, a few ministries distinguished the need to advance the general nature of traditional markets, as they are fundamental both for the businesses and the community. As per the Ministry of Industry and Trade, there were 13,450 markets with however much 12,625,000 vendors involved in 2007 (Kompas 2006). Expecting every merchant lives in a four-man family, traditional markets matter for in excess of 50 million Indonesians, around a fifth of the entire country's populace. The cooperation between private and government sectors is shown to be a viable measure in dealing with the market's waste frameworks.

The Pasar Sejahtera project, laid out in 2010 succeeds in better waste management system for traditional markets, which integrates a variety of technological innovations, for example, waste banks, consolidated final disposal places, and the installation of methane-delivering machines utilizing organic waste. These innovations are implemented in Pasar Baru Market in Probolinggo. Before the mediation of YDP, there was no unmistakable framework to deal with the market's loss in an environmentally friendly manner. Giving produce to 60 percent of the nation's populace, traditional markets create 20,000 tons of waste each day, which generally sums to 20 percent of total waste nationally.

Institutional inclusive innovation initiatives in Africa

The Rwanda Innovation Fund (RIF)

RIF received a support of \$30 million credit from the African Development Bank, Grand Challenges Canada, and USAID's Grand Challenges For Development. The main objective of the RIF Project is to establish an investment vehicle focused on funding Tech-Enabled SMEs and to develop the country's entrepreneurial innovation ecosystem capacity (Edoso and Thurstan, 2022).

One of the investee institutions, Veibeg - a Rwandan data-driven medical supply chain start-up - has influenced over two millions people and has succeeded to decreasing the cost of medical supplies between 20 to 40% of the market cost in three years.

818 ICT companies have requested finance support from the Fund. Of these, two got subsidizing, while two got funding, while 12 are in talks to sign the financing agreement. Priority sectors include energy clean technology and energy access solutions, smart transport and logistics, e-commerce, agri-tech, digital health, medical and technology devices, inclusive finance tech, and education technology.

It is expected to support more than 150 tech companies at various stages. It is direct jobs and over 6,000 indirect jobs over its 10-year life cycle. The initiative is part of broader efforts to realise the envisaged Kigali Innovation City, a \$1.9 billion flagship project that seeks to catapult the country into a knowledge-based economy.

The AgriFI Kenya Challenge Fund

The AgriFI Kenya Challenge Fund is a European Union initiative to help useful and market-coordinated smallholder agriculture through provision of financial support worth EUR 18,000,000 to agri- enterprises (agrifichallengefund.org). AgriFI plans to improve the capacity of smallholder farmers/pastoralists to practice environmentally sustainable and climate-smart agriculture as a business in inclusive value chains.

The Challenge Fund is subsidized by the European Union and co-supported by SlovakAid. The European Investment Bank (EIB) - under the AgriFI Kenya program - is giving long-term regional financial support to Equity Bank (Kenya) Limited for on-lending to eligible food and agriculture sector projects. Self Help Africa and Imani Development Limited are the Challenge Fund Managers.

SANKU Project Healthy Children

Due mostly to a starchy diet deficient in vitamins and minerals, over 243 million Africans are undernourished. Most of the maize flour devoured in Africa is delivered by local mill operators, who represent more than 90% of production (Sanitation Africa, 2023).

As of not long ago, be that as it may, they couldn't sustain their flours with the fundamental components iron, B12, zinc, and and folic acid, unlike most industrial millers To promote a balanced diet, the Sanku Dosifier permits the “dosing” of flour with precise nutrient ratios.

The business has so far equipped more than 300 flour mills in East Africa and intends to build 15,000 more by 2025 to serve over 100 million people.

The target of SANKU kids is to end hunger in Africa by ensuring manageable admittance to nutritious food (projecthealthychildren site)

SANKU introduced a fully-automated nutrient fortification technology (the award-winning Sanku dosifier) which empowers limited-scope mill operators to create sustained flour. The dosifier adds fundamental micronutrients into flour before it arrives at shoppers.

The plan of action permits mill operators to healthen their flour at no additional cost for themselves or their clients. Explicitly intended for small plants, the dosifier is light, effectively installable, can endure bad conditions over long working hours, and is completely prepared for real-time remote monitoring. The immediate activities are in Tanzania and Kenya, and with external implementers in Malawi and Rwanda.

Good Food Innovation Fund, Kenya and Rwanda

The Great Food Innovation Fund (GFIF) was launched in 2021 with a 5,000,000 dollar grant from The Rockefeller Installation to uphold SMEs to expand access to nutritious and affordable food across sub-Saharan Africa while likewise moderating obstructions like excessive costs, customer inclinations, and ominous policies. The Fund is managed by Intellectap Advisory Services.

Seven small and medium-scale enterprises received funding between one hundred thousand to two hundred thousand dollars each for a total of over a million dollars: Agri Farmer Centre Limited (Agriface) and Muteesa Company Limited from Rwanda. Fibered Fresh Partners, Keep it Cool, Sanku Kenya Ltd, Shalem Investments, and Smart Logistics Solutions are from Kenya (Dolapo, 2022).

Youth programme. Agrisafe Kenya limited

Agrisafe is an enterprise established to to alleviate poverty through Agri-preneurship and Trade (kenyacic site). The organization promotes beekeeping as a livelihood resilience option among smallholder producers in ASAL areas targeting men, women,

youth and people with special needs. Kenya is about 80% Arid and Semi-Arid areas (ASALS) making apiculture a fitting climate smart practice. The organization's coordinated plan of action provides end to end solutions for the value chain as such prepares, trains and provides access to modern beekeeping equipment and ready market for beekeepers' honey & other hive products (Bee venom, propolis, wax and royal jelly) thus creating economic and social resilience to the smallholder farmers.

South Africa Technology Stations programme

Technology stations programme is a network of technology stations hosted at higher education institutions in South Africa.

Herewith are the fundamental activities of two stations and the the content of the Youth programme.

Limpopo^[SEP]agro-food technology^[SEP]station (LATS)

LATS was laid out in 2007 and formally launched in 2008 at the University of Limpopo (ul site). The Station establishment was an initiative by the Department of Science and Technology (DST) through the Tshumisano Trust to improve agro processing services in Limpopo Province. The station is presently under Innovation Technology Innovation Agency (TIA).

The benefits of agro handling incorporate among others, a decrease in harvest and fruit wastage, an upgrade of food security, and improvement of jobs for low-income groups in rural areas in the Province.

The station is intended to guarantee that there is food handling data accessible, particularly to individuals living in rural areas of Limpopo Territory. And to alleviate poverty as it builds on the assets of poor people (indigenous knowledge and skills and local natural resources).

Its strategic partners are Limpopo Department of Agriculture (LAD) and Limpopo Department Economic Development, Environment & Tourism (LEDET). LATS offers its services to SME's, Agricultural co-operatives and Food Industries to help them meet the national and international product market requirements. LAT is funded by TIA (tia programme site) and catalyses partnerships to develop an enable

supporting Agro processing innovation for global competitiveness.

The African Medicines Platform (agbiz site) has developed projects in HIV/AIDS, TB, Diabetes, Malaria, Cosmetics, Nutrition, Moringa, Honeybush, Haw-Haw, Amaranthus, IK-Based Commercialisation and Nutri-veg drink.

Technology Station in rural sustainable innovation (TSRSD)

TSRSD is situated at Upington in the Northern Cape. The Station is a subsidiary of the Vaal University of Technology (VUT) Sebokeng's campus. It forms part of the VUT's Technology Transfer and Innovation Directorate. As such it is upheld by a Enterprise Development Unit (EDU); Iscor Innovation Centre (IIC); Engineering Manufacturing Centre (EMC) and Institute for Chemical and Biotechnology at the Sebokeng Campus. TSRSD offers two kinds of counseling and education services. The first type concentrates on product development and the improvement of product knowledge and skills. The second type concentrates on process improvement, and the improvement of process knowledge and skills.. The objective is to create a sustainable station, which can be utilized to expand the applied research of VUT, build research and innovation capacity, facilitate technology transfer skills to the Upington community including commerce, industry, agriculture, rural/urban and informal community settlements

Youth technology innovation programme (YTIP)

The purpose of YTIP created by the Technology Innovation Agency (TIA) is to play the connector job in supporting the improvement of new technologies by the young, which can be taken to the market to address different social and technological difficulties. What's more, it adds to following through on a pipeline of innovative technologies for various TIA programmes.

Its job is to expand the support of youth in the economy by giving subsidizing to the improvement of techno-projects (tiaprogramme site).

The Program is centred on financing and supporting youth, between the ages of 18-30, who have inventive thoughts that can establish new businesses.

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Inclusive innovations projects

Herewith we present some inclusive innovations projects developed for the customers of developing countries by companies and organisations in developed countries and by entrepreneurs in developing countries in Agriculture, Health, Transport and Energy.

Initiated by companies and organisations from developed countries

Agriculture

Herewith are a few inclusive innovations supporting farming in non-industrial nations (Seager, 2014)

Dairy hubs

Dairy hubs connect smallholder farmers to dairy processors, reducing costs and returning cash to local communities. Through this model, farmers gain higher income, education and healthier animals, while while the production of safe and affordable milk in developing countries increases. These hubs have proactively huge success in Bangladesh and Pakistan, and are being tested in India and East Africa.

Fertiliser deep placement (FDP)

On average, using FDP increases rice yields by 15-20 percent contrasted with other fertilizer application procedures like surface broadcasting and diminishes manure use by a third. Since the fertilizer is put on a deeper level at around 3 to 4 inches (7-10 cm) profundity, instead of being applied on the external layer of fields, there is less nutrient loss through water runoff or volatilization. This implies more nutrient can be retained to invigorate crop innovation and efficiency (IFDC 2013). Since the fertilizer is consistently accessible to the plant, it gets nutrient when it needs them instead of depending on the farmer to assess the right sum and times to broadcast the manures.

The Scaling Up Fertilizer Deep Placement and Microdosing Technologies, in Mali project (FDP MD), funded by the U.S. Agency for International Development (USAID) from 2014 to 2019, expanded cereal and vegetable efficiency through innovative fertilizer-based technologies while further developing resource-poor farmers' access to quality and nutritious food (ifdc site).

The FDP applied to NERICA 62N developed the most noteworthy turners and panicles numbers, prompting more yields. In the wet season, FDP essentially expanded agronomic proficiency by 39.43 % over prilled urea — PU and physiological productivity by 24.23 % (Bandaogo, 2014).

Mobile apps

The farming instructor app gives agricultural information to rural farming communities.

A mobile application called VetAfrica, developed by a product organization called Cojengo, is enabling animal health workers and farmers to accurately diagnose livestock illness and find the most effective drugs to treat the disease (cojengo site). With over 100 million farmers spread across a large number of square miles in East Africa, the developers predict massive growth of mobile and cloud tech solutions in African markets.

Another innovative app our community highlighted is farming instructor, which provides online and offline agricultural information to rural farmers and their communities

High-roofed greenhouses

Because of government restrictions, farmers in Turkmenistan often do not have access to large areas of land (Weidemann Associates, Inc, 2013). Nurseries are a good method for expanding production, although a traditional greenhouse can only grow short tomato and cucumber plants. To combat this, experts from USAid have created greenhouses with roofs of 12 feet or higher, which has been shown to double farmers' yields.

New feeding systems

Using a 'total mixed ration' has been found to reduce labour costs and increase animal health.

A better approach for feeding livestock, which includes gauging and mixing all food products into a total proportion, ensures each of the animals' supplement prerequisites is met. Utilizing a 'Total Mixed Ration'(TMR) has been found to diminish work costs, improve animal health and provide farmers more noteworthy greater flexibility with feed ingredients (nddb site).

TMR is a proficient procedure for conveying nutrients to dairy cattle and buffaloes. In conventional TMR, hacked green grub or silage is mixed with oats, cereal side-effects, protein sources, minerals, nutrients, and feed-added substances to provide adapted apportion to dairy animals. The dry TMR empowers better feed intake, decreases feed wastage, keeps up with a stable rumen environment, and further improve digestibility.

This multitude of variables together further develop ranch productivity by lessening feed costs - which make up 60-70% of total ranch costs - and amplifying milk production.

Farm management software and education

New Farm management programming is accessible that computes food apportions and draining frameworks to make ranch the board as basic as could be expected.

While this innovation is not generally open for local farmers, ranch management education has been found to have a major effect on farming output. For instance, providing cows with housing containing suitable bedding and food troughs has been shown to increase milk yield and drastically improve farm sustainability. The main five farm management programming utilized in South Africa are (multiweigh site): Multi-Weigh Nutlogger – Farm Management Software and Quality Control, Kiezo Forms – Crop Inspections and Pest Control, Cropwise Operations – Crop and

Livestock Management,Conservis – Budgeting, Planning and Recordkeeping and Fieldmargin – Farm Mapping.

Health

Embrace incubator, USA

Embrace was established in 2008 by Jane Chen, Linus Liang, Naganand Murty, and Rahul Panicker. The four originators met as graduate students at Stanford College in a Plan for Outrageous Moderateness course, where they were tested to plan a baby incubator that would cost 1% of the cost of conventional incubators (about \$20,000 in the US).

On a 2007 truth-finding excursion to Nepal and India, the group understood their plan would need to consider the infrastructural challenges in developing nations, including questionable power and restricted skills of Healthcare staff. An underlying model was developed looking like a child camping bed with a removable, heatable wax embed that forestalled hypothermia in untimely and low-birth-weight infants, which considered the capacity of the developing nation environment.

With beginning subsidizing from Stanford BASES Social E-Challenge and Repeating Green, Embrace was enlisted as a non-profit in 2008. In 2009, the group moved to Bangalore, India to additionally refine their models and investigate their Designed market. Medical preliminaries started in 2010.

In January 2012, Embrace reported a new hybrid organisational structure. A separate for-profit social enterprise, Embrace Innovations, was spun out of the Embrace organisation to handle product design, manufacturing, and sales/distribution, primarily to governments and private clinics in emerging markets.

The newborn child warmers are made out of three parts: an infant-sized sleeping bag or baby interface, a pouch of phase change material (PCM), and a heater. The pouch, when warmed in the heater and placed into a compartment of the sleeping bag, maintains the World Health Organisation (WHO) recommended temperature of 37 °C for a period of up to 8 hours. The product was designed to complement skin-to-skin care (embraceglobal site).

Contrasted with conventional incubators and radiant warmers that can cost up to \$20,000 and \$3,000 respectively, the Hug baby warmers are estimated at \$300 in India.

Siemens Fetal Heart rate monitor (FHRM)

The FHRM is a device that can monitor the heart rate of foetuses in the womb. The high end market segment uses products based on the ultrasound technology which can cost several thousands of dollars; The Siemens FHRM uses special acoustic microphones instead, making it significantly cheaper.

Although the idea was conceived and developed into a product at Siemens' Indian research Centre, it was a global effort with joint efforts across research teams in India, Germany & USA. Robust and inexpensive medical devices like FHRM helps to improve the health care of people in rural areas and has huge potential. [Siemens Pictures of the Future, Spring 2011

Robust and inexpensive medical devices like FHRM assist with further developing the Healthcare of individuals in rural areas and have immense potential.

Transport Opibus, Sweden

Opibus is a Swedish-Kenyan electric mobility company based in Nairobi (Page, 2022). It started by converting off-road vehicles to run on electric motors, before converting buses and designing its own electric motorcycle.

Opibus has roots in research by Linköping University students Filip Gardler, Mikael Gånge, and Filip Lövström, whose project involved identifying places where electric mobility could have the largest possible impact. They pinpointed Kenya and laid out Opibus in 2017, beginning their business by converting safari touring vehicles.

In January 2022, Opibus started an electric bus pilot in Nairobi, introducing installing off-grid solar power stations to charge its batteries.

In December 2022, Opibus announced a strategic partnership with Uber as part of the ride-hailing company's aim to be fully electric by 2040. Opibus will

supply 3,000 motorcycles this year and is working with a financing partner for Uber drivers to own the electric motorcycles for commercial use.

Outside Kenya, Opibus has motorcycle trials with different partners in Ghana, Nigeria, Sierra Leone, the Democratic Republic of Congo and Uganda.

Energy - Smart Energy Solutions for Africa” (SESA)

Smart Energy Solutions for Africa (SESA) is a collaborative project between the European Union and nine African countries, Ghana, Kenya, Malawi, Morocco, Namibia, Nigeria, Rwanda, South Africa and Tanzania, that aims at providing energy access technologies and business models that are easily replicable and generate local opportunities for economic development and social cohesion in Africa.

Herewith three of them.

Kenya

The demonstration implementation activities are carried out at two project sites, Kisegi, a rural village in Homa Bay county, and Katito a peri-urban community in Kisumu County. Both demonstrations are solar charging hubs that houses PV modules, central Li-ion battery storage, and balance-of-system (BoS) to increase energy accessibility for a range of electrical needs within the local community.

Ghana

The demonstration implementation activities are located in the Ga North Municipal district, which is an urban settlement, and Atwima Nwabiagya Municipal Assembly, which is a rural community. The innovation tested is biogas cooking systems to improve the knowledge, skills, trust and capacity of stakeholders in the design, construction, operation and maintenance of this clean, cheap cooking technology. Fuel is sourced from waste feedstocks.

Malawi

The living lab is situated in Mchinji region, Traditional Authority Mawvere. It provides affordable and reliable energy in one of the most energy impoverished parts

of Africa where only 13.4% of the population are connected to the national electrical grid. The innovation implementation activities will involve a portable cooker, which will be fueled from compressed briquets of residual agricultural byproducts.

South Africa

The demonstration implementation activities are situated in the Eastern Cape municipality of Alicedale and the semi-rural region KwaNanzwakazi on the edges of Alicedale. The showing innovation incorporates electric vehicle batteries and fixed stockpiling applications.

Initiated by companies and organisations from developing countries

The Rwanda Innovation Fund (RIF)

Herewith are the domains and projects supported by RIF:

Agro-business

Potatoes' Seeds incubators; Smart Egg Incubator; Co-Composting by using natural effective micro-organisms; Tunga Farm App; Intelligence agriculture and analytics for decision support; Volta irrigation; Adjustable multi-grain seeding machine automatic; Water billing and metering manual seeds planting machine system; Modern kitchen Garden; Design and fabrication of mechanically operated single wheel driven sprayer pump; Improving food safety and aflatoxin prevention through commercialization Of drycard™, A low –cost device to test food dryness and prevent mold growth on food grains; Rwanda cricket farming project; Chick sex control incubator: NJB-Electrodanes: Production of urea molasses Multi-nutrient Block ; UMMB solar-powered self-traveling irrigation machine; Processing Of vinegar from pineapple peels irrigating sky travelling prayer.

Energy

Speed bumps which produce electrical energy; Hi-Tech generation window design and development of an affordable waste water treatment technology In Rwanda and

production of energy from sludge (Bio-Gas) targeting schools and other public institutions; Landfill gas to energy facility at the Nduba Landfill Site Kigali City

Environment

Vehicle pollution restricting system, Institutional water treatment unit; Magnetic charcoal as an adsorbent of organic and inorganic pollutants for water treatment
magnetic charcoal as an adsorbent of organic and inorganic pollutants for water treatment

Transportation

Hyina Express; Solar electric car for goods mobility; Automatic LPG accident protection system

Construction

Hyina Express; Solar electric car for goods mobility; Automatic LPG accident protection system

Medical

Smart menstrual cycle mentor device; Urunigi intelligent menstrual tracker;

Instrumentation

Automatic water billing and metering system; Environment adaptive solar water heater;

The AgriFI Kenya Challenge Fund

Premier Food Industries Ltd (PFIL)

PFIL is a main food handling organization in Kenya, fabricating more than 50 unique products including sauces, squeezes, and sticks for the regional and provincial markets.

AgriFI permits PFIL to source produce straightforwardly from 1300 farmers in five provinces; Tana Waterway, Kwale, Lamu, Machakos, and Makueni sectors. The Project upholds PFIL to get a dependable stockpile of excellent mangoes during an era of rising interest yet continuous decrease in the supply of the fruit. They get and support the organization's unrefined substance supply, empower new plantings of mango trees, and will advance environment-savvy practices.

Coconut Holdings Limited (CHL)

CHL was laid out in Kenya in 2015 to claim and work two existing coconut handling procedures on the Kenyan coast: KenSIP Products Restricted and Kwale Coconut Processors Restricted. Coconut Property Restricted sells KenSIP marked and bundled coconut milk, coconut cream, coconut oil, and dried-up coconut to the regional retail market.

Coconut Property got economic help of €329,540 from the AgriFI Kenya Challenge Fund in the main call for applications and has coordinated these Funds with €354,740. This subsidizing assisted the organization with tending to sectoral difficulties, for example, flighty and occasional varieties in estimating, dependence on conventional agronomic practices, and decreasing coconut yields. 18000 cultivators are upheld by this program.

SunCulture

SunCulture delivers and conveys solar water system equipment that permits off-matrix smallholder farmers to work all the more proficiently and dependably.

SunCulture's savvy solar water system frameworks empower farmers to healthen production, alleviate organic risk and can permit producers to progress to higher-value crops. By giving cultivators excellent solar water system innovation, supplemented by altered data Services and pay-as-you-develop funding, AgriFI permits smallholder farmers to get to productive new leafy food value chains. 10000 smallholders are upheld by this program.

Olivado EPZ Ltd (OEPZ)

OEPZ is one of the world's biggest providers of organic fair trade avocado oil. The organization makes a scope of cold squeezed additional virgin oils and regular cooking oils for the eatable and corrective oil global markets. Olivado operates as a social enterprise integrating small scale farmers into international value chains for fresh avocado, edible and cosmetic grade oils.

The organization coordinates mango handling into its laid-out avocado business, giving a solid market to mango farmers and assisting to reduce post-harvest losses amongst smallholders in the sector. 10000 smallholders will partake in this program.

Ndumberi Dairy Farmers Co-operative Ltd

Ndumberi Dairy Farmers Cooperative Society Ltd is a part-owned dairy cooperative on the outskirts of Kiambu town in Ndumberi Township. The cooperative has been operating for over 50 years.

With AgriFI support Ndumberi Dairy upholds the expansion in milk production and provides a steady market for crude milk at competitive prices. 1300 farmers partake in this program.

Gum Arabic domain

66% of Kenya is arid or semi-arid land (ASAL) (Njeru, 2022). This region is quite compelling to the AgriFI Kenya Challenge Fund, a Euros 24 million program carried out mutually by Self Improvement Africa and Imani Development. When Sam Nyamboga, a visionary and business entrepreneur, learned of this Fund, he saw the enormous opportunity that an award could create for the realization of his dream. He had experienced childhood in Kajiado, an ASAL sector only south of Nairobi. Acacia trees that overflow with an unmistakable tacky fluid are a typical sight in dry regions. Walking home from school Sam would see this fluid dried into the gum and with his peers, used to rip off a portion of this from the tree rind and bite it. It was when Sam operated in Germany that he understood the economic value of this gum, Gum Arabic.

Subsequently, he applied to the AgriFI Fund and when chosen for a grant, he increase the Projects and results of his organization Acacia EPZ Ltd

This gum is utilized as a stabilizer, emulsifier, and thickening specialist in food sources and drinks as different as icing, confectionary, pop, beer, hack drops, and capsules. It is likewise utilized in the drug business as a suspending and emulsifying specialist for shampoos and syrups; in the cement, business to make sticks; in the paint business to increment consistency; and in the printing business to forestall oxidation of plates. He associated with the Kenya Forest Research Institute to find out more and with their direction, he set up his business in 2015 - Acacia EPZ Ltd - which sources, processes, research, and commodities Gum Arabic to the European market.

At the point when Sam learned of a call for strategic plans to the AgriFI Kenya Challenge Fund, which is supported by the European Union and SlovakAid, he applied and won a grant of EUR 749,155, which he has coordinated with EUR 752,999.

With the backing of AgriFI, Acacia EPZ is executing a two-year project to smooth out the Gum Arabic value chain in five Kenyan regions. Until this point, Sam's organization has laid out two regional stockroom offices for essential handling and 19 mobile collection hubs. Acacia EPZ has prepared 2,566 collectors, for the most part women, to to collect and store the gum and furnished them with apparatuses to tools to prevent injuries.

At present, Kenya delivers and produces 200 tons of gum Arabic every year, against a capability of 12,000 tons. As of October 2021, Acacia EPZ has traded over 500 tons and is looking at multiplying this in the approaching year.

Lake View Fisheries Ltd Grantee

Lake View Fisheries (LVF) has some expertise in rearing tilapia and developed a superior assortment of tilapia which becomes both bigger and quicker (Agrifi). The company currently supplies aquaculture inputs, including their high-quality mono-sex

fingerlings, to 600 fish farmers in the region. With help from AgriFI subsidizing, LVF has laid out a cage farming demonstration site where it hopes to train lead farmers on the management and production of cage aquaculture, in addition to the benefits of climate smart agriculture (CSA). With help from AgriFI, the Project expects to incorporate more than 1,000 cage fish farmers into LVF's outgrower scheme, involving guaranteed market access and access to extension support, high-quality inputs and credit.

Good Food Innovation Fund, Kenya and Rwanda

Muteesa Company Ltd.

Muteesa was laid out in 2012 by the local entrepreneur Mr. Thicien Nisunzimana and Namahoro Deborah. Their point was to further develop grain and vegetable production in the Western territory of Rwanda by connecting small grain and vegetable makers to high-value markets through value addition. Muteesa right now bought corn and carrots from local farmers, handled it into quality flour, and carrots juice packs, and offered it to rural and urban markets across the Western province of Rwanda. Muteesa is offered to different wholesalers in the Western province and the Republic democratic of Congo. Additionally, the company conveys straightforwardly to institutions like schools and emergency clinics. The primary products are white unadulterated flour, conventional quality flour, corn wheat, and carrots juice.

Smart Logistics Solutions(SLS)

Through the AgriFI project, SLS is promoting a new variety of beans 'Nyota' which is best appropriate for handling (Agrifichallengefund site).

It is a Kenya Agricultural Livestock Research Organization (KALRO) variety and is biofortified with zinc and iron. . It is also good for the farmer since it is drought tolerant and high yielding. 2000 smallholders from Kajiado, Machakos and Makueni counties participate to this program.

Shalem Invest

Product: Composite Flour and Wholegrain sustained flour (shalem site).

Objective: Create and circulate exceptionally nutritious composite flour comprised of entire Maize, Soya, Sorghum, and Millet which are known for their high energy value and wealth in protein and micronutrients.

Reserve Use: Improvement of capacity and production limit, production frameworks and processes, and quality confirmation.

By 2026, Shalem Speculations expects to arrive at 2,000,000 recipients. The organization produces 4,440 MT of invigorated wholegrain flour.

South African technology stations projects

Filter device for household water and wastewater purification

An evaluation and installation of an integrated low-tech Phytocoagulant-sand filter for family water and wastewater sanitization similar to local communities in Africa, utilizing bacterial culture tests, total solids, and turbidity among others is introduced (Yongabi Anchang, 2019). Demonstration utilizing 100 liters of exceptionally turbid water (130.3 NTU) was pretreated with 100 seeds of *Moringa oleifera* and further sifted through a sand channel drum (120 liters conveying limit) made of fine, coarse sand, charcoal, and rock. The mean total high-impact mesophilic bacterial counts, *E coli*, coliform, *pseudomonas*, and yeast counts, as well as turbidity of untreated water radically decreased to WHO satisfactory standards for edible water.

The outcomes demonstrated that the mean values of similar boundaries for sand-separated lake water alone were essentially lower than the comparing mean values acquired for *Moringa oleifera*-treated lake water.

From the findings of this study moved on to build capacities for communities in North West Region of Cameroon, through training at the Cathedral Parish, Big Mankon, Bamenda with more than a hundred participants. Four household water filters were installed during the trainings and have been in used for the past 6 years.

LANDPKS Mobile App

Nyambane A. furthermore, Ozor N.Alfred have developed the LANDPKS Versatile Application as an Instrument for Spanning Environment Data Gaps for Operated on Farming Efficiency, Land Use Arranging, and Environmental change Health - African Technology Policy Studies Network (ATPS)

LandPKS is unreservedly open and provides a prompt environment and soil data by utilization of a cell phone. This device has been utilized in different nations by farmers, augmentation specialists, land use organizers, and policy creators and the outcomes have been effective.

Dietary Phospholipids on Performance of Fish Larvae

Hafez Abdel Hamid Hassan Mabrouk investigated the job and entities of dietary Phospholipids in the Execution of Fish Hatchlings.

A phospholipid is a general term that incorporates all lipids containing phosphorus, it plays a significant part in broodstock production, egg, thusly larval and adolescent quality in marine fish incubation points. It is a significant useful dietary part expected for ideal innovation, endurance, counteraction of skeletal distortions, and, stress opposition in marine fish hatchlings and early adolescents. Dietary phospholipids are not suggested in that frame of mind than 5 g; essentially for salmon and white sturgeon, and suggested levels for marine fish hatchlings range between 2-12% as per fish species; hatchlings beginning size; taking care of era; dietary phospholipid combination and source, planning technique; basal lipid level, class, and unsaturated fats profile; thinking about that quantitative necessities diminishing with larval innovation.

Pratham's read program, India

Pratham InfoTech Foundation (PIF) is a non-profit association that works in India to bridge the digital divide, facilitate the adoption of information technologies (IT) in education, and equip disadvantaged youths with skills, tools and capabilities that new global economy demands (pratham site). Its leader program, Teaching at the Right Level (TaRL), has been carried out in a huge number of

schools and its Annual Status of Education Report (ASER) has turned into the standard of India's schooling policy scene.

At the instructional level, kids are assessed utilizing a straightforward device and afterward harvested by their learning level as opposed to their age or grade. Educators show each meeting beginning with what kids know (povertyactionlab site). This approach works best with kids in grade three or more established in light of the fact that they have some involvement with the school and are ready for the activities. For each meeting, there are activities and straightforward materials intended for assisting that meeting with pushing forward. There are activities that children do in enormous groups, small groups, and exclusively.

As a joint consequence of these components, kids can advance rapidly to the following meeting. All through the whole process, instructors survey their students' innovation through continuous, straightforward estimation of their capacity to peruse and do fundamental math. TaRL classes break free of the "chalk and talk" practices normally tracked down in grade school study halls across the world by utilizing connecting with, fun, and innovative activities zeroed in on building primary perusing and science skills. The TaRL Learning Camps in Uttar Pradesh multiplied the number of kids who could peruse a section or story.

Drawing on the progress of the TaRL approach in India, governments and non-governmental organizations in Sub-Saharan Africa are adjusting and carrying out TaRL programs in a few nations with technical help from Pratham, J-Buddy, and different partners. Since directing the TaRL approach in 2016, for example, the Ministry of General Education (MoGE) in Zambia has extended its Get Up to Speed program to 1,900 schools in three sectors. After the program was first guided in Quite a while in late 2019, TaRL Africa turned to support regionally situated realizing when the Coronavirus pandemic brought about school terminations from April 2020 to January 2021. Since schools returned, TaRL has been scaled to in excess of 800 schools across five states. In Côte d'Ivoire, TaRL Africa is supporting the Ministry of National Education and Literacy (MENA) to convey and develop the Programme d'Enseignement Ciblé (Program of Targeted Instruction, PEC). Different institutions are attempting to help states to scale TaRL-motivated programs in nations across the

African mainland, remembering Botswana, Ghana, Kenya, Madagascar, Niger, Sierra Leone, South Africa, Tanzania, and Uganda.

In 2021, TaRL programming arrived at over 1,000,000 kids in 12 African nations, and TaRL Africa, which started as a joint endeavor between between J-PAL and Pratham, registered as a Kenyan organization.

PUPA, early childhood education, Brazil

PUPA is a private company with a social mission focused on early childhood education, whose business also aims to generate value for low income communities (csrwire site). PUPA will probably guarantee that all kids in youth approach the best instructive practices and apparatuses to develop their maximum capacity, no matter what their social class and the environment in which they are. PUPA offers a group of energetic activities - newborn child tunes Mobile discs, LEGO units, books, and other toys and facilitator guides - to invigorate their mental innovation.

500,000 kids are supposed to to gain access to early childhood education in low-income areas of Brazil following a commitment by PUPA to the Business Call to Action (BCtA). The instructive organization has likewise sworn to utilize 22,000 low income women, driving likewise to quality youth improvement for more than 500,000 low income children in Brazil by 2017.

Business Call to Action is a global joint advocacy platform funded by Dutch Ministry of Foreign Affairs, Swedish International Development Cooperation Agency (Sida), Swiss Agency for Development and Cooperation, UK Department for International Development (DFID).

GrainPro® Bubble Dryer™, the Philippines

The GrainPro® Air Pocket Dryer™ is a a tunnel-type dryer that depends on solar radiation or power and the right levels of the overall dampness of the surrounding air and moisture content (MC) of the concerned product being dried. It is made out of a straightforward, UV-safe polyethylene top cover and a dark built-up PVC drying floor associated with a heavy duty (thechocolatelifelife site). Through the straightforward top

cover, solar radiation enters the evaporating chamber and warms the agrarian product being dried. Moisture is then vaporized and pushed out by the ventilators from the drying chamber. A rake mixer is also provided, which can be used in all types of terrain and a tube mixer (optional mixing device) which provides undulating motion during the mixing operation. The GrainPro® Air Pocket Dryer™ has two models. One is Solar and Electric. See the table underneath for additional subtleties. GrainPro® Air pocket Dryer™ Solar can be utilized even with flighty weather patterns/abrupt downpours. Normal drying pace of 0.5% each hour Drying time at 6-8 hours with 22-14% dampness content during completely bright conditions Works utilizing solar energy Can be utilized even with sporadic weather patterns/abrupt downpours. Average drying rate of 0.5% per hour Drying time at 6-8 hours with 22-14% moisture content during fully sunny conditions.

Nubrix Brick, South Africa

Elijah Djan has made blocks out of reused paper. With a science educator for a mother and a dad he named a 'Do-It-Yourself innovator', Djan gets his drive for innovation from. He was just three when he played out his most memorable science try for his group, utilizing a stone and water to make sense of gravity. At the point when he was five, he was competing in science rivalries with kids more seasoned than him. The thought for his innovation has been produced for over 10 years. At 11 years of age, he says he would watch his father consume a heap of undesirable course books and after a month he saw a program on TV about a lack of RDP housing in South Africa. Nubrix utilizes waste material to make elective structure technologies. The principal product is a block produced using waste paper. That is solid and has high protection properties (nubrick site).

Nanofilter, Tanzania

Experiencing childhood in rural Tanzania, teacher Hilonga experienced waterborne illnesses all through his young life. He involved his logical skill in nanotechnology

and his regional information to develop a channel in light of nanomaterials (thecivilwealth.io site).

Teacher Hilonga operated with the Ministry of Health and the Ministry of Science and Innovation to carry out his innovative water filtration framework to assist those for whom safe drinking with watering was as yet a luxury, similar to what it was for his family during his experience growing up.

Teacher Hilonga says the genuine test for any water-filtration framework is acknowledgment and conventional use by the community. Ladies have been instrumental in presenting water filtration as a component of day-to-day existence in rural Tanzania. A large portion of the water stations where the new framework is being tried are overseen by women. The drawn-out objective is to empower water decontamination in great practices across Tanzania and other African nations where rural populations experience the ill effects of waterborne sicknesses.

Tata Swach filter

In December 2009, Tata Chemicals uncovered its innovative water purifier in the Indian market which was Designed to address the difficulties looked by the purchasers getting to clean drinking water (tatachemicals site).

Tata Chemicals presented Tata Swach — the nanotechnology water purifier from the Tatas. On the earth-shattering event of World Water Day, Tata Swach is currently Launched in Karnataka after its effective rollout in Maharashtra.

Operated around a bulb-like water purifier made of normal components like rice husk debris impregnated with nano-silver particles, Tata Swach is cooperative to utilize. The product innovation has brought about 14 licenses being documented by the organization.

Tata Swach is a versatile water purifier and requires no energy or running water to work.

Tata Swach is accessible for 12.27 \$ for 18 liters limit. The replaceable channel, which closes the water supply after its cooperative life, is valued at 3.7 \$ and is great to decontaminate 3,000 liters.

Cerviscan, Cameroon

Innovation designed by youthful specialist Conrad Tankou has made cervical and breast disease screening more straightforward in rural areas of Bamenda in northwestern Cameroon (Bonny, 2020).

Cervical cancer is second with an age-explicit proportion of 1,993 new cases for every 100,000 women each year.

95% of cancer patients in Cameroon are analyzed at a high level or terminal phase of the sickness, while therapy choices are scant and the visualization is not extremely hopeful. Yet, evaluating methods for certain cancer growths are concentrated and challenging to access for individuals in distant regions. Called Gicmed, Conrad's innovation project was developed to address these problems. It is based on the use of a unique and atypical device. In particular, a telemedicine and pathology reading platform. It enables a trained doctor to collect data from patients after screening. The data is then sent to a specialist based anywhere for confirmation of a diagnosis without having to travel long distances.

According to the promoter, its impact is positive. He reported that more than 4,000 women have benefited since its launch.

Conrad's goals remain the same. It is to improve remote diagnosis for people in remote areas and to raise awareness of the importance of screening for certain chronic diseases.

It will be the same technology but more developed in diagnosing other diseases easily.

It is a question of upgrading the software and hardware to cover other pathologies which require microscopic diagnosis. Thus, to collect enough data to build applications that will use artificial intelligence.

Illuméxico, solar energy, Mexico

Illuméxico is a social enterprise that strives to eradicate energy poverty in Mexico by introducing clean technology solar systems and community development programs to marginalized communities (millercent site). By integrating last-mile marketing, microfinance options, distribution, and maintenance methods, Illuméxico has achieved a presence in 11 Mexican states, including four rural branches.

Unjani Clinics, South Africa

Unjani signifies "How are you?" in both Zulu and Xhosa. Unjani hospital run feebased services to guarantee that the business is sustainable and utilize women in communities to run the center (Chutukuta. also, Grobbelaar, 2016). Much accentuation is put on the provision of basic services in these clinics with running water, a reception area, examination facilities, a toilet and a medicine dispensary.

The facility is owned by a registered nurse and a managerial person. The model is a for-benefit diversifying model where Imperial Health Services (IHS) and partners provide start-up and growth capital. The model's well-being is demonstrated in the measurements or quantities of patients that they see and the effect they have made in these patients' lives. Scaling is occurring as the services presented by the center have extended from essential services to likewise incorporating eyewear. This represents the packaging of services for expanding income streams presented through such a facility and to make the overheads and the plan of action more sustainable. The program presently works out of 7 outlets and it has figured out how to increase through giving a more extensive scope of services.

In 2016, Johnson and Johnson turned into first corporate company, alongside Imperial Logistics, to offer funding for the Unjani Clinic initiative. Over the years, J&J has partnered with universities to provide leadership development programs and other trainings for nurses in South Africa to help sharpen their professional education. Until this point in time, J&J has financed 11 Unjani Clinics, enabling 11 attendants to become entrepreneurs. J&J as of late recharged its obligation to the Unjani Center

drive and has sworn to help an extra nine Unjani Clinics by 2021. In 2021, Bayer joined forces with Unjani Clinics and gave a grant of R4.6 million to lay out four points to elevate admittance to sustainable medical care.

Medical Diagnostech Medical Diagnostech, South Africa

Medical Diagnostech Medical Diagnostech is a Cape Town based manufacturer of low cost, quality, high sensitivity diagnostic kits for pregnancy, drug abuse and malaria (Chutukuta. and Grobbelaar, 2016). The devices are pointed intended to be sustainable, simple to utilize open for low-income communities that are confronted with jungle fever or chronic drug use. Different units are utilized for pregnancy, HIV, fertility tests. The company operates on a for-profit basis, thus its revenue is generated from sales. Malaria test kits are sold through distributors both locally and in 25 countries. For more than five years Medical Diagnostech has been effectively giving institutions quality products. The use of innovative technologies has operated with the prevalence in awareness, explicitness, and solidness of the testing packs contrasted with different units that are still being used. Some of the company's partners include the Small Enterprise Development Agency (SEDA) which helped it to facilitate the accreditation of the company and assisted the company to expand. The company has managed to scale through increasing the number of products distributed and also through a network of distributors.

BroadReach Healthcare down Referral Model, South Africa

Broad Reach Healthcare's Down Referral Model is an innovative healthcare system that reduces the reliance on the overstretched public healthcare through leveraging on the existing capacity in the private sector in treating people living with HIV/AIDS patients (Chutukuta. and Grobbelaar, 2016).

Patients are started at a public Healthcare office, the Wellness Centre, where they are stabilized for six months. Stable patients are distinguished day to day and alluded to a private center on government-subsidized treatment, in view of the geographic comfort of the patient. Drug adherence is improved through workshops, home visits adherence counsellors, SMS reminders and support groups. BroadReach Healthcare

down Referral Model works in conjunction with the Department of Health. Quality of care is monitored by Aid for AIDS, the largest Disease Management Organization (DMO) in South Africa. The program is primarily funded by donors and in kind contributions from the President's Emergency Plan for AIDS Relief (PEPFAR) , under USAID.

The Division of Health (DOH) and USAID have been helping with taking care of the incurred operational costs of the BroadReach Healthcare down Referral Model so far. The partnership with department of health has ensured sustainability of the model. The number of outlets involved has increased to 35 across the country, employing at least 49 personnel.

Powerfree Education Technology (PET), South Africa

PET is an association that mitigates the Healthcare conveyance hole by creating innovative technological devices and education apparatuses that assist to improve maternal survival and healthcare of newly born and unborn babies in developing counties (Chutukuta. furthermore, Grobbelaar, 2016). The company lobby's for the development of low-cost, power-free, and robust medical devices and learning material that help in making life saving decisions. They offer distant analytic instrument devices, for example, the Foetal heart rate monitor, and the Pulse Oximeter. PET operates not for profit however health facilities pay for the medical devices to ensure that the project is sustainable. Donors fund between fifty to sixty percent of the overall cost of the technological devices. The Grand Challenges Canada, Bill & Melinda Gates Foundation and Save the Children are also involved. PET has made relationships with healthcare experts from Wales and India who manufacture their equipment. They also have a partnership with Philips Healthcare that seeks to facilitate the expansion of its distribution to other countries as well as in commercializing the innovative Foetal Heart rate monitor. The partnership is also considered to lower production costs whilst maintaining high product quality .This will enable the devices to reach the disadvantaged communities across Africa (Alan, 2014).

Malaysian Global Innovation and Creativity Centre (MAGIC)

Cervisafe

Cervisafe set of set-tapping test apparatuses for individuals for starter screening of cervical cancer growth. Cervisafe is manufactured by LaDIY Healthcare Sdn Bhd in a joint effort with the Universiti Putra Malaysia Cancer Resource & Education Centre (CaRE) (astroawani site).

LaDIY plans to be a perceived worldwide leader in conveying quality and complete Healthcare and Medical solutions, to fundamentally improve quality of life (ata-plus site).

This device is distributed free of charge to women to help them detect cervical cancer at an early stage in about 10 locations nationwide in stages and Melaka is the sixth location and four other locations include Kota Bharu and Johor.

Early recognition and screening can reduce the risk of getting the cancer by 70%. The current techniques for detection are the Papanicolaou (Pap) tests and the more unambiguous Human Papillomavirus (HPV) tests that are led in clinics and hospitals.

Cervisafe is a 'DIY' Pack that caters for 'Privacy and Convenience - use at home', to test for both Pap and HPV.

The device separates cell tests for both Pap and HPV tests at the accommodation and privacy of the user's home. In the future, the test unit will provide initial prognosis of conditions that can be followed up with a more detailed analysis at clinics or hospitals.

Banana d'craft paper

Pn Asmawati who at first was selling banana chips, generated herself an idea of making a box utilizing banana stems as her native place, Kota Marudu which is the biggest banana manufacturing region in Sabah.

Pn Asmawati joined the MaGRIs competition facilitated by Yayasan Inovasi Malaysia. YIM recognized the innovation on banana stems as an extraordinary chance to move her towards a more elevated level. Among the help provided by YIM is to provide aptitude from local universities to improve the invention.

Beforehand, the paper concocted was dusty and torn without any problem. By adding catalyst ingredients, the paper delivered is tougher and has great quality. This led Pn Asmawati to deliver more product varieties, for example, goodies bags and boxes of different shapes & sizes.

CMI Sensori Mutiara

CMI was made in view of the essential acceptance that every citizen needs to develop self-capability and live with deference and in a noble manner through creation and availability of equivalent opportunities (cmi2u site).

Sensori Mutiara further develops educating and learning techniques, particularly for autism children.

International organization supporting grassroots and inclusive innovation

UNHCR's Innovation Service and United Nations International Children's Emergency Fund (UNICEF), UN Regional Information Centre (UNRIC), UN Equator Prize are four organizations of the UN supporting grassroots innovation. Ashoka international and Practical action UK are two examples of NGOs also involved in the promotion of grassroots innovations.

UNHCR's Innovation Ministry

UNHCR's innovation services puts resources into promising ideas in the space of digital inclusion, data, AI, environment refugee-led innovation, as well as innovation learning and storytelling.

UNHCR's Digital Inclusion program uses inventive methodologies, apparatuses, and philosophies to accomplish its objectives - empowering community-driven innovative methodologies that address identified challenges.

In 2018, the call centre and Feedback, Referral and Resolution Mechanism (FRRM) were designed and developed with the contribution of refugees who said it was hard for them to reach personnel and get a response to their issues, a challenge any humanitarian organisation can face. The original development also included input from staff, and initially involved just 14 focal points at partner organisations. The data wasn't caught in a way that could uphold text research. So when UNHCR Uganda needed to enhance the study of the FRRM's data, it contacted UNHCR's Innovation Services to assist the activity by creating dashboards that break down the qualitative data from referrals.

On the off chance that you're the exile who brought in about a wrecked water siphon, you'll be associated with specialists talking 38 dialects who records the data about your call, with subtleties expected to pinpoint your location, the issue you're having, and the telephone number from which you called.

Sierra Leone

117 began as a public hotline for maternal and youngster healthcare information yet quickly progressed to help the Ebola scourge in 2014 under the coordination of the public Emergency Operation Centre (EOC) (communityengagement site). During the crisis, paper structures were supplanted with several software solutions a few programming solutions to handle surge, and the staff was essentially increased. Whenever Ebola was contained, 117 was downsized to obtaining burial certificates, which allows for the immediate tracking of new cases as a passive surveillance mechanism.

El Jaguar - UNHCR, Central Americas

UNHCR in the Central Americas developed a communicating with communities (CwC) system that points to giving messages of direction and backing to migrants, applicants, and refugees, and space for them to communicate and provide feedback to UNHCR. The Project started as a part of UNHCR's Innovation Partnership program, in which a human-centred design and frequent and comprehensive user testing play an important role. Thusly, UNHCR attempted data and correspondence needs appraisals with evacuees, to decide their favored channels for learning about their freedoms to shelter, and for getting help. Facebook was a favored stage, with communities previously utilizing it to contact peers and friends, and family. At the point when community individuals are on the way, mobile stages including Facebook are less used due to meandering costs. As of June 2018, it has 6,000 devotees on Facebook.

FRRM Inter-Agency Helpline Uganda, UNHCR

UNHCR Uganda set up its call centre operation and also established the Feedback Referral and Resolution Mechanism (FRRM) (Smith, 2022). This novel interagency programming device is utilized by 68 different UNHCR partners that offer types of assistance to uprooted communities and host communities across Uganda. UNHCR identifies partners and staff already working in specific functions in various settlements such as water, sanitation, and hygiene (WASH), education, livelihoods,

protection-related issues, and more — and links them into the FRRM’s referral pathway.

Classes 1-2 are taken care of straight by the helpline specialists, directed by a broad cases got through the helpline are classified by the nature and criticalness of the call: database of standardized FAQs. Class 3 solicitations for help the mechanism’s case management system to preassigned focal points within partner organizations for resolution. Classification 4 cases connect to alleging fraud and corruption, and are channeled directly to the IGO or anti-fraud focal points. Class 5 cases are serious protection/ life threatening case, and are channeled directly to the head of UNHCR field offices in locations concerned. Since directing started in October 2018, the helpline has gotten (as of the thirteenth of November 2019) a sum of 55,004 calls and taken care of 20,258 individual cases. While nearly 9,092 cases were settled straightforwardly at the call place level, a sum of 11,275 alluded to FRRM central points (partners and UNHCR) for the goal. A sum of 14,762 individual inquiries has been settled. With upscaling of sharpening activities progressing, UNHCR Uganda trusts the helpline will ultimately get more than 10,000 calls each month.

Technologies introduced by UNHCR in refugee settlements (Eluère, 2021).

Transport

Off-road vehicles

During the 1960s UNHCR was called to provide help to thousands of exiles escaping the viciousness ignited by battles for freedom in Algeria, Congo, Angola, and Nigeria. To survey the requirements of and provide help to evacuees across huge domains with unfortunate roads infrastructure, heavy-duty off-road vehicles became essential. While first and foremost UNHCR for the most part bought Land Rovers, it switched in the 80s to Toyota Landcruisers, deemed more suited to deep field conditions. Today, UNHCR's armada is comprised of 6,000 light vehicles, 85% are rough terrain vehicles.

These cars include as few electronics as possible, with the exception of a radio and a tracking system to minimize the need for repairs.

Housing

Polyethylene sheet

During the 1970s, UNHCR became associated with huge-scope alleviation projects in Asia. UNHCR extended its activities to shield exiles escaping Vietnam, Bangladesh, Laos, and Cambodia. In 1971, India, UNHCR, and other guide institutions set up 800 camps to shield part of 10 million Bengali evacuees. Swarmed conditions prompted serious cholera episodes.

Giving better temporary shelters turned into a need. During the 70s, help institutions, which up to that point for the most part depended on supported cotton texture, costly and inclined to spoiling began utilizing polyethylene polyethylene sheeting to shield displaced people from outrageous environment and the spread of infection. The polyethylene sheeting utilized during the 70s was for the most part agricultural film, which remained fragile. Cover innovation developed a ton during the 90s when UNHCR and Médecins Sans Frontières (MSF) composed their details for producers. An MSF logistician found that dark filaments covered in white were safer and decreased the temperature inside covers.

Communication

Satellite phones and high-frequency radio

During the 1990s, great communications became indispensable to oversee programs and guarantee staff security. To send messages between UNHCR's 200 field locations and the central command, the staff utilized shortwave radio transmission.

By 1995, UNHCR had equipped nearly 1,200 vehicles with high-frequency radio handsets, permitting staff to keep in touch with their base inside a 1,000 km border.

Portable satellite telephones turned out to be especially useful in emergency conditions. Yet, in 1995, the sets were as yet restricted to a single voice channel (each individual in turn) and were very expensive to use (from \$ 6.50 to \$ 10.00 each minute).

Information technology

Biometric registration

To improve evacuee enlistment and security, UNHCR began utilizing biometric innovation in 2002. This comprises recording the displaced person's fingerprints and running iris examines. Biometric enrollment empowered more gotten character archives. It additionally turned into a section point for the conveyance of different sorts of help, most outstandingly cash moves.

Digital education

The 2010s were set apart by the conflict in Syria, which dislodged 12 million, and the South Sudanese nationwide conflict, which broke out two years after the nation's autonomy, uprooting 4 million. As the two struggles were delayed over years, a huge number of displaced people were left in an in-between state in adjoining nations.

A recent report by UNHCR and Accenture uncovered that outcasts see the network as a basic endurance instrument. Somewhat recently, giving mobile institutions and the web to outcasts turned into a need for UNHCR. Among different innovations, web availability has empowered computerized schooling services.

The Instant Network Schools, set up in 2013 by UNHCR and Vodafone Foundation, expects to provide 500,000 evacuees and educators admittance to advanced learning in in marginalized communities in Africa by 2025. Different initiatives like the Connected Learning in Crisis Consortium bring together universities which enroll refugees in online Bachelor and Master's programs.

United Nations International Children's Emergency Fund (UNICEF)

The Innovation Centre

The Innovation Centre deals with manages an assessed portfolio of innovations that range from robust, fully scaled solutions implemented at national level in multiple

countries, to new ideas being incubated, field-tested and assessed against scalability, replicability, robustness and effectiveness criteria.

Generation AI

In a long-term drive, the group will counsel specialists across important fields (going from brain research to industrial planning, to AI science, to innovation regulation, and so on) through conventional work sector research (counting a committed Experts course at UC Berkeley and an evidence survey by Bread cook Mckenzie), telephone interviews, workshops, and so forth to fill in the gaps in the evidence where it is generally expected to additional youngster freedoms with regards to the very sweeping, speedy, and at times capricious, improvement of man-made intelligence innovations. They reinforce their conventional research with harvested insights from children handing off their expectations, stresses, and dreams for what innovation can mean for their lives. Taken together, this work will advise sets regarding significant, explicit suggestions for states, institutions, and parental figures that we will pressure test before striving to implement through strategic partnerships.

Digital Health Initiatives

From birth enrollment to vaccine management and illness following, solid, innovative frameworks can provide governments the data and devices they need to answer rapidly to infection flare-ups and follow through on crisis health needs.

UNICEF imagines a reality where the health and well-being of kids are operated on through carefully empowered health frameworks in which computerized health innovations are utilized to upgrade the quality and reach of crucial health data and services for the most hindered children and their families. With advanced health, we have a chance to put resources into the policy, individuals, processes, and innovations that will permit us to use the information to further develop health frameworks and health results for billions of kids.

Blockchain Startups

The UNICEF Innovation Fund is hoping to make up to \$100K in value-free projects to provide seed phase funding and coaching to for-profit innovation new businesses that can help mankind. Candidates have the potential chance to get a financial support in digital money through recently launched CryptoFund. Provided the ongoing worldwide environment and a dramatic shift to a computerized world because of coronavirus, open-source solutions that address critical needs for society are as important as ever.

Information Technology

U-report

U-Report is UNICEF's flagship digital platform started in 2011, to draw in children in program needs, crisis reaction, and promotion activities. It upholds juvenile, youth, and community cooperation; functions as a device to share data, bring needs to light, and harvest quantifiable information on specific areas that influence kids, including the most defenseless. The got reactions are broken down progressively, designed, and shown on a public dashboard, guaranteeing the children's input can be actioned by local and national decision-makers.

In its largest implementation in Uganda, in excess of 250,000 children are polled with data analysed in real time. Both quantitative and machine-intelligence aided qualitative analysis are undertaken .

Biyinzika Pauline, a 21-year-old female U-Journalist, is as currently volunteering at the Wakiso Epi Centre Health Centre III alongside the Village Health Teams (VHTs). In her community, U-Report has consistently conveyed instant messages and shared posts via social media about the different immunization activities and Ebola sensitization, encouraging U-Reporters to be a part of them.

Thanks to the promotion efforts, she has been part of the COVID-19 vaccination program and Ebola sensitization, and most recently, she volunteered to be part of the door-to-door national polio vaccination to encourage the vaccination of children below the age of five. In addition, during the visits, the VHTs administered polio vaccine drops to safeguard the children against the disease.

Health

MTrac

A huge number of individuals pass on each day from sicknesses that can have been forestalled. Illnesses like HIV, Ebola, and Malaria are killing a large number of individuals in developing nations consistently.

Frequently, in spite of the work to create and circulate antibodies and medications, the absence of straightforwardness, responsibility, and monitoring implies superfluous stock-outs and an absence of vaccination coverage.

Accessible on RapidPro, mTrac is an innovation utilizing cell phones and SMS to digitize the transfer of Health Management Information System (HMIS). Launched by the Ministry of Health, Uganda, the underlying focal point of mTrac was to accelerate the transfer of HMIS week-after-week reports, which cover illness episodes and prescriptions, provide an instrument to communities to investigate services conveyance challenges, and engage regional Health Groups by giving opportune data to activity. The point is to stay away from superfluous stock-outs and to guarantee straightforwardness and responsibility. Continuous observing of antibody supplies empowered stock-outs to be addressed and prompted an expansion in vaccination inclusion of DPT1 from 52% to 98% in one year or less. During an Ebola episode in 2012, mTrac was likewise utilized in Uganda through a progression of SMS messages making health workers aware of the flare-up, the case definition (symptoms), isolation procedures, the location of the nearest isolation facilities and the hotline to the national response team for reporting suspected cases

Kangaroo mother care (KMC), Tanzania

Tanzania UNICEF has been leading the Kangaroo Mother Care drive to address the absence of incubators for preterm children in rural regions. KMC utilizes skin-to-skin

contact to help preterm children by wrapping them with a fabric near their mom's skin, mirroring a Kangaroo pocket. This policy has many advantages and has been demonstrated to essentially raise endurance rates (information shows that arriving at all preterm children in Tanzania with KMC alone would save the existence of something like 5,000 babies consistently).

It additionally permits the mother to distinguish health changes in the child's condition; the mother's blood pressure can stimulate that of the child in the event of breathing hardships. KMC can be practiced by any caretaker, anywhere.

Education

EduTrac

EduTrac is an SMS-based data collection system designed to track key issues such as absenteeism, school budget allocation and availability of water and sanitation facilities. Triangulated data sources provide greater accountability and transparency in the education sector and inform policy and programmes Real-time Data Citizenship and youth engagement Cutting delays in moving critical management data from frontline workers in remote areas to decision-makers. A shift from “What happened?” to “What is happening” and from “Information Management Systems” to “Information For Management.” Tracking Ensuring mothers and children receive necessary, lifesaving interventions.

The Ministry of Education and Sports in Uganda is increasing EduTrac with financing from the Global Partnership for Education (GPE) as a component of the coordinated instruction monitoring stage. The utilization of EduTrac and expanded accentuation on meeting and involving information is to a great extent because of close cooperation among UNICEF and the Ministry of Education and Sports all design and development phases, which started in 2011.

EduTrac is presently functional in 37 districts districts all through Uganda. It has about It has roughly 10,000 registered reporters in more than 3,800 schools.

All districts and associated sub-counties have schools that are effectively utilizing EduTrac, with several reaching response rates of above 70 per cent.

Support, training and related activities have been implemented in all districts, with a strong emphasis on building the capacity of District Education Officers and colleagues at the Directorate of Education Standards.

Internal exercises aimed at gauging the accuracy of the data revealed that several indicators, including violence, school management committee meetings, universal primary education, grant disbursement and curriculum progress, have accuracy rates of roughly 90 per cent.

Communications

MobileVRS

MobileVRS is a web- and mobile-based system that permits health workers and local government authorities to report births with a straightforward check and print birth declarations. Mobile Vital Records Systems (Mobile VRS) was developed with help from UNICEF, under a Public-Private Partnership (PPP) with Uganda Telecom. Mobile VRS utilizes low cost technology to catch births and deaths registration data at community and hospital levels, and communicate it into a central government server in real time using mobile phones and a web-based application respectively (jlos site).

UNICEF collaborated with Uganda Telecom under a PPP and upheld Uganda Registration Services Bureau (URSB), the government institution responsible for Civil Registration, to develop a solution known as Mobile Vital Records System (Mobile VRS). This system uses local mobile and internet technology to capture births and deaths registration data at community and hospital levels respectively. Data on birth records are sent progressively involving pre-enlisted cell phones regionally, and an electronic application in emergency clinics and districts local governments, into a central government civil registry server. This makes the birth enlistment process quicker, more available, and more dependable, and the system is as of now

utilized in each of the 135 government and missionary hospitals, and in 58 out of 112 district local governments.

Other planned actions include supporting development of a national policy on birth and death registration, capacity development of registrars and notifiers in the remaining 54 districts and over 200 Health Center IVs that have not yet started using Mobile VRS, system strengthening in the 135 hospitals and 58 districts that are already using Mobile VRS to register birth, advocacy with parliamentarians for increased government funding, builder partnerships with FBOs, CSOs and the private sector for improved service delivery and creating demand for birth registration through awareness creation on the importance of birth registration.

RapidFTR

RapidFTR is intended to smooth out and accelerate Family Tracing and Reunification (FTR) endeavors both in the prompt fallout of an emergency and during continuous recuperation endeavors. The innovation's flexibility and open-source nature take into consideration every association to involve it on a gadget fitting their personal preference as well as offer information securely between institutions when necessary.

Children and families who have become isolated in the disorder of a cataclysmic event or political crisis will be brought together more rapidly. Data about isolated children are quickly shareable among partners, and across camps and boundaries, while likewise keeping away from the need to re-interview kids on different events at each spot they end up in (introductory enrollment, travel camps, and so on).

UNICEF has made its RapidPro set-up of applications accessible to Airtel clients free of charge across the 17 African nations in which the telecom organization works (computerworld site).

The open-source group of uses is intended to assist governments with conveying fast and indispensable ongoing data and associate communities with lifesaving services. The applications offer health, schooling, and youth-centered content.

By acquainting the applications with Airtel clients, UNICEF content will be more open and information meetings across sectors made simpler. RapidPro makes

information connected with communications on the stage accessible in succeed for research.

RapidPro additionally permits institutions to make customized messages in view of data collected from clients, which could thusly increment reaction rates.

Downloading a free RapidPro Android application creates an instant connection to the platform. Apps include: mHero, deployed in West Africa to help tackle the Ebola crisis; U-Report, used in Zambia to link people to the resources of the National AIDS Council; EduTrac, which tracks education indicators to help in decision-making; and Project Mwana, used in Zambia to deliver HIV test results, cutting turnaround time in half, to 33 days.

The following expansion to the RapidPro platform will be RapidFTR, an Android structures-based data collection application developed in UNICEF's Innovation Labs in South Sudan and Uganda however starting in New York College's desogn for UNICEF class.

Nations in which Airtel works include Kenya, Malawi, Madagascar, Rwanda, Seychelles, Tanzania, Uganda, Zambia, Burkina Faso, Chad, DRC, Congo, Gabon, Ghana, Niger, Nigeria, and Sierra Leone.

DevTrac

DevTrac is a Ugandan initiative led by a consortium of government and donor agencies: including the GEO-IS Working group, OCHA, Uganda Bureau of Statistics and UNICEF - to visualize and monitor the status of national services (schools, health centers, water points, etc) and development projects.

DevTrac is a collection instrument that provides ongoing data about development projects for immediate programme response, analysis, accountability and advocacy.

DevTrac collects and visualizes site-specific data on national services like schools and healthcare centers. The data comes straightforwardly from local community members who conduct site visits and upload the statistics they collect.

The Government of Uganda's Public Investment Management Information System (PIMIS), developed in partnership with AidData institutional partner Development Gateway, tracks aid-funded projects and programs nationwide (Stade, 2014). The online database includes both projects from the government budget and those externally managed by donors.

The thought is this: by uniting PIMIS's hierarchical, official record of improvement help activities and DevTrac's bottom-up resident reports on what help activities mean for the Ugandan community, we make a more complete image of improvement data sources and results in Uganda.

With the backing of UNICEF Uganda, which has DevTrac, AidData Summer Colleagues in Kampala are taking a gander at the two Plans of information to check whether, and how, they can be joined. By interfacing inside and out data about on-the-ground realities with the information used to dispense Funds at an undeniable level, AidData desires to empower policymakers to more likely check effects and settle on evidence-based improvement choices.

To enhance this information cross-strolling exercise, AidData Summer Fellows are likewise attempting to study the general dynamic process and how information fits in. In particular: How does resident criticism influence choices? Also, what kind of resident input information prompts the best choices?

Such inquiries have specific significance at the local level in Uganda, where Community Improvement Officials use data about unambiguous requirements in their sectors to advocate for where funds are designated and which needs are centred on. Various kinds of information could yield new experiences, for example, instant messages from UNICEF's uReport enlightening sectors of more noteworthy need.

Education

Innovating non-formal education for youth at scale, the UPSHIFT approach

UPSHIFT is a social innovation and social business program intended to enable youth with the skills to connect emphatically with their communities and to change to

adulthood and work life effectively. The program is included as a World Bank's Solutions for Youth Employment Impact Portfolio and is one of solutions being recommended for scale by Generation Unlimited. UPSHIFT was first evolved by UNICEF's Childhood Innovation Lab in Kosovo and first guided in 2014 as a social business project program to help hindered children. As of October 2019, UPSHIFT has a presence in 20 nations. Up to the furthest limit of 2018 UPSHIFT had contacted over 200,000 children, who have made in excess of 5,000 youth-led projects, carrying advantages to regional communities.

UPSHIFT is designed to build transferable skills and create opportunity, with a focus on the most disadvantaged young people.

UPSHIFT Stage 1, Social Innovation Skills, contains 9 modules that are intended to direct children through a human-centred plan way to deal with distinguishing difficulties in their regional community, exploring their effect on partners, and creating and prototyping potential solutions.

UPSHIFT Stage 2, Social Business project, contains 10 modules based on the Business Model Canvas to support young people in turning an initial idea. into a very early stage venture.

UPSHIFT Bootcamp toolkit provides provides the devices expected to work with a Social Innovation Bootcamp for members matured roughly 12-18 years.

UN Regional Information Centre (UNRIC)

UNRIC works with partners, including European institutions, member states, academic institutions, civil society, young people, the private sector, and UN entities (unric site).

Cycling Without Age

Cycling Without Age is a movement launched in 2012 by Ole Kassow in Copenhagen, Denmark (UN, 2021). It begins with a generous act of taking a couple of old or less-abled individuals out on a bicycle ride. It is a straightforward

demonstration that everybody can do. The innovation has spread to 50 nations all over the planet, with more than 2,500 chapter locations.

Among its targets, Cycling Without Age has been quick to challenge ageism and segregation in light of an individual's age. It does so by making connections between generations, between pilots and passengers, care home employees and family members. Volunteer riders engage with their passengers, they stand by listening to their stories and thusly they share those stories with their loved ones, guaranteeing that they persevere through time.

World Bicycle Relief's mission (WBR) also in Africa

WBR assists communities improve access to healthcare, education, and environmentally sustainable economic open doors by manufacturing and disseminating a bike that is meticulously designed for rough conditions, weighty burdens, and exhausting everyday use: the durable and easy to keep up with Buffalo Bike (UN, 2020).

WBR prepares individuals through “The Power of Bicycles.” WBR does this through an innovative for-benefit social Project (Buffalo Bicycles), which offers to people and institutions, and by giving bikes to the weak who can't bear the cost of them (i.e. rural students, 70% of whom are young girls, volunteer health workers). Tending to the requirements of girls and women are core to their approach.

Institutions are key to WBR's model, especially with rural communities that deal with the bikes locally, and with Buffalo Bikes, guaranteeing a sustainable rural bicycle ecosystem of spare parts and community mechanics.

As of April 2019, WBR has distributed 518,190 bikes and trained 2,455 bicycle mechanics in 21+ countries, with significant results.

Girls feel more in charge of the choices influencing their lives, they are more able to contact a peer out of luck, and they have a more good mental self-view. Farmers expanded their deliveries and incomes by over 23%. What's more, town health workers extended their patient reach by a factor of four and increased patient visits by

88% per month. WBR likewise works with a few UN entities including UNFAO, UNICEF, UNDP, UNFPA, and UNHCR, giving 47,520 bikes in Ivory Coast, Kenya, Mozambique, Zambia, and Zimbabwe.

Working with the UNICEF- supported National Case Management System for the Welfare and Protection of Children in Zimbabwe, community case workers received 2,000 bicycles to reach and support vulnerable children. And in Malawi, The Ministry of Health and UNICEF-implemented Health System and Immunization Strengthening programme provided a Buffalo Bicycle for 2,740 health surveillance assistants to improve health service delivery, vaccine coverage, and patient dropouts.

The team from WBR is hoping to expand on their work with the UN, supporting arising needs, like the growing global refugee crisis, including with UNHCR and local partners for Kenya's Kakuma Evacuee Camp and Kalobeyei Integrated Settlement, and the ongoing worldwide health emergency made by the coronavirus pandemic.

In Kenya, WBR's Bikes for Instructive Empowerment Project is assisting with protecting girls en route to school while also reducing instances of dropping out due to pregnancy.

UN Equator Prize

UN Equator Prize recognizes innovative initiatives from local communities and indigenous peoples that show exceptional achievements in nature-based solutions for local sustainable development (UNRIC, 2021). Winning initiatives are honored for their successes in protecting, restoring and/or sustainably managing biodiversity for positive development outcomes.

Asociación de Mujeres Indígenas del Territorio; Limón, Costa Rica, 2014

The Association brings together indigenous women in Costa Rica's Talamanca region to promote the use of traditional practices and knowledge for food security and medicinal purposes, improve women's leadership and Indigenous rights, and protect the surrounding forest (Equator initiative, 2021). Despite the covid pandemic, the meeting immediately settled a virtual market via online entertainment to exchange and share food during the closure of regular. The affiliation additionally prepares women in rotational and regenerative agroforestry, and technologies for the utilization of local native seed varieties and traditional medicinal plants, improving community resilience in the face of climate warming

CoopCerrado Goias, Brazil, 2002

This community organization of over 4,600 families in Brazil's Cerrado ecoregion represents the sustainable use of a vulnerable ecosystem at large scale. CoopCerrado works with smallholders in a "farmer-to-farmer" policy to sustainably harvest and process fruits, plants, and seeds of the Cerrado, commercializing dozens of different certified organic products with creative marketing, elevating both the prestige of Cerrado products and local livelihoods for 26,000 people.

The organization deals with a sector of 124,000 hectares for economic use and was associated with the creation of two sustainable-use reserves. The outcome of the drive in shielding biodiversity, tend to the organic emergency and further develop local jobs has prompted its replication in five Brazilian states, showing the effect of community-based services and collective marketing

Asociación de Jóvenes Reforestadores en Acción (AJORA), Beni Bolivia, 2015

This group of young women and men is addressing bleak perspectives for rural youth in the Bolivian Amazon by working on financial opportunities while battling the impacts of a warming environment. AJORA has created jobs and reduced wildfires through the revival of traditional fire management practices. The restructuring of degraded areas has further developed soil fertility and water availability in the community.

BIO-KG Federation of Organic Development, Bishkek, Kyrgyzstan, 2012

BIO-KG Federation of organic development has promoted the transition of agriculture in rural and mountain communities to organic-only production in a landscape-level approach. More than 1,000 farmers have been guaranteed as cultivators of organic produce. Ten organic aimaks have been made, six of which are driven by women. The model has taken root in Kyrgyzstan, and BIO-KG assumed an instrumental part in the government's obligation to progress to organic agriculture across the country.

Aadhimalai Pazhangudiyinar Producer Company Limited, Tamil Nadu, India, 2013

This 1,700- member cooperative, overseen and run completely by native individuals from the Nilgiri Biosphere Reserve in Southern India, has further developed livelihoods across 147 towns by handling and promoting a different scope of forest products and crops. Through local value addition, individuals procure premium prices on a large number of products including those collected sustainably from the Reserve, honey, soap nuts and berries, phoenix leaves and others, as well as those cultivated organically such as coffee, pepper, silk cotton, cereals, spices, fruits, and many others.

Shareholders regularly monitor harvesting and agricultural practices to ensure product quality and prevent overuse of resources.

The organization has orientation-adapted participation and a women larger part among its representatives and provides training for shareholders and social enterprises across the region.

Maano, a Virtual Farmers Market

The United Nations World Food Programme (WFP), Digital PayGo and Zambia National Commercial Bank (Zanaco) launched the Virtual Farmers Market mobile based marketplace - referred to locally as Maano - that joins smallholder farmers to purchasers offering buyers offering competitive prices for their produce, in this manner expanding farmers' profit and income opportunities (UNRIC Maano).

Smallholder farmers are Zambia's biggest food producers, however, they remain generally remain widely excluded from formal markets, keeping their earnings low and trapping them in a cycle of poverty and hunger. The Virtual Farmers Market assists farmers with getting to purchasers and clients who would otherwise have been out of reach, improving their margins.

The mobile application permits smallholder farmers to promote their produce and associate with purchasers anywhere in Zambia. It provides farmers with ongoing product valuing, assisting them with getting better prices for their produce. Brokers countrywide can see the promoted produce, make offers and execute with farmers. Upon collection, the purchaser checks the quality and amount of the product before the payment is automatically released through mobile money or bank transfer.

Farmer Union Maddaben of Falwel and Farmer Union Hareyben of Tera, Niamey, Niger, 1999

The two farmers union are members of the Fédération des Unions de Groupements Paysans du Niger (FUGPN). MOORIBEN have further developed food security for over 5,000 members, the greater part of which are women, through participatory variety development, the production and marketing of crop varieties, and agro-ecological practices. Guiding the work of researchers to support them, the unions have led participatory processes to enhance their food production including millet, sorghum, and legumes varieties, increasing community resilience to a variable and warming climate.

The unions support their members to carry out organic agriculture, process their crops for local value addition, and fight a crop pest biologically. 1,500 hectares of degraded areas have been restored for cultivation, and 22,000 hectares of land have been greened through assisted natural regeneration, protecting against erosion and improving soil fertility and water retention.

Tropical Forest and Rural Innovation, Cameroon

A community-based endeavor working around the Dja Biosphere Reserve in southern Cameroon, Tropical Backwoods and Rural Development is enabling the Native

community through cacao-based agroforestry value chains and the collection of moabi, wild mango, and different fruits. The group has planted over 70,000 trees for production and provides training in collection quality standards to obtain higher prices for food and cosmetic products. Agreements between Indigenous women collectors and government agencies secure access and use rights in the Reserve. The model's feasibility is demonstrated through the avoidance of deforestation and a reduction in poaching in the communities. The initiative focuses on the economic inclusion of several Indigenous groups, some of them pursuing traditional semi-nomadic lifestyles, through access to education, the registration of community businesses, and jobs for 500 women collectors and 300 cacao producers. The drive. Tropical Forest and Rural Development maintains partnerships with several food and cosmetics wholesalers.

Ashoka International

Bill Drayton established Ashoka in 1980 in view of the possibility that the most powerful force for good in the world is a social entrepreneur: an individual driven by an innovative thought that can assist with remedying a dug-in worldwide issue (ashoka site).

Starting in India in 1981, Ashoka began distinguishing and supporting the world's driving social business people who have thoughts for expansive social change.

Ashoka finds and develops social business visionaries on each edge of the world, whose framework transforming innovations tackles well-established social needs. After a thorough application process, they are welcomed into the Ashoka Fellowship providing early stage financial support and a lifetime membership into an expansive network of peers and partners - empowering them to accomplish their vision and have a much more noteworthy effect.

For over 35 years, Ashoka has assembled and sustained the biggest organization of driving social business visionaries on the planet. After a thorough choice process, they are acquainted with a long-lasting partnership, where each part is centred on supporting new examples of social greatness.

The Entrepreneur-to-Entrepreneur — or E² — Network is a growing yet exclusive network of world-class founders and CEOs. The members have built businesses that transformed the world around them, and they have created generational wealth for themselves and others.

Ashoka Young Changemakers are a carefully selected network of young people who have found their power to create change for the good of all around them. They engage their peers and societies in realizing a world where everyone is a changemaker.

The Ashoka Young Changemakers program launched in the US in 2018, and is currently accepting applications in Brazil, Bangladesh, India, Indonesia, Nigeria, and the US.

Agriculture

NanoCide

Experiencing childhood in a farmer's family, Aranyo Beam, an 18-year-old secondary school senior from Barasat, a town on the edges of Kolkata, was at that point familiar with seeing the ruin unleashed by conventional pesticides on farmers and the environment. He chose to mediate and make more secure, eco-accommodating pesticides.

Aranyo developed a nano pesticide, NanoCide, at 16 years old for jute farmers.

Nanopesticides are more secure alternatives in contrast to regular pesticides.

Nanotechnology is utilized to battle lethal agrarian vermin, to shield farmers and the environment.

1,120 farmers have involved NanoCide for their yields. From this group of farmers, 228 participated to the successful field tests. There was a fundamentally higher harvest yield contrasted with control setups, improved plant development, plant shoot and root growth without unfriendly secondary effects. NanoCide had a "knockdown" impact which enabled the rapid elimination of pests within 24 hours of application.

Fisherfolk in Southern Thailand

Ashoka upholds business visionaries in industrializing native fishing skills of fisherfolk in Southern Thailand to empower them to acquire moderately better income. Ashoka empowered with technical and economic help, as well as upgraded best practices for agrarian business, engaged limited scope fishers with advertising and marketing information

Health

Health insurance program

Mukteshwari Bosco, an Indian Ashoka Individual, alongside her group, empowers fair and evenhanded admittance to high-quality healthcare in India through comprehensive health education and entrepreneurship model. She began her excursion as a social business visionary with a one-of-a-kind healthcare coverage program for the economic and health requirements of India's country poor (Ashoka, 2022). This high- high-impact model united the insurance agency, health suppliers, and assistance support through her association, Healing Fields, to guarantee access and accessibility of health services to poor people. The lessons learned from the micro health insurance led to the germination of another highly impactful program, the Community Health Facilitator program. The program at first centered around making health awareness in the community through local women prepared as health change specialists. Steady collaborations with the women and communities uncovered that to make a change, admittance to health products and services should be made and the facilitators should be supported through livelihoods. This led to the evolution of the model to elevate these women as Community Health Entrepreneurs (CHE). The CHE attempts to forestall medical conditions and work with admittance to health services and privileges from the government and empower jobs for themselves through admittance to health products to their communities. Through these health change specialists, positive health and empowerment results are accomplished in country towns of 10 states, contacting over 6.25 million individuals. These women have in the last 18 months led COVID-19 responses.

Education

Communities Will Connect

Wonder Kalu is a youthful changemaker devoted to enabling students in rural sectors of Nigeria, particularly small kids, with computerized skills. Through his drive, Communities Will Connect is connecting the computerized proficiency hole by giving underserved children the valuable chance to get familiar with the basics of coding, master PC skills, and become changemakers in their communities, utilizing technological innovation to flourish in a quickly impacting world.

Communities Will Connect expects to stir the soul of innovation in students. The association's essential goal is to enable essential and auxiliary students between the ages of 10 and 16 years - especially small kids - from under-served communities with advanced skills. Also, the drive means to impart students with the craving to seek after professions in software engineering and innovation, at last offering them the chance to tackle certifiable needs through STEM (Science, Innovation, Designing, Math).

Mobile school

Arnoud Raskin, an Ashoka fellow situated in Belgium, launched a spearheading thought of 'mobile schools' alongside 300 instructive devices to engage underprivileged kids who are compelled to live in the street (Ashoka, 2022). Other than supporting and planning children for reintegration into society, the program likewise inculcates a sense of self-esteem, by making them aware of their extraordinary survival skills and grit that distinguish them from the rest. Arnoud's organization not just connects expected stakeholders like academics or educators, but also NGOs, companies, and youth in general to make more vigorous networks and robust tools for engaging his target group. His organization trains around 10,000-15,000 workers and teachers consistently.

Biotech-in-a-Box (BTBox)

BTBox is an hands-on, lab-in-a-box tool kit that empowers educators and students to do biotechnology tests in a classroom setting. Adjusting to the shift of Philippine instruction to the K-12 framework is certainly not a simple project for most schools and teachers. For one's purposes, showing STEM is difficult for teachers without

apparatuses that can complement course reading-based promoting especially those subjects that are either excessively conceptual or not apparent to the unaided eye like science, cell science, genetics and molecular sciences. Showing these subjects is especially significant since it envelops a wide sector of utilizations going from the drug and medical industry, environmental, agricultural, and, surprisingly, forensics and crime scene research.

The Global Innovation Fund (GIF)

GIF is a non-profit, influence-first project fund that puts resources into the development, thorough testing, and scaling up of new products, services, business interaction, or policy changes that are more cost-effective than current practice and targeted at improving the lives of the world's poorest people (gobalinnovationfund site).

GIF puts resources into a scope of developments with solid potential for social effect at a wide scope which incorporate new plans of action, policy practices, technologies, conduct insights, or approaches to conveying products and services that benefit the poor in non-industrial nations.

Agriculture

AgriTask

AgriTask offers in Africa, Asia, and Latin America Software as a Service (SaaS) platform to upgrade dynamic across the agriculture eco-framework, serving Ag-institutions looking for visibility of the farmers in their supply chains.

The platform lends itself well to scaling, which has proactively been exhibited to date by growing its presence in 35 nations throughout recent years. AgriTask intends to arrive at 9 million smallholder farmers by 2026.

AgriTask meets the topics of climate action, protection and nature regeneration and raising living standards of smallholder farmers.

Despite the fact that smallholder farmers are not the immediate clients of AgriTask, the products that address the needs of the Ag-corporates and Ag-insurers are designed with the farmer at the center, and straightforwardly benefit smallholder farmers through increased agricultural productivity and optimization of resource use, improved small-farms profitability and financial resilience, increased product traceability, increased access to contract farming and improved contract arrangements.

Aquaculture in Bangladesh and India

Aquaculture has filled quickly in the previous many years and can assume a significant part in fulfilling the the nutritional needs of the growing middle income group, while also meeting the food security needs of the poorest. Nesta, as a team with University of Sterling and Forum for the Future, plans to design a Challenge Prize in Aquaculture for Global Development, which would address market failures and accelerate innovation in aquaculture in India and Bangladesh.

GIF investment will cover the design stage for a Challenge Prize in Aquaculture for International Development. This includes research on market failures, stakeholder mapping and analysis, prize prototyping, and final prize design.

Information technology

PLACE

PLACE provides in Ghana, Ivory Coast, Malawi, Senegal, and Zambia, detailed, timely mapping data for urban and coastal areas to governments at a less expensive cost. PLACE utilizes interconnected innovations. First, an institutional innovation in the form of a data trust that accords data ownership to governments, while facilitating access and ethical use of data by private companies, NGOs, and academics. Secondly, a financial innovation via a sliding scale of payments for access to the data. Commercial users finance data collection and have the right to build their own data products on top of the base maps. NGOs and researchers pay a nominal charge. PLACE is likewise a technological innovation. It utilizes minimal cost, superior execution robots to provide geo-referenced pictures at a 5 cm goal along with geological precision (height) to 6 cm. At last, Spot is a market innovation. PLACE builds capacity, and creates demand, for locally run organizations to operate the UAVs and supply imagery on a regular basis.

SparkMeter

Over a billion people lack access to any form of electricity. An additional billion people who are nominally connected to grids experience frequent power outages and unreliable service, especially for those based in more rural, remote communities. The absence of access and inconsistent access prompts the proceeded with utilization of unsafe alternatives such as kerosene, and barriers to broader economic growth.

SparkMeter sells a proprietary smart metering technology and associated software and services to central grid utilities and microgrids to enable real-time monitoring of grid systems, pay-as-you-go electricity usage, and load control to prevent grid outages. SparkMeter is situated in the US but has associated a huge number of clients in Africa, Asia, and Latin America.

Convey dependable power for end-clients, especially low-pay purchasers, further develop utility cost recuperation show interest for the product by focal lattice utilities.

Energy

Simpa Communities, India

Simpa clients make a small beginning payment to get a solar electric system introduced at their home or business. Clients then, at that point, buy "energy days" utilizing a prepaid or pay-as-you-go mobile payment system. Upon completion of the contract, clients can take ownership of their systems, receiving clean electricity. The system is Simpa's patented technology platform. Since its beginning, Simpa has sold more than 4 million clean energy days, conveyed over 1 GWh of clean power, and created over 3,000 full and part-time jobs in rural India.

In today's digital world, maps (including location data) power much of the modern economy. States use maps continually (through present-day geographic data frameworks) to course police, fire, and ambulances to individuals and communities out of luck. They use guides to design more astute urban communities, to decide charge rates and bills, to distinguish public framework needs and project opportunities, or to direct environmental clean-ups.

Africa is urbanizing at 20% each year, a rate that outpaces the availability of resources to manage it. Governments on the African continent lack staff and resources to map the areas. Africa has 3% of its total mass mapped and currently 80% of urban development in Africa is happening blindly without technologically informed approaches.

Education

SmartStart education, South Africa

SmartStart is a non-profit organization making social franchises pointed toward scaling quality Early Childhood Education (ECE) across South Africa. SmartStart right now arrives at around 35,000 children a year through 3,500 specialists in each of the nine of South Africa's regions and is focusing on 10,000 experts.

to design and build a mobile-enabled GIF's grant is utilized by to design and build a mobile-enabled ECE/ECD practitioner management and support platform.

Mr. Green Africa Recycling, Kenya

Waste management is a tremendous issue in Africa and Kenya's capital, Nairobi, is no exemption. The city produces around 2,400 tons waste per day, of which generally 60% is collected and just around 10% reused.

Waste pickers collect waste and sell it. They aren't employed by anyone and are routinely exploited by traders who pay them very low amount or don't buy from them at all.

Mr Green offer an in-house end-to-end process for recycling, purchasing directly from their sourcing agents, waste pickers who are the most marginalized individuals.

Mr Green own and operate a series of trading hubs across Nairobi where they transact with their sourcing agents directly to purchase their collected plastic for onward transfer to the MrGreen manufacturing plant.

Mr Green own and operate a series of trading hubs across Nairobi where they transact with their sourcing agents directly to purchase their collected plastic for onward transfer to the MrGreen manufacturing plant. It at present connects more than 2,000 previously marginalised waste collectors and sells over 2,000 metric tons fairly sourced recycled materials for local and international markets. The business looks to formalize the plastics production network and make livelihoods, as well as alleviate developing urban communities from plastic pollution.

The collected plastics are handled and sold as post-buyer reused plastics to plastics makers for use by large fast-moving consumer goods (FMCG) companies, such as Unilever.

Mr. Green is creating and constructing the business through the GIF project to develop their plastics handling volumes by opening further transforming points, onboarding extra obtaining specialists, putting resources into IT upgrades to run a cashless operation, running additional shifts on existing handling machinery,

and putting resources into new machinery to expand the nature of their reused plastics and their edges.

Practical action UK

In 1966, Schumacher and others founded the – Intermediate Technology Development Group (ITDG) to put his philosophy into practice (practicalaction site).. In 2005 ITDG change the name to Practical Action.

Surges strike in Peru.

Practical Action is utilizing 3D printing and microcomputers to save lives when floods strike Peru. The charity has developed a unique way of producing early warning system equipment at a fraction of the normal cost by helping communities produce their own rain gauges and sensors to monitor water levels and evacuate when floods are imminent.

Practical Action has developed a special approach to creating warning system equipment for a fraction of the ordinary cost by assisting communities produce their own rain gauges and sensors to monitor water levels and evacuate when floods are imminent.

In 2017 the the worst floods and landslides for a long time cleared across half of Peru, during this time the machinery gave communities in Chosica (40km east of Lima) the time they expected to escape with their lives.

Utilizing inexpensive materials, for example, 3D printers, sunlight-powered chargers, and open-source tech like Arduino & Raspberry Pi micro-computers villagers that are hit first and worst by the effects of climate change are able to escape. These cost under \$25 yet are sufficiently strong to make sensor communities intend that during the latest surges, community pioneers in Lima and Piura utilized WhatsApp to transfer life-saving data and to arrange reaction endeavors. This implied help could be conveyed rapidly to those most out of luck.

Improved seeds in Balaka District, Malawi

Practical action, Malawi Genetic Resources Centre and farmers in the Balaka District of Malawi joint forces in order to combine seed scientist and local farmer knowledge to select local and climate-resilient seeds, train farmers to choose, store and replant saved seeds, link up small farming groups to form larger seed producer associations, to build farmer knowledge and the skills needed to marker their quality saved seeds. Duration of the project is 2020 – 2022 and the funder is Innocent Foundation.

Renewable Energy for Refugees

Practical action operated with the private sector to plan and carry out innovative market-based energy solutions by helping states and public NGOs, improving the evidence base through original research, and demonstrating new approaches tried and tested in refugees camps and host communities.

The Project is upheld by the IKEA Foundation in association with the UNHCR, the the UN Refugee Agency, Chatham House and Energy for Impact and Norwegian Refugee Council. The project is situated in Nyabiheke, Gihembe, Kigeme, Rwanda, and Irbid, Jordan and its span is April 2017 - February 2022.

High tech innovations programmes in developing countries

Google.org Impact Challenges launched programmes such as Mobile School VZW and GiveDirectly empowering marginalized communities. The Netherlands launched The Geodata for Agriculture and Water (G4AW). Southern and East African countries, The Energy and Environment Partnership Programme of Southern & East Africa (EEP S&EA), UK, GSMA Mobile for development funds, Zambia, the Remote Sensing Centre, Kenya, the FinTech programme, Uganda, the Food Technology Business Incubation Center and the Consortium for Enhancing University Responsiveness to Agribusiness Development Limited (CURAD) and Myanmar, the Yangon Innovation Centre.

Google.org Impact Challenges

Trough Google.org Impact Challenges, Google grants community-driven charities and social projects with help to make their community a superior spot (google valuable opportunities site).

Mobile School VZW

Tackling youth vulnerskills by improving Frontline youth work

Mobile School VZW develops and deploys three digital tools to support frontline practitioners as they work with vulnerable youth:

Streetsmart Impact, an app for the impact measurement of casework, Streetsmart Play, an instructional platform with materials and resources for youth workers and teachers, Streetsmart Learn, a platform where youth workers can upload their methodologies to facilitate learning and experience-exchange, Through this work (mobileschool site). Mobile School intends to improve functional tools accessible for youth workers to further develop youth work and its effect.

In 2005, the first mobile school on the African mainland was established in the Kenyan capital, Nairobi. From that point forward, the East African country became the most dynamic StreetSmart Wheels partners.

In the wake of being in touch with the association SathSath for over 10 years, the time was at long last there to send off their mobile school in the Nepalese capital

Kathmandu. After a fruitful study in August, the StreetSmart mentors Adi and Anupriya led the execution preparation phases for the regional group toward the finish of February.

StreetSmart Wheels Colombia

At the local level, the residents realize the local conveyance communities as "las ollas", where addictions, viciousness, and destitution arrive at the limit. Thus kids face various dangers from an extremely youthful age, for that reason, Casa Tejiendo Sueños de Esperanza needs to provide new opportunities to these children through the mobile school.

StreetSmart Wheels Malawi

In 2018, StreetSmart launched the main mobile school in the Malawian capital Lilongwe. In any case, because of a mix of lamentable conditions, the school immediately became latent. Mid-June, an answer was at last found, and the expert mentors Bram Van de Putte and Fredrick Mbise headed out to Lilongwe to move the Malawian mobile school to our pristine accomplice Youth Net and Counselling (YONECO).

StreetSmart Wheels Uganda

After almost two years of closure because of the pandemic, students in the East African nation of Uganda were at long last ready to get back to their classes on January 10, 2022. Nonetheless, specialists have cautioned that after one of the world's longest school terminations, around 30% of the 15 million students in the nation never return to their classrooms. The new partner Dwelling Places is impatient to start working with the very first mobile school in Uganda.

ProvideDirectly

ProvideDirectly enables marginalized communities and those impacted by calamities like Coronavirus through direct money moves, which provide individuals the adaptability to accommodate their actual requirements, as opposed to in-kind donations. Beginning around 2012, Google.org has provided more than \$10 million to ProvideDirectly to help individuals out of luck and research the effect of ProvideDirectly's inventive methodology.

Google-operated with the USAID group in Rwanda to sort out which of their activities would be generally valuable to compare with cash transfers.

Cash transfers had impacts in accordance with existing exploration, and specifically bigger trades altogether affected three of the five essential results that USAID was wanting to move. An all-surrounding WASH and nutrition intervention increased savings but did not affect any of the primary outcomes, which is frustrating but valuable to be aware of. A similarly sized cash transfer also did not affect the primary outcomes, but drove a significant increase in asset.

Air Quality Monitoring, Makerere university, Uganda

This project aims to improve the metropolitan surrounding air quality by giving logical evidence using low cost technologies to better manage air pollution and its associated health risks (cs.mak site).

Project aims are to develop minimal cost apparatuses that can be utilized by city and specialists to do 1 observations of air quality in urban regions and to provide insights into the sources and quantification of the magnitude of outdoor air pollution in Kampala

The AirQO innovation was conceived out of the Software Systems Center that was established and supported under the Bright Sida/317 project with Sida support through the Embassy of Sweden in Kampala.

AI-based solutions, The Wadhvani Institute for Artificial Intelligence, India

The institute was formed to build and deploy AI solutions that benefit underserved populations in developing countries, which it has actively been doing since mid-2021 (wadhwaniai site).

Presently the organization is building artificial intelligence-based solutions in the farming and health sectors.

Pest Management

Our solution is being developed to assist with lessening crop losses through coordinated integrated pest management in cotton farms.

Tuberculosis

The institute is creating technologies towards: Automated reading of TB LPA test results.

Providing differentiated interventions for TB patients by anticipating a score for patients most likely to prospectively not adhere to the treatment regimen, when they come in for their first treatment.

Newborn Anthropometry

The institute has created a smartphone-based anthropometry technology, which allows frontline workers to track baby weight in rural homes and hospital settings.

COVID-19

The institute is giving conducting research to identify signature patterns for COVID-

The Geodata for Agriculture and Water (G4AW)

G4AW facility is supportive of the water and food security policies of the Ministry of Foreign Affairs of the Netherlands and implemented by the Netherlands Space Office (NSO) ([advanceconsulting site](#)).

The program provides grants from EUR 500,000 up to EUR 3,000,000. The base co-supporting is 30% for G4AW partner nations and something like 40% for G4AW partner countries in transition.

The G4AW facility upholds institutions among private and public sector partners, NGOs, and research institutions to set up the large-scale, demand-driven and user-tailored satellite-based service chains

Partner transition countries (max. 60% grant): Colombia, Vietnam, South Africa
Other partner transition countries (max. 70% grant): Angola, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Ethiopia, Ghana, Indonesia, Kenya, Laos, Malawi, Mali, Mozambique, Myanmar, Niger, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Zambia, Zimbabwe

Mavo Diami (My Land) in Angola

The Mavo Diami social project contributes to the speed increase of agribusiness performance leveraging using geodata-based data services in Angola to serve smallholder farmers.

The compelling utilization of Mavo Diami Services has reinforced the resilience of smallholder farmers to environmental change, and further developed soil supportability and land assignment.

The project expects to develop services customized to both objectives client groups, the smallholder farmer and the large & commercial farm segment.

The Mavo Diami consortium unites six public and private institutions herewith, each with their own expertise:

World Vision (Netherlands); Aquaator Groen & Ruimte (Netherlands); eLEAF (Netherlands);FutureWater (Netherlands);Ministry of Agriculture (Angola);Weather Impact (Netherlands)

The consortium is joined by NovaAgrolider, an Angolan company, which will be the the main business owner of the Mavo Diami to be laid out under this project.

Currently, 100 Angolan farmers partaking in the Mavo Diami project have enlisted for another help that provides them crop guidance and weather conditions reports on their cell phones. The general project objective is to improve manageable food and pay security for more than 100,000 smallholder farmers in Angola (dutchwatersector site).

Geodata for sustainable vegetable farming Cambodia

Angkor SALAD carries out geodata-based data services in Cambodia to increment production, income and food security and decrease the use of water, manure, and pesticides. This help provides irrigation, fertilizer, crop planning consultations.

Execution of these geodata-based data services will uphold no less than 100,000 vegetable farmers in Cambodia.

Lead partner: ICCO South East Asia (Netherlands/Indonesia/Cambodia)

Partners: Akvo (Netherlands); Angkor Green (Cambodia); General Directorate of Agriculture (GDA) (Cambodia); Nelen & Schuurmans (Netherlands); SMART Axiata (Cambodia); VanderSat (Netherlands); World Vegetable Center (Cambodia).

Mobile Data for Moving Herd Management and better incomes (MODHEM), Burkina Faso

MODHEM project improves the food security of pastoralists and farmers' families through the utilization of geo-satellite-data.

100,000 pastoralists' families and 200,000 farmers' families in Burkina Faso will be connected to MODHEM.

Lead association: SNV Netherlands Improvement Association (Burkina Faso)

Partners: Ecodata (Burkina Faso); Ministry of Animal Resources (Burkina Faso); Permanent Interstates Committee for Drought Control in the Sahel Agrhyment (CLISS) (Burkina Faso); Satelligence (Netherlands)

The Mobile User-owned ICT4 Ag-enabled Information Ministries (MUIIS) project, in Uganda

Around 250,000 small Ugandan farmers have enlisted for qualification for agricultural advice information and financial services.

Ugandan farmers receive explicit environment data and agrarian advice on their cell phones as well as market data and drought insurance. Consequently, the farmers pay 20,000 Ugandan shillings (almost 5 Euros) per developing season and they are incorporated for a computerized database with information about the farmer, the family their possessions and production results.

The MUIIS project is being executed by CTA along with 6 other consortium partners:

The Technical Community for Agrarian and Rural Collaboration (CTA), situated in the Netherlands

Alliance for a Green Revolution in Africa (AGRA), based in Kenya; aWhere Inc., based in the USA; the Eastern Africa Farmers' Federation (EAFB), based in Kenya; EARS Earth Environment Monitoring (EARS-E2M), based in the Netherlands; the eLEAF Competence Center (eLEAF), based in the Netherlands; and Mercy Corps, based in Uganda

Geodata for upgrading smallholders' farming systems (G4INDO) in Indonesia

G4INDO supports smallholder rice farmers in Java, Indonesia. These farmers regularly have land possessions of less than 2 hectares.

The Indonesian Government has chosen to develop a yield insurance contract to help farmers and support food security. The G4INDO project provides technical help with surveying crop yield peculiarities at the plot scale. The project will provide crop protection and third-yield possibility guidance to 200,000 farmers. Processed satellite information, for example, radar and optical earth perceptions provide the necessary data. This is joined with weather conditions monitoring, research and anticipating crop models, and hydrological models. The Indonesian Ministry of Agribusiness and the insurance agency can utilize this incorporated data to survey claims from services contract holders encountering harvest misfortunes. The project likewise upholds the trimming schedule of the Ministry of Agriculture, by prompting whether a third rice harvest can be anticipated to receive sufficient rain.

Lead partner: Alterra Wageningen University (Netherlands)

Partners: Radar and optical remote sensing technology (Wageningen University, SarVision, and Terrasphere, Netherlands); Royal Netherlands Meteorological Institute (KNMI, Netherlands); Rural conditions in Java, hydrology, crop growth modelling (Alterra, including PRI, and Deltares, Netherlands); Smallholder insurance systems (Syngenta Infrastructure for Sustainable Agriculture, Switzerland; NDI, Great Britain).

Energy and Environment Partnership Programme of Southern & East Africa (EEP S&EA)

EEP S&EA promotes renewable energy, energy proficiency, and clean innovation interests in the Southern and East African districts ([advanceconsulting. site](#)). The EEP Program upholds projects which expect to provide economical energy services and energy security to the poor in the country and semi-metropolitan regions while combatting environmental change. The project ought to execute innovative clean energy plans, innovations, and plans of action, with a specific spotlight on clean energy for useful use and clean energy in roundabout economy Plans. Qualified innovations are Biofuels fluid, Biogas, Cookstoves, Energy Proficiency, Crossbreed, Hydropower, Solar PV, Solar warm, Strong biomass, Waste to energy, and Wind power.

EEP Africa is controlled by the Nordic Innovation Fund. EEP Africa provides finance through two funding windows:

EEP Innovation will consider co-financing demands as grants and repayable grants between EUR 200,000 and EUR 1 million.

EEP catalyst provides restricted follow-on help up to EUR 2 million for choosing projects that have recently gotten EEP subsidizing. This help is in the form of loans, guarantees or other risk sharing instruments.

Acacia Innovations, Innovative clean cooking fuel distribution, Kenya

This project increased the production and circulation of inventive, non-carbonized biomass briquettes that trade charcoal and firewood for clean cooking. Acacia Innovations targets small and medium-sized institutions in Kenya, like schools, eateries, kids' homes, and hotels (eepafrica site).

Acacia has turned into the biggest provider of clean cooking power for schools and private companies in Kenya, yet demand surpasses existing production limits. With EEP Africa's support, Acacia extended production of its Kuni Safi brand briquettes and steered an inventive new cookstove that can be sold at a low price as a component of a membership pack.

Acacia expects to sell 1,800 cookstoves and 8,400 tons of clean briquettes. Every significant amount of briquettes saves 25 trees, bringing about a decrease of 30,492 tons of CO₂e during the existence of the project. Each everyday schedule's home that changes from charcoal to briquettes saved EUR 750 every year, while additionally prompting better health, resources and quality of life for children in low-income slums and rural areas.

African Clean Energy, credit-based energy access through smart tech, Lesotho

This Project launched a new pay-as-you-go (PAYG) cooking Plan in Lesotho. The new Pro 1 cookstove has an underlying microchip, permitting it to speak with cell phones, and it was sold in a pack with telephones that have ACE application pre-introduced. The company used their network of shops across Lesotho to increase access to energy products in off-lattice regions and offered client capacity on sustainable fuel pellets based on their payment history and credit rating. The objective was to galvanise the clean fuel sector and create long-term demand. With EEP Africa financing, ACE rolled out the first 2,567 cookstove bundles within this network of energy hubs.

excite the perfect fuel sector and spur long-term interest. With EEP Africa support, ACE carried out the initial 2,567 cookstove groups inside the network of energy hubs. The project expanded clean energy access and brought the advantages of cell phones to 1,250 families, contacting an expected 13,195 individuals. This Project sector of

health delivered influence through further developing family health and income, creating 21 new permanent jobs and reducing 14,685 tonnes CO2e emissions.

Tiny Totos clean energy financing through slums daycare business partnerships, Kenya

The aim of this project was to pilot the distribution and financing of cookstoves and other clean energy products through business partnerships with daycare centres. Over 3,500 informal childcare places work in the slums of Nairobi, filling in as day-to-day center points for working moms from thousands of expert and private institutions. These women lack access to distribution networks and financial credit. Tiny Toto's innovative solution tapped into this network to reach marginalised but credit-worthy women.

The aim was to build business partnerships with 200 childcare habitats and sell 5,000 clean cookstoves.

Agsol, solar mills: powering rural productivity

This project produces and distributes solar mills in rural regions to provide access to renewable energy for milling and other productive uses. Agsol's Gen2 solar mill are carefully designed to meet the staple food handling necessities of African farmers, while additionally integrating the Internet of Things (IoT) technology and cloud computing that allows for remote monitoring. Connecting useful agricultural machines to solar power offers off-grid communities a solution for income generation, food processing and access to meaningful and scalable energy. With EEP Africa's support, Agsol will develop new markets and distribute mills through local partners in Kenya, Tanzania, Uganda and Zambia.

The project means to sell 570 solar mills in the four nations, furnishing 45,000 rural families with access to renewable energy and a tool for economic growth.

ASOBO, e-Boarders on Lake Victoria

This Project expects to supplant profoundly polluting petroleum engines on fishing boats in Lake Victoria with electric choices controlled by sustainable power. Existing fishing boats will be retrofitted with electric detachable engines through a sustainable renting model. Regional fishers will approach a full-services “propulsion-as-a-service” model on a PAYG premise and at a cost 20% lower than petroleum.

GSMA Mobile for innovation funds, UK Aid

GSMA Mobile for Innovation funds unites brings together mobile operator members, tech innovators, the development community and governments, to demonstrate the force of mobile in developing markets (gsma site). It recognizes opportunities and conveys innovations socio-economic impact in financial services, health, agriculture, digital identity, energy, water, sanitation, disaster resilience and gender equality. The base co-supporting is 30% to half of the total project spending plan.

This program runs three innovation reserves, which plan to cultivate innovation in mobile innovation to increment financial effect. Effective grantees get grant financing as well as coaching, technical help, and amazing chances to build partnerships in the mobile industry:

The Disaster Response Innovation Fund provides financing to projects that utilize mobile technology to help and enable people or communities impacted by humanitarian emergencies, or to strengthen prevention, preparedness and response in disaster contexts.

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The Ecosystem Accelerator Innovation Fund provides chosen new companies in Africa and Asia with grant subsidizing and the amazing chance to cooperate with mobile operators in their markets to assist with scaling their products and services into sustainable businesses.

The Mobile for Development Utilities Innovation Fund means to test and scale the utilization of mobile to improve or increase access to energy, water, and sanitation services.

Target nations: Institutions and institutions working in Africa, Asia, and Latin America. Herewith is some of the sectors upheld by the GSMA fund.

Digital Utilities

The Digital Utilities programme enables digital solutions and partnerships between innovators, mobile operators, government providers of utility services.

GSMA fund's mission is to empower admittance to affordable, reliable, safe and sustainable urban utility services through digital solutions and innovative partnerships. Inclusive utility services, such as energy, water, sanitation, waste management and transport support urban resilience, which allow cities in low- and middle-income countries to better withstand challenges related to population growth, climate change, and inequality.

The Digital Utilities program empowers digital solutions and partnerships between innovators, mobile operators, government providers of utility services.

The GSMA's Connected Women works with mobile operators and their partners to address the barriers to women accessing and using mobile internet and mobile money services.

AgriTech

The GSMA upholds the mobile industry, agricultural sector stakeholders, innovators and investors in AgriTech spaceto lauch, improve and scale effective and economically suitable digital solutions for smallholder farmers in the developing world (Javed, 2022).

Internationally, 500 million families rely upon agribusiness for their livelihoods. Smallholder farmers are answerable for delivering the food on which up to 70 percent

of the total populace depends, in any case, they remain economically avoided and progressively defenseless against transforming environment designs influencing their yields.

GSMA funds are shutting the gap between the requirement for social and environmental effects and fairness in the food value chain and the business interests of partners in the farming business and AgriTech space.

By giving financing and profound technical ability to service providers, GSMA subsidizes scalable commercial digital solutions that impact smallholder farmers and the agricultural industry at large.

Jazz Pakistan

Farmers' efficiency in Pakistan is deteriorating, with yields being lower than in neighbouring countries. This can be credited, in addition to other things, to an absence of data on agriculture best practices and timely weather forecasts but also to the impacts of climate change.

Jazz is the largest mobile network operator in Pakistan with over 70 million+ subscribers while JazzCash, its mobile cash Services, arrives at more than 12 million clients in the nation. Provided the significance of agriculture to the public economy, Jazz has had a longstanding presence in the sector, fundamentally through BaKhabar Kissan - an omnichannel Business-to-Customer (B2C) mobile agribusiness advisory service that provides farmers with farming best practices, weather alerts and access to agriculture experts.

Perceiving farmers' requirement for a more all-surrounding set-up of rural services, Jazz has collaborated with a consortium of agritech institutions including BaKhabar Kissan (and its sister concern Harvest Agro) and Ricult, to convey various carefully empowered use cases: profiling, Procurement, installments, credit and protection services for farmers. In September 2020, this consortium led by Jazz was chosen as one of the grantees for the GSMA Innovation Fund for the Digitisation of Agricultural Value Chains, a FCDO-funded initiative that aims to improve farmer livelihoods, financial inclusion and climate resilience through digital services.

Working principally in the potato and maize value chains, Reap Agro is both an input provider and off-taker of agricultural produce that leverages digital channels to

improve farmer productivity and market access. Backed by contracts with leading manufacturers like Pepsico and Candyland, Reap Agro, with support from BaKhabar Kissan, maintains detailed farmer profiles, including polygon mapping of their fields, and procures crops under a contract farming model with pre-locked prices with farmers. Upheld by contracts with driving producers like Pepsico and Candyland, Reap Agro, with help from BaKhabar Kissan, keeps up with definite farmer profiles, including polygon planning of their fields, and gets crops under an agreement agriculture model with pre-locked prices with farmers. Consequently, Reap Agro offers advisory services to farmers (both through the BaKhabar Kissan application/IVR Services and face-to-face through Reap Agrospecialists), input loans that are recorded on Reap Agro's accounting report, and and guaranteed crop purchase when the harvest is completed.

Collaborating with GSMA and Jazz, Reap Agro tried to upgrade its services presenting by consolidating financial services through formal financial institutions that consider more scale than Procure Agro's accounting report, as well as including climate resilience solutions for enrolled farmers.

Milk cooperative union turns digital, Tanzania

In Tanzania's Tanga region, not a long way from the country's business capital Dar es Salaam, Tanga Dairies Cooperative Union (TDCU) is a significant purchaser of milk from dairy farmers (Loukos, 2022). With a broad enrollment of over 6,500 chiefly smallholder farmers, TCDU and dairy farmers face a significant test as current milk production can't satisfy the developing need for dairy products by metropolitan and semi-metropolitan clients. To industrialize activities, make efficiencies in the production network, and back individuals to build the stock of milk, TDCU has done whatever it may take to digitize its farmer-confronting processes. Thusly, it hopes to healthen the production and assortment of milk products, while working on the livelihoods of dairy makers in the region. Over the course of the past ten years, many crop buyers in low and middle-income countries have implemented digital agriculture solutions to address challenges faced in the procurement of crops.

In Tanzania, milk is sold fundamentally by means of informal channels with most dairy farmers offering to neighbors, local markets, and trade stores. While supply by means of formal channels is restricted, expanded buyer interest in dairy products has prompted to a steady growth of supply via milk collection centres operated by cooperatives, farmer organisations or private entities.

TDCU is the umbrella association for 28 primary cooperative societies (PCS). Whose enrollment base comprises for the most part of smallholder farmers. . PCS manage the collection of milk via 42 milk collection centres and are responsible for making bi-monthly payments to farmers. PCS, also known as AMCOs Computers, otherwise called AMCOs Agricultural and Marketing Cooperatives Societies (AMCOs), assume a significant part in sorting out farmers by supporting them through different eras of the agricultural process, from production to handling, shipping, and marketing of crops.

TDCU is a majority holder (43.5 percent) in Tanga Fresh, the principal milk processor and maker of dairy products in the region. Milk from the collection centres is delivered daily to the Tanga Fresh factor

Right now, the milk supply is lacking to meet the processing capacity of the plant. TDCU lack of visibility and transparency in last mile operations, challenges in farmer registration and milk collection, and poor support to farmers along the process. To address its difficulties and the difficulties experienced by its farmers, TDCU joined forces with GSMA to develop a digital agriculture solution M-Kulima. TDCU executed the M-Kulima last mile digitisation Plan in association with Tanzanian MNO Vodacom, the nation's driving MNO by piece of the pie and proprietor of mobile cash Services, M-Pesa. M-Kulima is a continuation of Connected Farmer Alliance (CFA), a multi-year programme between USAID, Vodafone and TechnoServe that was set to create and scale mobile applications for agricultural communities and crop buyers. The M-Kulima Plan comprises numerous modules in English including a farmer management system, a communication tool, a mobile money-based solution for business-to-farmer payments using M-Pesa, and a training module that provides information on agronomic best practices.

Working with a consortium of partners under the GSMA Innovation Fund for Digitisation of Rural Value Chains has permitted TDCU to profit from the technical skill of expert institutions and to utilize charitable cash-flow to de-risk investment. This has likewise permitted it to test and iterate the digital solution before pursuing scale.

Under the consortium, the GSMA provides risk capital as a grant and a thorough bundle of designated consultancy covering a scope of areas, for example, client experience research; business knowledge; monitoring, assessment, and learning; product and project management.

Remote Sensing Centre, Zambia

In 1999, the National Remote Sensing Centre (NRSC) was laid out under the Plans of the 1997 Science and Innovation Act to manage remote detecting and geographic data framework technologies. It is constrained by a board initiated under a similar Demonstration, while the general policy management has a place with the Ministry of Higher Education (MoHE) (UNCTAD, 2022a). In 2001 the NCSR was replaced by the National Institute for Scientific and Industrial Research (NISIR) which acquired all the research orders of the NCSR. Each of the three institutions has been since working under MoHE.

The Technology Business Development Fund (TBDF) is a financing vehicle of MoHE. It offers help to firms with innovative projects. The TBDF offers seed cash and endowments that are reimbursable assuming a Project is fruitful. The Project determination and the board processes are in accordance with the global experience, yet the accessible economic Funds are very restricted and sum to somewhere in the range of \$200,000 and \$300,000 each year. In 2019, 19 proposals were received, of which four were selected for support.

Africa FinTech Network (AFN)

AFN is a platform that unites Africa FinTech leaders, organizations and stakeholders through their country associations by making an environment that invigorates information exchange, ideation and the support and promotion of innovative

technologies within the financial services sector across Africa and beyond (africafintechnetwork site). The organization was initiated in Lagos, Nigeria on Tuesday fourth December 2018 during the principal Africa FinTech Celebration by the VP of the Government Republic of Nigeria and the Leader of Africa Innovation Bank. With seven part nations at take-off in December 2018, there are right now 32 part nations across the mainland, with public FinTech affiliations making up the center enrollment and key partners additionally joining up

The Incentive of AFN is centred on supporting part FinTech Affiliations, partners, and public controllers across Africa, to exploit opportunities of rapid advances in financial technology that are transforming the provision of financial services, they are centred around the following core objectives

In 2020 AFN, in association with findexable and Cenfri, launched the Africa Fintech Radar. This note shares the starter discoveries as the Radar strives to be the first Pan-African fintech census and digital map that tracks fintech activity.

Utilizing information provided by Africa Fintech Organization, Cenfri, and findexable, the Africa Fintech Radar is the principal live posting that endeavors to grandstand fintechs working in Africa. The posting is ordered from a composite of the accompanying three groups of measurements - 1) a quality score in light of the size and outcome of fintech institutions in a sector, 2) an amount score in view of the number of firms, and 3) an ecosystem score utilizing chosen measurements from the Doing Business Indices, Africa Fintech Organizations and survey data. All companies listed on the interactive map are qualified and updated fintechs to the best of our knowledge and according to available data.

African fintechs still have many difficulties to conquer in a market that contains 54 nations, each with an alternate region and extraordinary fintech environment. The open door is to make a bound together, straightforward African fintech environment to support society at large. The Coronavirus pandemic has set off profound computerized change universally, not least in Africa, which addresses anywhere close to half (46%) of all worldwide mobile cash accounts.

The Africa Fintech Radar will provide basic data to more readily comprehend and address the trouble spots and eliminate the hindrances for fintechs to add to Africa into turning into a manageable computerized economy.

The Centre for Financial Regulation and Inclusion (Cenfri)

Cenfri is an independent African financial effect organization attempting to support economic innovation and increment economical improvement in developing markets (cenfri site).

Doubell is the organizer and overseeing head of Cenfri. He has broad involvement with microinsurance, AML/CFT, distribution of financial services, and regulatory framework design. He is likewise a leader in conceptualizing symptomatic techniques and utilizing the diagnostic instrument to respond to genuine policy questions and to plan evidence-based, consultative market improvement procedures.

Cenfri was established in 2008 and initially began working in Rwanda in 2014 when we assessed a agricultural protection pilot project for Admittance to Fund Rwanda (AFR).

A couple of years later, was developed a regulatory framework for micro-insurance regulations and then in 2018, was initiated another project via Cenfri's insight2impact programme. The point was to comprehend the way that mobile cash works - the socioeconomics, geological dissemination of trades, and by and large mobile cash project for new and existing clients. In 2020, with the impacts of the lockdown, Cenfri was approached to help with surveying the effect that Coronavirus had on the adoption of cashless payments in Rwanda, and that turned into the groundwork of the Rwanda Economy Digitalisation program.

Cenfri has done and is completing a few projects connected to financial sector improvement, innovation, and more profound digital change in Rwanda. Specifically, Cenfri operated with the Ministry of ICT (MINICT), Kigali Innovation City, Access to Finance Rwanda, and other applicable partners in the financial sector to help the improvement of the draft fintech policy and procedure, which MINICT published in

May 2022. Cenfri attempted statistical surveying on digital payments pricing for the NBR. Along with AFR, Cenfri led an underlying evaluation of the effect of Coronavirus on the Rwanda protection market towards the finish of 2020.

In 2022, Cenfri led a significant level evaluation of the potential for Open Finance in the Rwandan market, with some initial considerations for potential design to unlock innovation opportunities.

The Rwanda Economy Digitalisation Programme

The Rwanda Economy Digitalisation Program is a three-year digital change drive by the Government of Rwanda, the Mastercard Foundation, and Cenfri (Umutoni et al, 2022).

The Rwanda Economy Digitalisation Program plans to help the Government of Rwanda in its vision of building a digital economy utilizing information-driven policymaking. To help information-driven dynamics through limit building and innovation activities, Cenfri has invited eight information science assistants to the group. These students will go through the following year supporting key legislative institutions by cleaning relevant data to be used strategically, analysing data to determine trends and projections for business planning processes as well as translating data findings into understandable templates, dashboards and other graphic presentations.

The students carry with them various experiences and skills from driving scholarly installations in Rwanda like Carnegie Mellon College, African Authority College, African Organization of Math and Science, and the College of Rwanda. The students will be working intimately with the Ministry of Agriculture, Ministry of Education, Ministry of Finance and Economic Planning, and the Information Society Authority to help the utilization of information for policy activities as well as working with **the** Chief Digital Officers to use information-driven approaches.

Risk, Remittances, and Integrity (RRI)

Openi2i is a drive of Cenfri and Finmark Trust focused on sharing a part of the automatic learnings found during the 5 years of executing the insight2impact program. Through Openi2i, we will archive and investigate our journey from the start to end of this programme while considering what has contributed to our successes and failures. A part of the key learnings we have will be used to investigate the program design, partner commitment, innovation in Africa, and digital skills improvement.

RRI and insight2impact (i2i) programs assisted financial service providers with further developing products for more than 361,000 individuals. More than 1 million individuals have seen and been drawn in by the improved web.

Smart Africa Alliance

The Smart Africa Alliance invited in 2022 Cenfri as a global non-profit part to propel Smart Africa's digital transformation initiatives.

With a mission to speed up manageable financial improvement on the mainland, the Smart Africa Alliance has committed, as a component of its leader's projects, to the innovation of a ground breaking policy for e-commerce and e-payment. Cenfri, with its attention on comprehensive economic frameworks and government assistance improving advanced economies, will unite with the Smart Africa Alliance to impact the e-payment and e-commerce topics across the continent and digital transformation in general.

Smart Africa Alliance is a union of 32 African nations, worldwide institutions, and worldwide private sector players entrusted with Africa's digital agenda. The alliance is enabled by a striking and innovative responsibility by African Heads of State to speed up manageable financial improvement on the mainland and usher Africa into the knowledge economy through sustainable admittance to broadband and the utilization of ICTs.

Microinsurance Challenge Fund

For the most part, health care coverage has an exceptionally low take-up across Africa (Dark et al, 2021). As per Finscope, 53% of Ugandan adults reports experiencing a health risk in the last year but only 1.4% of adults have any kind of formal insurance. Ugandan insurtech Turaco made an emergency hospital cash product to assist with close this gap and decrease funds being diverted away from loan payments, to their partner Fenix, to deal with unexpected health costs. This pilot was a part of the Microinsurance Challenge Fund by FSD Uganda.

To economically sell microinsurance products insurers need to cooperate with aggregators. Microinsurance products intend to provide protection cover to low-income people thus, to be successful, the costs should be kept exceptionally low. One method for keeping the cost low is to work with partners that as of now have large client bases that can be distributed to. For this study, Turaco cooperated with Fenix Global, an organization that forms and offers solar home systems allow customers to purchase home electrification kits on credit. This partnership permitted Turaco's access to Fenix's client base of more than 1,000,000 clients in Uganda.

Loan repayments improved, however the quantity of non-performing credits didn't diminish as at first expected. This was to some extent in light of the fact that the specialists selling the solar home units and explaining the insurance product were incentivised (through commission) to emphasise full loan repayment. This meant that the agents did not sufficiently highlight that the customer only needed to make half of their payments to access health cover.

FinTech is flourishing in numerous African nations directly following the Kenyan MPesa. Numerous applications are proposed to work with different kinds of banking, virtual portfolios, and different services. There are additionally innovative systems set up to encourage household savings, including by the poor. One model is a plan to work with saving practices among individuals in the informal sector who keep cash concealed in private places. In mid-2020, the pilot activity had contacted 20,000 individuals. There is a serious business environment in Zambia FinTech: 13 mobile wallet suppliers were registered in January 2020.

ENGIE Energy Access, Swedish Embassy, and USAID

ENGIE Group began in Zambia in 2017 as Fenix Worldwide and has since helped in excess of 300,000 clients with their clean energy systems impacting over 1.5 million lives. In 2020, with Mobisol and ENGIE PowerCorner formed ENGIE Energy Access (see site). They receive the support from development partners – the Swedish Embassy and USAID (see site).

ENGIE Energy Access saw that the connections between mobile connectivity, solar PV accessibility, and financial technology offered the answer to solving the global challenge of connecting communities living far from the electricity grid.

Zambia

ENGIE Group began working in Zambia in October 2017. With over 250 workers and in excess of 50 service centers, the Zambia team is giving a client experience, while high-quality products (designed in the United States and Germany) guarantee long-term consumer loyalty.

Group designs, manufactures and distributes ReadyPay Solar packs, a solar panel and smart battery system. ENGIE Group targets 15 million or 80 percent of Zambians live off the electrical grid.

Adjoua from Côte d'Ivoire

Adjoua is a seamstress and mother from Côte d'Ivoire. Since she joined our solar home solar system, she has found that it assists her with dealing with her business and her home life substantially more.

Previously, when there was no power, she couldn't function work well and had to stop working around 5pm because of the darkness. Presently she can keep working at the time she needs.

Mr. Okello from Kenya

Mr. Okello lives in northern Kenya. He possesses four independent companies - a fitting place, supermarket, mobile charging station, and hairstyling parlor - that are all run by a single 200W solar home system.

Acquiring the solar-powered haircutter allowed him to open his barbershop, and with the mobile charger, he can charge 10 customers' phones simultaneously.

Warren from Tanzania

Warren, a welder living in Tanzania, says that joining his local village's ENGIE PowerCorner mini-grid has changed the future prospects of his family. He has now the possibility to start selling some groceries as a second business and diversify his revenues. He can now pay for his two children to go to university.

Food Technology Business Incubation Center, Uganda

The Makerere University School of Food Technology, Nutrition and Bio-Engineering hosts the Food Technology Business Incubation Center, established in 2009 within the framework of the Presidential Initiative for Value Addition, with support from the Rockefeller Foundation and the Norwegian and Malaysian governments (UNCTAD 2020).

The incubator has between 20 to 30 new businesses all at once. Products developed so far incorporate pineapple juice, soya bean products, smoked meat, lemongrass tea, amaranth products, canned maize, and beans. The incubator plays out a valuable job in working on the commercialization of conventional products through technical and business advice, and testing facilities and shared machinery.

Consortium for Enhancing University Responsiveness to Agribusiness Innovation Limited (CURAD), Uganda.

Together with NARO and the National Union of Coffee Agribusiness and Farm Enterprises, Makerere University is also one of the partners involved in CURAD.

This is a non-profit public-private organisation's drive pointed toward supporting youthful business people in the agribusiness business to lean toward the improvement of new endeavors by establishing an environment wherein new companies can be upheld from innovative thought through to suitable business. CURAD is one of the six agribusiness incubators started by the Forum for Agricultural Research in Africa under the UniBRAIN-DANIDA programme, aimed at supporting agribusinesses led by women and young people. CURAD has supported in excess of 70 small and medium-sized projects, adding to the making of in excess of 2000 jobs. It offers facilities, such as greenhouses, agricultural land and other basic infrastructures, which are needed by startups in their incubation phase.

Yangon Innovation Centre, Myanmar

The Yangon Innovation Center (YIC) was laid out in 2018. It was intended to be where youthful business visionaries could associate with technology companies and develop their capabilities and ideas.

The Centre is managed by by Seedstars, a worldwide organization of tech business visionary points that work fundamentally in developing markets. It has links back into the regional government, and is advised by a Yangon Regional Innovation Committee, which includes representatives of the private sector, as well as government officials. Innovative new companies the primary beneficiaries of the services presented by the YIC.

Ooredoo Myanmar and United Nations Development Programme Myanmar today launched the “Innovation Hub – Supporting the Sustainable Development Goals” (the Innovation Hub).

Ooredoo is a global communications organization working across the Center East, North Africa, and Southeast Asia, serving consumers and businesses in 9 nations. Ooredoo delivers the leading data experience through a broad range of content and services via its advanced, data-centric mobile and fixed networks.

Targeted frontier technologies and high-tech innovation adaptation projects

In this chapter we present the targeted frontier technologies relevant for developing countries, Solar energy, High-tech robots managing environmental conditions, Water purification, Drone and satellite imaging and high tech adaptations to the condition of developing countries in the following domains: Nano , Drones, Education, Communication platforms for informed decisions, Financial and ordering digital services, Energy, Agriculture and Healthcare.

Targeted frontier technologies

Solar energy

The cost of solar panels has fallen by a variable in excess of 75% throughout last ten years (Criado-Perez, 2019).

Low-cost, high-efficiency solar panels can be utilized for family housetop solar installations as well with respect to town-level micro- and mini-grids. Throughout the next few years, there are probably going to be further breakthroughs in the design and manufacturing of photovoltaic cells and battery stockpiling frameworks, with conceivably the approach, not long from now, of printed organic solar cells (Museminari, 2017; UNCTAD, 2018).

In 2021 solar power was positioned as the top renewable power source introduced across the globe (Hemetsbergeretal, 2022). Solar energy contribute 47% of renewable capacity.

As per the most recent Levelised Cost of Energy (LCOE) research, in October 2021 the downward trip of utility-scale solar cost has progressed by a further 3% compared to the previous year (lazard site). The spread of conventional age technologies is enlarging, taking into account that the cost of gas and atomic went up. Solar's cost decline has genuinely been exceptional: contrasted with 2009, the beginning of our noticed era, solar power generation cost has diminished by 90%.

Solar energy in Asia

Supported innovation in Asia's top markets China and India maintained the standing of solar in the Asia-Pacific region. The regions kept its strong leadership in 2021, addressing 58% of the worldwide solar power capacity, however, diminished its worldwide offer somewhat by one percent contrasted with the prior year.

Solar energy in Africa

Across the African Mainland, South Africa is the biggest market and introduced 930 MW in 2021.

The Renewable Energy Independent Power Producer Program was launched by the Government in 2011. Until this point in time, nearly 9 GW of sustainable power has been obtained by the Government, of which 1.5 GW is solar. The nation plans to introduce in excess of 8 GW of solar by 2030.

Off-matrix solar controlled Services - In far-off provincial sectors of Rwanda, Zambia, and India, the organization Vanu is off-grid, solar-powered, voice and data services (nanosun, site).

The Beyond the Grid Fund for Africa (BGFA) program has endorsed 2022 its most memorable Plans in Uganda to help the innovation and scale-up of high-quality solar home systems (BTG program, 2022). The Projects will increase energy access in rural and peri-metropolitan regions in the country with the assistance of results-based support given by the program.

The Project has been endorsed by d.light Plan Uganda and ENGIE Energy Access Uganda. The Total value of the two first Plans is approx. EUR 5.2 million, empowering the infrastructure of up to 370,000 high-quality energy service connections, which will benefit approx. 1.8 million individuals.

d.light is a local solar distributor in Uganda, laid out in 2016 as a as an operational subsidiary of the d.light Group. The company enables reliable power through solar energy solutions with a Pay-As-You-Go business model.

ENGIE Energy Access Uganda (beforehand Fenix Worldwide) was laid out in 2013 as a subsidiary of the French mother company ENGIE. ENGIE Energy Access

Uganda has sold more than 700,000 solar solar home systems in Uganda, bringing clean, reliable power for lights, phones, radios and TVs.

Power Africa Off-grid Project (PAOP) provides technical help and designated grant subsidizing to help the innovation of Africa's off-grid solar home system (SHS) and mini-grid sectors.

High-tech robots managing Environmental conditions related to COVID-19

Rwanda is conveying High tech robots developed by the Belgian organization Zorabots (powerblom site) to play out various assignments connected with Coronavirus management, including mass temperature screening, conveying food and medicine to patients, catching information, identifying individuals who are not wearing covers, among others (zorarobotics site).

It is likewise utilizing refined numerical algorithms developed by a regional disease transmission expert to limit the cost and expand the viability of coronavirus testing (Kuteesa, 2020).

A robot developed in India cleans sewer vents remotely utilizing PC vision and technological arms. The robots do away with the inhuman practice of manual scavenging. The organization that developed and conveyed these robots is likewise training the scavengers, who are primarily from the lowest castes to become robot operators (GIZ, 2016; SIDSDOCK, 2016; UNIDO, 2016; Jeffreys, 2020).

The Pune Municipal Corporation (PMC) recently started using 'Bandicoot' designed by the Kerala-based GenRobotics Innovation Pvt Ltd for cleaning manholes (Jadhav, 2022).

This drive is in is in alignment with the vision of Pune Smart City to bring more safety in the maintenance of city manholes using advanced technologies. Manual searching expects people to enter manholes and clean them physically and this practice has claimed the lives of many workers. To solve this challenge, PMC is presently utilizing robots to clean sewers.

Water purification

Water purification can convert polluted fresh water, brackish water, and saltwater into WHO-quality potable water. Some filters can even be 3D printed (Ssuuna, 2020).

Further innovations in this space could include the production of filters on-site and for personal use, making them more readily available to remote communities.

These are based on ground-breaking research in software radio at MIT, for community without grid power or Internet connectivity are giving many advantages to communities, through progresses in agrarian extension, telemedicine, and distance education.

Waste-to-energy processes create low-cost, renewable energy from animal and human waste, organic/organic waste from farming and food processing, industrial waste, and municipal garbage. These frontier technologies also mitigate environmental damage from landfill and wastewater run-off into ground and surface water (vanu site).

Drone and satellite imaging

AI combined with robot and satellite imaging can be utilized to develop risk maps for quickly developing urban communities in Africa and somewhere else. Artificial intelligence can assist with surveying which structures are at a high risk of breakdown and consequently needing retrofitting before the following quake or tropical storm. New and more sustainable materials combined with innovative technologies can empower unfortunate families to retrofit houses that are at risk for underlying breakdown (Hindustan Times, 2019).

Genomic applications

Most genomic applications has been accumulated from individuals in developed nations, very small from non-industrial nations (Bustamante, Burchard, and De la Vega, 2011).

Data are typically produced through genome-wide association studies (GWASs) which examine the genomes of many individuals to find varieties related to a specific

sickness. In this research, 96% of the subjects have been of European drop (Gameiro et al, 2018).

The Human Heredity and Health in Africa (H3Africa)

Africa carries the highest burden of both infectious and non-communicable diseases, and hosts the greatest genetic diversity within its population, but only seven of the thousands of GWASs, have been conducted exclusively on African participants H3Africa Consortium et al. (2014; Mulder, 2017).

By 2017, under 10 percent of GWAS data was coming from African populaces (Mulder, 2017).

This is chiefly on the grounds that Africa misses the necessary biomedical research infrastructure for large-scale genomics studies. In cooperative research, African researchers generally only participate in sample collection (H3Africa Consortium et al, 2014).

H3Africa engages African scientists to be cutthroat in genomic sciences, lays out and supports compelling joint efforts among African analysts on the African mainland, and produces remarkable information that could be utilized to improve both African and worldwide health.

The H3Africa consortium works with major research into illnesses on the African mainland while likewise creating infrastructure, resources, training, and ethical rules to support a sustainable African research enterprise – led by African scientists, for the African people. The initiative comprises 51 African projects that incorporate population-based genomic studies of common, non-communicable disorders such as heart and renal disease, as well as communicable diseases such as tuberculosis.

H3Africa consortium, the Wellcome Trust DELTAS programme, and the GSK Africa OpenLab support different genomic programmes in Africa.

Genome Asia

India has 20% of the total populace yet its residents have provided just 1% of genetic data (LSE, 2018).

A few new businesses are trying to accumulate additional data from Asian populations. For instance, GenomeAsia 100K means to make reference genomes of all significant Asian ethnic groups beginning with the sequences of 100,000 people (Wall et al, 2019).

GenomeAsia 100K is an interesting association between the academia, research organizations and private companies uniting the thoroughness of academic research with the objective-driven approach of private companies (program genomeasia site). The first phase of the Project will sequence 10,000 Asian individuals for ethnic stratification within each local ancestry. This will be trailed by sequencing of 90,000 people combined with clinical and phenotype information to find unique Asian variants. The 100,000 entire genome groupings from 28 distinct nations will speed up the accuracy of medication applications for Asian patients. Further, the unique genetic diversity prevalent in South, North, and East Asia provides a significant source of clinical insights that ought to upgrade how we can interpret disease biology; from rare inherited disease to common and genetically complex illnesses such as cancer, diabetes and cardiovascular disease.

Nanotechnology

Nanotechnology for developing countries

Water

The utilization of nanotechnologies in five key water industry segments - identification, observing, desalinization, decontamination, and wastewater treatment - could a large role in averting the coming water crisis (nanowerk site).

Concerning nanotechnology and water treatment, a functioning arising sector of exploration is the improvement of novel nanomaterials with increased affinity, capacity, and selectivity for heavy metals and other contaminants. The advantages of utilization of nanomaterials may get from their enhanced reactivity, surface area and sequestration characteristics. A variety of nanomaterials is in different phases of

research and development, each possessing unique functionalities that is potentially applicable to the remediation of industrial effluents, groundwater, surface water and drinking water.

Membrane processes are viewed as key parts of advanced water purification and desalination technologies and nanomaterials like carbon nanotubes, nanoparticles, and dendrimers are adding to the improvement of more efficient and cost-effective water filtration processes.

Medicine

Various nanomedicine research endeavors manage diagnosing and battling the Human immunodeficiency virus (HIV) that causes AIDS (Acquired Immune Deficiency Syndrome).

Research is likewise in progress to utilize nanotechnology against malaria and nano biosensors for early discovery of tuberculosis as well as investigating the chance of making a tuberculosis immunization.

Agriculture and food

Agriculture efficiency upgrade (developing more food with equivalent or fewer resources; precision farming with less waste) and food processing & storage are the main impact areas for underdeveloped nations where food supply is much time restricted and the quality of available food leads to nutritional deficiencies.

Rather than ordinary manure use which involves many tons of inputs, nanotechnology focuses on small amounts. Researchers are effectively exploring a scope of metal and metal oxide nanoparticles, otherwise called nano fertilizer, for use in plant science and agriculture. These materials can be applied to plants through the soil irrigation and sprayed onto their leaves.

Nanocapsules, nanoparticles, and surprisingly, popular capsids are instances of purposes for the upgrade of supplements retention by plants and the conveyance of dynamic fixings to explicit sites. The utilization of target-explicit nanoparticles can decrease the harm to non-target plant needs and how much chemicals are delivered

into the environment. Nanotechnology derived devices are also explored in the field of plant breeding and genetic transformation.

Nanotechnology in South Africa

Health and environment

DST highlighted a Project to create nano-polymer capsules for the slow release of tuberculosis therapies; a country community water filtration project; a modest, mark-of-purpose water channel; and minimal cost sensors for Medical determination in the field.

Mining industry

Numerous labs are doing nanotechnology research for the mining business. Mintek, the mining business' true 'research committee', as government labs are brought in South Africa, was offering this sort of help, however different universities labs were additionally involved (Unforgiving et al, 2018). Those labs were making metallic nanoparticles, especially platinum products. South Africa is the wellspring of a larger part of the world's platinum, and manufacturing nanoparticles from the platinum would add economic value contrasted with simply sending out crude platinum.

Mining institutions are expected to satisfy environmental standards, and nanotechnology research points were attempting to develop various new choices for achieving that objective. These incorporate the utilization of nanostructured materials to tidy up corrosive mine overflows. Remediation of corrosive mine run-off through nanotechnology innovation could in this manner decidedly affect unfortunate communities.

Petroleum industry

Most every lab additionally appeared to be working with the big South African parastatal petroleum firm, on different parts of its processes. For example, one research facility was dealing with carbon-based nanocatalysts, and one more on remediation of carbon emissions.

Agri-food sector

South African nanotechnology analysts were likewise helping firms in the agri-food industry, including the regional seed firms that provide contest to the enormous multinationals. Farmers' institutions were giving their all to keep keep the prices of new South African varieties low for local farmers, trying to negotiate arrangements to pass the development costs on to more affluent farmers in the global North. This should be visible as an equalizing mechanism (Cozzens 2010) and a primarily inclusive innovation (Heeks et al. 2014), as it makes an economic design to help less fortunate local farmers. A small firm in the agri-food region is creating diagnostic policies for animal farming and starch production.

Energy sector

In the energy area, we did not find many new South African firms stemming from locally-invented, nano-based devices or techniques. One South African invention had been licensed to a German firm for improvement and production — something contrary to what South African innovation policy needed to have occurred in the country. This exception, was a prominently successful university spinoff firm that is dealing with a indigenous African solar cell.

The group has won prizes at a few significant career expos for this work. The solar cell work is pushing ahead with significant financing from a worldwide development agencies and partners in the USA and Europe.

Water sector

The water area additionally showed enterprising action, essentially for nano-organized materials to further develop filtration.

A wave-driven reverse osmosis process was in trying on South Africa's West Coast. One spin-off from a major research university was commercializing a nano-based individual water filtration system, and another was building desalination plants for communities and farms. Another university lab was considering getting into the business of providing filters for use in village water systems.

The rural water filtration project, as well as being a source of pride within South Africa, is well known internationally (Hillie and Hlophe 2009). The accounts stress the low cost and simple design of the system, as well as community consultation at the time it was installed.

The system had been introduced on the grounds of a school, and the lead scientist detailed that the top of the school regarded the cleansed water as the school's property, disseminating it fundamentally through school children taking containers home with them.

The water the town gets, which has high nitrate levels, is terrible, risky to children, and over the long term unfortunate for everybody there. The nano-based water filtration system solved those problems(Heeks et al. 2014).

The tea bag water filter consolidates the skills of a microbiologist with those of polymer scientists at at the same university.

The microbiologist considered embedding anti-microbial nanoparticles in a polymer membrane filter, to expand its ability to clean water. The idea to shape the new filter as a tea bag was unintentional; the filter is the bag, not the charcoal that fills it. The microbiologist-innovator guarantees that this sort of filter has a superior possibility of assisting Africa with arriving at improvement objectives for water than ordinary systems.

Vaccines

The encapsulation project is an especially encouraging one. The slow release of tuberculosis medications would significantly improve the treatment of that sickness for unfortunate patients whose lives don't uphold muddled drug regimens with exact timing. The primer outcomes show critical upgrades with the encapsulated version of the drugs, even in laboratory animals. The large, worldwide medication institutions are not interested. The tuberculosis drugs themselves are quite inexpensive and there is little prospect of being able to recapture the high costs of putting the slow-release treatment through pre-clinical and clinical trials under a standard pharmaceutical

business model. South Africa itself doesn't have the pre-clinical testing facilities to take on the innovation process in government laboratories. The project group is working with the worldwide general health community towards an answer and is trusting that one of the new tools, for example, a public-private organization or advance purchase commitment might move the drug delivery system forward.

Zimbabwe

Zimbabwe enacted a national Science, Technology and Innovation policy in June 2012 determined to advance the utilization of emerging technologies, including nanotechnology, for national development (Demissie, 2020). The nation launched its most memorable nanotechnology place through an organization between the Government and The State University of New York, working with local universities. Zimbabwe is trying to apply nanotechnology in areas, for example, water sanitization, energy generation, drug production, and mineral beneficiation, to speed up economic growth. The well-thought-out plan of the nation is driven by research at tertiary institutions, and four Ethiopian universities have been incorporated into groups, with each group entrusted with a specific aspect of nanotechnology.

Ethiopia

Ethiopia is putting resources into nanotechnology to guarantee the quick headway of its agriculture and energy sectors, and its biotechnology and manufacturing enterprises. Be that as it may, the country's nanotechnology program has so far neglected to take off due to an absence of powerful regulations and policies, and insufficient infrastructure improvement.

Nigeria

The Government has laid out a public guiding council on the improvement of nanotechnology. That board involves specialists and pertinent partners who have formed a guide for the country's dynamic innovation and utilization of nanotechnology. The board is liable for developing a policy structure and execution methodologies for tending to public necessities and yearnings through the sending of nanotechnology.

Drones

Rwanda and Ghana

In October 2016, Zipline started conveying delivering whole and componentized blood (red and white blood cells, plasma, platelets and cryoprecipitates) to remote hospitals in Rwanda. By 2019, this program had extended to cross-country support, with Zipline conveying 75% of the nation's blood supply beyond the Rwandan capital of Kigali to 2,500 hospitals and health facilities and and 25 million individuals from six distribution centres that cover 100% of Rwanda and 50% of Ghana. Zipline is as of now developing four additional distribution centres, enabling coverage of 90% of the population of Ghana.

In March 2020, during the COVID-19 pandemic, Zipline expanded deliveries to include personal protective equipment (PPE) for doctors in remote areas and, notably, transport of COVID-19 test samples from rural hospitals around its distribution centres to laboratories in Ghana's two largest cities, Accra and Kumasi, making regular autonomous flights in densely populated areas

In March 2020, during the Coronavirus pandemic, Zipline extended conveyances to to include personal protective equipment (PPE) for doctors in far-off regions and, eminently, transport Coronavirus test samples from rural hospitals around its distribution centres to laboratories in Ghana's two largest cities, Accra and Kumasi, making ordinary independent trips in thickly populated regions. It likewise acquainted community-level conveyance with advanced care closer to patients' homes, permitting immunocompromised ongoing consideration patients to stick to treatment regimens without risking travel to hospitals during a pandemic. By March 2021, Zipline had extended its current vaccines distribution program in Ghana, which conveyed more than 1 million dosages of immunizations in 2020, to incorporate coronavirus immunization circulation to rural and exurban health centres. In three days, Zipline had distributed its entire initial allocation of 11,000 doses of vaccine, representing 13% of Ghana's total vaccines administered in that period .

Zipline needs Nigeria to support its drone delivery medical service—as Rwanda and Ghana did (Onukwue, 2021)

In Oct. 2016, Zipline began conveying blood products to 21 Rwandan hospitals on-demand, decreasing conveyance time from four hours by street to no less than 20 minutes, utilizing drones that move up to 100 km each hour at a time. The organization has since added more Medical products to its stock, including meds and Coronavirus antibodies, and has conveyed packages to in excess of 2,000 medical hospitals across Rwanda, Ghana, and the US where it is based.

It marked its fifth anniversary last month by reaching 200,000 commercial deliveries, even as it says it serves 75% of the blood needs outside Kigali, Rwanda’s capital. These numbers suggest Zipline has nailed down an efficient model for a complicated task.

In Ghana, the company has four distribution centers. Each gets health products from the country's health ministry through medical stores designated for each region.

The distribution centers are essentially centralized warehouses that operate round the clock and from which products are delivered to hospitals when they are needed.

India

The World Economic Forum launched the Medicine from the Sky initiative in 2019 to deliver vaccines to rural communities. It lies at the convergence of two of the most intensely controlled sectors internationally, medical care and flight, and includes the southern state of Telangana, Apollo Hospitals and India's policy think tank NITI Aayog. Medication from the Sky has set off a policy conversation for additional liberalization of the drone rules in India and has opened new roads for use across medical care.

The Indian Project, which involved illustrations from comparative initiatives in Rwanda and Ghana, has finished in excess of 300 vaccines conveyance preliminaries in Telangana to extremely distant regions, making it the very first occasion in Asia where vaccines were conveyed utilizing drones. The trials were a culmination of efforts inaugurated by India's Minister for Civil Aviation, Jyotiraditya Scindia.

The initiative is now expanding to other parts of the country, including the northeastern state of Arunachal Pradesh. Medication from the Sky was instrumental not simply in paving the way for last-mile drone projects in India, yet additionally for the the greater liberalization of aviation policy in the region

Urban drone, Malaysia

AirAsia has announced that they are partnering with MaGIC to launch a pilot project for the delivery of goods from AirAsia's e-commerce platforms (My Magic, March 2021).

The pilot project is set to be carried out through a 6-month phased approach at the third National Technology and Innovation Sandbox (NTIS) test site in Cyberjaya. They are currently testing out the service with two local drone operators—VStream Revolution and Meraque Services.

The primary stage of the project is to evaluate the drone operators' capabilities, experience, process, organization status, and services expansion. After this stage the project will move "beyond the sandbox environment".

NTIS has additionally been working fully supported by Malaysia (CAAM) to ensure safety and security of Unmanned Air Services in urban settings meet the requirements and regulations. Dealing with the regulatory requirements, they trust would speed up the project from the innovative work stage to it being economically prepared.

Education

Aakash tablet, India

The world's least expensive tablet, Aakash was valued at \$35 for students with government sponsorships, or \$60 in stores (Frigillana, 2016). Today with the government aid to understudy half, 15 US\$ Affordable and effective, the device operated perfectly under a two-hour video test in 118-degree heat that replicated the harsh summer weather in northern India.

The One Laptop per Child (OLPC) Programme, Rwanda

OLPC is a key project that points to the Improvement of Education through the Presentation of innovation in Elementary schools (reb.gov.rw/olpc site).

The OLPC project, aims at the Enhancement of Education through the Introduction of technology in Primary schools The principal goals are to change the job of the educator from the information holder to a facilitator who guides students to get to the immense information on the workstations, servers, and the web and to grow the information on unambiguous subjects like Science, Math, Dialects, and Sociologies through internet-based research and computerized content facilitated on school servers.

In the primary era of the program execution in 2008, the Government guaranteed that each district has at least 5 schools running OLPC. In the second stage launched in 2011, all administrative sectors in the country have a minimum of 1 school with the OLPC program.

The component of the OLPC programme includes content development, capacity building of head of schools and teachers and repair and maintenance.

The distribution has reached a total deployment of 269,116 Laptops in 933 schools with this process on-going.

TalkingPoints (USA) parent-teacher engagement

TalkingPoints is education innovation not-for-profit that supports the schools in associating families and educators for the achievement and well-being of every single understudy (talkingpts site). TalkingPoints' multilingual stage involves two-way deciphered correspondence and customized content in excess of 145 dialects to work

with significant family-school partnerships. Energizing this exceptional methodology is a real-time spotlight on wiping out boundaries to draw in families, including language, time, mentalities, and capacities.

TalkingPoints is utilizing AI to empower two-way interpreted parent-educator commitment and education when language represents a barrier to communication.

In 2022 talking points added 20 new dialects to its family-school association stage, which can uphold more families and schools in building strong partnerships that can lead to improved attendance, course proficiency, and higher test scores for students. The new languages are:

Bhojpuri, Dogri, Konkani, Maithili, and Meiteilon (Manipuri), Mizo — spoken in India

Aymara, Guarani, and Quechua — spoken in South America

Bambara, Ewe, Krio, Lingala, Luganda, Oromo, Sepedi, Twi, and Tsonga — spoken in Africa

Ilocano — spoken in the Pacific Islands

Faroese — spoken in the Faroe Islands

Nurses, counselors, bus drivers, and other critical staff can connect directly with families through the TalkingPoints platform, increasing family engagement.

Text to Change (TTC)

Text to Change (TTC) connected with a large number of children in Africa in politics, economics and social issues through the Voice Africa's Future project (Frigillana, 2016).

The Project's objective was to assemble 150,000 children in Africa to message their considerations and contribution to the future state and activities of their countries.

Dell's computer hardware and literacy program, Youth Learning, initially launched in India but now operates in 15 countries across the world to provide grant funding and the latest technology to address the lack of basic needs that may hinder a child's ability to learn, such as food or security.

Communication platforms for informed decisions

Nokia world's cheapest cellphone

Aimed at the developing world and set to be first launched in 2010 in India, Turkey, and eight African nations the 150 is valued at \$15.

The telephone fundamental necessary activities voice calling, text messaging and mobile payments.

The Vodafone-Nokia 250 costs around \$20. The variety screen is somewhat greater at 1.45 inches making it a downplayed however appealing-looking device and there is additionally an FM radio ready.

The 2022 rendition is Nokia 105 which costs in India (91mobiles site) and in South Africa (priceinsouthafrica site) \$16 - \$18.

Monitoring environment systems

Satellite imagery to detect illegal mines

Poor environmental practices from unlawful mines pollute surrounding regions, contaminating water and fish, and endangering local workers and communities (impactchallenge.withgoogle site). In Colombia, specialists utilize satellite imaging and Google AI to distinguish unlawful mines all through the nation, empowering communities and the government to take actions that will protect people and natural resources.

Colegio City Hall leader de Nuestra Señora del Rosario (Colombia) is utilizing satellite imaging to detect illegal mines, enabling communities and the government to protect people and natural resources.

Del Rosario College is a Colombian university situated in Bogotá. Due to its important place in Colombian history, it is known as "The 4445Cradle of the Republic". At least 28 of Colombia's presidents have been students of this university

Crisis Text Line, Inc. (USA)

Crisis Text Line is using natural language processing to optimize the assignment of texters in crisis to counselors, reducing wait times and maintaining effective communication.

Crisis Text Line was intended to assist individuals in torment with as small erosion as could be expected. It is accessible through SMS, Facebook Courier, or WhatsApp.

The framework was launched in South Africa during the last quarter of 2019 out of 3 languages, English, isiZulu, and Afrikaans (backabuddy site).

Full Fact (UK)

Full Fact (UK) is creating pattern observing and grouping tools to help fact checkers' analysis so that they can help contextualize the news and enable informed decisions.

The primary stage of the project was upheld by a grant from Facebook in 2020 (fulfact site). Full Fact convened a group of partners to examine starting contemplating the parts of the Framework and its utilization in both the UK and international. In the first stage have partipated developing countries representatives from Africa Check (South Africa/Nigeria/Kenya/Senegal) and Blast (India).

From March to June 2021 Full Fact ran a meeting looking for input on the draft Framework.

Full Fact likewise developed simulation training exercise based on the Framework, which was conveyed to 200 members at a WHO education conference. This assisted

with testing the useful utility of the Framework with people tackling health misinformation from different industries, and to identify improvements.

Predicting air pollution, Uganda

Makerere University (Uganda): is following and foreseeing air contamination patterns via low-cost sensors in Kampala, Uganda, improving air quality forecasting and intervention (cega.berkeley site).

CEGA's Development Impact Lab (DIL), Engineer Bainomugisha, an Associate Professor at Makerere University, developed AirQo, a minimal-cost air quality monitoring, research, and analysis network in Uganda. At the groundwork of the organization are detecting devices designed to attach to boda bodas (motorcycle taxis) across Uganda. Regularly less expensive sensors lead to one-sided and wrong estimations. By using probabilistic AI policies and one-of-a-kind air screen plans, AirQo has has surmounted many of these technical barriers.

AirQo has now scaled in Kampala city and other metropolitan towns in Uganda, growing its sensor organization and making continuous air contamination maps accessible on cell phones, web platforms, and social media. Kampala presently has one of the greatest numbers of air quality screens of any African city, with AirQo in the greater Kampala metro rising from 15 to 40 just during the first half of 2020.. This increase happened with perfect timing to assist with estimating a 40 percent improvement in air quality during the Coronavirus lockdowns, providing a strong data point for informing future pollution reduction efforts.

Predict times of and locations at risk for landslides, Pennsylvania State University (PSU)

PSU is using deep learning tools to better predict times and locations at risk for landslides, creating a warning system to minimize the impact of environmental disasters. With the availability of satellite images from Google Earth, past landslides can be identified from space (psu site).

The goal was to produce an artificial intelligence method to identify these events from the satellite images. Over time, the AI began recognizing the cues it could use to identify a landslide, but it also needed to spot the differences from other occurrences, too. The shape of a disturbance can have indicated a landslide, but it could also have been from a wildfire, excavated mine, or torn-down building. After a year of research, the model is now correctly identifying a landslide 97% of the time. The researchers set up a website where people could upload their own Google Earth images to help train the model.

The Canary Islands, volcanic islands

The Canary Islands are a region of seven volcanic islands that lie 100 kilometers off the shore of Africa. These islands developed over a sector of interest as in the Hawaiian islands and everything except one has dynamic volcanoes. The shorelines of the Canaries are portrayed by enormous, steep precipices and there has for some time been a hypothesis that these entities are shaped by sensational breakdown.

The speculation that the Canary Island breakdown produces a megatsunami is not all-around acknowledged. This distrust emerges from the way that the island breakdown can not have been disastrous, all things being equal, occurring gradually in various discrete small events as opposed to a single giant collapse. Such a sluggish breakdown wouldn't produce a large tsunami.

It doesn't provide the idea that an overwhelming megatsunami developed in the Canary Islands is unavoidable. There is potential for breakdown of the volcanic flanks on the islands however these events will probably be less dramatic than once feared and with waves only devastating on a local scale.

Information-communication technology infrastructure

Hurricanes (Switzerland), Human rights

Huridocs is utilizing normal language handling and AI to extract and associate pertinent data on the off chance that connected records, permitting human rights lawyers to effectively research and defend their cases.

The global community sees the Plurinational Territory of Bolivia as a country that is effectively relieving the extractive blast while maintaining the freedoms of the native community in the shielded domains. This, nonetheless, is extremely distant from reality (Booyzen, 2022). The Coordinator at the Bolivian Centre for Documentation and Information (CEDIB) is intently monitoring the basic freedoms and environmental circumstances and has tracked down evidence of countless brutality and assaults against those shielding the privileges and domains of communities and their shielded regions. The dangers and assaults are for the most part against women, completed without any potential repercussions and fundamentally inside the setting of extractive activities in the region.

Huridocs upheld CEDIB and National Coordination for the Defence of Indigenous Peasant Territories and Protected Areas (CONTIOCAP) with the improvement of a documentation framework that maps the immediate dangers and infringement against environmental protectors.

Birth registration, Tanzania

In Tanzania, an SMS-based application has been developed that makes the birth enlistment process more productive, practical, and open for parents (Utoikamanu, 2018).

Over ten million Tanzanians subscribe to voice, SMS, web, or mobile cash services from Tigo Tanzania, the second biggest mobile network operator (MNO) in the nation (GSMA, 2016). Driven by a pledge to put resources into the digital change of the country, Tigo turned into Tanzania's first MNO to operate a GSM and 4G coverage in each district. Tigo Tanzania belongs to Millicom Group.

To modernise and improve the registration process, The Registration Insolvency and Trusteeship Agency (RITA) and UNICEF operated intimately with Tigo to develop innovative mobile applications that permitted registrars to collect birth registration

and transfer it to a centralised system. As well as giving their technical ability to this project, Tigo operated with the mobile enrollment process by giving the new registrars with free mobile handsets, data and SMS texting. free mobile handsets, information, and SMS messaging. For Tigo, the essential choice to an accomplice in this work was driven by the value acquired by growing and developing relationships with government and civil society partners, as well as a desire to showcase the role mobile providers can play in addressing a pressing social need through the application of their technology and expertise. Through this drive, they have likewise had the alternative to develop a new, innovative application and acquaint Tigo services with over 700 registrars, as well as the thousands of customers the registrars serve.

Over 7.4 million boys and girls matured five years of age have been enlisted and provided with birth certificates through special under-five birth registration strategy launched in 2013 (Robi, 2022). In 2012 only 13 % of this targeted population was registered, in 2021, 65%.

Disable accessibility, Vietnam

Dr. Vo Thi Hoang Yen at the Disability Research and Capacity Development (DRD), developed Dmap as an application that assists people with disabilities,, planning their movement, and exploring accessible buildings in Viet Nam (drdvietnam site). It was launched in April 2019 in Ho Chi Minh City, fully intent on being carried out in other Vietnamese urban sectors later on.

The application has data on the availability of thousands of buildings, including restaurants, shopping malls, entertainment centers, and religious buildings.

The Dmap application was developed fully backed up by foundations, philanthropists, UNDP, and USAID. The Dmap application offers an effectively open instrument, considering that it is promptly accessible on cell phones.

In September 2017, DRD kept on being gotten to be received fund from USAID for project "Access For All" 2018-2020 term. In the new term of the project, one of the fundamental activities has a place with the project objective "Building PWD's ability in Tay Ninh and Binh Dinh provinces.

Skilllab refugees

Skilllab B.V. (Netherlands) is assisting refugees with interpreting their skills to the European work market and prescribing pertinent professional pathways to investigate.

Skilllab is a social business creating innovation-based solutions for engaging the coordination of displaced people into regional work markets. Skilllab develops software technology that captures the employable skills of disadvantaged job seekers such as refugees and migrants and matches their skills to local labour markets.

They are persuaded by a conviction that the nobility of freedom through work is a central right that working work markets ought to provide.

Skilllab has previously directed its product with displaced person work searchers in a few different European urban communities.

With Skilllab's ability evaluation mobile application, displaced people recognize and report their expert skills quickly and in their regional dialects and investigate proficient professional pathways they could seek in the work market. The application automatically matches a person's range of skills to every one of the 3,000 occupations recognized in the European skills, competency, and qualifications framework. In this process, Skilllab offers basic support to outcasts who frequently battle to distinguish sustainable work opportunities in new geographies.

ILO Prospects Egypt as a team with Skilllab, and the Association of Businessmen in Alexandria (ABA), directed a skills profiling application that empowers exiles and host communities to self-evaluate and impart their skills to likely bosses (ILO site).

The pilot study was directed among 400 beneficiaries somewhere in the range of 2020 and 2021. The tracer study was conducted three months after to collect direct feedback from the beneficiaries.

Gozem

There are around 12 million Moto-Taxis in West and Central Africa that work in a for the most part informal economy. Most Moto-Taxis don't approach conventional banks and micro-finance institutions to fund their vehicles. All things considered, they depend on cash banks that charge higher loan costs, frequently over 70% every year. Gozem, with its Mobility / Ecommerce / Fintech Super App, has put the driver at the center of its strategy to respond to their daily challenges.

Gozem was launched in 2018 in Togo with the conviction to carry top-notch advanced services to under-served populaces in West and Central Africa, beginning with the transport/mobility sector (website.gozem webpage).

Gozem offers different ride-hailing services on their platform including motorcycle-taxis, car-taxis, and tricycle-taxis, as well as grocery delivery, food delivery, and other offerings.

Gozem operational across Francophone West and Central Africa, provides various on-demand transportation, delivery, and cashless payment solutions in one app to hundreds of thousands of users in the region: Ride-hailing; Grocery Delivery; Food Delivery; Logistics & Other E-commerce Services; Digital Wallet & Cashless Payments in Togo, Burkina Faso Cameroon Ivory Coast Gabon Mali and Senegal.

Gozem and IFC join forces to co-develop a \$10 million project that will enable Moto-Taxi drivers in Togo and Benin to access affordable vehicle financing to purchase or rent bikes (technode.global site). The project will likewise approve that electric bikes are a sustainable substitution for the flow petroleum bikes.

Gozem has launched many projects to assist drivers with expanding their income, declining their cost of activity, and accessing instruction. Gozem started giving vehicle support to its drivers 14 months prior and they have now assisted in excess of 2,000 drivers with procuring vehicles with sustainable financing. Through this association, Gozem and IFC will back new vehicles for 6,000 drivers.

PPP in Digital Transformation, Kazakhstan

The Project intrinsically requires private sector investment for expanded effectiveness and capacity to answer rapidly to changing digital needs and to innovate (ADB site). The digital change could be applied across various sectors like vehicle, energy, education, urban and wastewater, health, and social sector.

Some examples of digital technology-based projects and services are information-communication technology infrastructure, automated fare collection systems across integrated multi-modal urban transportation, automated vehicle locations (e.g., in bus rapid transit), smart traffic management, e-government services, healthcare screening and e-health platforms, digital identification technologies, digital payments.

Pink phones

Women in Kampong Thom region, in central Cambodia, can utilize the pink telephones provided by Oxfam to get data that assists them with when to harvest, and this goes a long way towards protecting livelihoods and securing them a better future.

The telephones likewise empower the women to purchase greater plots of land, sell more vegetables, set aside cash, and make improvements to their homes. Before the project, women weren't in a level position with the men in relation to selling their crops and seeking better prices

Ooredoo platform

The Yangon Innovation Center (YIC) was laid out in 2018. It was intended to be where youthful business people could associate with innovation institutions and develop their capacities and thoughts.

The Centre is overseen by Seedstars, a worldwide organization of tech business person center points that works essentially in developing markets. It has joined once more into the regional government and is exhorted by a Yangon Territorial Innovation Panel, which incorporates delegates of the private sector, as well as government authorities. High-tech new companies are the essential recipients of the services

presented by the YIC, yet an innovation center is certainly not essential for approaching the center.

Ooredoo Myanmar and Joined Countries Innovation Program Myanmar today Launched the "Innovation Center - Supporting the Economical Improvement Objectives" (the Innovation Center point).

Ooredoo is an international communications company working across the Center East, North Africa, and Southeast Asia. Serving purchasers and institutions in 9 nations, Ooredoo conveys the main information experience through an expansive scope of content and services by advanced, data-centric mobile and fixed networks.

Ooredoo developed an income of QAR 30 billion starting around 31 December 2021. Its portions are recorded on the Qatar Stock Trade and the Abu Dhabi Protections Trade.

Strategically situated at the Ooredoo Base camp in Yangon, the Innovation Center provides hopeful youthful business people a to help them create and showcase their products and services that can speed up the execution of Sustainable Development Goals (SDGs) through digital innovation in Myanmar. The platform has provided Myanmar's youth with an inclusive innovation platform to introduce their mobile application models and business thoughts while developing youthful business people through financial and technical help which has been granted to the winning participants.

In December 2018, Ooredoo Myanmar and UNDP in Myanmar coordinated a a Hackathon under the theme 'Women's Empowerment and Agri-Tech', with the objective of promoting innovation and entrepreneurship (qatar-tribune site

. Three teams have been organized:

Team Blind Hat's application, 'SeinLaeMyay', under the Agritech in the Value Chain category, assists local farmers with a platform for transactional, rental and information-sharing activities to bridge the information gap between buyers and sellers of agricultural products, nutrients and machines.

Team Deca's 'DrKyet', in the Agritech for Rural Farmer's category, enables poultry farmers with interactive chat bot for daily information, prompt answers to their questions and troubleshooting support. What's more, Group Divas' innovation, 'HearU', in the Women's Empowerment category representatives to report offense at work straightforwardly to the organization's HR division or management.

Team Divas' innovation, 'HearU', in the Women's Empowerment category, allows employees to report misconduct at work directly to the company's HR department or management.

Financial and ordering digital ministries

Kenya's M-PESA

Silicon Savannah, the dynamic private sector in Kenya changed the country to Hardware, software and become a financial center in East Africa for investments and innovation (UNDP, 2017). Because of the country's innovative investments like M-Pesa and the subsequent enterprising soul, Kenya and particularly Nairobi, are frequently alluded to as Silicon Savannah (Pilling, 2018).

M-Pesa by Safaricom was overall the first money transfer and payment services in 2007 and disrupted the financial sector. A large number of unbanked individuals in the rural regions were currently ready to partake in market activities by just utilizing their telephones. Strangely, low-income nations can frequently jump by utilizing innovations because of an absence of institutions and huge frameworks (Meatham Hasan Al-Tewaj and Tünkers, 2019). To that end, late worldwide projects and general consideration of innovation are placed on Africa since institutions see a high opportunity for future opportunities there (Pilling, 2018).

Kenya's M-PESA application permits cellphone proprietors to effectively and safely move cash utilizing their telephones and is for the most part utilized for staff salaries and kid support. Launched in 2007 by Safaricom, the country's biggest mobile

network operator, the application is presently utilized by more than 66% of Kenya's developed-up populace.

As of late, Kenya's social security fund and pay-TV service DStv have added their particular applications to the M-Pesa application (Chenze, 2022). This makes it simple for clients, who can somehow have to get to various regions or download and introduce a few separate applications, access everything in one spot, and making payments from a central place. Makao and Little are the furthest down-the-line applications to be added to the M-Pesa application.

Makao is an hospitality industry booking service connecting clients of the M-Pesa application with convenience and occasion/get-away offices while Little is a renowned transport provider that has diversified its product portfolio to include food deliveries, movie bookings, utility bill payments and more.

Considering that the Little application one can download from the Playstore is a super application, the one that has advanced toward the M-Pesa application's 'Discover' segment as a smaller-than-expected application is only the ride-hailing part, connecting clients of the M-Pesa application with many taxis and cruiser taxis (bodabodas) in a basic and simple to-utilize interface.

Wave

In no less than four years, Wave has gone from a side project from Asia and Africa-centered modest settlement organization, Sendwave, to a mobile cash specialist co-op valued at \$1.7 billion (Ajifowoke, 2021).

The billion-dollar valuation comes after it brought \$200 million up in a Series A round led by payments giant Stripe; Sequoia Heritage, a private investment fund and unit of Sequoia; Founders Fund; and Ribbit Capital, with participation from other existing investors.

In 2015, the Central Bank of West African States (BCEAO), the common central bank of eight French-speaking nations in the region (counting Senegal), permitted nonbanks to work mobile cash in its member states. Mobile money adoption has expanded since then, driven by early telecom entrants that had the requisite

infrastructure and user base (mobile networks and subscribers) to establish the service.

Wave, a product made by two Americans (Drew Durbin and Lincoln Quirk) to bring down the cost of mobile cash transactions, steered in 2016 and formally launched in Senegal a year after the fact, entered the market with a 70% less expensive service.

Wave offers free deposits and withdrawals through its mobile application and applies a proper exchange cost of only 1% for cash moves between people. Not at all like its rivals, Wave passes extra charges on bill payments from clients onto businesses. For clients without a cell phone, it provides a free QR-card to transact with agents, who are able to open accounts, receive deposits, and execute withdrawals.

The startup's low cost transaction services have assisted it with taking on incumbents, eat into their market share, and turn the entire mobile money industry on its head.

Wave's technique has figured out how to shake Orange specifically. To match the super aggressive proposition that the startup has operated with since May 2020, the telecoms operator had to bring down its costs also, cutting down bill payment charges to 1% from June 1, 2020.

Pressure on the network operator likewise saw it prevent clients in Senegal from buying Orange broadcast appointments by means of Wave's mobile application, a move that has been portrayed as hostile to cutthroat by the fintech organization and brought about a dispute currently in the hands of the country's telecoms regulator.

Wave's branch in Dakar has partnerships with UBA and Ecobank for its Senegal operations.

The startup additionally expects to develop its 800-man group across product, design, and business, as well as project into different markets it thinks about administrative amicable, similar to Uganda and Mali.

Vortex solar-based transaction systems

Branch-based banking is too costly to possibly be stretched out to far-off rural regions where the volume of trade is small (South, 2008). Utilizing traditional ATMs (automatic teller machines) as a channel presented numerous troubles on the grounds that these ATMs were not operated to work in [illiterate] conditions. Thus the requirement for developing an ATM is well-defined for this specific situation.

Costing simply a tenth as much to work as a standard cash machine, Gramateller has a unique finger impression scanner for the unskilled and can accept dirty and crumpled bank notes.

The rural clients find unique fingerprint authentication intuitive and simple and the ATM convenient and simple to utilize. A couple of clients likewise gave criticism that the ATMs look less scary, perhaps in light of the fact that it is set in a non-cooled room with simple access and is different in shape from a typical ATM.

ATMs were tried for expanded working processes under hard conditions that would win in the country setting, utilizing ruined economic standards, working in non-cooled and dusty conditions, and exposing the machine to typical fluctuations in line voltages and power outages.

With respect to hoodlums getting their hands on the money before poor people, Vortex keeps up with the machines.

The product is based on UPS and battery backup. It had a tough plan and could be run either on solar or electrical power (The Indu, 2010). An ordinary ATM consumes around 1,000 watts of force and requires a cooled environment, one more 1,500 watts for working.

A significant contrast between the Vortex Gramateller ATM and standard units is its low power utilization, 90% not exactly normal, which makes it a sustainable candidate for using solar power. It can work in surrounding temperatures of 50 degrees Celsius, Gramateller ATM's utilization under 100 watts of force, and does not need cooling. As per the organization, contrasted with ordinary ATM

installations, Vortex's solar-controlled Gramateller Team ATMs diminish carbon dioxide emanations by somewhere around 18,500 kg each year. Gramateller Couple ATMs additionally incorporate biometric security highlights.

The State Bank of India demanded 400 solar ATM units for installation in semi-metropolitan and country India and one more 80 have been demanded from that point forward by different economic institutions.

Gramateller Duo ATMs also include biometric security features.

With operated biometric skills, these ATMs had been utilized by the Union Government to disburse wages under the MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) programme.

Energy

Solar-powered hydro plant

Hydro Plant is a tech startup in Myanmar that is creating practical cost-effective solar-powered smart Internet of Things (IoT) farm control systems for food processors, traditional, aquaculture and hydroponic farms. These are intended to assist farmers with diminishing activity costs, increment functional effectiveness, and gain reliable quality results.

They expect to help the productivity of current farms that can access and utilize farm-level, weather and market data to support precision farming.

Mini hydroelectric dam for rural electrification, Malaysia

Five settlements of the native Kadazandusun identity live in the Ulu Papar Valley (Asean city Chairmen EU, 2022). They are primarily housewives and firewood gatherers. A portion of their day-to-day activities, like consuming and cooking from firewood and utilizing lamp oil lights, are hazardous to health. Their under-

development, geographical isolation, energy shortage, and poverty have deteriorated their life.

To answer the issue, hydropower is an optimal source of power for rural people in this region close to Borneo, where precipitation is abundant throughout the year.

Furthermore, this power is one of the fundamental sectors for innovation since it will provide livelihoods and income for individuals in the town. Additionally, this drive is expected to improve people's management capacity. They find out about watershed management ideas, the use of electricity and Micro-Hydro system operation and maintenance.

SunSaluter

Eden Full, a mechanical engineering undergraduate at Princeton College, developed solar panels that optimize energy collection by pivoting to point toward the sun for however much time as could reasonably be expected every day (Frigillana, 2016).

The innovation, known as SunSaluter, is cheap and efficient. It costs only \$10 for the system which utilizes 40% fewer panels than run-of-the-mill solar energy. Its point is to propose solar panels for places that has never approached electricity.

Monsoon Wind Power Project, Lao

The project is being developed by Impact Energy Asia Development (IEAD), with an expected investment of up to £720m (\$1bn). IEAD is a partnership between Impact Wind Investment (55%) and BCPG Public Company (45%). Impact Wind Investment is owned by Japan's Mitsubishi with a 43% stake, while the remaining 57% stake is held by an affiliate of Impact Electronics Siam (Kamonthip Mama oon,2 022).

The project of 600MW is situated in the Southeast of Laos, around 22km from Laos - Vietnam line. The designated commercial operation date (COD) of the project is in the second quarter of 2025.

Monsoon wind power project is connected to the Vietnamese power system via Monsoon (Laos) - Thanh My (Quang Nam, Vietnam) 500kV transmission line with a total length of 65km. To serve the grid connection of the project, the extent of work in

Vietnam incorporates 2 projects: Rainstorm - Thanh My 500kV transmission line in Vietnam (around 43km) and the project of extension and redesign of the current Thanh My 500kV substation.

For the line to be associated with Thanh My 500kV substation overseen and operated by the National Power Transmission Corporation (EVNNPT), EVNNPT has been carrying out a project to extend and renovate Thanh My 500kV substation since September 2021 and strived to finish it by December 2024.

Agriculture

ICT applications

American University of Beirut (AUB), Lebanon

AUB is applying Google AI to the environment and rural data to further develop water systems for resource-strapped farmers in Africa and the Middle East. The specific measure of water expected to flood crops in a particular field, alongside a proposed water system timetable would be conveyed to the farmer through a mobile application, or straightforwardly to the water network system utilizing a smart water system regulator. The proposed technology plans to provide close real-time water-use data predictions to farmers, empowering them to settle on exact water system choices and to conserve water. It will likewise make smart water systems more open to small-scale farmers in Lebanon and other dry and semi-dry districts all over the planet.

AgSAT assists farmers irrigate more precisely, increases crop yield, and guides decision-making in water allocations (sites.aub.lb site).

The smart irrigation app can be embraced by ministries and municipalities, farmers, water system engineers, water authorities, large and small farming enterprises, and non- governmental organizations to expand on their adaptive capacity, and subsequently further develop water system practices.

AgSAT brings irrigation technology to the farmer's telephone on both Android and iOS. AgSAT is being utilized in excess of 50 nations all over the planet. AgSAT

clients get their crop water requirements and apply irrigation where it is most required with regards to environmental change, water shortage, and worldwide financial difficulties, which win particularly in bone-dry and semi-parched sectors.

Wadhvani AI (India)

Wadhvani artificial intelligence is utilizing image recognition to follow and analyze pest-control efforts, enabling timely and localized intervention to balance out crop production and diminish pesticide use (wadhwaniai.org).

Almost 100 million farmers depend on cotton agriculture for their livelihood. 90% of these are small-scale producers (less than an acre of land) from low and middle-income nations. India becomes 26% of the world's cotton - and alongside having the biggest region under cotton cultivation (41%) it is the world's biggest cotton producer. Many variables can antagonistically affect the efficiency of crops like plant illnesses, weeds, and extreme weather conditions changes. Cotton is especially helpless against insects. Farmers battle with vulnerability in yield and income and are frequently headed to indebtedness and despair.

Bollworms are assessed to cause 70% of pest damage. The Pink Bollworm (PBW) is viewed as the most harmful insect for cotton crops as it has as of late developed a resistance to Bt-cotton.

India has an expected 5.8 million cotton farmers, with 40-50 million individuals taking part in related activities, for example, cotton handling and trade.

Over 75% of these farmers are smallholders or landless farmers, who lack the resources to adopt sophisticated pest management measures. Up to 30% of yields are lost consistently because of nuisances, regardless of farmers utilizing more than half of all pesticides in the nation (trailed by paddy and wheat). Cotton yield in India is 487 kg/ha, which is essentially below the world normal of 768 kg/ha.

Existing ways to deal with counter nuisance assaults have a few constraints, since they require manual data collection (actual including of vermin tracked down in ranches), research, and advisory dissemination, they tend to be error-prone, unverifiable and

difficult to scale. Provided the short era of time in which activity should be taken while controlling PBW infestations, any postponement can deliver measures ineffective. There is likewise an absence of mindfulness among farmers about which synthetics work for explicit vermin and the frequency of showering. This has brought about unpredictable pesticide use, which neglects to shield crops and is both harming the environment and farmers' health.

CottonAce is an AI- powered early warning system accessible through an application on Android cell phones. It assists farmers with protecting their crops by deciding the ideal opportunity to spray pesticides through immediate, localized advice (wadhwanai.org).

The primary user of the solution is a cotton farmer who has introduced pest traps and works intimately with farmer government assistance projects to oversee insect invasions - alluded to as a 'Lead Farmer'.

Lead farmers or expansion workers will introduce the CottonAce application and transfer a photo of pests collected in commonly-used pheromone to the CottonAce application.

The AI algorithm recognizes and includes the the pests in the photo and decides the degree of pervasion, in light of which a group of significant warnings is provided to the farmer. This data is shared with neighbouring 'cascade' farmers for whom no additional tools, including smartphone, are necessary.

The application works on a simple smartphone and even works offline in places with low network coverage. It is accessible in 9 languages, English, Hindi, Marathi, Gujarati, Telugu, Kannada, Tamil, Odia, Punjabi.

Jaguza Livestock, Uganda

Jaguza Livestock application is a software for livestock record keeping, offering an offline and online monitoring system to detect cattle movement and keep track of health and fertility status.

Jaguza Livestock application is an artificial intelligent and computer vision system (IOT), mobile (android, windows, IOS) as well as SMS and USSD empowered system and web that targets improving livestock production in Uganda and Africa as a

(itu.int). It has various modules of which a farmer can pick a module that suits his/her best need (Self Help App). This mobile health technology startup focus on developing and deploying mobile and offline solutions to increase access to animal health for millions of smallholder farmers in African rural communities best farming practice. Developed a novel algorithm combines crowdsourcing and machine learning with with predictive analytics to estimate infections sufficiently early to assist country farmers with working on their efficiency. The framework real timely collects animal health data from farmers and health workers and corresponds it with external information sources including laboratory data, historical data and early warning signals. Jaguza application has a low cost, easy to understand voice alerts and reminders for care seeking as well as actionable information and advice to help deal with disease outbreaks. The farmers can pay utilizing their current mobile credit so that no upfront seasonal costs are necessary. Jaguza Application is right now functional in over 40 communities in 62 Ugandan local farms in Uganda where it is provided exact animal health information, outbreak alerts and educational content on more than 8300 users every month. The project has been finished from 14/04/2013 to 08/03/2016

The partners are Uganda communication Commission (UCC) Common Wealth Telecommunication Organization (CTO) Uganda Nation council of science and Technology(UNCST) Ministry of communication and Information Technology National Information Technology Authority-Uganda (NITA-U).

M-Voucher, Uganda

M-Voucher is a system utilized by farmers and agro-vendors to redeem electronic vouchers via mobile phones.

As a graduate in Computer Science who had already worked with electronic payments in Uganda, Evelyn Namara saw all of the trouble spots of the ongoing system (cartierwomensinitiative site).

Sure that she could simplify the flow of money to institutions to beneficiaries in agriculture and improve the welfare of communities, Evelyn established Vouch Computerized with the vision of involving innovation to build effectiveness and transparency in the distribution of monetary aid programmes.

Settled in Kampala, Uganda, Vouch Digital appeared with first product, the M-Voucher two years ago to facilitate subsidy distribution across Uganda.

The M-Voucher system is a software-as-a-service that consists of a USSD (Unstructured Supplementary Service Data) system used by farmers and agro-dealers to redeem seed crops as well as post-harvest equipment; a services data system that tracks ongoing data collected from beneficiaries as well as a payments system integration that allows agro-dealers and beneficiaries to receive instant payments for products redeemed.

Vouch Digital's clients are are segmented by development agencies running cash-based programs; government-led social security programs, humanitarian projects as well as private sector cash-based programs seeking efficiency and transparency in the distribution of goods, items or services to beneficiaries. Vouch Digital 's market is at present in the agriculture sector serving providers, agro-sellers, and smallholder farmers yet they are trying to grow to different sectors like medical care and education.

Satellite ministries, Uganda

The market-led user-owned ICT4AG-empowered data Services (MUIIS), is a satellite-based project to make services more accessible to farmers.

NITA-U upheld the send-off of the MUIIS project, a satellite-based, data and correspondence innovations for farming (ICT4Ag) Services drive (rsr.akvo site). MUIIS targets tending to the ongoing rural data hole by building a sustainable plan of action that will make markets sustainable and open for farmers in Uganda.

It delivers timely bundled service with products ranging from accurate weather information, agricultural tips (trend analysis comprising of soil analysis, water

efficiency, market information, etc.) and index-based drought insurance to empower farmers to make informed decisions.

In Uganda, as in many sub-Saharan nations, the absence of convenient and exact admittance to data about the environment, financial services, crop management, markets, and climate coping mechanisms is a serious obstacle for smallholder farmers, keeping them from accomplishing more significant returns and selling their produce at better costs. To address these difficulties, an innovative drive is modelling the way in which ICTs can be utilized to capture satellite-based information on a wide range of agricultural indicators, packaging it into tailor-made messages for farmers in local languages.

EzyAgric mapping, Akorion Uganda

EzyAgric which purchases input, receives technological support, and maps the farm land, was developed by Akorion, a startup based in Kampala (akorion site).

Akorion is a startup laid out by youthful alumni in 2014 with a grant from USAID and is presently associated with the accelerator programme of Google for Africa. They offer GPS planning with expansion services and a marketplace to purchase inputs. Besides, they have developed a help conveyance model in which community-based specialist co-ops are furnished with cell phones to convey services on demand to individual farmers. Up to this point, Akorion has served over 60,000 farmers and carefully profiled 42,000 out of 480 towns, teaming up with 100 farmers' cooperatives. Akorion's goal is to digitize rural value chains to empower every business farmer and different agribusinesses to get to excellent production and marketing services through their EzyAgric platform. To empower services, EzyAgric is enhanced by an Electronic Village Agent Model – e-VAM. E-VAM is a delivery model in which community-based service providers, typically "super farmers", are outfitted with cell phones to convey services on demand by different farmers. Services on offer are digitizing biological and production information, exact GPS planning of nurseries (real estate), an expansion for diagnostics of illnesses, and agronomic recordings and cooperation with agronomists. Different services incorporate the acquisition of soil testing and certifiable data sources (seed, manure),

acquisition of agriculture insurance, a digital records systems to track income and expenditure for informed decision making, and seasonal performance analysis.

Rainforest Connection (RFCx)

RFCx, established in 2013, is a US-based non-profit, which has developed another weapon battle: a framework that researches the hints of the woods to identify deforestation in real life (Lago, 2021). The framework has been utilized in tropical forests across 16 nations, including Indonesia, Brazil, and Cameroon, and is presently being sent as a method for protecting endangered animal species.

RFCx began by introducing upcycled mobile phones to send sounds of the forest, which would be analysed for evidence of illegal logging. It has since developed its devices called 'guardians' that combine custom logic boards in a weatherproof box with solar panels, a directional antenna and a microphone. They are introduced at the actual top of the rainforest shade and they can record the whole soundscape of the woodland.

This information is then gushed to the cloud, where it is broken down by RFCx's AI models to distinguish sounds like trimming tools, vehicles, human voices, shots, or whatever would tell us that there's unlawful logging, poaching, or mining occurring in the region.

These alarms are shipped off individuals on the ground, like officers, native individuals, and non-profits, through their cell phones. The beneficiaries can see the spectrogram of the alarm, pay attention to it, and affirm or dismiss it, which thusly assists RFCx with further developing its AI algorithms.

The information got from the watchman devices not just makes monitoring vast areas of rainforest easier, it likewise makes the work of rangers or those on the ground more secure as they can try not to coincidentally find risky conditions. Brutal wrongdoing related to unlawful logging has been on the ascent lately.

In any event, when rangers have identified criminal behavior in the backwoods, it can, in any case, take them days to get to where it is working out. This is the reason, in

2019, data systems provider corporation Hitachi Vantara, approached RFCx to help it move from detection to prediction.

The algorithms that RFCx had developed within detected anomalous sounds and afterward alerted rangers in the area to go research the unnatural noise.

A bioacoustic mark is a portrayal of the sound that the animals in woodland on the whole make in typical conditions. At the point when they are upset - by a scout searching for the best regions for logging, for instance - animals that are typically calm will sound cautious, so any progressions in this mark can be an early warning sign for logging. The algorithms developed distinguish those adjustments of the infrastructure bioacoustic mark of the woodland and with 96% exactness, allow rangers five days advance notice on when those chainsaw events are going to occur.

Regional Innovation Clusters, Indonesia

This program led by the Ministry of Research, Technology and Higher Education (RISTEKDIKTI), brings together regional governments, research institutions, industry, and regional communities trying to lay out specializations in Regional Superior Products (Produk Unggulan Daerah PUD). Funding is provided to research institutions to work with local industry and farmers' groups to create and move innovative products in light of existing local resources.

To date, 14 high-value regional products have been developed and marketed through the provincial innovation group program.

A good example has been the development of innovation clusters around patchouli oil, prized for its use in perfumes, cosmetics and insecticides. While the Aceh region in Western Indonesia once provided 70% of the world's patchouli oil, the business has been vigorously hit by civil clashes and catastrophic events. All the more as of late, a group of scientists at a university in the region have developed an original refining technique for the oil which can increment production amount and quality. A Centre for Patchouli Innovation Group has been laid out, with financing from RISTEKDIKTI, which has united scientists with government actors, industry, and

regional Aceh farmers. The Centre has upheld the commercialization of patchouli oil by SMEs and includes farmers in the commercialization process, empowering them to sell their products in store or online.

The PUD in Bondowoso Regency, East Java Territory has a few industrial centers that produce regional potential products that can become prevalent products. The potential industrial centres incorporate coffee, tape, brass, furniture, baskets, iron crafts, embroidery, chips, tiles, batik, and bricks (Arif, 2021).

The Coffee Sipi Falls project

In Western Uganda Simon Levélt, a Dutch family business owning specialty tea and coffee shops, and Kawacom Ltd, a Ugandan private coffee processor, invested jointly in central coffee processing facilities and started providing training to farmers, many of whom are families led by women, on how to pick the beans and other agronomic techniques (royalcoffee site). Transportation is likewise proposed to farmers situated in far-off towns to carry beans to the handling offices. The improvement both in the degree of production of beans and handling has prompted a superior price for the farmers. Before, coffee makers in the region were familiar with home processing their coffee. Thanks to the project however, they have learnt that a central mill can perform more consistently and professionally the different phases of washing, fermenting, and drying, needed to reach the standard of quality required by the international market. The project joins 5,000 smallholder coffee farmers with an average of 0.5 ha each. The farmers, quick to take part in higher value craft markets, were prepared in socially and environmentally capable coffee-developing practices and efficient farm management. In 2002, the Project received the very first 'Organic' certificate. This has attracted additional certification from the UTZ standard, JAS and the Rainforest Alliance. The project has since extended essentially and was accounted for to include more than 10,000 smallholder farmers in 2015. Farmers get greater prices for their better coffee and take part in related social and environmental projects.

Proximity Designs, Myanmar

Proximity Designs is a design company and global NGO that works as a social enterprise (proximitydesigns site). It was launched in Myanmar in 2004 to assist farmers and agricultural workers with getting to better innovation, in light that this need was not being met by the general population and private sectors, or by humanitarian aid work. Proximity Designs develops affordable products for rural workers, involving them in the design process to ensure they address client needs. Proximity expects to urge different institutions to set out on comparative action and innovate in the low-cost sector and continue toward new projects once they see different players creating comparable products. The organisation has three business units: farm technology, farm advisory services (FAS) and Proximity Finance, which develops loan products for farmers.

Proximity's R&D focus is on irrigation, aiming to address the challenge of water management in Myanmar where percentages of irrigated farmland are amongst the lowest in Asia. The FAS provision offers free counsel at the village level on points like seed choice, soil health, fertilizer utilization, and insect and sickness management. Over 100 field agronomists work working together with the local government to recognize needs and execute changes to augment yields and salaries. Proximity Finance has been running beginning around 2014, prevalently loaning to town groups however presently guiding individual technologies.

U Kyaw Hlaing, the guava farmer, lives in Kyaung Gon town in the Irrawaddy Delta had 400 guava trees to water (medium site). He would convey two huge pails on his shoulders with a burden, beginning at 7 am and working until 11 am to cover a portion of the plot. The engine broke on the siphon and the one who came to fix recommended contacting Vicinity who offers guidance on the water system.

With Proximity's "Yetagon" system it takes him around 10 minutes to water 100 trees. He used to make around 300,000 kyat (USD 200) per Harvest, three times each year. Presently he makes around 400,000 or 500,000 kyats for each Harvest, and in the hot season, he can reap consistently. He gets around 100 fruits for each tree, though when he was battling to water them appropriately he'd get around 50 or 60, and just 30 of those eventually fit to sell.

Crop Innovation in West Africa (CIWA)

The Institut Sénégalais de Recherches Agricoles (ISRA) in Senegal, Institut de l'Environnement et de Recherches Agricoles (INERA) in Burkina Faso, and the Institut Public de la Recherche Agronomique du Niger (INRAN) in Niger unite their aptitude to frame CIWA and speed up the the development of climate smart varieties of sorghum, pearl millet and cowpea.

Their coordinated efforts will deliver productivity gains in the target crops that will underpin food and nutrition security, resilience and economic growth in West Africa.

Recognizing that sorghum, pearl millet, and cowpea have generally been under-resourced at the national program level, CIWA is ready to gain ground at numerous levels with farmers and customers, value chains, and regional progression in research, economic growth, job creation and gender equity

A project looks to further develop sorghum reproducing by consolidating the best parts of two strong programming applications, applying front-line genomic exploration to farming and building institutions between researchers in the U.S., Senegal, and Costa Rica (ilci site).

Sorghum, a grain that becomes quicker than wheat and has more grounded dry spell resistance than corn, is a fundamentally significant yield in both Senegal and Costa Rica. Another drive from the Feed the Future Innovation Lab for Crop Improvement (ILCI) will help plant raisers in those nations in growing new sorghum varieties, in a joint effort with the lab of Ed Buckler, ILCI's genomics lead, a research geneticist with the U.S. Division of Agriculture - Rural Exploration Services and an assistant lecturer of plant rearing and hereditary values.

Current DNA-based correlations include a large number of adaptations, which can wind up useful traits in a plant. Looking “a level up,” at how RNA and proteins are expressed from DNA, reduces variation and can provide more helpful information for breeders.

Most plant-rearing models depend on DNA, and this project will try to integrate RNA and protein articulations, too.

The scientists have consolidated the best highlights of two technologies for plant-rearing specialists: TASSEL software and the R coding language. TASSEL is the main programming device used to assess plant diversity; it has in excess of 20,000 clients each year. R is a PC coding language utilized by numerous raisers and other applied researchers that empowers researchers to follow and rehash information explores more productively than is conceivable with the basic Tuft graphical point of interaction.

The worldwide group is based at Cornell College, with U.S. partners at Cornell University, with U.S. partners at Clemson University, Kansas State University and Colorado State University.

The East African Center of Innovation for Finger Millet and Sorghum (CIFMS)

CIFMS is harnessing sorghum and finger millet genetic resources for increased productivity and utilization in the arid and semi-arid regions of East Africa (Longley et al , 2021),

With a dream to raise new varieties that convey advantages to smallholder farmers, partners at the National Semi arid Resources Research Institute in Uganda, the Tanzania Agriculture Research Institute and the Kenya Agricultural and Livestock Research Organization unite to confront food security across East Africa. 400 million individuals call the dry land regions of sub-Saharan Africa home, however regional difficulties of low efficiency, frequent droughts, devastating floods, and pest and disease outbreaks threaten livelihoods. Finger millet and sorghum act major sources of carbohydrates and micronutrients in rural communities. Genetic improvement of these crops offers a proficient and savvy policy to increment smallholder production, serve market needs and unfathomably further develop food and dietary security across East Africa.

CIFMS will evaluate value chains, market study, and drivers of reception and recognize wellsprings of protection from biotic and abiotic stresses and hotspots for nourishing quality. Fully intent on reproducing strong assortments, CIFMS will

involve quality and sub-atomic marker disclosure for novel characteristics (especially the protection from biotic and abiotic stresses, protein and micronutrients) and develop devices and techniques for effective phenotyping and fast age progression of cooperative attributes. To follow the progress of technologies in crop improvement, CIFMS will lay out digital data capture and integrated management of data. Recognizing that crop improvement influences all aspects of life, the Centre of Innovation will centre on gender analysis and streamline of gender dynamics in finger millet and sorghum value chains.

Center of Innovation for Crop Improvement for East and Southern Africa (CICI-ESA), Cowpea in Malawi

One of the very first plant species tamed, cowpea is likewise one of the world's most ungrasped crops (ILCI, 2021). The CICI-ESA in 2020 with the Feed the Future Innovation Lab for Harvest Improvement was trying to change the unique obliging cowpea, attempting to interface and team up with regional partners on a more profound level. One of the main reproducing programs in Malawi to focus on cowpea, CICI-ESA endeavors to raise new varieties with attributes wanted by farmers and customers, with an accentuation on women's inclinations, as they work to diminish nourishment lacks and alleviate poverty in Malawi, Tanzania and Mozambique. The majority of the superior varieties of cowpea accessible in the region were obtained from global reproducing programs. Out of four superior varieties delivered, only one was developed in-country, while the other three were presented from somewhere else. These superior varieties had low take-up in Malawi, with adoption rates of less than 10% in smallholder farmers' fields.

Different nations in the sector experienced blended results. Tanzania has had high adoption rates, while Mozambique has had rates like Malawi's.

Cowpea is a farmer most loved provided its health during the dry season, in any event, during dry years, smallholder farmers realize that their cowpea harvest will be solid. However, with regards to putting away the yield after harvest, farmers face especially loaded difficulties from vermin and infections.

Uganda: Sweet potato weevil (SPW) resistance

Mainstreaming quality attributes and SPW resistance being developed of farmer-favored Sweet potato varieties in Uganda (ilci.cornell.edu site).

Sweet potato is a significant food security crop whose potential has not been completely taken advantage of in Uganda due to serious SPW harm and restricted broadening of usage. To spike the improvement of handling type orange-fleshed sweet potato varieties (OFSP), this project tries to recognize prevalent parental germplasm for consideration in the rearing pipeline. SPWs cause up to 100 percent yield misfortunes. The accuracy of SPW phenotyping through advanced applications will be basic for quick improvement of SPW resistance.

The research objective is to profile the Ugandan sweet potato germplasm and presentations for total hydroxycinnamic corrosive esters for the determination of parents for SPW resistance.

Malaysia: Grass-cutting Machine for Pineapple Farming

A retired soldier and presently pineapple farmer from a small town who developed a straightforward grass-shaper that empowers quicker cutting of grass weeds without harming the product of pineapple farms (Shelter Kwee et al, 2021).

A new concept and prototype were developed with a two-sharp edge plate type, fueled by an equipment box 1:3 proportion and movable level for peat soil condition. After the pineapple crop has arrived at the age of 15 months, it will be collected and pruned before fertilizer application work for pineapple sucker production starts (Ahmad Sayuti et al, 2021). Regularly under conventional technique, farmers will utilize a sharp machete or sickle to prune. Nonetheless, pineapple leaves and cob have high strands content which can cause pineapple yields to handily break. The regular policy calls for a great deal of investment, as well as the requirement for a large workforce, and the cost of production, would likewise increment in such a manner. The goal of the review was to assess the presentation and viability of utilizing a motorization approach in contrast with the ordinary technique of pruning the pineapple crop. A 38hp tractor with high freedom elastic trip controlled by power take-off (PTO) max

speed 540 and farm truck rpm 1500 was utilized in this research. The height of the cutter blade can be adjustable according to the height of the crop needed to be pruned. The able working pace of the machine was 0.86 ha/hour, speed farm vehicle was 2.03 km/hour Machined time activity depended on 1.2 hour/ha and operated for 8.4 ha/per day. Moreover, the machine appears to have a clean-cut result on pineapple leaves and cob without breaking the pineapple crop.

Malaysia: Smart Oil Palm Multi-purpose Tractor (SOPMT)

SOPMT is a multipurpose vehicle intended to act in a wide range of landscapes, while obedient to the environment. An expressive 4x4 off-road vehicle (model) developed with a smart hydraulic system that could work in peat, wet soils, and bumpy conditions (Wan Nor Zanariah and Zainul Ariffin, 2019). This tractor offer adaptability in performing an extensive variety of errands which is appropriate for harvesting and transporting the fresh fruit bunch (FFB) of oil palm to the executive as well as valuable for showering and applying fertilizer, herbicide, pesticide, or insect spray. SOPMT was likewise developed to eliminate the harmed frond from its trunk and could incredibly pull weighty burdens. It is likewise furnished with a control chamber that has a movable sit and an advanced screen to independently control the expected assignments. This tractor is of a high standard to solve the harvesting, collection and transportation of FFB. Hence, by utilizing this tractor, it could essentially improve the nature of work fills in as well as the nature of oil palm production.

Healthcare

ICT applications

There are around 360 million individuals who are hard of hearing all over the planet, and 80% of them don't figure out the communicated in and composed language of their particular nations.

In Brazil, the HandTalk product has been a reaction ([accessibledigitallearning site](#)). The principal product is the Site Interpreter, an extremely pragmatic device that

settles the absence of accessibility with a straightforward snap and has become well known in Brazil because of government regulations that require a level of TV content to be marked, not recently subtitled.

After the Translator is activated on a device, the client is introduced to Hugo, a well-disposed 3D virtual interpreter that translates a website's Portuguese text or audio to LIBRAS, otherwise called Brazilian Sign Language. Besides this, Hand Talk also has an app that works like a pocket translator.

Hand Talk (Brazil) is utilizing man-made intelligence to make an interpretation of Portuguese into Brazilian Sign Language through a digital, empowering digital communication for Brazilians who are hard of hearing or have halfway hearing misfortune.

The mobile application has proactively been downloaded more than 2,000,000 times and deciphers voice and text Environmentally from Portuguese to LIBRAS.

It likewise has a LIBRAS dictionary function for academic vocabulary, that is very useful for deaf students during the schooling process. HandTalk however requires a smartphone or a computer and an internet connection.

Bionest, India

The Technology Business Incubator scheme of the Department of Science & Technology or by Bionest the incubation of biotech innovations set up by the Department of Biotechnology

Buzzark Simulations Pvt. Ltd.

Laid out in 2013 by Dr. Rejith Raveendran, Buzzark Simulations creates innovation for Natural Orifice Surgery, a medical procedure that empowers clients to practice the medical procedure quite a few times in different situations to prepare hand and eye coordination of the user (buzzarkxr site).

Calibri (Body)

Caliri is an affordable and portable smart phone based ophthalmic screening device. The vision is to diminish instances of avoidable/unnecessary visual impairment by giving cell phone-based convenient and sustainable eye screening equipment for limited resource case and rural areas.

Kornerstone Devices Pvt.LtdKornerstone Devices Pvt Ltd

Kornerstone Devices, situated in Chennai, India (kornerstone site) was consolidated in 2017 and incubated at Indian Institute of Technology, Madras, Incubation Cell (IIT-Madras) and received SEED funding from Bio-Technology Industrial Research Assistance Council of Government of India (BIRAC).

HigHNooN - CT Directed Needle Route Framework directs the clinician to confidently, accurately insert the needle with multiple check points, identifies & corrects patient movement does not interrupt the workflow or "feel" of free hand method. It is not difficult to utilize, and simple to learn: over 100,000 CTs overall and 5000 in India.

The objective is to disrupt the Onco-Radiology segment, empowering radiologists to practice intervention & make a tremendous impact in early diagnosis & treatment of cancer

Alfaleus Technology

Alfaleus technology, an Indian startup has developed a device able to speed up the location of glaucoma in its earliest stages (alfaleus site).

C3FA

C3FA is a visual field test that can be performed anyplace, utilizing a wireless connected tablet, without any prior training or specialised darkrooms, permitting the patient to rest in any situation during the test further develops precision.

Small Enterprise Technology Upgrading Program (SETUP), the Philippines

DOST DOST has a flagship initiative called SETUP. It is a nationwide program that assists MSMEs in improving their competitiveness, operations, productivity, products and services.

SETUP upholds MSMEs by giving: seed funds for technology acquisition, needed equipment and equipment upgrading, technical trainings and consultancy services, packaging and label design, database information systems, and support for establishment of product standards, including testing, and calibration of equipment (ncr site).

Knee replacement , Dr. Ramon Gustilo

Patients with serious knee harm caused by arthritis or injury are in need of total knee replacement. This can require surgery, and an activity like this in the Philippines is very costly and complex that main few specialists are prepared to do.

Luckily, the Axis Knee System is a sustainable, excellent, and FDA-supported complete knee substitution system explicitly intended for Asians. It's instrumentation and careful policy permit specialists to carry out the methodology precisely, preventing disappointment.

eHealth Tablet for Informed Decision-Making of LGUs (eHATID), Dr. Dennis Batangan

The eHATID is a software application that provides health Information system (HIS) and decision-making support to LGUs through an Electronic Medical Record (EMR) that generates particular health reports for the Department of Health (DOH) and the Philippine Health Insurance Corporation (PhilHealth).

It is presently intended for mobile Android devices and can function without Internet connection. It likewise provides scientific data about the health status of clients within

a local area as well as has integrated functionality within the LGU and between Rural Health Units (RHUs) and other government entities.

DNA Nanobiosensor, Dr. Francisco Elegado

The DNA Nanobiosensor provides an accurate and rapid detection system of bacterial pathogens such as the E.coli, E. coli 0157:H7, and Salmonella enterica in food, feed, and farm produce. It is a portable device that produces an electrical output by integrating a biological element with a transducer to quantify a biological event or chemical reaction.

Marshmint , Dr. Ceciille Maramba-Lazarte

Marshmint or normally known as Yerba buena (*Mentha cordifolia* Opiz) contains Menthalactone which has been displayed to have pain-relieving or torment-freeing action for the treatment of migraines, toothaches, joint inflammation, and dysmenorrhea. Further, it has been medically tried to be protected and viable as a pain-relieving for alleviating post-employable moderate to serious agony after circumcision, dental extractions, and labor (post-episiorrhaphy) in 30 minutes or less.

Pepper senior or regionally known as Ulasimang bato (*Peperomia pellucida*) is herbal plant that diminishes the serum uric corrosive levels with a typical drop of up to 78% in about fourteen days of oral admission. Over 85% of the patients treated with Ulasimang bato additionally experienced good relief from discomfort from joint torments and didn't insight "bounce back" hyperuricemia.

Its analgesic, anti-infl ammatory, and anti-hyperuricemic properties makes ulasimang bato a viable alternative for Allopurinol, the common medication for hyperuricema and gout.

Condom-catheter device Uterine balloon tamponade (UBT)

Almost 10 years prior, Burke, a crisis doctor who heads the Division of Worldwide Health Innovation at Massachusetts General Medical Hospital, was in South Sudan,

where he and a group of specialists had been entrusted with setting up projects to improve maternal and infant health. More than half of maternal passings in developing nations are brought about by postpartum hemorrhage (PPH), in which the uterus, frequently exhausted late at night of work, drains wildly. The typical uterine balloon can cost around 400 \$, excessively costly for South Sudan. Burke had found out about a cheaper, unregulated UBT — sometimes dubbed Sayeba’s method, after Sayeba Akhter, the Bangladeshi doctor often credited with coming up with the idea, in 2000—constructed from a standard catheter and a condom. Burke and his partners wondered whether there was a solution between the medical-grade balloons and the ad-hoc condom-catheter device.

The E.S.M.- UBT — E.S.M. represents has been conveyed a huge number of times, in nations from Peru to Zambia.

The survival rate of women who received it—many of whom are in advanced or even end-stage shock—is ninety-seven per cent over all, according to numbers compiled by Massachusetts General.

The Domsday Invention E.S.M.-CPAP

The FDA approved, ultra-low-cost ESM-UBT device has been demonstrated to save nearly every hemorrhaging woman if the device is readily available in a timely fashion.

A large number of children around the world, need oxygen support in the first year of life (Vanderbilt, 2019). Be that as it may, CPAP machines, the standard device in a nation like the U.S., are costly and require continuous power. In numerous nations, specialists resort to using a makeshift solution: Coke bottle loaded up with water and joined to some tubing. Burke took this straightforward yet misguided thought and further developed it, planning the E.S.M.- CPAP, which is comparable to its high-tech equivalent but costs around thirty dollars.

Ketamine as an emergency anesthetic

Ketamine is anything but an ideal sedative, a muscle relaxant and doesn't need costly machinery, or a prepared proficient to protect a patient keeps relaxing. Ketamine costs a couple of pennies a dose and has now become an ad-hoc, unregulated alternative throughout the world. In Kenya, exactly eighteen hundred archived medical procedures under ketamine have been performed, with no inferable passings.

Oral rehydration therapy (ORT)

In 1968, scientists in Dhaka, Bangladesh, started managing a solution of glucose and salts to patients experiencing extreme cholera-related lack of hydration. Oral rehydration treatment (ORT) was a revelation in pediatric health, helping to stem an epidemic in children's deaths from diarrhea — from an expected 5,000,000 passings each year in 1968 to four hundred thousand and six hundred and sixty thousand.

In developed nations, the standard treatment for diarrhea was to manage an intravenous liquid, an expensive methodology requiring hospitalization. ORT — which basically amounts to drinking Pedialyte—costs just several cents a dose and can be administered anywhere by anyone, yet the magic bullet was resisted by many doctors.

LifeStraw

The LifeStraw is a technological innovation getting access to clean water.

Initially presented in 2005, series of water purification systems capable of killing up to 99.9% of bacteria. LifeStraw's Follow the Liters program delivers water purification systems to schools in developing countries (Frigillana, 2016).

Lifestores Healthcare

As a pharmacy management network, Lifestores Healthcare is already the first contact for health issues for 100.000 patients (Ogweno, 2022); kofiananfoundation site).

As a B2B marketplace, this social business now works with 500 pharmacies to assist them with smoothing out their procurement, lessening the cost of essential medicine, and battling fake medication dealing. Situated in Mauritius and working in Nigeria, the team is mostly pharmacists with a deep knowledge of logistics.

Lifestores Healthcare has presently 50 representatives (half female). By 2025, Lifestores Healthcare intends to serve a million patients every day with this all-in-one resource, where they coordinate sellers and patients.

Rocket Health

Rocket Health presently assists 3.8 million patients with real-time infections to follow their treatment plans. The telemedicine stage offers day-in and day-out web-based discussions with specialists through various stations (chatbot, telephone, video calls, SMS) in various dialects.

Rocket Health has end-to-end medical service, takes lab tests, provides follow-up calls from specialists, and conveys meds to homes. Their telemedicine solution also works on “non-smartphones” and offline to ensure that all patients have access.

The 2012 founded enterprise is one of the largest and best-established telemedicine platforms in Uganda, with plans to extend the services to Nigeria and Kenya. It works with clinics, laboratories, and pharmacies. The enterprise has 110 full-time, and 43 part-time workers, 50 % of those are women.

MOBicure

The application upholds adapting to sexual maltreatment and forestalling high school pregnancies or HIV diseases. myPaddi, provides anonymous access to doctors and trained counsellors. Clients can buy sexual health products online by means of the app’s e-pharmacy. Established in 2015, myPaddi employs 15 people (40% female) and is on the rundown for the Top 30 Health Innovations in Africa.

VaxiGlobal, Zimbabwe

VaxiGlobal minimize vaccine waste in the wake of the global pandemic by facilitating AI verification of vaccine deliveries. The World Health Organization (WHO) assesses that over half of the vaccines can be wasted internationally consistently and don't arrive at their intended beneficiaries. Vaxiglobal creates offline, biometric-linked digital vaccination certificates to verify vaccine delivery in Africa. Already 320,000 users are registered .

The WHO Afro has engaged the company with its tech partner, who provides the artificial intelligence, in a 10-year strategic partnership to verify vaccine delivery in immunization campaigns. Tech partner Simprints provides the AI verification. The start-up was established in 2019. It utilizes 11 full-time workers, of which 62% are female. The prompt objective is to ensure yellow fever inoculation for voyagers.

Flare Emergency Response

Flare provides a day-in and day-out one-stop public crisis reaction network stage. This advanced stage helps coordinate the divided environment of crisis vehicles and explores inside the space of minutes in urban sectors. That decreases holding up times. As of now, Flare has empowered admittance to around 1.2 million clients. Established in 2016, the organization is settled in Kenya and utilizes 30 full-time workers, 53% female.

Shezlong

Shezlong's answer has previously assisted in excess of 70,000 individuals with getting sustainable emotional wellness Services. Among them are 65% Arabic talking ladies who could not have possibly approached psychotherapy, particularly during the pandemic. Online meetings can be reserved from any place and whenever.

The female health-centred stage effectively addresses the disgrace and social disgrace connected with psychotherapy through persistent mindfulness crusades. It points around ladies enduring savagery and misuse and provides their online-stage ladies advisors from comparative social institutions. During the continuous Coronavirus pandemic, the stage extended its Services to provide broad treatment meetings to specialists. The organization was established in 2014 and utilizes 40 individuals; 25 of these are ladies.

mDREET

In industrialized nations, there is one mobile hearing assistant expert for every 20,000 individuals. In Africa, the proportion is 1 to a few million. The outrageous deficiency of experts prompts hearing impairments to go undetected and unmanaged.

With its mobile hearing test, mDREET, whose central command is in Botswana, is upsetting the field of screening. Their quick objective is to test 3,000,000 kids between the ages of two and six. Their innovative hearing Plan depends on sustainable solar-controlled amplifiers developed by Deaftronics (Pty) Ltd. The listening device depends on batteries, which are chargeable by the sun, family light, or cell plug. They keep going for 2-3 years and can be utilized in 80% of listening devices available.

Talamus

The marketplace model of Talamus guarantees consistent patient consideration through one stage. Patients are associated in real-time with medical care specialist institutions in their closeness. Over 120,000 clients as of now utilize the completely incorporated versatile health stage, which provides admittance to clinics, diagnostics, drug funds, and protection inclusion.

In an effective pilot with the government of Ghana, in excess of 50 points, 80 labs and 180 drug funds joined by means of a connection point to the computerized marketplace of Talamus Ghana. A rollout for 101 points is arranged. Talamus Nigeria will digitize 100 Healthcare habitats.

This medical care Plan diminishes holding up times in clinics by almost 70% and decreases medicine costs by 30%. The complete point of interaction is not difficult to utilize, overseeing patients with no interferences or desk work. Established in 2016, Talamus has 42 representatives, of which 45% are female.

GeroCare Solutions Ltd

The organization was established in 2017 and utilizes 11 individuals, almost half female. GeroCare at present provides health Services to 160,000 senior residents by furnishing them with normal specialist visits. Recently bought-in patients are coordinated with specialists, and patients' relatives benefit from getting standard Medical updates about their old family members. Gerocare likewise empowers simple Application based installments

for tests and medications. The cloud-based stage right now has 750 specialists, 900+ drug funds, and 100+ research clinics across Nigeria and provides essential health Services in 52 urban communities.

Diagnostics For All

Diagnostics For All (dfa.org) is a not-for-benefit organization established at Harvard College in 2007 by a meeting of researchers and business visionaries with a civil obligation to save lives and mitigate illness in non-industrial nations and other Fund unfortunate settings through minimal cost, innovative, pragmatic symptomatic gadgets. They developed a minimal-cost, designed paper-based, liver protein symptomatic test that can provide an evaluation of liver health from a solitary drop of blood in around 15 minutes. This was tried in Vietnam, where less severe guidelines operated with more fast testing and arranged for the organization to meet more rigid US FDA standards.

Diagnostics For All was hence granted a grant by the Bill and Melinda Doors Installation to develop a minimal-cost, fast indicative test for resistant markers of effective immunization against lockjaw and measles. The improvement of a basic, mark-of-care resistance evaluation will quickly affect the ebb and flow of worldwide endeavors to control immunization-preventable illnesses. The organization has developed other minimal-cost, straightforward, and fast analytic tests for use in Healthcare and agribusiness.

The Befrienders Worldwide Network

The point of the organization is to help part Points in offering fitting profound help Services for self-destructive individuals and additionally in trouble (befrienders site)

A few habitats have developed necessary institutions, for example, those institutions between the World Health Association and Sri Lanka's Sumithrayo to diminish the number of suicides by pesticides in their rural communities. Different points are focusing on specific sectors of society through innovative help conveyance, for example, our points in Brazil with their web talk informing support.

Befrienders Kenya

Befrienders Kenya is a beneficent drive that offers self-destruction counteraction support. The association accomplishes this by offering free mental help to individuals in trouble and hence in danger of biting the dust by self-destruction (enableme site).

Past contribution to mental help, the association, which is controlled by volunteers and subsidized by well-wishers, additionally makes mindfulness on self-destruction among the citizenry. Through mindfulness production, Befrienders Kenya looks to diminish the shame surrounding self-destruction.

Through its work, the association imagines a general public wherein fewer individuals bite the dust by self-destruction. It endeavors to accomplish this vision by offering secret profound help for individuals who are encountering sensations of trouble or sadness and through centered programs make mindfulness centred on self-destruction avoidance.

Other part nations in Africa are Sourire de Reda (Befrienders Casablanca) - Morocco, Befrienders Mauritius - Mauritius, Befrienders South Africa, Bloemfontein - South Africa, Befrienders South Africa - South Africa, Samaritans, Bulawayo - Zimbabwe.

Befrienders in East Asia

Suicide Prevention Ministries (Hong Kong) – China: The Samaritans (Hong Kong)

Japan: BW Tokyo , BW Miyazaki, BW Osaka Japan

Malaysia: The Befrienders Society, Johor Bahru Befrienders Ipoh, Befrienders Kota Kinabalu, Befrienders Kuala Lumpur, Befrienders Malacca, Befrienders Penang, Befrienders Serembanm, Befrienders Muar, Pertubuhan SNEHAM, Thailand: Befrienders Kuching, Samaritans of Thailand, Samaritans of Chiang Mai

Singapore: Samaritans of Singapore; Vietnam: Ngaymai; Nepal: Kohsish.

Befriends in Latin America

Brazil: Centro de Valorização da 67 affiliated centres; Argentina: Centro de Asistencia al Suicida; St Vincent and the Grenadines: Samaritan Department, Kingstown; Uruguay: –Último Recurso; Ecuador: Anima EC

Befriends in South Asia

Bangladesh: Kann Pete Roi; India: Sneha, Roshni, Hyderabad, Lifeline Kolkata, Befrienders India, Sumaitri Befrienders, Maithri Cohin, Maitreyi, Saath, Aasra, Samaritans Helpline Mumbai, Sri Lanka: The National Council, Sumithrayo, Sumithrayo, Kandy, Sumithrayo, Bandarawela, Sumithrayo, Katunayaka, Sumithrayo, Kurunegala, Sri Lanka Sumithrayo, Matale, Sumithrayo, Panduwasnuwara, Sumithrayo Rural, Sumithrayo, Sumithrayo, Panadura, Sumithrayo, Kohuwala.

Points for Health Market Innovations (CHMI)

CHMI is composed of the Results for Development Institute (R4D) as a team with a broad network of in-country institutions and global actors (healthmarketinnovations site).

Throughout recent years, CHMI has operated with over fifteen in-country partners all over the planet sharing CHMI's main goal and objectives. Partners have launched innovation grants, encouraged institutions among innovators and funders, and exhibited promising models to policymakers.

The network shapes a more extensive collusion of innovation facilitators, dealing with comparative activities, gaining from one another, and tying down extra help to convey forward-related activities under the CHMI pennant. CHMI's latest partners were situated in India, Kenya, Nigeria, Pakistan, and South Africa.

Many projects profiled by CHMI are utilizing inventive conveyance and finding ways to deal with further developing admittance to quality medical care for moms and children.

CHMI provides unique admittance to competitors, fundraising platforms, and mentorship communities run by Global Collaborators such as the Skoll Foundation, Innovations in Healthcare (formerly IPIHD), and Global Giving. CHMI designates candidates for opportunities run by global challenge funds and competitions such as

Saving Lives at Birth. Collaborators often search CHMI's database to identify candidates.

Nexleaf, India, Indonesia

Nexleaf is a non-profit technology organization that provides institutions, states, and producers sensors that are intended to provide real-time monitoring and data collection. Sensors are matched with phone-based innovations to get significant data from remote locations.

Nexleaf serves and joins forces with rural families, regional health centres, non-profit institutions, scholarly and government scientists, and health institutions. The mobile sensory technology has affected different low-income communities tackling the most major problems connected with general health and the environment.

Nexleaf draws in with a few projects all over the planet, carrying out the sensory technology in different communities that address water and sanitation hygiene (WASH), immunizations, organic life preservation, and clean cookstoves.

The ColdTrace technology is a remote sensor that is introduced in both clinics and mobile storage facilities. The sensors provide real-time information that monitors temperature, power, and GPS location. It produces SMS messages and PDF reports that can be gotten to somewhat on a worldwide, shared information base and can be retrieved at some random time.

ColdTrace data set keeps a steady log of temperatures in clinic refrigeration units and allows for analysis of failure rates across local, regional, and national areas.

Web dashboard upholds remote configuration, device status monitoring, data visualization, and sharing with donors, NGOs, ministries of health.

ColdTrace is transforming the cold chain industry by providing low-cost sensors that produce real-time data used to monitor vaccines' productivity, track the location of vaccines, and make informed decisions by relevant stakeholders.

The sensory technology is additionally being utilized in country India to monitor how frequent people use clean cookstoves. Clean cookstoves depend vigorously on biomass as the principal source of fuel and are designed to significantly reduce carbon emissions and indoor air pollution by 70%. The sensory technology permits program implementers to screen frequency in utilization. This data can then be utilized to address program deficits, local concerns, and program expansion. It additionally furnishes clients with ongoing information on low fossil fuel byproducts. This information can be utilized to get to carbon markets and get carbon credits as an elective type of revenue.

Nexleaf technology is being carried out in Indonesia to address w water and sanitation hygiene (WASH). Using SMS-enabled technology, impoverished communities can communicate with their water sanitation providers. Clients can share various forms of feedback that can be accessed on a a shared database.

This valuable channel permits clients and suppliers to get to a string of communications that incorporate relevant needs and solutions. The technology was intended to advance community commitment and dynamic interest. Thereby, clients and suppliers can help improve services and disseminate important information.

Smile on Wheels, India

Smile on Wheels upon Wheels is a public-level mobile a national-level mobile hospital programme, catering to the underprivileged children and womenm. The program takes well-equipped medical vans alongside along with specialized doctors, nurses, medical staff, and medicines to the identified villages and slums in a systematic manner.

Smile on Wheels vans covering the country or slum areas in the sector where either no Services Healthcare offices exist or where those that in all actuality do exist don't provide adequate consideration to the populace. Every unit conceals a sector of 25 km from its Centre and visits 2-3 towns daily consistently. In crisis cases, it functions as a reference facility and a rescue vehicle. The vans are positioned in a metropolitan community, typically with a static emergency clinic, which behaves like a reference Medical centre.

Stage - I Five vans under the main era of Smile on Wheels have arrived at 150,000 recipients in a populace sector of 750,000 covering 249 identified villages across five Indian states (Orissa, Chhattisgarh, Uttarakhand, West Bengal, and Maharashtra).

Stage - II Two extra mobile clinics are presented for the slums populace of Delhi and Chennai in 2008. The services given incorporate OPD, ante-natal/post-natal services, identification of difficult pregnancy and referral for institutional care, immunizations, minor surgery, BP examination, X-ray, ECG, first aid, distribution of Iron folic tablets, Vit-A prophylaxis, and treatment of mal-nutrient cases.

An Khang E-clinic, Vietnam

The A Khang E-facility is the main center in Vietnam overseen by a complex electronic services platform. The facility offers a different scope of services, for example, dietary counseling, gynecology testing, pediatrics counseling, and health screening.

All Medical processes are coordinated through an IBM server, laptops, and custom-fitted programming that consider the web-based capacity of medical documents and decreases the time patients need to spend in an ordinary center. E-center lessens the tedious processes that outcome from manually written record-keeping and shields patients from normal healthcare disasters by utilizing using smart e-prescription and e-storage of patients' profiles.

Eyeway, India

Eyeway endeavors to further develop admittance to data in India through online information resource center for everything related to blindness.

Score Foundation has set up Eyeway a single stop knowledge resource for existence with visual deficiency. Eyeway endeavors to utilize the force of information to achieve a significant impact on the attitudes of the visually impaired, their families, the community, experts, policy creators, and the government. The central goal is to assist with acknowledging individual freedom, financial confidence, and social consideration for all visually impaired and outwardly debilitated individuals in India."

Orasel KIT, Cambodia

Abt/POUZN's principal implementing partner, Population Services International (PSI) in March 2006 launched the world's first diarrhea treatment kit, called Orasel KIT®, in Pursat and Siem Reap districts of Cambodia.

The objective of the program is to lessen grimness and mortality related to diarrheal sickness, especially in children under five years old from low-income provincial settings.

The pack is as of now financed to guarantee affordability to the vast majority of individuals and incorporates a low-proficiency embed, designated to moms of children younger than five to treat drying out and loose bowels.

PSI/Cambodia is utilizing different technical policies, including a television and radio business, mobile video shows, a karaoke tune VCD, and retail location materials to build information on the right treatment of the runs and to encourage interest for Orasel Unit. PSI/Cambodia's communications highlight the significance of safe drinking water, hand washing, kept taking care of practices, and different components of legitimate looseness of the bowels of the board with ORT.

The Trevor Project (USA) is using natural language processing and sentiment analysis to determine an LGBTQ youth's suicide risk level to better tailor services for individuals seeking help.

Hunu Teletherapy, Ghana

Early and intensive intervention for autism and social communication delays reduce symptoms but African families are finding it challenging to access interventions for their children today (hundred site). diminish side effects however African families are finding it trying to get to mediation for their children today (hundred site).

Hunu trains parents and educators to help children with a continuous way of behaving and learning defers like mental imbalance at home or school by joining WhatsApp, informing, and calls

Subsequent to making and running an afterschool program for a considerable length of time, it turned out to be progressively challenging to let parents know how Rudolph Ampofo couldn't show their children due to their postponements. While trying to take care of this, he changed over the afterschool program into a Centre based treatment program which has now transformed into a teletherapy platform.

If somebody has any desire to utilize this solution, all they need to do is send a message to the virtual therapy assistant Hubeta on WhatsApp, who will assist them complete a behavior assessment in 5 minutes.

Hubeta coordinates parental figures with a guaranteed specialist in minutes who works with guardians to develop a treatment platform for their children.

Rise Bionics, India

Arun Cherian, a US-returned geek, is the organizer and head of Rise Bionics, an endeavor he established quite a while back. He is searching for the right investors to help his Dish India platform.

Situated in Bengaluru, Rise Bionics makes sustainable and great prosthetic and orthotic devices for the entire body.

The company utilizes advanced technologies to make customized orthotic devices within just a day or two of scanning a patient. Reversely, public clinics require as long as two years to provide such device.

Rise Bionics has simplified the procedure. Regional Healthcare professionals should scan the head, hand, neck, spine or leg for assistive devices in just two minutes at the home or hospital. They transfer the document to the Cloud. A central facility digitally modifies the file according to the diagnosis. Finally, the device is fabricated with sub-millimetre accuracy and couriered within a few hours to the healthcare provider for fitting.

Up until now, Rise Bionics' devices have helped around 1,000 patients, including patients for the Indian Armed Force, corporate and community hospitals and NGOs in South India.

Under its Help a Child Walk programme, Rise Bionics has tied up with the government of Karnataka to provide assistive devices to children with special needs studying in government schools in Bengaluru or children from BPL or low-income families.

IoT multi-parameter device, India

Robin Singh, founder and CEO of Cluix Llp which is a deep-tech startup that plans to minimize the consumption of undetectable contaminants in drinking water (cluix site). CLUIX C011 is a Pre-Calibrated hand-held Digital Water Quality analyzer can test 8 basic parameters of drinking water and can impart information to a central server for observation and quality control: Turbidity (NTU), pH (potential of hydrogen), Free residual Chlorine (FRC), Total Hardness (TH), Pt/Co-Hazens (Colour) Total dissolved solids(TDS), Electrical conductivity (EC), Lead – Heavy metal (Pb).

CLUIX C011 as per IS 10500 uses calorimetry, potentiometry, conductivity, and nephelometry. It's a low-cost high accuracy device that reduces the total cost of ownership for smart analytical instruments used in public and private laboratories and institutes.

The device is IoT enabled and can share testing information alongside GPS directions to the organization's central server for monitoring.

Improved diabetes care, Sanofi, Colombia

In 2016, Sanofi, a main supplier of diabetes treatment and related services, joined the Business Call to Action (BCtA) with a diabetes-management program for patients served by the Colombia's subsidized healthcare system (businesscalltoaction site).

In Colombia, in excess of 800,000 individuals have been determined to have diabetes. The information shows that there is an exceptionally high extent of undiscovered diabetics inside the sponsored public medical care program. It likewise shows that among those generally analyzed, uncivilly inside insulin-subordinate diabetics, there is a high rate of under-treated or insufficiently treated, prompting raised paces of

avoidable complexities. Likewise, the rated pace of patients on insulin treatment inside the financed public healthcare program is below the public normal, which prompts more terrible health results among patients inside this system.

With this case situation, Sanofi sees a high potential for increasing its diabetes care model among sponsored patients in Colombia.

Sanofi's inclusive business model is a strong example of the private sector meeting the healthcare needs of poor people.

Clic Educa, Chile

Clic Educa is a modular e-learning platform developed in Chile (borgenprojects site). The program estimates students' emotional states and standards of conduct and provides teachers with customized feedback. Instructors can adjust Clic Educa's instructional program and learning materials to best suit their requirements. They could plan illustration plans for students with learning handicaps or different conditions.

Emiti, Mexico

Emiti is a startup settled in Guadalajara, Mexico. It made a health-observing smartwatch for eldercare purposes. The watch incorporates a crisis button, and it consequently identifies in the event that the wearer is going through a health-related crisis. Abrupt falls and cardiovascular abnormalities are among the conditions the device will distinguish.

Biofase, Mexico

Scott Munguía produces bioplastics from avocado seeds (unep site). This youthful Mexican substance engineer found in 2011 that the avocado seed contains a biopolymer like the one present in corn, which is utilized to deliver bioplastic. In 2014, he established Biofase, an organization situated in Monterrey that popularizes bioplastic products, made of 60% avocado biopolymer and 40 percent manufactured organic mixtures.

The straws and cutlery produced using avocado seeds disintegrate in just 240 days, and there is no requirement for cremation. This makes them a manageable Alternative for urban communities or nations that need cremation offices in their waste plants.

Biofase's products have extraordinary manufacturing potential. As per Munguía, 300,000 tons of avocado seeds are disposed of every year in Mexico, an expected 20 percent of the worldwide interest for bioplastics. Up to this point, Biofase arrives at 11 nations in Latin America.

Not at all like different sorts of bioplastics, this alternative does not utilize crops sustainable for human utilization — like corn or cassava. Alongside different plastics produced using food waste, Biofase's bioplastics could assist with fulfilling the developing need for plastics without hampering progress in the battle against hunger.

Turbines to save our oceans, Ecuador

Plastic contamination is one of the most squeezing environmental difficulties in recent times: it hurts marine biodiversity, coastal economies, and, surprisingly, human health. Each year, around 13 million tonnes of plastic waste end up in the oceans, the equivalent of a full garbage truck every minute. The biggest part of this trash is unloaded in streams of significant urban areas.

Inty Grønneberg, a youthful Ecuadorian trailblazer, concocted developing a few kinds of turbines equipped for sifting and meeting plastics from waterways, in this manner forestalling them to wind up in the seas.

The turbines designed by Grønneberg, through his company called Ichtion, can collect as much as 80 tons of plastic from waterways consistently. They can be introduced on any boat and get plastic waste during the route.

In November 2018, Grønneberg was perceived as one of the pioneers Under 35 Latin America 2018 of the MIT Innovation Survey, and this year, he was respected with perhaps the greatest differentiation allowed by the Government of Ecuador. He trusts

these honors will assist him with getting the news out on his innovation and raise the US\$2 million expected to execute the innovation in his nation of origin.

Water-soluble bags, Chile

1,000,000 plastic sacks are consumed consistently around the world. The majority of them end up in landfills or the seas. The one-piece polyethylene shopping sack, made during the 1960s, requires as long as 500 years to decay.

So when Roberto Astete and Cristian Olivares, founders behind Chilean start up Solubag, introduced a plastic pack that breaks up in the water in only a couple of moments, they caused a stir. Is it even conceivable?

As per Olivares, Solubags utilizes limestone rather than oil by products. To that end, they have zero environmental effect contrasted with different Alternatives like oxo-biodegradable packs, which are as yet made of polyethylene and break into small bits of harmful plastic.

The synthetic formula of Solubags contains polyvinyl liquor (PVA), a material found by Astete and Olivares while examining biodegradable cleanser cases.

Their innovation is expected to be widely accepted in Chile, where a ban on plastic bags in large businesses came into force in February 2019. Solubag currently produces in China and is thinking about introducing a manufacturing plant in Tomé, Chile.

A home for a sustainable lifestyle, Uruguay

Our energy utilization relies straightforwardly upon the conditions of ventilation, temperature, and light in our homes. In the event that the house is extremely warm, we will likely utilize cooling. Furthermore, on the off chance that it has not had many windows, we will depend more on artificial lighting.

. In the coming years, the construction sector must embrace these factors to increment energy proficiency and speed up environmental activity. Presently, the buildings sector represents a critical 39 percent of total energy-related CO₂ emissions.

In view of this challenge, a group of students, graduates, and teachers from the ORT University Uruguay made La Casa Uruguay (The Uruguayan House), a practical and savvy housing project motivated by bioclimatic design and outfitted with innovation that can diminish energy utilization while offering a maintainable and open way of life.

The residing unit comprises a house inside a box, as indicated by ORT College Uruguay. The protection keeps intensity and cold from entering. It has two roofs — one on top of the other — and, between the two, complex components that can be somewhat opened or shut to control indoor temperature. Windows are decisively situated to further improve lighting.

The house is self-provided with solar energy, informs occupants of energy abuses, and has a water reuse system and sensors that assist to control temperature, humidity or lighting. The unit can be introduced in just 15 days and costs somewhere in the range of US\$50,000 and US\$90,000.

La Casa Uruguay won significant grants at the Solar Decathlon Latin America and the Caribbean in 2015, a worldwide academic competition coordinated by the US Department of Energy. In 2016, the Project got a National Energy Efficiency Award in Uruguay. As of now, the team members market the project in their nation and regions.

Emi Labs, Argentina

Most talent acquisition tools are designed for HR professionals who support desk jobs, while those who support frontline workers are left without solutions that serve their unique needs.

AI is transforming business and innovation around the world, and Argentina is no special case. Emi Labs uses a virtual AI assistant to automate rote tasks necessary to HR operations such as screening resumes and scheduling interviews.

Emi is the frontline recruitment automation platform that assists institutions with filling high-volume jobs quickly. Emi screen thousands of applications, streamline the

interviewing process, and personalize every interaction for a quality candidate experience.

Bambox, baby supplies, Argentina

Bambox is an e-commerce platform focused on providing baby supplies such as nappies to new parents. Founded in 2017 by Charles Carette, Rémi Beaufiles, and Timothée Jaufrett, Crunchbase reports that Bambox has raised \$100,000 in funding from Eurekalabs.

Blended, Communicate with parents, Argentina

Blended is an edtech start-up that helps schools communicate in real-time with parents about their children's progress. Already boasting hundreds of thousands of users across 200 schools in Argentina, the company raised \$200,000 in funding from Telefónica's start-up accelerator, Wayra.

Coderhouse, mobile applications, Argentina, Uruguay, and Chile.

Coderhouse provides tools and courses that help users to develop their mobile apps. Founded in 2014 by Pablo Ferreiro and Christian Patiño, Coderhouse has expanded to teach courses across Argentina, Uruguay, and Chile.

Increase, Argentina

Fintech player Increase empowers businesses by simplifying, how they control their funds. Established in 2014, Increase as of late selected Agustín Pagnoni as Chief. The organization has brought \$240,000 up in subsidizing to date, as per Crunchbase, with investors including the Google Platform Gas pedal.

Trideo, Argentina

Trideo manufactures 3D printer systems as well as working a 3D-imprinting on-demand services. Established in 2014 by Laurent Rodriguez, Simon Gabriac, and Nicolas Berenfeld, Trideo has constructed its PrintBox kind of 3D printer.

Workana, Argentina

Focused on connecting companies with freelancers, Workana has developed to turn into a key part of Latin America and has started venturing into Asia. It was established in 2012 by four Argentine business people: Tomás O'Farrell, Guillermo Bracciaforte, Fernando Fornales, and Mariano Iglesias. This company has brought more than \$12m up in funding to date from investors that include Seek, NXTP Labs and the Google Launchpad Accelerator.

International institutions supporting inclusive innovation and new technology integration in developing countries

International organizations support inclusive innovation in developing countries by programs transferring knowledge from developed countries. Herewith some details about inclusive innovation programs of UNCTAD, the World Bank, UNDP, World forum, Tres Cantos Open Lab Foundation, The UN Commission on Science and Technology for Development (CSTD), Universal Service Fund (USF) and UK Royal Academy of Engineering.

Automated System for Customs Data (ASYCUDA)

ASYCUDA program was laid out by UNCTAD in 1981 to help the endeavors of developing nations to modernize their Customs Services and to automate customs clearance processes. ASYCUDA combines state-of-the-art information technology and proven field experience. ASYCUDA has turned into UNCTAD's biggest technical help program with in excess of 100 user countries, including 41 African countries, 39 Least Developed Countries, 34 Small Island Developing States and 21 Landlocked Developing Countries.

ASYCUDA projects include ability, technical help activities, execution of the ASYCUDA system, and related training. They plan to speed up the customs clearance process while upholding security, through the introduction of computerization, alongside improving on methodology and consequently minimizing administrative costs. During the most recent couple of years, in line with part nations, the ASYCUDA program has been broadened to include automating trade facilitation procedures using frontier technologies such as AI and blockchain. Donors include the African Development Bank, Asian Development Bank, COMESA, Enhanced Integrated Framework, EU, German Corporation for International Cooperation, Southern African Development Community, TradeMark East Africa, and the World Bank

Angola

Before ASYCUDA in Angola, customs controls were led following a decentralized architecture. Cargo manifests and customs declarations were processed separately, control of oil exports was done manually, and customs-related payments captured from payment receipts.

The results of modernizing clearance and revenue collection procedures across entry and exit points in Angola showed: Increment of income by 44% in 2018 after the first year of activities and by 13% in 2019; Paperwork for goods clearance decreased by 70%; Quicker freedom of merchandise at the passage and leave points with Customs leeway process diminished from 30 to 7 steps

ECOWAS

ECOWAS and its member States face scarce information on transit goods at transit and destination points, a long transit processing time at the border and a high trade costs.

At the takeoff country, a travel statement is enrolled and a duplicate is electronically shipped off the travel and objective nations' frameworks to caution of the appearance of the merchandise. Import/export officers at the boundary or the objective office just affirm the appearance of products on the travel announcement got in their framework. The affirmation is sent electronically to the takeoff country.

The outcomes are a more limited travel handling time at the line: 1 hour normal for products bound to Niger traveling through Benin or Togo; operated with exchange and exchange community acknowledgment: 111% expansion of travel reports (T1) handled in the

Corridor Abidjan-Ouagadougou: rather than 7 days, 15 hours Normal travel time
(From flight to appearance office)

Corridor Lomé-Ouagadougou: rather than 8 Days, 19 Hours Normal travel time
(From takeoff to appearance office)

Corridor Cotonou-Niamey: 60 minutes

Cambodia

In 2015, Cambodia's General Department of Customs and Excise (GDCE) implemented a new customs system, with ASYCUDAWorld as its backbone (managing transit, e-payment and human resources). maintenance and backup strategy implemented were limited, prompting interruption of services and requiring the critical intercession of GDCE and ASYCUDA specialists.

Results: Better and quicker services with clearance times dropping from up to five days to short of one day; Increased resources like the automatic opening/closing of the daybook, enhanced exit note, and an improved payment interface; Secure communication between clients and servers through the installation of digital and code signing certificates for application and web servers; 24/7 operational, secured and redundant system with a complete failover mechanism, a Disaster Recovery (DR) site that takes over the main data centre, and the separation of transaction data, administrative data and scanned documents.

Democratic Republic of Congo (DRC)

DRC's Customs and Excise Authority relied on a private company to perform "pre-shipment inspections" (PSI) to ensure that the price declared to customs reflected the true value of goods.

However, World Customs Organization (WCO) and the recent WTO Agreement on Trade Facilitation advise against the use of PSI as it increases burden and costs in international trade and can be counter-productive for the country of importation and for its traders.

Following the improvement of ASESORIA Y VALIDACION SL (ASYVAL) by the ASYCUDA Program in 2011 to further develop control of products valuation and computation of customs obligations, the module was adapted to the regional requirements and a particular policy, called "amber lane", was established. A Central Value Control Unit was created in 2014 and is operational since February 2015.

The automation of valuation control has provided key advantages, for example, Securing state revenue; Harmonizing the system-wide customs value controls; Increasing redundancy of pre-shipment inspection certificates; Releasing more goods without manual customs control.

Nepal

The Department of Customs of Nepal is expected to help customs monitors in their day-to-day assignments while in the field with restricted admittance to PCs to provide details regarding product examination. ASYCUDAWorld system furnishes examiners with a simple method for filling and updating progressively the research report with their findings, for the Customs process to continue without interruption due to the limited access to equipment in the field.

The deployment of the ASYCUDA Mobile Application has allowed:

Increased security by ensuring e-document integrity using barcodes; Improved access to information on the Customs process; Ability for inspectors to submit real-time inspection results while in the field without further delay; Shortened Customs clearance time; Limited interaction between brokers and Customs and reduced use of paper

Expanded security by guaranteeing e-report uprightness utilizing barcodes Improved access to information on the Customs process; Capacity for monitors to submit real-time review results while in the field right away; Shortened Customs clearance time; Restricted association among specialists and Customs and decreased utilization of paper

World Bank Digital Innovation Partnership

The World Bank Digital Development Partnership is a platform for digital innovation and development financing. States can incorporate specific network rollout obligations as conditions for granting licenses (digitalinnovation site).

A typical device is the General Help Fund (USF) which collects funds from telecom operators as subsidies that can be used for private companies to

extend ICT infrastructure and operate services in underserved areas. The experiences with USFs in over 70 countries have been mixed.

Many of the frontier technologies are directly or indirectly dependent on Internet infrastructure. In this regard, the Alliance for Affordable Internet (A4AI), a global coalition to bring down the cost of Internet access in low- and middle-income countries, is advocating for a meaningful connectivity (MC) target, a tool to raise the bar for internet access and set more ambitious policy goals for digital development.

MC target sets these base edges across the four components of web access that make the biggest difference to clients, as indicated by the accompanying: Regular internet use - minimum threshold: daily use; an appropriate device - minimum threshold: access to a smartphone; Enough data - minimum threshold: an unlimited broadband connection at home or a place of work or study; A fast connection - minimum threshold: 4G mobile connectivity.

Some successful initiatives related to universal service and access funds (USF) are briefly described below.

Malaysia

In Malaysia, the government utilized its USF and its public broadband Plan to increment broadband accessibility and carry out supply-side interventions for example, access pricing regulation. The latter resulted in a 40 per cent price drop for 1 Gbps and only a few months after the policy was implemented in 2018.

Costa Rica

In Costa Rica, the government launched in 2015 a a country wide policy (CR Digital) with an aggressive objective of interfacing with the country in two years or less. While this was not accomplished, the nation had the alternative to utilize the USF to partially subsidize Internet access as well as ICT equipment, bringing over 40,000 families online.

Pakistan,

In Pakistan, which has a market approach to telecommunication infrastructure regulation, the USF was established in 2006. Besides having increased the level of

penetration and access to the Internet, the USAF was also used to finance contractors to facilitate people's access to telemedicine, e-learning, and e-government at telecentres, since digital literacy is still a barrier to many.

Rwanda

In Rwanda, the USF resources, which are managed by the regulator, Rwanda Utilities Regulatory Authority (RURA), are utilized to provide a network to all regions in the nation, including through telecentres, and public and private universities.

Affordability has improved dramatically, and keeping in mind that in 2015, the price of 1GB of data was 20 per cent of the average Rwandan's monthly income, the same data package costs around 3.4 per cent today.

Starting around 2018 the Web Foundation, A4AI and UN Women have been advocating for USF to dedicate a minimum of 50 per cent of their unused funds to support women and girls projects. They further suggested that project design and implementation should be more gender-responsive; transparency of fund financing, disbursements and operations should be increased; and USF's governance aspects should be taken into consideration, with increased awareness of gender targets and concerns (World Wide Web Foundation et al., 2018).

UNDP Accelerator Labs

Consensus building and collective action are expected to change over the thoughts and innovations of information-rich yet economically unfortunate people and communities, into practical methods for raising pay, tending to social requirements, and preserving the environment (World Financial Meeting, 2021).

The UNDP Accelerator Labs is the world's biggest and quickest learning network on wicked sustainable development challenges (undp acceleratorlabs site).

The Project has gotten \$71 million (UNDP, 2019) in funding for three years from the Federal Ministry for Economic Cooperation and Development of Germany and the Qatar Fund for Development, with additional help from Italy and UNDP core donors

For setting, UNDP's yearly spending plan is \$5 billion more than 170 nations (UNDP, 2020).

The UNDP Accelerator Labs is seeing significant opportunities in trade, business operations and supply chains in key sectors of the informal economy (Gustilo Ong, 2021).

The UNDP Accelerator Labs hosted a learning circle bringing in 11 Accelerator Labs that specifically work at the intersection of digitalization and informality. This learning circle was intended to comprehend what the Labs are doing on the ground and from the bottom-up common patterns on how digitalization is affecting informal economies.

Uganda

In March 2020, when the main coronavirus case was kept in Uganda and the government made a move through a cross-country lockdown, the UNDP Accelerator Labs collaborated with Jumia, a main web-based business organization, to connect the informal market sellers with their clients on the web. Up to this point, the UNDP Accelerator Labs and Jumia have associated more than 2,000 market sellers on this web-based business platform. Another product offering, "Kikumi," was likewise launched inside Jumia's infrastructure, custom fitted to low-income workers to purchase food for a limited price and make orders without a cell phone by bringing in utilizing a self-improvement menu on their component telephones. The Lab is currently taking a gander at pathways to scale this stage broadly and change informal projects in Uganda through inclusive e-commerce.

The Gambia

In the Gambia, the Lab upholds regional informal brokers, especially women, and youth, through "My Lumo," a computerized web-based business platform permitting regional informal merchants to showcase their labor and products and execute electronically. Over 200 informal market brokers are on the platform, with an average of 100 clients visiting month to month.

Namibia

UNDP collaborated with Tambula, a local online shop, to furnish informal private projects and brokers with a computerized business platform to arrive at additional clients and create more income. The Lab has effectively onboarded 50 informal fruit and vegetable vendors to the platform as part of the pilot phase of this initiative.

The Tambula platform offered informal street vendors access to a wider and larger audience base, across the city of Windhoek (city2city.network site).

This way, besides their existing customers, informal vendors reached new customers during the pandemic - generating more income, expanding their businesses, and earning larger customer networks. The project has earned substantial political and public visibility, facilitating a sustained series of innovation and capacity development activities in partnership with the Office of the Prime Minister.

Along these lines, other than their current clients, informal merchants arrived at new clients during the pandemic - creating more income, extending their businesses, and earning larger customer networks. The project has procured significant political and public visibility, working with a sustained series of innovation and capacity development activities in partnership with the Office of the Prime Minister.

Malaysia

The UNDP Malaysia accelerator Lab is accelerating the adoption of digital solutions among rural micro, small, and medium enterprises to achieve broader market access through e-commerce platforms.

During the pandemic, they onboarded informal producers and aggregators to sell their products and Services through WhatsApp Business.

The UNDP Malaysia accelerator Lab guided an elective e-commerce biological system for rural farmers and producers in Sabah to help business progress during the pandemic, exploring different avenues regarding green technology and traditional knowledge for food production in the process (undp.org/acceleratorlabs website).

The lab investigated urban biodiversity as a nature-based answer for a greener post-coronavirus future to comprehend how they see and experience urban widely varied vegetation.

Barbados

The UNDP Accelerator Lab in Barbados and the Eastern Caribbean, upheld by the German Federal Ministry for Economic Cooperation and Development (BMZ), the Qatar Fund for Development and UNDP core partners, developed BlueFISH, one of four components of BlueDIGITAL (undp Barbados site).

BlueDIGITAL is a digital-first pilot experiment which uses online tools to better connect key sectors such as fisheries and tourism and their stakeholders in the Blue Economy ecosystem in Barbados.

Upgraded admittance to e-commerce through BlueFISH could promote greater resilience. BlueFISH permits fisherfolk to collect truly necessary information on species type using image recognition technology and to utilize their insight to enter data like local names. Furthermore, in phase 2 of the pilot, the BlueFISH application will likewise be fit for utilizing innovation to determine species size which could illuminate future policies to both protect and safeguard the sector against external shocks.

Sudan and South Sudan

In Sudan and South Sudan, one of the significant difficulties women face is accessing credit to reinforce their financial standing and versatility. Over the long term, to tackle the actual issue, women developed a traditional savings scheme called ‘Sanduk-Sanduk’ (the name can be traced to the South Sudanese concept of “sanduk,” or box) where each member deposits money periodically. This framework has assisted women with arranging investment funds and raising start-up capital at a premium-free rate. Accelerator Labs in Sudan and South Sudan are collaborating digitize and scale the Sanduk savings scheme and exploring the potential of transforming these groups into more robust savings and credit cooperatives.

The UNDP South Sudan Accelerator Lab provides education to 400 women and young people, the greater part of which are from powerless and informal groups, to develop economic certainty and engage them to begin their regional businesses.

Angola

In Angola, the Accelerator Labs is learning and mapping the financial flows of local small businesses and brokers in urban markets to help the financial management of their markets and improve the daily efficiency of their trade activities.

Analyzing financial flows point the Lab to experiment with alternative digital financial tools to increase efficiency, such as digital wallets, mobile banking and e-money transactions.

The Philippines

In the Philippines, UNDP Launched Adaptable Digitally-Enabled Post-crisis Transformation (ADEPT) drive to provide advanced cash moves to helpless and informal groups during the pandemic. During the execution of this drive, the UNDP Philippines Accelerator Labs saw low digital adoption rates due to low digital and financial literacy rates inside these communities as a bottleneck to payment. The Lab is currently giving digital and financial skills training for these groups to figure out how to select, register, cash out, and utilize mobile money features.

Tanzania: waste management and informal settlements

Mwanza is Tanzania's second biggest city and perhaps of the quickest creating metropolitan centre in sub-Saharan Africa. Official information from the city administration estimates that 357 tons of strong waste are produced by the city every day. The municipal waste management system is upheld by four regionally owned

businesses that go about as aggregators and five community-based waste collection services.

The Lab utilized satellite information and herd mapping to make an outline of the production and collection of waste in Mwanza's Buhongwa ward, a fringe region with numerous informal settlements. They joined forces with OpenMap Development Tanzania (OMDTZ), to run a virtual mapathon with ten local universities students utilizing the Humanitarian OpenStreetMap platform.. Over different meetings over the course of about fourteen days, students labeled buildings, roads and waterways in the Buhongwa ward, as well as identifying possible trash sites. The resulting dataset was verified by the team at OMDTZ.

Zimbabwe: food security

The country's food production and distribution industry has a high extent of informal actors including farmers, wholesalers, and merchants. Right after the coronavirus pandemic, Zimbabwe confronted abrupt food deficiencies. Yet, it was challenging to recognize the specific sources and drivers of this disturbance because of data gaps about the ecosystem that supports food production.

To draw attention to to the informal economy's contribution to food supply chains, the Lab used a combination of non-traditional data sources and qualitative insights from informal actors. The Lab operated with three significant national trade associations to get verifiable datasets on the volume and estimating of food supplies to informal markets. Albeit the affiliations held numerous datasets about the day-to-day changes to market prices between them, the information was not interoperable and hadn't recently been joined. The Lab consolidated this information into a vivid computer-generated experience information representation to assist with imparting insights about patterns, market vulnerabilities, and associated behaviors more effectively to decision makers. The team likewise improved this information with experiences from a subjective study of in excess of 3,000 sellers, merchants, and providers across the nation. Utilizing the intelligent voice apparatus, Viamo, they sent voice reaction surveys to sellers in three distinct urban communities in Zimbabwe (Mutare, Harare, and Bulawayo), as well as a few more modest border towns.

Guinea-Bissau: UNDP Na Nô Mon platform

The UNDP laid out the Na Nô Mon platform as a shared resource to help international and local development actors identify unmet needs across the country. It likewise works as a coordination device for a more compelling reaction to the pandemic and in the more drawn-out term. There are near 400 members, representing around 100 civil society organizations (CSOs) and grassroots affiliations. The platform provides forward-thinking direction on coronavirus and allows members to engage in dialogue, through community rooms. Members can also share resources and events related to sustainable and inclusive development. While setting up the platform, the UNDP purposely operated with institutions with binds to underrepresented groups across the nine regions of Guinea-Bissau. For instance, the team cooperated with the National Network of Youth Associations, RENAJ, to assist with conveying training on the utilization of the platform and construct commitment with more youthful individuals and communities at large.

By joining forces with the women's radio in Bafatá they expanded the cooperation of younger people. The platform has likewise been utilized as a coordination center point for a small grants plot that upholds grassroots innovations. This has helped grassroots groups, who are generally detached, to interface with a more extensive community of innovators, while getting greater visibility and acknowledgment for their work.

For a long time, worldwide improvement institutions and civil society actors in Guinea-Bissau have battled to organize activities in their endeavors to help regional communities and reinforce social unions. The shortfall of a committed space for this trade to occur was especially obvious during the early months of the coronavirus pandemic when partners attempted to grasp regional needs and to plan existing grassroots endeavors to moderate the effects of the pandemic.

Digitize trade in borderland communities

In Africa, borderland communities depend vigorously on informal cross-line exchange for their livelihoods, yet coronavirus, environmental change, and struggle increment increase the requisite complexity.

Over the recent years, week after week showcases called "Lumos" in numerous country communities have arisen in both The Gambia and adjoining Senegal. Seeing this developing pattern across borders, UNDP The Gambia is taking a gander at scaling their digital marketplace application "My Lumo" to Senegal to improve sub-regional trade.

Zooming into the border of Zambia and Zimbabwe, informal brokers depended heavily on middlemen and runners to move merchandise, which further exacerbated insecurity during the pandemic. The UNDP Zambia and UNDP Zimbabwe Accelerator Labs are investigating the capability of innovation to digitize trade and the breaking point of the reliance of informal dealers on mediators. To succeed, the two Labs are investigating digital solutions which don't need informal merchants to utilize complex technologies or require steady web availability yet still serve informal dealers' necessities to track goods, make payments, and access financing.

The UNDP Zambia and UNDP Zimbabwe Accelerator Labs are working with Lab teams in Niger, Mali, Burkina Faso, Sudan, South Sudan, Togo, Ghana, and Benin to take on the UNDP's African Cross Border Challenge.

Cross-border trade is suffering because of the coronavirus pandemic. The Labs are leaning into digitalization, leveraging digital tools and platforms as a method for borderless communities to improve and proceed with their trade track goods, make payments and access financing opportunities.

What's more, propels in technology and data science hold the possibility to take advantage of collective intelligence for a bigger scope than at any other time. In this quickly developing field, the UNDP has collaborated with Nesta's Centre for Collective Intelligence Design to produce a more clear vision of how collective intelligence approaches can accelerate progress on the SDGs (smartertogether.earth site).

Youth Co: Lab

Youth Co: Lab, co-made in 2017 by UNDP Asia and the Pacific and Citi Foundation is a multi-layered and staggered reaction to handle the difficulties children face by situating youth up front to find solutions for the present most pressing problems.

Through a series of sub-national innovation bootcamps across India facilitated at Atal Incubation Centres, the top 30 teams were identified. In preparation of the National Innovation Challenge and Dialogue (NICD), a National Springboard programme was conducted to better aid the teams with their business models. The top 4 teams were chosen from NICD that went through the Regional Springboard Programme.

In 2020, through the overarching theme of COVID-19 Recovery to #BuildForwardBetter, Youth Co:Lab India called for solutions in the areas of Education, Mental Health, Gender Equality, Green Economy and Improving Access.

The top 80 teams participated in the Bootcamp and after an intense final pitching round, Top 3 winning teams were identified who underwent National and Regional Springboard Programme. In 2020, were launched the Innovations Marketplace for Gender Equality with a focus on LGBTI Livelihoods.

Herewith are some of the projects supported by this program.

Bundle

Ordering a book from Amazon, prime supporter co-founder Nagendra realised that the company did not deliver to Bhutan. The nearest conveyance point was Jaigon, an Indian city near the Bhutanese border. His main choice was to have the book conveyed to Jaigon and to then go get it there. As many vehicles drive this distance day to day, Nagendra saw the potential for a startup that would make conveyances more productive regarding time, energy and money.

This was the start of Bundle, a symbiotic delivery system, which benefits both sender and the person who does the delivery, the bundler. A bundler can be anybody who is unexpectedly going toward the path that the shipper needs to send a thing. Shippers essentially pay a decent rate for the Bundle.bt services, of which the bundler gets 20%. Along these borders, shippers get their packages conveyed in a split second and bundlers procure a commission. The Bundle team experienced a great demand for

their service over the initial twenty-day trial period. They hope to get enough investment to be able to partner with a strong tech team, so that they can develop an app that tracks bundlers.

A-chieve

A-chieve is a Thai social project that helps children pick and plan their professional ways by leading vocation direction workshops and work experience positions, as well as offering free web-based data about professions.

They have upheld over 37,000 students and have cooperated with several companies, NGOs, and government institutions, including Sub-District Administrative Organization of Surin Province, Adecco group, KPMG and Banpu Champion foundation.

LawKo

LawKo is a social media that plans to connect the information gap between an overall set of laws covered with muddled terms and processes, and a public that frantically needs to figure out the law. The prime supporters of LawKo thought of this thought while attempting to address the absence of comprehension of legitimate processes in the Philippines.

The chatbot can address inquiries concerning civil, criminal, and other relevant legitimate needs in an open language liberated from technical language, engaging normal Filipinos to comprehend their privileges and settle on informed conclusions about lawful and civil processes.

Arooga Health

Arooga Health is an award-winning startup connecting care providers to those who need emotional and mental health assistance. The startup was founded by Samantha Sanchez (Sam) and Dominique de Leon (Dom), who came up with the idea after realising that they both had close friends and family members suffering from mental health issues.

With the vision of working on the well-being of care searchers, decreasing their expected medical costs, and supporting their efficiency, the co-founders addressed mental health professionals and explored various sorts of psychological wellness

needs, the kinds of care that could be controlled by various platforms and the potential clients that different consideration suppliers could take care of.

In light of this research, Arooga Health provides a customized platform for employees, companies, and organizations who don't have on-site counsellors or therapists and need cooperative consideration access for their profound and mental well-being. The organization coordinates clients or care searchers with care suppliers in light of their goals for looking for counsel, economic ability to pay, accessible timetables, and favored methods of virtual cooperation.

Sam and Dom trust that their project will assist with finishing the disgrace surrounding mental health and begin a discussion about the need to find inventive solutions for emotional well-being needs.

Blue Hearts

Blue Hearts is a web-based platform which means to provide youth-based psycho-social help to the individuals who need it, with the assistance of prepared volunteers. Volunteers would have a brain science-related educational background and would work under the direction and management of enlisted psychology professionals in Maldives.

When psychology student Mariyam Shiba saw an expansion in the pace of suicides in the Maldives, she chose to take care of the unfortunate admittance to mental help in the country, especially for the adolescent in the numerous small islands beyond the capital. She felt that a web-based approach would work better compared to the conventional hotline, as the nation has complete web inclusion and a well-informed more youthful age.

Through this platform, clients can visit, make appointments and read data about emotional well-being.

Stranger

The Stranger is a Sri Lanka project that expects to make clean water more open through an application that tracks water distribution vehicles and marks purified water shops on a map. The application likewise provides information acquired by IoT

(Internet of Things) devices in purifying centres, so that individuals can have data about the nature of the water that they are buying.

The co-founders of the project are students at Rajarata College. At the University's campus, there is no running drinking water, thusly students need to buy it from water supply trucks. Worried about the changing color and taste of the water that they were purchasing, and what this could mean about its quality, the students met up to examine manners by which they could guarantee that they were purchasing safe water. This is how the idea for Stranger came about.

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Psycoder

Psycoder is an application from Sri Lanka that would assist individuals who experience loneliness and depression with an intelligent chatbot.

Seeing how normal psychological wellness needs are in the tech era, Janaka and the remainder of the Psycoders group chose to chip away at an application that would assist people who experience the ill effects of loneliness and depression. With a canny chatbot that tracks and further develops clients' emotional well-being status through explicitly designed activities, the application could make emotional well-being support more open in areas where mental treatment is costly or inaccessible. In the long term, it is imagined that the application could be involved by psychologists as part of their treatment.

UNDP accelerators labs projects

Herewith projects carried out in the different UNDP accelerators in selected countries (Berditchevskaia et al, 2021)

Argentina: Using DIY machinery and citizen sensing to measure changes in air quality

WHO has estimated that around seven million premature deaths globally are caused by air pollution every year. Air quality monitoring is important for guaranteeing that

contamination is brought down within limits that are OK for health and well-being. These estimations are ordinarily upheld by costly fixed-sector sensors and stations that sample at the macroscale level. Utilizing participatory resident participatory citizen science and low cost sensors, the Lab set out to understand of differences in air quality across different parts of Buenos Aires. The team laid out a partnership with open-Seneca, a network of citizen science pilots that measures air quality using low-cost sensors. They ran two workshops where 80 local university students figured out how to assemble the air quality sensors, assisting them with growing new skills and finding out about the effect of air quality on health. Over a time of seven weeks, these local sensors' collected data about day-to-day changes to air quality in Buenos Aires via conveying the Do-It-Yourself sensors on their bikes.

Ukraine: Combining satellite data and herd sourcing to map open burning in rural communities

Open burning of waste is a broad practice in Ukraine, with profound roots in culture, the farming economy, and family propensities. Official reports gauge that between 36,000-56,000 fires happen every year with annihilating effects on local air quality and the normal equilibrium of environments. Burningwaste likewise also leads to economic losses which can add up to great many US dollars. Regardless of the size of the issue, the government needs granular regional information about open burning or insight into the uptake of sustainable waste management practices, such as composting.

To better understand patterns of waste management practices across the country, the Lab set off to make a state-of-the-art guide of open burning and treating the soil in rural communities utilizing a combination of open satellite data with GIS and crowdsourcing. Working with the Center for Innovations Development, the Lab made a model dashboard that visualized the data. The dashboard was imparted to regional groups over a progression of ten internet-based groups because of coronavirus limitations. The meetings were gone to by in excess of 200 individuals from grassroots groups, as well as policy makers from local authorities, with approximately 20 groups taking part regularly.

Lao PDR: Combining big data with qualitative data to understand community waste behaviors

Vientiane, the capital city of Lao PDR, produces more than 1,100 tons of waste every day. Formal waste collection services are provided by a mix of private and public actors, and come with a charge to local communities. It's assessed that less than a third of the city's million residents access waste management services, leading to the dumping of waste and open burning. As of late, the municipality has put forth attempts to further develop waste collection coverage and acquainted standards that point to control the utilization of hurtful garbage removal practices. Open burning stays common among residents, filling the roads of the capital with thick dark smoke that causes unfriendly environmental and health influences. Utilizing a mix of GIS planning with satellite information, ethnography, and town hall discussions in communities, the Lab set off on a mission to make a superior comprehension of open burning in three towns around Vientiane. The team originally made an Air Quality File with GIS planning to point out the impacts of open burning on air quality. Working with the local NGO, Disadvantage Children and Youth Development Association (DCYA), the Lab took advantage of 20 volunteers to run community meetings that would help to fill these data gaps. The Lab utilized a blend of meeting consideration, ethnography, and micro surveys to improve the planning information with subjective insights about the drivers of waste conduct in the towns.

Serbia: Using Google search and LinkedIn data to map labor market trends

Serbia has one of the 10 quickest contracting populaces on the planet, with an 18.9 percent decline in populace anticipated between now and 2050 and around 120,000 individuals passing on the country every year to seek after-work potential opportunities in different nations. This example of eradication fundamentally affects the nation's work market, through the deficiency of the most youthful individuals from the labor force and a developing shortage among both high-and low-talented specialists. By better comprehension of the schooling and expert opportunities looked for by the roughly 4,000,000 Serbians residing abroad, the government plans to develop policies to stimulate their return to to bring their networks and skills back home. Governments

battle to follow the entities of current economic relocation in an exact manner, particularly when public measurements of workplaces depend on conventional and rare information collection practices such as the census. To overcome the limits of traditional labor market data, the Accelerator Lab utilized collective intelligence to plan and figure out the drivers of outward relocation in real-time. The team incorporated novel information (made accessible by the World Bank) about Serbian clients of LinkedIn and Serbian language work-related to Google search. The LinkedIn information was anonymized to protect the security, however, contained significant data about the locations, industries and skills of Serbian professionals.

Tanzania: Herd mapping informal urban infrastructure to improve waste management

Mwanza is Tanzania's second biggest city and perhaps of the the fastest developing urban centers in sub-Saharan Africa. Official information from the city administration appraises that 357 tons of strong waste are produced by the city every day. The municipal waste management system is upheld by four locally owned businesses that go about as aggregators and five community-based waste collection services. In any case, the city faces various difficulties that take steps to overpower the ongoing waste services system including low investment, a lack of recycling facilities and the growth of informal settlements with unmapped waste management infrastructure. The Lab utilized satellite information and crowdmapping to make an outline of the production and collection of waste in Mwanza's Buhongwa ward, a fringe region with numerous informal settlements. They collaborated with OpenMap Development Tanzania (OMDTZ), to run a virtual mapathon with ten local university students using the Humanitarian OpenStreetMap platform. Over different meetings over the course of about fourteen days, students marked structures, streets, and streams in the Buhongwa ward, as well as distinguishing conceivable waste sites. The subsequent dataset was verified by the group at OMDTZ.

Viet Nam: Mapping the Role of informal waste workers with Sensors

In Viet Nam, the government has set the objective of reusing something like 15% of waste by 2025. Notwithstanding, most families don't separate their loss at source and

fund both recyclable and landfill waste together at the side of the road and official unloading sites. Official waste management services are provided by a complex ecosystem of both public and private actors. With regards to reusing, the many informal waste workers make a critical commitment to assisting with redirecting waste from landfills the nation over. These workers, for the most part, women, separate materials, for example, cardboard, metal, and plastic from other waste and take them to the collection centre.

Zimbabwe: Combining Datasets to identify supply trends in informal food markets

The informal sector represents nearly 90% of the economy in Zimbabwe. Because of its invisibility, informal economic activity isn't well understood, which makes it challenging to mitigate against market disturbances. For instance, the country's food production and distribution industry has a high extent of informal actors including cultivators, wholesalers, and merchants. Directly following the coronavirus pandemic, Zimbabwe confronted unexpected food deficiencies. However, it was hard to distinguish the specific sources and drivers of this interruption because of information gaps about the ecosystem that upholds food production. The Lab works with three major national trade associations to get verifiable datasets on the volume and evaluation of food supplies to informal markets. The Lab consolidated this information into a vivid augmented simulation information representation to assist with imparting experiences about patterns, market vulnerabilities, and related ways of behaving all the more actually to decision makers. The team likewise enhanced this information with insights from a subjective study of in excess of 3,000 merchants, wholesalers, and providers from the nationwide.

Bosnia & Herzegovina: Herdsourcing ideas for COVID-19 response to develop civic engagement

The online ideation platform, CovIDEJA2020 was launched by the Accelerator Lab in April 2020. Its motivation was to prepare residents to contribute novel solutions for coronavirus related needs that could be executed within a brief time frame. The Lab cooperated with 28 institutions, including regional IT institutions, global institutions,

the Ministry of Environment and Tourism. Of 109 thoughts submitted, six were chosen to get an economic prize and customized help towards execution, including mentorship from industry partners and pitching meetings to broad innovation institutions.

Colombia: Stimulating an innovation ecosystem to make PPE for COVID-19 response

The Lab set off on a mission to prototype robust, close-face shields that could be developed and disseminated rapidly. This aided lockdown measures to be loose diminished the spread of the sickness and made new supply chains to lay out a PPE market.

Ecuador: Peer-to-peer learning for economic empowerment during COVID-19

Along with the social business Do-It-Yourself Club and local seamstresses, the Lab assisted with laying out an internet-based published skills trade program across Quito. The meeting was generally self-coordinated and peer-led, with individuals running virtual instructional meetings for each other to diversify their skillsets, as well as supporting each other by sharing sewing materials and devices. They distributed the work amongst themselves using micro tasking arranged through their WhatsApp group. Over the initial four months of presence, the meeting individuals started and ran 16 virtual instructional courses, adding up to 90 hours of upskilling through peer learning.

Guinea-Bissau: Mapping grassroots innovations to identify gaps and coordinate pandemic response

The UNDP laid out the Na Nô Mon platform as a shared resource to help international and local development actors identify unmet needs. It likewise works as a coordination device for a more compelling reaction to the pandemic and in the more extended term. There are near 400 individual members, addressing around 100 civil society organizations (CSOs) and grassroots affiliations. The platform provides cutting-edge direction on coronavirus and permits individuals to take part in the

exchange, however community rooms. The team cooperated with the National Network of Youth Associations, to assist with deliver training on the utilization of the platform and assembling commitment with more youthful individuals and communities at large. By joining forces with the women's radio in Bafatá they expanded the support of more younger women. The platform has likewise been utilized as a coordination center point for small grants scheme that supports grassroots innovations.

Mexico: Combining multiple datasets to understand gender-based violence (GBV) in public sectors

In Mexico, more than half of the homicides of women in 2019 (52 per cent) occurred in public spaces. High paces of femicide certainly stand out. Even with this developing issue and public strain, the Government of Mexico City proclaimed a public caution about GBV in November 2019. Following the ready, it attempted to expand the health of public sectors in the city by presenting more secure public pathways and emergency signals to support the revealing of occurrences. The effect of these various mediations on paces of savagery in the city is as yet hazy and policy creators are quick to comprehend where they have demonstrated best. In a joint effort with GIZ Information Lab and GIZ Mexico, the Lab is consolidating open information about metropolitan infrastructure (like public vehicles) with closed government datasets about the use of new panic buttons.

They trust this will prompt a superior comprehension of the urban values related to GBV in public spaces across Mexico City. They will likewise work with datasets that tap into inhabitants' impressions of urban security, for example, feeling research of social media and crowd mapping with local women's groups. By mobilizing these different sources of intelligence, they will test whether collective intelligence can help them to identify the urban spaces where women are safest. Cross-corresponding their findings with the known locations of the government's more secure pathways will likewise assist the government in assessing which policy measures in order to guide future interventions.

Mexico Text mining with Natural language processing (NLP) to identify barriers to policy implementation

The Lab is mining the text entries using NLP40 to cluster and rank dominant themes across this vast public service dataset. Via training an AI model to contrast text entries with a set of predefined common causes and recognize novel subjects, they're planning to further develop the detailing system for civil servants in the future. The algorithm is empowering them to analyze and utilize civil-servant generated data that's otherwise too unstructured for centralized analysis. The team desires to build a hybrid collective intelligence model, where the quality of evaluations is improved by combining NLP classification and inputs from civil servants in real time.

World Forum centres

World Forum centres are (co-)hosted and (co-)funded by national public and/or private entities (initiatives.weforum site).

Kazakhstan

Launched on August 01, 2021, C4IR Kazakhstan serves as a global public-private platform for the development of technology governance and policy protocols in an inclusive and sustainable manner. fills in as a worldwide public-private platform for the development of technology governance and protocols in an inclusive and sustainable manner. The Centre is developing a positive environment to bridle the arising innovations that will fundamentally influence the innovative improvement of Kazakhstan. C4IR Kazakhstan is a cooperation between Tech Hub, hosted by JSC Astana and the World Economic Forum.

Colombia

Launched on April 29, 2019, C4IR Colombia boosts the advantages of science and technology for society by creating policy systems that advance inclusive growth, sustainable development, and well-being. The Centre is locked on Artificial Intelligence (AI) and machine learning, Internet of Things (IoT), robotics and intelligent cities, and Blockchain and distributed ledger technology.

Its technologies and works with public policies, the move of information creates science technology and innovation talent, drives public and private investment, and the development and adoption of technology in an ethical and inclusive manner. C4IR Colombia is founded by the Mayor's Office of Medellin, the Ministry of Commerce, Industry and Tourism of Colombia, and Ruta N (Medellin's centre of innovation).

Rwanda

Launched on January 01, 2020, C4IR Rwanda brings together government, industry, civil society and academia to co-design, test and refine policy frameworks and governance protocols that maximize the benefits and minimize the risks of 4IR technologies. The Centre is fundamentally focusing on AI, data policy, and seeks to develop multi-stakeholder partnerships to drive innovation and adoption at scale for the benefit of society.

South Africa

Launched on December 23, 2019, C4IR South Africa, upholds industry change across different sectors, upholds government change to to maintain robust and resilient technology governance protocols and creates frameworks to support awareness and development of frontier technologies

Tres Cantos Open Lab Infrastructure

In 2001, GlaxoSmithKline (GSK) converted one of its major laboratories in Tres Cantos, Spain, into a profit-exempt laboratory dedicated to developing drugs to treat diseases affecting primarily people in the developing countries.

In 2010, the Tres Cantos Open Lab Foundation was created to allow independent researchers to access (GSK R&D facilities, resources and expertise to help them advance their own research focused on medicines for endemic infectious diseases, including malaria and tuberculosis. The Foundation consolidates subsidizing with admittance to best-in-class industrial offices and ability. This approach works with the move and co-production of unsaid information on drug disclosure and pre-Medical Research and innovation through the colocation of external analysts with GSK researchers.

Since the Open Lab was laid out in 2011, in excess of 250 propositions have been assessed, 99 researchers from elite institutions have been prepared in worldwide health drug disclosure in an industrial setting, and 69 projects have been endorsed. Herewith are those connected with Africa.

Treatments for neglected tropical diseases

Open Lab', based at GSK's research centre at the Tres Cantos Campus, Spain, will go about as an engine room of scientific innovation for neglected tropical diseases. GSK has created capacity for up to 60 researchers from around the world approaching the lab.

The 13,500 malaria compounds result from a screen of GSK's pharmaceutical compound library of more than 2 million molecules for any that inhibit the malaria parasite *P.falciparum*. This is the deadliest type of malaria, which is tracked down basically in sub-Saharan Africa.

This exercise required five researchers per year to finish. GSK will make these findings, including the chemical structures and associated assay data, freely available to the public via scientific websites.

Governance of the related knowledge base is taken over by an independent third party, BIO Ventures for Global Health (BVGH). GSK and BVGH have consented to a Plan with the Emory Institute for Drug Discovery to add further chemical libraries and other assets in the search for new anti-malarial drugs.

A joint effort has been laid out with South African firm iThemba Drugs upheld by the South African Government, to recognize possible new mixtures against TB, explicitly multidrug and incredibly drug-safe TB, and co-disease with HIV-AIDS.

Investigating combination antimicrobial therapy for treating infection caused by invasive non-typhoidal Salmonella disease in sub-Saharan Africa

This exploration examines the expected utility of mixed treatment for treating bacterial diseases (openlabinfrastructure site). This study has shown synergy with tebipenem against other invasive Salmonella, and aims to expand this scope to other drugs against an important set of pathogens in Africa.

Generation, characterization, and in vivo evaluation of a novel live malaria vaccine

Intestinal sickness stays the most predominant parasitic illness for which vaccin is as yet not accessible. Whole-sporozoite (Wsp) vaccines have shown the most accomplishment among current applicants.

The applicant's lab has defined and established the proof-of-concept of a novel approach to Wsp malaria vaccination, based on the use of non-pathogenic rodent malaria parasites, genetically engineered to express antigens of their human-infective counterparts. PbVac, a Plasmodium berghei (Pb) parasite that expresses the P. falciparum (Pf) circumsporozoite protein is the first member of this new class of vaccine candidates.

PbVac has shown a high-security profile and huge vaccinating viability in ongoing stage I/IIa medical preliminaries. Coming from these uplifting results, GSK proposes to create and assess a new transgenic Pb parasite with upgraded immunogenicity and viability against Pf disease.

Phenotypic screening to identify small molecule inhibitors of Visceral Leishmaniasis and Chagas disease

Visceral leishmaniasis (VL) and Chagas disease (CD) are brought about by kinetoplastid parasites that influence millions of individuals worldwide and impart a

heavy burden against human health. Because of the partial efficacy and harmfulness-related impediments of the current medicines, there is a dire need to develop novel treatments with better adequacy and security profiles that effectively treat these sicknesses.

Chagas sickness, otherwise called American trypanosomiasis, is a possibly perilous infection brought about by the parasite *Trypanosoma cruzi*, commonly transmitted by biting insects known as ‘kissing bugs’ that are tainted with the parasite. As individuals regularly show no side effects for a long time, most are ignorant that they have Chagas.

Up to 33% of individuals with Chagas will endure heart harm that becomes obvious just numerous years after the fact and can prompt moderate cardiovascular breakdown or unexpected demise. Chagas kills a greater number of individuals in Latin America every year than some other parasitic sicknesses, including malaria.

The research provides details regarding the use of entire cell phenotypic measures to screen a group of 150,000 mixtures against *Leishmania donovani*, a causative agent of VL, and *Trypanosoma cruzi*, the causative agent of CD, with the objective of finding new starting points to develop novel drugs to effectively treat and control these diseases. The screening campaign, led by the motivation behind worldwide open access, distinguished twelve novel chemotypes with low to sub-micromolar action against *T. cruzi* or potentially *L. donovani*. We reveal these hit structures and connected movement with the objective to add to the drug discovery community by providing unique chemical tools to probe kinetoplastid biology and as hit-to-lead candidates for drug discovery.

Rapid eTrade Readiness Assessment programme, UNCTAD

UNCTAD's Fast eTrade Status Evaluation program provides recipient nations a speedy evaluation of current opportunities and challenges in eCommerce, as well as the primary needs ahead in tackling e-commerce for improvement (UNCTAD, 2022b).

UNCTAD rolled out an eT Ready Implementation Support Mechanism (ISM) in 2020 to improve collaborations and scale up joint endeavors among eT Ready recipient

nations and innovation partners. The ISM depends on an organization of eT Ready Focal Points in recipient nations' trade ministries or other entities with a perceived position of authority in the area of e-commerce. Implementation Reviews are a cornerstone of the ISM and apply a monitoring methodology to assess progress and evaluate gaps in the execution of the propositions contained in the assessments and to record great practices, policy effects, and lessons learned. Following the first Implementation Review (IR) published in 2020, UNCTAD set out on a second survey in 2021, considering the encounters and criticism shared during a progression of partners' commitment events. 25 nations were welcome to partake in the second IR, outstandingly those that had finished their appraisals by June 2021. These are, from Africa: Benin, Burkina Faso, Côte d'Ivoire, Lesotho, Liberia, Madagascar, Malawi, Mali, Niger, Senegal, Tanzania, Togo, Uganda, Zambia; from the Asia/Pacific district: Bangladesh, Bhutan, Cambodia, Iraq, Kiribati, Lao PDR, Nepal, Samoa, Solomon Islands, Tuvalu, Vanuatu. This report points out the 15 nations featured in striking that answered the invitation.

Cambodia

In Cambodia, the Ministry of Trade perceives the reactant pretended by the eT Ready for a few government initiatives on the side of the e-commerce ecosystem. One suggestion centred on by the Royal Government of Cambodia was to develop a National E-commerce Strategy. Led by the Ministry of Commerce, with strong involvement by the private sector, a National E-commerce Strategy strategy was launched in November 2020 with the view to building a comprehensive and orchestrated e-commerce environment in the country. The eT Ready was utilized well fully backed up by the Enhanced Integrated Framework (EIF) and (UNDP). They have pursued carrying out the methodology's proposals through the "Go4eCam" project, a long-term, 2,000,000-dollar drive that plans to support domestic and worldwide opportunities for MSMEs through e-commerce. The Government has likewise evolved and changed regulations and standards pointed toward governing e-commerce.

Bhutan

The team led by the Policy and Planning Division laid out in 2019 has united an expansive scope of partners from the public and private sectors. Such a platform has fostered collaboration and provided the incentive to ignite reforms and spur investments in a wide range of policy areas, particularly in encouraging networks, reinforcing online protection and digital payments framework, and organizing awareness campaigns and skills development programmes. The support from development partners, such as the EIF, ITC and UNDP contributed to molding a public vision, first through the improvement first through the development of E-Commerce Guidelines, and more recently with a national E-commerce Policy in 2021.

Senegal

The eT Ready assisted with catalyzing the the adoption of a strategic framework to promote the development of e-commerce and the digital economy. This structure is presently an indispensable piece of the execution approach of the Public Methodology of Senegal for e-commerce development ("Stratégie Nationale de Développement du Trade Electronique au Sénégal", SNDCEs) led by the Ministry for Trade and Small and Medium Enterprises. Building on the E-commerce Working Group established in the context of WTO discussions, the Ministry has figured out how to keep a regular engagement with a wide scope of government agencies, and simultaneously, to help the private sector in a several aggregation initiatives and sharing resources, particularly with regards to stages laid out in the early reaction stage to the Coronavirus pandemic. Building on a solid foundation, the government has made strides in building IT infrastructures (e.g., new data centres and cables) and increasing power generation capacity, as well as in helping digital entrepreneurship thrive through the passing of a Start-up Act.

Togo

The eT Ready conducted in 2018 was the first framework for public-private sector dialogue on e-commerce that has since then flourished. The supported Togo e-commerce week held in August 2021 is an illustration of how the Ministry of Trade has since the country profited from the eT Ready, sustained the discourse with the

private sector, and gained by it to provide a catalyst to e-commerce empowering initiatives. Strengthening the legal framework on data protection and cybersecurity infrastructure turned into a main concern, which prompted the reception of new regulations and the infrastructure of an organization to oversee cyber threats. Connectivity has also benefited from new investments from the private sector, increased competition and better access to electricity. The telecom controller has adopted a proactive policy to make the Web more sustainable. The national postal operator has likewise understood the capability of e-commerce to advance Made-in-Togo products and laid out a committed marketplace. In November 2021, the Ministry of Trade approved a public e-commerce system, which looks good for a further organized way to deal with help the quickly developing Togolese e-commerce environment.

UK Royal Academy of Engineering

The UK Royal Academy of Engineering has shortlisted a scope of products for the 2022 Africa Prize for Designing Innovation (Innovolo, 2022).

These include an off-grid neonatal crib for jaundiced babies, a portable vaccine fridge, a hydrogen fuel-cell generator that runs on gas and a natural, plant-based fibre that can be used to clean up oil spills.

Other companies have developed commercial packaging from a variety of agricultural waste, transformed invasive plants into an absorptive fibre used to clean oil spills on land and water and created an aquaponics starter kit to grow their own fish and crops at home, complete with a remote monitoring system and online marketplace.

Business people dealing with smokeless cooking ovens produced using scrap metal, a chilly stockpiling system for off-grid farming communities, an energy unit put together hydrogen generator that runs on liquefied petroleum gas, and a mini grid monitoring system to help utilities and mini grid operators oversee solar installations.

Further innovations provide communities an online platform to exchange used goods like household appliances, clothing and more, using a virtual currency. An outdoor

and off-grid communal workspace gives students access to WiFi and power, and a prepaid bank card that requires no bank account and can be used worldwide giving the unbanked access to online purchases and cash from mobile money.

An online platform helps entrepreneurs recruit and oversee consultants across a scope of disciplines, reevaluating skills that are not a piece of their center business.

The 2022 shortlist incorporates the Africa Prize's most memorable Togolese and Congolese innovators, with nine nations addressed, including Cameroon, Ethiopia, Ghana, Kenya, Nigeria, South Africa, and Uganda.

Herewith are some of the supported projects.

A-Lite Vein Locator

A-Lite Vein Locator, Dr. Julius Mubiru, Ugandais is a device that outlines patients' veins as shadows on their skin, assisting medical staff insert a drip or draw blood more easily.

Agelgil

Agelgil, Afomia Andualem, Ethiopia is a sustainable range of packaging and tableware made from agricultural by-products such as barley and wheat straw.

Aquaponics Hub

Aquaponics Hub, Lawrencia Kwansah, Ghana, is a pack for new clients to set up their hydroponics system, complete with smart sensors to monitor crops and fish, and an online marketplace to sell produce.

Bleaglee

Bleaglee, Juveline Ngum, Cameroon is a sustainable cooking system that incorporates a smokeless cookstove produced using reused metal pieces, and bio-briquettes made from plastic and biomass waste.

Coldbox Fund

Coldbox Fund, Adekoyejo Kuye, Nigeria is an off-lattice cold capacity answer for farmers to fund and sell new products without depending on the electrical framework.

Crib A'Glow

Housing A'Glow, Ethicalness Oboro, Nigeria is a foldable photograph treatment bunk that treats jaundice in babies. The housing can improve solar or network power and screens the child's condition.

Genesis Care

Beginning Consideration, Catherine Wanjoya, Kenya is a framework to administer and later discard female cleanliness products. The framework is introduced to provide small kids admittance to sustainable products.

HoBeei

HoBeei, Mariam Eluma, Nigeria is a web-based free-process stage where clients can transfer undesirable or unused things in return for virtual money with which to buy different merchandise.

Hyena power pod

Hyena power unit, Dr Jack Fletcher, South Africa is an energy component-based hydrogen generator that changes over LPG into usable power, all inside one gadget.

Kukia

Kukia, Divin Kouebatouka, The Republic of the Congo is an interaction that changes the intrusive water hyacinth plant into an absorptive fiber that can tidy up oil slicks and stop oil spills ashore or water.

Peec REM

Peec REM, Philip Kyeswa, Uganda is a remote monitoring and metering framework for off-network solar installations. It likewise makes utilities aware of power outages or altering.

SolarPocha

SolarPocha, Oluwatobi Oyinlola, Nigeria is an open-air workstation, a solar-powered space where students can interface with WiFi and off-matrix power.

Solimi Prepaid Card

Solimi Pre-loaded Card, Gaël Matina Egbidi, Togo is a Visa-upheld card that doesn't expect clients to keep money with one explicit bank, giving unbanked people admittance to the computerized economy.

TelMi

TelMi, Fabrice Tueche, Cameroon is a group of gadgets that assist medical caretakers with monitoring patients, answering cautions, and Harvest information to further develop work processes and reaction times.

Terawork

Terawork, Femi Taiwo, Nigeria is an internet-based stage that interfaces clients to consultants, so entrepreneurs can find and securely rethink key skills like coding and bookkeeping.

VacciBox

VacciBox, Norah Magero, Kenya is a mobile and solar-powered cooler that securely funds temperature-delicate medication like immunizations, to be utilized by movement points and for transport.

High-tech institutional innovation initiatives of developing countries

We present in this chapter the institutional innovation governance related to high tech in India, Malaysia, Thailand, Viet Nam and Bandung, Indonesia, Rwanda, Kenya and South Africa. In each country we present selected projects illustrating the high tech promoted specialisations.

R&D expenditures in developing countries

China and India perform well in R&D (UNCTAD, 2021). This mirrors their plentiful supply of qualified and profoundly talented HR accessible. They also have large local markets, which attract investment by multinational enterprises. In the case of China the progress is partly a reward for spending 2 per cent of GDP on R&D (Patra SK, 2017; UNESCO, 2020).

Jordan likewise gets along admirably, again reflecting strong government policy. Jordan was one of the principal Centre Easterner nations to support ICT as a standalone economic sector and in 1999 had the first cross country ICT strategy. Jordan currently has a youthful, carefully educated populace and high Internet penetration (Oxford Business Group, 2016).

The Philippines has a high positioning in the industry. This reflects elevated degrees of FDI in high-innovation manufacturing, especially in electronics. MNEs are drawn in by the country's solid value chains and a solid base of parts manufacturing. The Philippines likewise has favorable business policies alongside a skilled, and English-speaking workforce, and a network of economic zones (Oxford Business Group, 2018).

Viet Nam has been effective in expanding its technological and. In the range of 2005 and 2018, the proportion of exports made up of primary and resource-based goods fell from 52 per cent to 22 per cent, while those of high tech products rose from 6% to 35 percent (UNCTADstat site)

Innovation Governance in India

Institutions

DST created in 1971 under the MoST was given strong power of coordinating the policies and research programs among ministries by establishing Science and Technology Advisory Committees (STAC) within each socioeconomic ministry, and the Inter-Sectoral STAC (IS-STAC).

Science and Technology Policy 2003 united the sectors of S&T fully intent on expanding the project expected for R&D and innovation in the areas impacting the economy and society (DST, 2020). This led to the emergence of a strong institutional mechanism through the creation of Scientific and Engineering Research Board (SERB) under the ambit of DST to advance logical and designing research in the country. The era following the S&T Policy 2003 is set apart by a significant increase in R&D Investment, a rise in publication ranking, and a steady increase in institutional and human capacity. Thus, the ten years of 2010 to 2020 were proclaimed as the 'Ten Years of Innovation' with the plan to make a 21st Century National Innovation Ecosystem. The necessary highlights of this policy were to advance an S&T -led innovation ecosystem in the nation, attracting private sectors into R&D and linking STI to socio-economic priorities. The 12th Five-year plan (2012-17) The twelfth Five-year plan (2012-17) focused on the creation and development of R&D facilities, building technology partnerships with states, large scale investment in Mega Science projects. India is quickly evolving by changing national and international dynamics.

High-tech Innovations in India

Following are a few High tech innovations in India that have an effect universally (insightandinnovation site).

Water from air – IceStream:

IceStream Technologies extracts water from the air even in arid conditions and humid weather conditions. IceStream's innovation is cheap and brings about no emissions or

greenhouse gas emissions, while an equivalent system controlled by electrical energy (for example solar panels) would expect a several solar panels and a large support structure, which makes the IceStream system more sustainable and cost-effective. It can likewise be handily moved or migrated to different sectors depending on the situation with little effort. It is intended for use in developing nations where the accessibility of water is basic, as well as dry regions, for example, desert areas and drought-stricken areas all around the world that in any case need admittance to freshwater supplies.

Replacing fossil fuels with India's first solar-powered train – Vande Bharat Express

India's most memorable solar-controlled train or Train 18 is good to go to supplant a motor that utilizes petroleum derivative (diesel). This very first solar-controlled train will run between Delhi and Varanasi. Another train named Vande Bharat Express (Train 20), which utilizes both diesel and electric resources, was was flagged off by PM Modi from Delhi's Safdarjung railway station in February 2023.

Tulsi Green is a new type of grass that grows without irrigation

It was developed by Anil Rajvanshi, an inventor from Maharashtra. This exceptional grass requires no water to develop and can be flooded by water alone. It's perfect for both rural and urban regions where water protection is necessary. The grass doesn't require a lot of care and it's not vulnerable to pests or diseases. The owners simply need to cut it around 3 inches every two weeks and they get organic lawns every time.

India's first supercomputer, Param 8000

It can perform 8 quadrillion estimations each second. This PC was developed by the Centre for Development of Advanced Computing (C-DAC). The new framework will be introduced at the Indian Institute of Tropical Meteorology (IITM), Pune. It is right now being utilized in different fields like weather conditions gauging, environment research and air quality monitoring.

Fabric made from reprocessed plastic bottles that could replace the leather

Making texture out of reused plastic bottles is certainly not a groundbreaking thought yet metal detectorists can have quite recently tracked down a less expensive method

for getting it done. Metal indicators work in light of the fact that ferrous metals are attractive though non-ferrous metals are not. The Indian startup, Jayashree Materials, has figured out how to extricate the filaments from non-ferrous PET bottles. These small fibers are then weaved together into a texture like fleece or cotton.

A rechargeable battery made with eggshells

A group of researchers at Thiagarajar College of Engineering (TCE), Madurai have developed an innovative technology that uses eggshells as electrodes for making a rechargeable battery. The new material can produce power with practically no antagonistic environmental impacts. It's not only cost-effective but also sustainable and eco-friendly compared to other technologies for generating power. The research group is pursuing reducing the cost of this alternative source of energy further with the goal that it becomes sustainable for day-to-day use.

3D model of the human body to diagnose diseases from Residence

As indicated by a new research directed by a team of medical science students at MIT School, Mumbai, a mobile application called Cellcontrol could distinguish cardiac ailments with an exactness rate higher than that of some other existing technologies. This innovative product can likewise follow changes in patients' heart frequency over the long term in any event when they approach their day-to-day everyday practice constantly being monitored by doctors and specialised machines.

A unique water-based cooling system for high-performance devices like PCs & laptops:

A team of researchers from Chennai has developed a straightforward cooling system that requires just water and some salt to work effectively. The eco-friendly device is cost-effective too, ensuring you don't need electricity to keep your device cool. It's a unique innovation that can reduce the amount of heat generated by high-performance electronic devices in an environmentally sustainable manner.

A robot for blood transfusion

Robots in clinics are certainly not another peculiarity yet what makes this medical wonder exceptional is its capacity to complete confounded medical procedures in basic conditions when there's deficient labor to physically get it done. Designed by

Sastra Advanced mechanics, the medical robot executed independent activities effectively during more than 1,000 simulated blood transfers without any mishap or human intervention. The point is to further develop innovative work capacities in India and make Healthcare more available for patients all over the planet.

3D-printed wheelchair with folding arms & rotating seats:

This 3D printed wheelchair is simple to transport or store, dissimilar to different wheelchairs that need large spaces to park them in. As per its makers - Sachin Tendulkar Foundation and IIT Bombay, the seat can likewise be easily folded into a compact size so patients don't have any difficulty in carrying it around with them.

A solar-powered boat that can carry 500 people at a time across rivers

Designed by specialists at MIT School of Engineering, the biggest solar-controlled boat on the planet can ship in excess of 500 travelers in one go. Intended to have two decks, this eco-accommodating vessel requires just daylight for power and creates carbon emissions during operation. The innovations are durable too – researchers claim they were able to run these boats continuously for five whole days during tests.

Eco Water Purifier

Frequently ignored issues influencing a large number of Indians - drinking water pollution with arsenic or fluoride prompts serious health concerns including loss of motion, kidney illness, and malignant growth. Scientists at IIT Roorkee have developed a low-cost answer for battling the pollution issue without introducing costly purification plants. The Eco Water Purifier has been tried for effectiveness and it requires just daylight to drive, dispensing with the requirement for power. This is one of the innovations being executed across India by IIT Bombay under its Ek Bharat Shrestha Bharat project.

A hand-held device that detects early signs of diabetes:

As per the WHO, over 422 million individuals experience the ill effects of diabetes overall and it's a significant reason to worry in India too. The glucose meter developed by Mumbai-based startup Prensense has been intended to make life simpler for patients by cautioning them about high glucose levels through an Android

application on their cell phones. This is one of the innovations being executed across India by IIT Bombay under its Ek Bharat Shrestha Bharat project.

Innovative water disinfection system using solar power:

One of the innovations being carried out across India by IIT Bombay under its Ek Bharat Shrestha Bharat project, this water sterilization system stops India's water woes that affect millions of people in rural areas. Conventional sterilization frameworks demand a ton of investment and money, yet this solar-powered solution makes it possible to purify large volumes of water at low cost and within two hours. It eliminates germs, works with quicker recuperation, and controls the spread of different illnesses like typhoid and cholera.

Talking electronic pillbox with audio reminder system:

One of the innovations being executed across India by IIT Bombay under its Ek Bharat Shrestha Bharat project, this innovative electronic pillbox assists Alzheimer's patients with following their day-to-day daily practice. The device has an audio reminder system to take medication at the right time and whether they have already taken medicine or not after every two hours.

Innovation policy governance in Malaysia

The main government ministries

The main government ministries involved in innovation are The Ministry of Science, Technology and Innovation (MOSTI) and the Ministry of Higher Education (MOHE) (Park and Kim, 2018). MOSTI spearheads the development of STI in the country. It oversees more than 20 departments, agencies, and companies clustered into five focus areas: biotechnology, information and communication technology (ICT) policy, industry, sea to space, and science and technology core (Day and Amran, 2011).

MOSTI provides most research grants through specialised schemes and established MASTIC to compile the national STI statistics and indicators. MOHE tries to lay out Malaysia as a hub of excellence for higher education. It plans to develop no less than 20 centres of excellence that are globally perceived for research output, copyright, publications, and research collaborations.

Public institutions

Publicly created institutions include the Malaysian Institute of Microelectronic Systems (MIMOS), which was set up in 1985 to support fundamental and applied research in microelectronics. In 1993, the Human Resource Development Council was laid out to address the absence of skilled human resources (Ambashi, 2020). The Malaysia Technology Development Corporation was shaped in 1992 to advance and popularize local research and to introduce new technologies from abroad. In 1993, the Malaysian Industry–Government Group for High Technology was framed to organize industry–government partnerships in high technology. The Small and Medium Industries Development Corporation (renamed the SME Corp) was likewise settled in 1996 to regulate the requirements of SMEs and to remember them for the initiatives.

Public research institutes contribute to innovation and technology diffusion, especially in agriculture, health, forestry, and electronics. In 2011, there were 29 public public research institutes, including statutory bodies, Cess-funded organisations, and a MOSTI-owned company; the rest were attached to ministries.

Public higher education institutions

Public research institutes assume an essential part in Malaysia's innovation system. In 2012, they provided 80% of the country's research personnel and accounted for 29% of its total R&D expenditure (OECD, 2016). Private universities, hampered by the lack of funding and specialised staff, have not yet contributed significantly to the NIS.

ICT

In 1997, the Multimedia Development Corporation, a government-owned organization, was shaped to create an attractive environment for Malaysian and global firms in the ICT industry. It also oversees MSC Malaysia (formerly the Multimedia Super Corridor), which offers offices facilities and tax reductions to firms situated in the multimedia corridor near the Kuala Lumpur International Airport.

Several science parks have been set up the nation over. These include the Kulim High Tech Park in 1993, focusing on high-tech production, and Innovation Park Malaysia in 1996, which is designated more towards Research and innovation-based institutions. The third-biggest park is the ICT-centered group of Cyberjaya - situated inside MSC Malaysia - which has drawn in MNCs like Dell, Hewlett Packard, Motorola, and Ericsson.

The innovation of ICT in Malaysia, particularly in the manufacturing sector, has been additionally supported by government-enacted policies, for example, 'Industry4WRD', a public policy that expects to change the manufacturing sector and related services inside the era from 2018 to 2025 (Spotlight on business, 2020).

Innovation in Agriculture

The Malaysian Agricultural Research and Development Institute, the Malaysian Palm Oil Board, the Malaysian Rubber Board, the Malaysian Cocoa Board, and the Forest Research Institute Malaysia are key public research institutes in the primary commodities sector.

Innovation of MNC's representations

In the business sector, a few MNCs are leading high-end R&D. They are principally the electronics industry and include Intel, Motorola, Hewlett Packard, and Altera, which have all moved from labour-intensive assembly to R&D activities, including design and product development. In addition, numerous projects aimed at fostering high-tech clusters have been established.

Among the government-connected institutions, Petronas is by a long shot the biggest and most popular. Other than taking part in intense R&D activities in the oil and gas industry, it likewise assumes sectors of health for supporting domestic R&D.

Malaysian Global Innovation and Creativity Center (MaGIC)

MaGIC finds and engages innovation new businesses and social pioneers through imagination, innovation and technology adoption, and develops an economical business environment in Malaysia. Since its beginning in 2014, MaGIC has provided its community of new companies, investors, and environment players with capacity

building programmes, market & funding opportunities and regulatory assistance that impacted more than 100,000 aspiring and seasoned entrepreneurs.

MOSTI, MaGIC works with, explores, and empowers the environment with the mission of reinforcing Malaysia's situation as an arising innovation country.

Herewith are some innovative companies supported by MAGIC:

ERTH, beginning around 2016, has effectively collected and recycled more than 200 tons of e-waste, diverting them from landfills. This reduces leakage of toxic materials and wastage of precious materials in landfills.

OA Organik collaborated with more than 36 Orang Asli Organic farmers, assisting with elevating their livelihoods by giving capital; education, innovation, and advertising support bringing about income for the community.

Pinkcollar has impacted at least 80 migrant workers in the past and plans to improve work maintenance of underestimated communities, like the Orang Asli of Peninsular Malaysia, to assist with supporting their livelihood.

Goodkids has influenced in excess of 500 adolescents in danger from marginalized communities by utilizing performing expressions to build their confidence.

Aerodyne is a high-level knowledge system involving delivery drones and precision agriculture solutions for spraying fertilisers, counting trees and mapping.

Poladrone is the main high-accuracy agribusiness showering drone - Oryctes, will be dedicated to control rhinoceros beetle outbreaks.

BrainTree is an AI-enabled robots will help automate farming practices with seeder bots for cultivation, harvest bots for speedier harvesting, and sprayer bots for crop protection.

Nanoezzin is a potent antifungal nanodelivery system based on nanotechnology, will help treat the Ganoderma boninense disease that attacks oil palm.

Ofotec solution: this GIS National Asset Management System, uses drones for data acquisition and IR4.0 technologies to facilitate better crop management

Farm Assist Robots for Multi Operation (FARMO) is an amulti-terrain robots to automate deployment of pesticides and fertilisers.

Ethovent Ventilator is an easily scalable semi-ventilator to assist patients with breathing difficulties

MCK19 is a delivery and disinfectant robots to aid the country's battle against COVID-19

ORYCTES is a smart agriculture using drone technology in the agriculture sector

Robotic Arm Rehabilitation is a robotic Arms used to assist the rehabilitation of stroke patients

Industrial Linear Robots is a linear pick-and-place robots to increase productivity, efficiency and product quality

After eight purposeful years, MaGIC has converged with Technology Park Malaysia (TPM) in 2022 to form the Malaysian Research Accelerator for Technology and Innovation, MRANTI (My.Magic, 2022).

MRANTI is a one-stop place for pioneers and tech business visionaries to find resources, funding, advice and facilities in Malaysia in their quest to commercialise their solutions. The objective: Impact 5,000 technopreneurs, and 1,250 owners with the result of RM500 million value production in 2022, supporting them with programs, institutions, park systems, and offices, training and tutoring, market access, as well as information trade services.

MRANTI is likewise setting down plans for the primary Artificial Intelligence (AI) Park in Malaysia. Various facilities, including a 5G development hub, sustainable urban farming incubation facility, biotechnology incubation hub, an AV and Robotics Hub, will be developed within the AI Park.

Innovation Policy Governance in Thailand

The Ministry of Science, Technology (MST) is responsible for formulating national policy on science, technology, environment, and energy and implementing these policies (Park and Kim, 2018).

To push the Thai industry forward and keep it cutthroat, the government has formally endorsed the Thailand 4.0 drive (thaiembdc site).

Thailand 4.0 is an economic model that means to unlock the country from several economic challenges because of past economic models which put accentuation on agriculture (Thailand 1.0), light industry (Thailand 2.0), and advanced industry (Thailand 3.0). These challenges include “a middle income trap”, “an inequality trap”, and “an imbalanced trap”.

The manufacturing industry has driven the way in digital transformation and adopting IoT. Significant producers like UAC Global, Unitech Co. Ltd, Royal Universal, and AAPICO Hitech Public Company have conveyed IoT to improve the proficiency of the manufacturing system and cut maintenance costs.

With regards to Thailand 4.0's accentuation on the utilization of digital technologies to spur national economic growth and development, the Thai government is exploring the possibility of involving blockchain to create value-adding services for mainstream industries. Blockchain technology has proliferated in a number of traditional industries outside of the cryptocurrency space in Thailand.

In August 2017, Thailand Post presented the utilization of blockchain for its sorting, shipping, and delivery processes, to upgrade functional effectiveness. In the meantime, the Electronic Transactions Development Agency (ETDA) has marked a Memorandum of Understanding (MoU) with the local blockchain start-up Omise Co., Ltd. to build a national electronic Know-Your-Customer (e-KYC) platform, as part of the ETDA's Digital Identity project.

In October 2019, the Ministry of Commerce of Thailand declared that it was investigating the utilization of blockchain in the sp areas of copyright, agriculture, and trade finance to support the country's validity terms of intellectual property. Around a

similar time, the Ministry of Finance reported that it was wanting to involve blockchain to follow track tax payments for the purpose of detecting tax fraud.

Robotic Process Automation (RPA) is the automation of manual tasks that are time consuming, rule-driven, repetitive, and prone to human error. RPA in Thailand can prompt new projects across enterprises as institutions mechanize their processes to improve cost proficiency and efficiency.

The sectors which most use RPA are banking and insurance, manufacturing, services, energy, and food and drink.

The pro-innovation policy framework in Viet Nam

Legal framework supporting innovation

During 1987-1995, Viet Nam had another lawful structure for science and technology(S&T) based improvement (Ambashi, 2020). The state monopoly on S&T activities was progressively taken out, R&D organisations were allowed to enter into contractual relationships with individuals and non-state actors, and basic regulations on technology transfer were implemented.

During 1996-2010, the S&T system was rebuilt and the state of the board of S&T was updated. Research centres were laid out under partnerships to strengthen links between S&T and production. Relations between public research institutions and enterprises started to come to fruition in 2004 and 2005, and new innovation infrastructure was initiated such as the Hoa Lac Hi-tech Park and, later, the Saigon Hi-tech Park.

The Law on Science and Technology (2003), the Law on Technology Transfer (2006), and the Law on High Technology (2008) reinforced the legitimate structure for the involvement of foreign investors and hi-tech activities ranging from manufacturing and production to education and training.

In accordance with this course, the Law on Standards and Technical Regulation was voted in 2007 fully intent on adjusting public standards to worldwide norms. The

Intellectual Property Law was revised in 2005 and 2009, making a sound reason for Viet Nam's coordination into the international innovation system. The government's institutional ability was reinforced by the the creation of the National Council for Science and Technology Policy in 1997, the Viet Nam Science and Technology Evaluation Centre in 2006, and the National Agency for Technology Entrepreneurship and Commercialization in 2011.

The revision of the Law on Science and Technology in 2013 consolidated critical upgrades, for example, expanding the rights of S&T organisations to do business, promoting the development of the S&T market; reserving incentives for S&T enterprises in hi-tech fields.

The Vietnam National Innovation Center (NIC)

NIC has three departments:

the Ecosystem Development Department uphold and develop the startup and innovation ecosystem, including the government; science and innovation institutions and institutes; banks and investors; corporates; new businesses; incubators and accelerators.

NIC fills in as the key motor that is qualified to catalyst innovation with special mechanisms and policies to support the Vietnam startup ecosystem (NIC, 2020).

The Enterprise Support Department upholds and creates inventive projects, people, and institutions' innovative projects.

The Human Resource Development Department develops national innovation human resources, plan programs to prepare and retrain people and institutions on business and innovation; deals with the NIC's scholarship, and selects beneficiaries.

Do Ventures

Do Ventures is a beginning-phase funding firm that spotlights on making investment in information technology companies in Vietnam and Southeast Asia. Entrepreneurs who are willing to accomplish other things will tend to make more right decisions and outpace the competition. Do Ventures is centred on supporting outstanding

entrepreneurs to accomplish their vision and build disruptive, high-impact technology-based startups.

Hi-Tech Parks

Vietnam laid out its most memorable super-advanced park, Hoa Lac Hi-Tech Park, in Hanoi in 1998, trailed by Saigon Hi-Tech Park in Ho Chi Minh City in 2002 (tilleke site). To push the improvement of science and technology in the Central region, a third Hi-Tech Park was laid out in Da Nang in 2010. Recently, the government of Vietnam gave Declaration No. 04/2018/ND-CP on incentive regulations and policies for Da Nang Hi-Tech Park, which took effect on February 20, 2018.

At present, 10 projects are working in Da Nang Hi-Tech Park, three of which are Japanese entirely contributed activities and seven of which are projects of local investors.

Intel activities in Vietnam'

Intel has been a part of Vietnam's business and innovation community for over 10 years (Intel Vietnam site). Beginning around 1997, the company cooperated with the Vietnam government to further develop the country's innovation infrastructure and reinforce its school systems. Intel opened its activities in Ho Chi Minh City in 1997, followed with one more office in Hanoi in 2008. The continuous responsibility and commitment to IT improvement in Vietnam procured Intel recognition from the Ministry of Post and Telecommunications in 2007 during Intel Vietnam's tenth commemoration. In November 2006, Intel declared a project of US\$1 billion into a chip assembly and testing facility in Vietnam. Intel's move was the very first interest in chip fabricating in the nation and addressed the biggest interest in Vietnam from an American company to date. The new office is supposed to make create several thousand new jobs and generate significant export revenue annually for Vietnam once production is fully in operation .

Regional innovation initiatives in Bandung, Indonesia

There are a few Indonesian urban communities wherein the regional legislatures have laid out a conducive ecosystem for invigorating innovation and started powerful

projects to work with broad data streams among innovation actors. One of only a handful of exceptional fruitful instances of such regional-level innovation projects is Bandung, the capital city of West Java Territory.

Innovation initiatives in Bandung include the Bandung Creative Hub, start-up incubators, Bandung Creative City Forum, the Creative Tourism Village, Bandung Digital Valley, the Little Bandung Initiative, the Bandung Creative Center, Bandung Technopark, the New Entrepreneurs Program and Bandung Technopolis. Such initiatives have been fruitful in delivering innovation and creating business projects with the local community. Bandung has innovation resources, particularly universities, for example, Bandung Institute of Technology, Telkom Institute of Technology, and Padjadjaran University. The Bandung city government consistently welcomed MNEs with trend-setting innovation to team up with regional universities or communities, making significant channels knowledge diffusion at the local level. Residents are engaged to create innovation, and genuine dispersion happens. Innovation led to the improvement of the handiwork industry through the expansion of innovation developed by designing students from Bandung University.

The Rwanda Innovation Challenge

The National Research and Innovation Fund (NRIF) has laid out the Rwanda Innovation Challenge program to help 36 innovation projects from youth, researchers, scientists, and business visionaries (NCST). This program began carrying out the incubation services in December 2020 and has a time of one year (ncst.gov.rw/rwanda-innovation-challenge site). The incubation services are provided to grantees by Leap applied research labs and PRC Kigali private consulting company.

Rwanda innovation challenges for academia–industry research and innovation collaboration grant scheme grants.

[An e-Mental Healthcare Architecture as an Innovative Solution to Promote an Alternative and Conventional Support in Rwanda \(e-Ruhuka\), Vincent Sezibera](#)

The aim is to design an innovative and cost-effective e-mental health platform (e-Ruhuka), that will uphold mental health service delivery conveyance, and advance mental wellness proficiency through online psychoeducation in Rwanda.

Lithium-ion Battery Direct Cathode Recycling and Battery Cell Manufacturing, Leandre Berwa

The project is to pioneer battery direct recycling in Rwanda and show the first of its sort, completely recycled and made-in-Rwanda battery cells.

Biodiversity, Beers, Bitters, Beverages, and a Bag of Crisps (5Bs Products), Elias Bizuru

The project aims to valorize Rwanda's regional biodiversity through the production of new commercially competitive food and beverages improved with fragrances/smell and fermentation sources from indigenous plant species making novel "Made in Rwanda" products.

IoT-AI Based Environment and Quality Monitoring System for Agricultural Value Chains (ICQMSA). Case study of Cassava Value Chain”, Florence Uwamahoro

The project means to apply IoT and AI in the Cassava value chain since cassava is a root crop that is broadly consumed in Rwanda and sub-Saharan Africa overall. This project has the primary target of establishing a new low-cost device that associates the IoT and AI based Climate and Quality Monitoring System for Agriculture (ICQMSA) in order to provide an ICT-based solution for cassava value chain.

An Infrastructure for Remote and In-Situ Collection and Aggregation of Agricultural Data and Its Application to Yield Estimation Principal Investigator, Moise Busogi

The project is to develop an Open Geospatial Data Platform (OGDP), hosted at Rwanda Space Agency (RSA), to empower multi-source geospatial information democratization to improve farming results.

Improved solar water heater adaptive to Rwandan weather conditions, Esdras Nshimyumuremyi

This project expects to expand the diffusion of solar water heaters and develop the green manufacturing industry by designing and fabricating cost-effective SWHs using local materials. The results of this project are the production of new prototypes of High efficiency and cost-effective SWH system locally made.

Improving food security through the production and value addition of quality tomatoes, Didace Ndahimana

The ongoing policy for tomato production is wasteful in terms of seeds used and agricultural practices. Over half of the produced tomatoes in the nation are lost along the value chain. There is a need to diminish losses of tomatoes and increment the value of tomatoes through processing which will also extend the shelf life. In this circumstance, the University of Rwanda (UR) has formed a partnership with AFRINET Ltd to create and execute a research project on the progress of tomato production and value expansion in Rwanda. This exploration project will establish new technology related to the integration of bio-fertilizers and animal-derived manure from the local farming.

Design and Performance Analysis of the Candela Model 1 A Novel Electricity Generating Biomass Cook-stove, Celine Umurenzi

CANDELA Tech Ltd has formed a consortium with the University of Rwanda, and renowned experts. The motivation behind the project is doing a broad innovative improve Candela Model 1-A novel Electricity Generating Biomass Cook-stove. The ovens are developed at CANDELA TECH Ltd premises and tests led in UR labs.

Enhancement of the processing and standardization techniques towards the production of certified phytomedicines and food supplements in response to critical health needs in Rwanda, Andre Ndagijimana

The goal of this project is to standardize the production process of chosen and trust value phytomedicines delivered by IRST and food supplements for them to satisfy global standards. The models of three phytomedicines (Batankor, Rusendina, Tembembe), an Aloe vera-based food supplement, and Lippia tea will be delivered consistence with worldwide standards.

Retrofitting of Fossil motor processes to Electric Motorprocesses, Abaho G
GersResidence.

This proposed project expects to control transport air emissions starting with retrofitting Internal Combustion Engine (ICE) motorcycles in the taxi business as one of the significant wellsprings of air contamination in Rwanda, especially in Kigali. The execution of the project will carry solutions for the air quality degradation and soil and water pollution caused by the discharge of used engine oils during the maintenance.

Excellent Research Grant

Breast cancer molecular subtypes status and epigenetic indicators in Rwandan populace, Clarisse Musanabaganwa.

Health Determinants for major nontransmittable sicknesses among individuals living with HIV in Rwanda Clementine

Appraisal of hydro-meteorological dangers and related take a chance for the urban and rural populace, Deogratias Nahayo

Appraisal of pesticides deposits on new tomatoes in the production network in Rwanda, Anastase Harelimana

Phytochemistry and antibacterial research of medicinal plants in Rwanda, François Niyonzima

Characteristics, Dietary Patterns and their Association with Clinical Subtypes of Preterm in Rwanda, Erigene Rutayisire

Enhancement of Production Technologies Quality and Competitiveness of Rwandan Banana Beverage Products, Grace Irakiza

Prediction and Classification of Heart Failure in Rwanda Using Hybrid Machine Learning Algorithm , Théogène Rizinde

Immunity to Hypatitis B Virus (HBV) Infection 17 years after Implementation of Universal Infant HBV Vaccination in Rwanda, Emmanuel K. Rusingiza.

Sustainable Health Changes in in theory and practice improving the control of WASH related sicknesses and vulnerability conditions in Rwanda, Elias Nyandwi

Remote Detecting based monitoring of water efficiency in smallholder plant horticultural farming systems of Rwanda utilizing WAPOR Model, Adrie Mukashema

Women in science research and innovation grant scheme grant

Telegenetics and Genomic Nesting in Rwandan Patients with Neuroinnovational Problems (TELEGERNE), Annette Uwineza

Design, Fabrication and Testing of Solar Powered Induction Cooker, Delphine Abijuru

IoT Empowered Precision Agricultural Techniques for Improved Rice Production: An Automated Irrigation and Fertilization Application System for Small-scale Rice Producers in Rwanda, Peace Bamurigire,

Design and Construction of Efficient and Cost-Effective Solar Dryers for Low and medium-size farmers and food processing enterprises in Rwanda, Mukeshimana Annoncée.

Improving indigenous chicken productivity for enhanced livelihood and food security among the resources limited household in Rwanda, Claire D' Andre Hirwa.

The AgriFI Kenya Challenge Fund

The AgriFI Kenya Challenge Fund is a European Union's drive to help useful and market-incorporated smallholder farming through the provision of financial support worth EUR 18,000,000 to agri- enterprises (agrifichallengefund.org). AgriFI means to improve the capacity of smallholder farmers/pastoralists to practice environmentally sustainable and climate-smart agriculture as a business in inclusive value chains.

The Challenge Fund is funded by the European Union and co-funded by SlovakAid. The European Investment Bank (EIB) - under the AgriFI Kenya program - is giving long term local currency financing to Equity Bank (Kenya) Limited for on-lending to eligible food and agriculture sector projects. **Match** financing is likewise accessible for fruitful candidates. Self Help Africa and Imani Development Limited are the Challenge Fund Managers.

Premier Food Industries Ltd (PFIL)

PFIL is a main food processing company in Kenya, producing more than 50 products including sauces, juices and jams for the local and regional markets.

AgriFI permits PFIL to source produce straightforwardly from 1300 farmers in five Counties; Tana Waterway, Kwale, Lamu, Machakos, and Makueni. The Project upholds PFIL to secure a reliable supply of high quality mangoes at a time of rising demand yet gradual decline in supply of the fruit. They help secure and support the company's raw material supply, empower new plantings of mango trees and will promote climate smart practice.

The eco-bricks project was officially launched on the eighteenth of September 2020 on World Clean Up day. Up to this point, over 750 Eco-bricks have been made and the process is progressing (peptang site).

In 2021, the PFL sustainability team partnered with Frigoken Limited and Miti alliance for an eco-brick course at Gikambura elementary school and Ruaraka secondary school. They demarcated the school's tree nurseries and flower beds using eco-bricks.

As indicated by the champions, the eco-bricks can be utilized as building blocks to make walls, benches and even houses.

Waste management is a key element for PFL, other than eco-bricks recycling the company has acquainted different initiatives with guarantee they lessen waste developing from the industrial facility. They have additionally joined forces with the Kenyan PET Recycling Company (PETCO) to guarantee that this endeavor yield fruits.

The eco-bricks team, normally referred to as eco-bricks champions have deliberately devoted their extra energy to making eco-bricks as a recycling policy to promote waste management and reduce the burden on landfill. They are additionally upheld by the company's sustainability team.

Prior to making the eco-bricks, they collect PFL's tetra packs, recycled plastic bottles and plastic wastes. After the collection, the team goes on to clean every one of the plastic materials they have collected and dry them prior to embarking on the eco-bricking-making process.

The eco-bricking-making process includes making pet plastic bottles densely stuffed with clean and non-recyclable plastics.

All you want is spotless plastic material, clean empty plastic bottles, a wooden stick to assist you with filling the bottle, and some scissors to assist with cutting the plastic material.

PFL has eco-brick store in the company. The tam collects the plastic waste three times each week and they make the eco-bricks every day. They likewise acknowledge eco-blocks made by individuals around the community.

Coconut Holdings Limited (CHL)

CHL was established in Kenya in 2015 to own and operate two existing coconut processing operations on the Kenyan coast: KenSIP Products Limited and Kwale Coconut Processors Limited. Coconut Holdings Limited sells KenSIP branded and packaged coconut milk, coconut cream, coconut oil, and desiccated coconut to the local retail market.

Coconut Holdings received financial support of €329,540 from the AgriFI Kenya Challenge Fund in the first call for applications and has matched these funds with €354,740. This funding helped the company address sectoral challenges such as erratic and seasonal adaptations in pricing, reliance on traditional agronomic

practices, and dwindling coconut yields. 18000 planters are supported by this program. With the diversification, acquire over 670 acres of Organic coconut estates in the Coconut Triangle of Sri Lanka. Having registered over 4,000 acres of Organic coconut estates as suppliers to our factory is one of the strengths they have.

Coco House specializes in Organic Virgin Coconut Oil (VCO) manufacturing and selling in local and foreign markets. The company manufactures VCO for private labels as well. Coco House has a state-of-the-art production facility in Dankotuwa that is fully automated to enhance efficiency.

SunCulture

SunCulture produces and distributes solar irrigation equipment that allows off-grid smallholder farmers to operate more efficiently and reliably.

SunCulture's smart solar irrigation systems empower farmers to transition to higher-value crops. By giving producers high quality solar irrigation technology, complemented by customised information services and pay-as-you-grow financing, AgriFI allows smallholder farmers to access profitable new fruit and vegetable value chains. 10000 smallholders are supported by this program.

SunCulture offers solutions tailored to smallholder farmers, combining technology with pay-as-you-go (PAYG) financing and value-add services (Jackson, 2020). SunCulture right now arrives at clients across Kenya, Ethiopia, Uganda, Zambia, Senegal, Togo, and Ivory Coast.

The US\$14 million Series A round was led by Energy Access Ventures (EAV), a past investor in SunCulture, and joined by Électricité de France (EDF), which likewise supported the organization last year and in 2018. Acumen Capital Partners (ACP) and Dream Project Incubators (DPI) complete the investor program.

With these Funds, SunCulture is in a situation to speed up direct deals in Kenya, keep on extending globally, and reserve existing product enhancements and new product innovation.

Olivado EPZ Ltd (OEPZ)

OEPZ is one of the world's biggest providers of organic fair trade avocado oil. The organization makes a scope of cold squeezed additional virgin oils and regular cooking oils for the edible and cosmetic oil international markets. Olivado works as social enterprise integrating small scale farmers into international value chains for fresh avocado, edible and cosmetic grade oils.

The company integrates mango processing into its established avocado business, giving a solid market to mango farmers and assisting with decreasing post-harvest losses amongst smallholders in the sector. Olivado's Market Focus Study for Mango and Avocado Powders is a Technical Assistance (TA) project aiming to develop a market in the United Kingdom (UK) and France for Olivado's main products in particular for its mango and avocado powders.

This TA is permitting them to work with a methodology specialist that will help with economic demonstrating, field-tested policy and coordinate correspondence, robotization, and study frameworks that will empower Olivado to expand their proficiency and guarantee better consumer loyalty to their farmers while giving them more revenues. Olivado's main goal is to develop quality products with the premise being supporting smallholder farmers while encouraging an environment where environmental movement can flourish. Olivado effectively runs a Fair-Exchange organic out-producer plot for 1,500 smallholder farmers in Kenya, the greater part of them are women.

Ndumberi Dairy Farmers Cooperative

Ndumberi Dairy Farmers Cooperative is a member-owned dairy cooperative on the outskirts of Kiambu town in Ndumberi Township. The cooperative has been operating for over 50 years.

With AgriFI support Ndumberi Dairy upholds the expansion in milk production and provides a steady market for raw milk at competitive prices. 1300 farmers partake in this program.

Ndumberi Dairy Farmers Co-operative Ltd (NDFCS) is centered on expanding the return around their farmers through a better milk price. This will be accomplished through proficient processes and expanded market distribution with more value-added products with better margins. Optimal utilization of installed machine capacity and enhanced sales and marketing hold the key to the desired goal of more cash going to the farmers, who are members of the Society.

Gum Arabic domain

Sam Nyamboga had experienced childhood in Kajiado, an ASAL region just south of Nairobi. Acacia trees that overflow a sustainable tacky fluid are a typical sight in dry regions. Heading back home from school Sam would see this fluid dried into the gum and with his peers. It was when Sam operated in Germany that he understood the economic value of this gum, Gum Arabic. Thusly, he applied to the AgriFI Fund and when selected for a grant, he ramped up the operations and output of his company Acacia EPZ Ltd.

This gum is utilized as a stabilizer, emulsifier, and thickening agent in food varieties and refreshments as different as icing, confectionary, soda, beer, cough drops and lozenges. It is likewise utilized in the pharmaceutical industry as a suspending and emulsifying agent for shampoos and syrups; in the adhesive industry to make glue; in the paint industry to increase viscosity; and in the printing industry to prevent oxidation of plates.

He connected with the Forest Research Institute to find out more and with their direction, he set up his business in 2015 - Acacia EPZ Ltd - which sources, processes, analyses and exports Gum Arabic to the European market.

At the point when Sam learned of a call for business proposals to the AgriFI Kenya Challenge Fund, which is financed by the European Union and SlovakAid, he applied and won a grant of EUR 749,155, which he has coordinated with EUR 752,999.

With the support of AgriFI, Acacia EPZ is executing a two-year project to smooth out the Gum Arabic value chain in five Kenyan counties. Sam's company has established two county warehouse facilities for primary processing and 19 mobile collection hubs. Acacia EPZ has trained 2,566 collectors, mostly women, to collect and store the gum and provided them with tools to prevent injuries. EPZ produces and sells out 200 tons of gum Arabic every year, against a potential of 12,000 tons in the country. As of October 2021, Acacia EPZ has sent out more than 500 tons and is monitoring multiplying this in the approaching year.

Lake View Fisheries Ltd Grantee

Lake View Fisheries (LVF) specialises in breeding tilapia represents considerable authority in rearing tilapia and developed an improved variety of tilapia which becomes both bigger and grow quicker (Agrifi). The company presently supplies aquaculture inputs , including their mono-sex fingerlings, to 600 fish farmers in the region. With help from AgriFI subsidizing, LVF has laid out a cage farming demonstration site where it desires to train lead farmers on on the management and production of cage aquaculture, in addition to the benefits of climate smart agriculture (CSA). With help from AgriFI, the project plans to integrate over 1,000 cage fish farmers into LVF's outgrower scheme, train 600 cage fish farmers, set up cold storage facilities at farmer group locations, and to carry out environmental assessments and acquire environmental compliance licenses

South Africa technology stations program

The innovation stations program is a network of technology stations facilitated at higher education institutions in South Africa. Herewith are the fundamental activities of the two stations.

Limpopo^P_{SEP} agro-food technology station(LATS)

LATS was laid out in 2007 and officially launched in 2008 at the University of Limpopo (ul site). The Station was an initiative of the Department of Science and Technology (DST) through the Tshumisano Trust to improve agro processing services in Limpopo Province. The station is currently under Technology Innovation Agency (TIA).

The advantages of agro processing include among others, a decrease in yield and fruit wastage, an upgrade of food security, and an improvement of livelihoods for low-income groups in the rural regions in the Territory.

The station is intended to guarantee that there is food processing data accessible, particularly to individuals living in rural areas of the Limpopo Region.

Its essential partners are the Limpopo Department of Agriculture (LAD) and Limpopo Department Economic Development, Environment & Tourism (LEDET). LATS offers its services to SMEs, Agricultural co-operatives and Food Industries to assist them with meeting the public and worldwide product market requirements.

LATS financed by TIA (tia program site) SMEs, industries and universities to develop an empowered supporting processing innovation for global competitiveness.

The African Medications Stage (agbiz site) has developed projects in HIV/Helps, TB, Diabetes, Malaria, Cosmetics, Nutrition, Moringa, Honeybush, Haw-Haw, Amaranthus, IK-Based Commercialisation and Nutri-veg drink.

Herewith are some of those projects:

Eucalyptus Genome project – providing cost savings to industry (up.ac.za eucalyptus site)

The goal is to identify genes associated with growth and woody biomass production in these trees. During the time spent growing the trees is eliminated carbon dioxide from the environment. They store this carbon as a sustainable unrefined substance (wood) that provides an alternative for fossil carbon products, including bioenergy and a large number of biomaterial and biochemical products (construction wood, pulp, paper, cellulose, textiles, pharmaceuticals and food additives). Understanding

the genomes of these trees is fundamental for creating future woody biomass crops, which will be the feedstocks of the bio-based economy.

Xsit – providing additional income to the citrus industry (xsit site):

X Sterile Insect Method (Pty) Ltd provides successful, harmless ecosystem control of *Thaumatotibia leucorrea* or Bogus Codling Moth (FCM) in citrus, table grapes, stone leafy foods other varieties, diminishing FCM to help YOU – whether you are the producer, pack house, packer, exporter, importer, client or just benefitting from a healthier, lower pesticide environment.

Umbiflow – providing for better maternal healthcare (up.ac.za maternal site)

The identification and counteraction of embryos in danger of stillbirth, explicitly, those not recognized by conventional methods utilizing a continuous-wave Doppler ultrasound, an Umbiflow. A pilot concentrate has been laid out in 9 sites in South Africa. The project has been stretched out to 5 African nations as Umbiflow worldwide.

development of Umbiflow was funded by the Council for Scientific Research (CSIR) and The South African Medical Research Council (SAMRC). It is likewise the consequence of fruitful cooperation between the Gauteng, Western Cape, and the National Departments of Health.

An underlying review led by SAMRC and the University of Pretoria's Maternal and Infant Health Care Strategies Unit in Mamelodi, Pretoria, uncovered that the device decreased the perinatal death rate in the review group by more than half when contrasted with the control group.

mTriage – better emergency care

In 2004, the South African Triage Group (SATG) was convened under the auspices of the joint Division of Emergency Medicine at the Universities of Cape Town and Stellenbosch.

The objective of the SATG was to deliver a triage scale for use all through South Africa. The group was multi-disciplinary and contained specialists, medical

attendants, and paramedics. The result of the SATG's activities is the South African Triage Scale (SATS), a physiology and side effect-based scale that points on into one of four colours and can be utilized in hospital Emergency Centres as well as in the pre-hospital setting. The SATS has been approved in general society, private medical care settings as well as pre-emergency clinics.

Medical plants (anti-acne, anti-eczema, anti-wrinkle, antiaging, skin toner, moisturisers and sun-screens) are prepared for early commercialization in view of concentrates, for example, Shea spread reinforces and recovers skin by improving collagen production, Baobab oil skin moisturizer retains rapidly into the skin without stopping up pores, Marula oil (tones and hydrates the skin and minimizes wrinkles), Buchu plant, Buchu plant (a diuretic and for a wide range of conditions including stomach aches, rheumatism, bladder and kidney infections and coughs and colds, Resurrection plant for asthma and pains, Mongongo oil a natural vitamin E (tocopherol), powerful and effective dermal regenerator. natural moisturiser for your hair and skin, Mafura margarine with antimicrobial and anti-inflammatory properties (formulabotanica site).

Technology Station in Rural Sustainable Innovation (TSRSD)

TSRSD is situated at Upington in the Northern Cape. The Station is subsidiary to the Vaal University of Technology (VUT) Sebokeng's campus. It is a part of the VUT's Technology Transfer and Innovation Directorate. As such, it is supported by an Enterprise Development Unit (EDU); Iscor Innovation Centre (IIC); Engineering Manufacturing Centre (EMC) and Institute for Chemical and Biotechnology at the Sebokeng Campus. TSRSD offers two kinds of counseling and training services. The first type concentrates on product development and the improvement of product knowledge and skills. The second type is focused on process improvement and the improvement of process knowledge and skills. The objective is to make a sustainable station, which can be utilized to expand the applied research base of VUT, build research and innovation capacity, facilitate technology transfer skills to the Upington community—including commerce, industry, agriculture, rural/urban and informal community settlements.

Youth technology innovation programme (YTIP)

YTIP's job is to expand the support of young people in the economy by giving financing to innovation of techno-enterprises (tiaprogramme site).

The program is centred on financing and supporting youth, between the ages of 18-30, who have innovative thoughts that can lay out new businesses.

Fund development of innovative ideas, enable access to infrastructure and services, mentoring and incubation, to support development and speed up commercialization.

Herewith some of the projects.

Filter device for household water and wastewater purification

An installation of an ntegrated low-tech Phytocoagulant-sand filter device for household water and waste water purification akin to rural communities in Africa, utilizing bacterial culture tests, total solids, and turbidity among others is introduced (Yongabi Anchang, 2019). The exhibit utilizing 100 liters of extremely turbid water (130.3 NTU) was pretreated with 100 seeds of moringa oleifera and further separated through a sand filter drum (120 liters conveying limit) made of fine, coarse sand, charcoal, and gravel. The mean total aerobic mesophilic bacterial counts, E coli, coliform, pseudomonas, and yeast counts, as well as turbidity of untreated water, diminished to WHO satisfactory norms for drinking water. The outcomes showed that the mean values of similar parameters for sand filtered pond water alone was significantly lower than the corresponding mean values obtained for Moringa oleifera treated pond water. From the findings of this study moved on to build capacities for communities in North West Region of Cameroon, through training at the Cathedral Parish, Big Mankon, Bamenda with more than a hundred participants. Four household water filters were installed during the trainings and have been in used for the past 6 years.

LANDPKS Mobile App

Nyambane A. and Ozor N.Alfred have developed the LANDPKS Mobile App as a Tool for Bridging Climate Information Gaps for Improved Agricultural Productivity,

Land Use Planning and Climate Change Resilience - African Technology Policy Studies Network (ATPS)

LandPKS is freely accessible and provides instantaneous climate and soil information by use of a smartphone. This device has been utilized in different nations by farmers, extension agents, land use planners and policy makers.

Dietary Phospholipids on Performance of Fish Larvae

Hafez Abdel Hamid Hassan Mabrouk the role and functions of dietary Phospholipids on Performance of Fish Larvae..

Phospholipid is a general term that incorporates all lipids containing phosphorus, it plays an important role in broodstock spawning, egg, in-turn larval and juvenile quality in marine fish hatcheries. It is an important functional dietary component required for optimal growth, survival, prevention of skeletal deformities and, stress resistance in marine fish larvae and early juvenile. Dietary phospholipids are not suggested in fish greater than 5 g. at least for salmon and white sturgeon, and recommended levels for marine fish larvae range between 2-12% according to fish species; larvae initial size; feeding period; dietary phospholipid mixture and source, preparation method; basal lipid level, class and fatty acids profile; taking into consideration that quantitative requirements decreasing with larval development.

The Technology Innovation Agency (TIA) innovation programme, South Africa

The Technology Innovation Agency (TIA) is a public institution in South Africa that fills in as the critical institutional intervention to link between research and development from higher education institutions, science councils, public entities, and private sector, and commercialisation (tia site) .

TIA was laid out in 2010 and has a public reach with workplaces in KwaZulu Natal, Western Cape, and Gauteng. The central purpose of TIA is to subsidize and support innovative technologies that demonstrate the potential to be popularized. The association likewise has programs that offer non-financing help to pioneers and SMMEs. TIA is a catalyst and enabler of innovation through various partnership initiatives locally, in the African continent and globally.

TIA funds and helps grassroots innovators in the innovation and production of fully functional prototypes of product innovations respond to social challenges (2fundforgnos site). TIA supports skills training and business improvement incubation and mentorship, specific equipment, presentation of evidence of idea where a practical business case can be illustrated, registration of new enterprises and registration of intellectual property rights, copyright and trademark protection, and licensing. Herewith introduced a part of the proposed innovations project (PMG, 2022).

SmartVein Transport Solution

Street Governor is a transport intelligence system designed to help stabilise the minibus taxi industry. This is accomplished by giving a group of choice help devices to different partners that make the matter of the taxi business work. The system narrow the trust deficit by improving transparency, accountability, and profitability.

Mpumalanga Art Exposure Online Fund

An online art store that sells genuine hand-tailored craftsmanship locally made by native people living adjacent to the parks. The specialties are impacted by the styles and cultures of the people, making them original and limited-edition art crafts.

Credit Peak/Builder

Credit Peak/Builder is the first cellphone mobile wallet in South Africa that can assist you with building credit, earn rewards points and access greater financial inclusion. Every month, Credit Peak adds up all your purchases and payments and reports registered to a credit bureau to build your credit score.

24/7 Printing Station

24/7 Printing Station is an easy to understand and self-serviced print, copy, fax, email, examine, mobile composing, published storage, and internet services paid via a virtual account, vouchers, or cash. The service is open at the closest urban workplaces, municipal offices, post offices, police stations, community centres, libraries, schools, and shopping centres.

ERS Tech

ERS Tech is An end-to-end Business Intelligence (BI) driven Fleet Management Solution. BI associates multiple Internet-of-Things enabled devices and sensors including GPS tracking devices, fuel sensors, temperature sensors, on-board video cameras, to collect data of interest from vehicles, thereafter the solution utilizes AI and Machine Learning algorithms to examine the data and produce significant insights to inform decision making in real-time.

MO-Hand Hygiene Assistant

Mkazi Concepts (Pty) Ltd has developed the Sensani™ system, an intelligent hand sanitation station that goes about as a protection intercession against the spread of transmittable sicknesses and irresistible microorganisms. It is a management system for high foot traffic environments through conditions which grants employees and the public access to a building based on infection prevention, sanitation and public health and safety standards.

M-Temp

M-Temp is a Hospitality Staffing Chatbot platform that will serve two sorts of clients 1) the temporary work job seeker, and (2) hospitality business or enterprise clients. The Chatbot will be utilized for work searcher commitment, and collection of data and information, while the hospitality business or enterprise clients will utilize the site to post available work shifts based on their requirements.

Solar Window Blinds Made from Waste Solar Panels

LC Dynamics is a technology start-up aiming to improve access to clean alternative energy solutions. The first product is a mobile solar window blind that intends to make solar PV technology accessible for tenants and sectional title schemes where customers often lack the freedom, space or ownership of their properties to install a traditional solar energy system. They are additionally developing an online platform to assist associating clients to find the most sustainable product.

Lerthoka Smart Panic Buttons

This is a IoT services based company that creates devices (smartwatches and tags) and systems (mobile apps and web-based apps) for GPS tracking and SOS panics. They do personal tracking and panics, animal tracking (game animals and pets) and asset tracking focused on logistics companies. They cooperate with private security institutions and EMS for health and security emergency responses.

Video Remote Interpreting (VRI)

Proudly South African Telecom Relay Service that remotely connects Deaf people to qualified Sign Language Interpreters in real-time, empowering them to impart all the more successfully and gain equivalent admittance to data and services and in this manner increment accessibility to education, health, security, and giving myriad social benefits.

Sisanda App Universe

Sisanda Application Universe (SAU) is a virtual science research center that utilizes cameras and real-time 3D content to permit to experiment any place and whenever.

Sisanda Application Universe works with physically produced products namely SICU (Sisanda Cube) and SITEE (Sisanda T-shirt).

DSM Communicator

Intends to bring about digital inclusion, primarily focusing on the neglected township school community. DSM communicator considers the conditions of municipality schools work under and the degree of technology literacy of system users. The key achievement will be straightforwardness; it is a communication tool built by South Africans for African conditions.

Ka-dah Device

An innovation that helps outwardly disabled people to explore and get to the functions, controls, and applications of cell phones without the need to utilize the touch screen of cell phones: This includes wearable hardware, mobile application and creates a provision for any Bluetooth earpiece to connect with the phone at the same time.

Memeza Community Safety

Through Public Private Partnerships, Memeza Yell aims to empower community reaction models, reinforcing communities impacted by SGBV, violence and crime with the ability to such as SAPS/CPF and community members, enabling citizen-to-citizen policing.

Smart Water Tank

A water storage tank has been designed in a rectangular shape that is modular and sealed. This allows the tank to be installed in numerous layouts and positioned on any of the three sides. The fixed element guarantees the content put away inside the tank cannot be contaminated by entry of any living/non-living matter.

Aqua Cura

The trailer or holder-mounted mobile water disinfection units are standalone, self-contained, and lockable units that are not difficult to work with and can be quickly deployed, to provide clean, healthy drinking water to small communities. The sanitization process is finished through a licensed advanced oxidation process.

Prev Leak

Innovative smart polymer manhole covers that are tech-fitted with IoT sensors to recognize when sewage lines are impeded and report such irregularities involving the plumber App and Municipal management system when they happen. TPS likewise developed a progressive web app used by the public to report clean water leaks to promote ease of reporting and speed up service delivery.

Moonshine

A reflective paint in the form of a spray designed to make stray animals visible at night. The main objective is to reduce or at least avoid accidents caused by stray animals

Low-Cost Geyser

Our low-cost solar water heater (LCSWH) offers numerous benefits to low-income households. The geyser is 100 percent South African, from design to manufacture and

materials. It has an extended life expectancy of over 30 years and is practically indestructible. It is easy to install, with no leaks or corrosion and is impact resistant. Tested to heat water to 56 degrees Celsius at sea level.

Startup India mission

The Indian Startup scene has shown gigantic innovation over the course of the last 10 years (Begin up India, 2021). Throughout recent years (2015-2022), there has been 9x Increase in Number of Investors 7x Increase in Total Funding of Startups and in Number of Incubators

The Startup India Activity Plan was launched in January 2016. The vision of the activity plan is to build a strong startup ecosystem that nurtures innovation, drives sustainable economic growth, and generates large-scale employment opportunities. The Department for Promotion of Industry and Internal Trade (DPIIT) regularly engages with stakeholders to invite consultations on regulatory issues raised by startups, investors, and others in the ecosystem.

Currently, most States and UTs have functioning State Startup portals with information available in local languages. Besides, a few designated policies and plans have been presented with an emphasis on problematic innovation, women's business visionaries, and grassroots innovators to drive inclusive innovation in the ecosystem. Moreover, the State upheld incubators, mentorship networks, and funding opportunities along have also expanded across the country.

Sāscan

Sāscan is an emerging healthcare innovation company founded in 2015 by a different and experienced group of researchers, doctors, design thinkers and business developers (sacan site). The name Sāscan is gotten from two words - सांस in Hindi articulated as 'Saanz' meaning breath and 'can' that stands for cancer. The oxygen in the air we inhale or our 'Sās' is shipped all through the body as oxygenated

hemoglobin. Sāscan utilizes oxygenated hemoglobin absorption maps to locate potentially malignant transformation in tissue.

Newndra Innovations

Jaipur, Rajasthan-based Newndra Innovations is building Exo-Skeletons (newndra site). Their leader product - JaipurBelt - is an unpowered, lightweight, practical, basic yet effective exoskeleton. Developed over nine years, they went through many models real timely improving and idealizing the product for the end client.

Their Salient Features: Single point Load Adjustment.

JaipurBelt is unisex, adjustable to different ergonomics and anthropometry and useful to all users – Industrial & MSME workers, Agriculture and Construction workers, Back and Spinal Patients, Aged people & House Wives among others; Body and Spine Supporter – It is a spine and body support system for people who have to work in a continuous crooked, back-bent position or have to spine and back problems like Kyphosis, Spondylitis, Slip-Disk, due to work load, age lifestyle.

Oncosimis® Biotech

Oncosimis® Biotech is a clinical stage biopharmaceutical company focused on identifying, developing, manufacturing and commercializing therapeutic relevant proteins including mAbs, recombinant proteins (oncodimis site). Oncosimis® Biotech uses the AcceTT® platform to produce endotoxin-free recombinant protein and Fab from E .coli in an efficient and cost-effective manner.

Testright Nanosystems Private Limited

Laid out in the year 2016, Testright Nanosystems is a maker of a wide range of Prizm Spectrophotometers, Prizm Spectrometers, and so forth. The company produces these products utilizing premium grade raw material that is procured from the authentic vendors of the market.

Professional employees keep themselves abreast with advanced manufacturing techniques and designs. All units are equipped with all the essential tools, machine, and technology in order to manufacture a high-quality range of products.

Bhairaj Organics

Bhairaj Organics has built a network of farms and the necessary ecosystem to ensure that the milk taken from cows reaches the collecting center faster and without contamination. It distributes natural A2 milk under the 'DesiGo' brand in both B2B and B2C areas (benisonmedia site).

The company oversees each step of the process 24 hours every day, seven days per week, to guarantee that the milk is followed from the udder to the collection facility and hence is charged at a premium due to the assurance of quality.

MachPhy Solutions

MachPhy Solutions is a start-up from IIT Delhi and incubated at 'Technology Incubator' which develops low-temperature storage and transportation devices for biological or medical products (yourstory machphy and machphy sites). The company has expertise in the fields of energy systems, robotics, machines, agricultural systems and cold chain solutions and solar solutions. They develop sustainable and manageable solar and cold-chain solutions for meeting the necessities of different sectors.

Koshbio

Koshbio is a main biotechnology company situated in Faridabad, Haryana (India) engaged in R&D, manufacturing and marketing of rapid tests kits, clinical chemistry kits, serology kits, haematology reagents and urinary strips (koshbio site). The company offers cost-effective and technologically advanced solutions for early and accurate diagnosis of SARS CoV-2, HIV, HCV, HBsAg, Syphilis, Malaria, Chikungunya, Dengue, Typhoid, Kala azar, Pregnancy, Ovulation and Fertility. IVD test kits permit medical experts to analyze illnesses rapidly and precisely for early discovery and anticipation of infections. The straightforward measure policies in

addition to the mobility of the quick test units make them ideal for use in an extensive variety of settings including distant regions and nations.

IVET Labs

IVET Labs is a diagnostic research facility that services only the field of veterinary science and animal farming (ivet site). The company provides a dedicated platform where farmers have direct admittance to its services through field executives, website and mobile app iVET. IVET Labs focus on areas such as detection of veterinary pathogens, biochemical conditions, pregnancy, in a wide range of farm animals, aquatic animals and wild animals.

Flixdrop

Flixdrop is specialized in Cattle Health Monitoring Solution (CHMS).

CHMS is a multi-metric, cloud-based ‘Smart Collar’ for dairy cows that improves the productivity of farm breeding programs and reduces health care costs through early illness detection. CHMS utilizes a multi-metric study on every individual cow's conduct empowering more accurate and timely heat detection and ideal intensity discovery.

CHMS indentifies both cystic and non-cycling cows empowering early intervention and treatment. The framework is joining pre - reproducing research with post-pregnancy health location and a 96% intensity detection rate guarantees that CHMS can maximise your 3 and 6 week submission rates.

CHMS screens cows taking care of and nourishment/feed conduct and looks at this as her standard way of behaving and that of the remainder of the herd.

Statlogic

Statlogic is specialized had some expertise in integrated geospatial, big data, and IoT solutions (iimuic site). The firm has delivered bespoke message-oriented middleware and geospatial services for aviation and space downstream applications.

They have forayed into developing solutions catering to mitigating the outcomes of extreme weather events in livestock and allied sectors through integrating animal biometeorology, actuarial science, and climate economics.

Prompt Innovations, Automatic Milk Collection System

Prompt Innovations, is an innovative start-up in the field of energy efficient and sustainable cooling solutions (promptinnovations site).

Prompt Innovations is newly created start-up by founders of Prompt Group, an Ahmedabad, India based company which has been a technology solutions and services provider for the cow-to-consumer supply chain in the Indian Dairy Industry.

In 1995, the company lauched the 'Automatic Milk Collection System' which helped the dairies in India digitalise and streamline their supply chain. Prompt offers innovative equipment and programming solutions to guarantee that the purity of milk is held at each step. The majority of their products and solutions are Cloud, IoT, and BI- enabled that facilitates transparency as well as traceability throughout the supply chain at all levels on a real-time basis.

They are available across 24 states, 221 regions, and 55,000+ towns. They have a group of over 800+ employees.

Ravi Prakash, milk chilling unit

Ravi Prakash is an Indian Ph.D. researcher of ICAR- National Dairy Research Institute (NDRI), Bangalore (jagranjosh site). He was granted the BRICS-Youthful Pioneer Prize for concocting a native and sustainable answer to storing milk while maintaining its quality and safety.

The milk chilling unit can be utilized by small dairy farmers to cool milk to cool milk from the point of production by reducing the temperature of raw milk from the place of production by lessening the temperature of raw milk from 37 degrees Celsius to 7 degrees Celsius within only 30 minutes utilizing nano-fluid based phase change materials.

Atsuya Technologies

Atsuya Technologies was established in 2017 in order to support businesses to accomplish their goals without compromising on their growth or profitability (atsuyatech site). The team comprises software and hardware engineers who have helped design and implement state-of-the-art engineering solutions for some of the world's largest corporations, using bleeding-edge technologies like AI, Deep Tech, and IoT. AI-enabled dashboard provides a common platform that collects real-time data, simplifies reporting against globally accepted ESG frameworks and ensures transparency to stakeholders at all levels.

Seragen

Combining reproductive health datasets with AI, Seragen is powering insights and advancing the frontiers (seragen site).

Conceivf IVF Success report helps clinicians analytically arrive at patient chances of success with IVF, and associated ET risks.

Based on coordinating each patient's health parameter with 15 million patients going through IVF, the report improves the matching algorithm helping you counsel better.

IVF Protocols

Conceivf IVF Protocols module helps the clinician generate patient specific IVF calendar based on Antagonist, Ganirelix, Mini IVF, Down Regulation calendar.

Clinicians seamlessly build a cascading flow with pre-built recommenders that are intuitive with full flexibility and control.

Embryo Grading Report

Conceivf Embryo Grading AI module that analyzes patient embryos and prioritizes them for transfer using the well accepted Gardner, Veeck-Zainovic methodology. This is a non-invasive investigational diagnostic that uses millions of embryo images to deliver proximate results, real time.

Konmos technologies

Konmos technologies is a main manufacturing company company recognized for the design and development of most advanced motor and inverter drives for industry, electrical vehicle and pump (konmos site). The company offers turnkey product solutions to textile, pharmaceutical, cement, glass, steel, elevator, traction, marine, power generation and mining application.

Summit Energy

Summit Energy is a foremost Integrated Energy Contracting Company that provides wide range of services to the Oil and Gas (summitenergy site). The Services contributions cover the areas of Exploration & Production Geosciences, Drilling & Production, EDPC (Engineering, Design, Procurement & Construction), Asset Management, Power (Generation, Transmission & Renewables), Advisory & Consultancy and Training & Manpower Development

Etherenergy

The essential thought behind this Project is the restoration of an innovation, which permits electrical energy to be accumulated straightforwardly from the ether (etherenergy and tart-aria sites). This innovation had been utilized until it was lost toward the start of the twentieth hundred years because of economic and political reasons. Its application covered all spheres of life, be it complex engineering facilities or just common home appliances.

The growth of economy caused the ether energy technologies to be adapted for the needs of heavy industry, railway construction and other needs of that time.

Later on, toward the start of the the 20th century, for different reasons, the ether innovation was annihilated and replaced with traditional electrical generators that we know today. One more essential component was the change that happened in scientific circles, which forced the mainstream science to completely disregard any knowledge related to ether and ether related technology.

Reverse innovation

Innovation Diffusion from Developing to Developed Economies

Herewith we present selected successful reverse innovations of Philips, Vortice, higher filtration capacity (HEPA Filters) ,Maschio Gaspardo, agriculture machinery, Mahindra and Mahindra tractor , Siemens, Multix Select DR, General Electric, P&G, Speres, Huawei's , Mindray, Galanz, BYD, PepsiCo, Suzlon Group, Tata , Husk Power System, Arbutus Medical and two failed reverse innovation of Tata Nano and Godrej .

Definition

Reverse innovation is an inclusive innovation that is successfully adapted to and adopted by developed economies (Porumboiu, 2022).

The concept was introduced and popularized by the former Chairman and CEO of General Electrics, Jeff Immelt, and Vijay Govindarajan, Professor of International Business and Chris Trimble, both authors of Ten Rules for Strategic Innovators – From Idea to Execution (Govindarajan and Trimble, 2005).

Reverse innovation benefits of low-income nations conditions where work is more affordable and production costs are fundamentally lower than in developed nations.

The main hindrance to reverse innovation is the organizational barrier. In order to overcome this organizational challenge, multinationals embrace Vijay Govindarajan management model called Local Growth Teams (LGT), (ibscdc site). LGTs are based on the following principles:

LGTs are localized resources and localized decision-making power. It must take a zero-based approach to innovation and will have to be connected to global technology and global resources in order to benefit from economies of scale. LGT has profit and loss responsibility as well as decision-making powers to decide on what products to develop and how.

Required conditions for successful reverse innovation

To advance effective reverse innovation opportunities we need to develop a good enough performance for cheaper price, to adopt early new technologies, to protect the environment and preventing pollution, to fulfill regulation requirements and customer preferences (Govindarajan et al., 2012).

Good enough performance for a cheaper price

The standard reasoning of “low cost” design has been stripping down the highlights of a current product and offering a sufficient a good enough performance version at cheaper price. This is counter to the philosophy in the West, where a customer agrees to buy lower performance products for lesser price. Consequently, creating a disruptive cutting edge technological solution with decent cost and lowest cost could capture greater pie in low end customer segments.

Early adAlternative to new technologies

Inaccessibility of infrastructure in arising nations offers a more prominent chance for firms to begin on clean slate and adopt or setup a state of art and high tech solution first time. The best models are from China and India as the world's main two cell phone markets are practically synchronous with the west. The arising economies have jumped on existing available high tech solutions and are venturing in as early adopters for highly scalable futuristic cutting edge solutions.

Protecting the environment and preventing pollution

Environment harms developed side-effects and production process demand solutions adapted to the standards in developed nations. The mass consumption in the emerging nations is not met in environmentally friendly way, the result could be catastrophic, hence the products designed for here need to be ahead by several miles in terms of their “greenness”.

Regulation requirements

Reverse innovation from arising to developed nations request regulation adaptation. Presently the extra above added because of regulation is minimal here and this could end up being a huge advantage in terms of faster innovations with lower resistance. Any simple and inexpensive solution could be launched into the market quickly with least resistance.

Fulfill customer preferences

It is critical for the firms to understand the preferences of international customers and address those preferences that can be considered similar across the globe.

By and large, banking has forever been centered around tending to the the needs of wealthier people. Worldwide the majority of the fruitful banks neglected to believe in the chance to have the alternative to loan more modest sums and offer mobile financial services. Those solutions are currently getting popularin the west.

Reverse innovation success stories

Philips

Philips's ClearVue

Philips drives R&D activities in the company's main R&D hub in Eindhoven and in the Philips Innovation Campus, the second biggest R&D centre of the company that is located in India, Bangalore (Ballerio, 2016).

ClearVue 350 is an ultrasound machine explicitly built to target the Indian market and particularly focusing on poor rural areas. The product is equipped with a leading-edge technology that has been developed in India and is appropriate for the states of the actual nation. ClearVue 350 has low ownership costs and it is modular, lightweight and energy efficient, nonetheless, the quality that it conveys as far as accuracy and imaging is still of superior grade.

Philips figured out how to sell this technology as a reverse innovation additionally in nations like the USA and Germany, where the machine has been presented as a feature of the equipment of a rescue vehicle, in emergency treatment rooms to perform speedy research and save time, and doctors' offices, in order to let them

perform some analyses. The way that the test is more affordable than the cost typically charged for a high-level machine ended up being uplifting news for those 2 million individuals in the US that don't have medical insurance.

GoPure automotive air purifier

Since pollution is a major issue for China, GoPure had the alternative to figure out the need of the local populace and provide a product that would address their needs (Falchetti, 2021). Development of the product was done by the R&D center in Shanghai. The product offered an effective solution which was eliminating the 99.9% of harmful substances in the air. The cost, nonetheless, was somewhat sustainable for the Chinese middle-class (400 RMB). GoPure has been effectively traded to Americans and European markets.

Noodle Maker

The idea came out directly from the Kitchen Appliances Innovation & Development Team (KAIND) Center in Shanghai. The reasoning behind this innovation was to help Chinese individuals in keeping their practice of noodle making. The machine would have operated with the populace to continue to make their noodles at home. Besides, being health-related concerns progressively significant in China, particularly while talking about food, this product would have guaranteed the food safety and control over ingredients. That's what the outcome was, at first, 40,000 of these machines were sold in the Chinese market, while thusly, 200,000 were sold mainly to North America.

Philips Ultrasound Machine ElastPQ.

Hepatitis B Infection is very normal in China, with roughly 7.18% of the populace. This can turn into chronic hepatitis B and eventually might result in cirrhosis, causing liver cancer. At that point, in order to discover a liver cancer, the only solution was biopsy, which, apart from being painful, was too expensive for Chinese middle-class. Consequently, R&D center in Shanghai developed this new innovative product. This fits impeccably for the Chinese community since it can find whether there is any abnormality with the liver. In any case, uniquely in contrast to biopsy, it is simple, accurate, non-invasive, cheap and painless. This has led many Western Chinese hospital to increasingly use this product. As an issue of realities, EU state-run

Services are presently prescribing a similar sort of innovation to analyze liver infections.

Vortice, higher filtration capacity (HEPA Filters).

In China, Vortice has presented ventilation systems with much higher filtration capacity (HEPA Channels). Delivering products without this trademark could have driven the company to not enter effectively the Chinese ventilation market. By understanding this exceptional need of the regional populace, the company has presented an ad hoc innovation that is absent in its European catalogues.. One more illustration of an innovation primarily delivered to the Chinese market and created inside the local R&D in China is the ventilation system with integrated dehumidification. Another innovation which has firstly proliferated in the Chinese market is the touchscreen display for controlling Vortice's products.

The high-filtration system, because of the Coronavirus and the steady demands of disinfection in most of the closed buildings proliferating in every country of the world, the headquarter has requested from the Chinese branch these high-filtration systems. After cautious research of these products through the assistance of the Italian University Politecnico di Milano, Vortice comprehended that these ventilation units were effective as protection against the Virus. Thus, the headquarter decided to introduce in Europe this China-based innovation. In China, the product is called IVU (Intelligent Ventilation Unit), in Italy, this product will be popularized with the name Aria Salus. The product will be moved to Italy also the display for control, which was as well developed exclusively in and for China.

Maschio Gaspardo, agriculture machinery

Maschio Gaspardo from Italy, has a R&D department inside China, in the city of Qingdao, along with a production plant. In this R&D centre, his company has developed new products to meet different characteristics of the Chinese market, too the different buying power in agricultural equipment.

The paddy tiller machine

The farming procedures connected with rice cultivation are different in Italy and China. The product for China should have been adapted to the local method of cultivation which depends on the seedling of the rice seed being relocated straightforwardly into the mud, in the sodden soil. Something else entirely contrasted with the Italian approach to developing rice, Maschio Gaspardo developed the MTR Narrow product to answer to the local necessities of disposing 3 sowing units for soy at the distance of 22.5 cm. The sowing units are arranged in backhoes, which work on trunks of soils. There are two principal purposes behind this specific disposal of the soil, unconventional to the values of the north-easter part of China, the main market for the farming machinery of Maschio Gaspardo in China. The explanations behind arranging the soil in ridges are the followings: first, the soil unfreezes in April and it stays wet when the ice liquefies, the ridges are useful to accelerate the soil drying process. Second, the ridges raise the soil temperature to arrive at the seed germination temperature prior. Without ridges, the establishing season would be postponed for around fourteen days and would make the yield life process shorter, since the late spring season is shorter.

Precision planter

Consequently, Maschio Gaspardo has developed an a precision planter adaptable to the precise characteristics of the Chinese soil, which as mentioned above, as ridges. Consequently, this innovation, called MTR Thin and developed for China, has the quality of arranging 3 planting units. In Europe machines of this sort are not used. Few regions of the European market, are utilizing a comparable procedure but with 2 planting units. Provided these necessities, the company settled on the choice to adjust the Chinese product to the European equirements. In this way, was born the Chinese R&D center. Maschio Gaspardo has made a product that can have been utilized, after a slight change, in a part of the European market. In the industrialized nations, this product is known as the MTR Twin.

Mahindra and Mahindra tractor

In 1945, two brothers named J.C. Mahindra and K.C. Mahindra united with Ghulam Mohammed and began Mahindra and Mohammed as a steel company in Mumbai (courshero site). After two years, India won its autonomy. Ghulam Mohammed left the company to become Pakistan's first finance minister, and the Mahindra brothers

ignited the company's enduring growth with their decision to manufacture Willys jeeps in Mumbai. Mahindra farm tractors, turned out to be well known in India. They were affordably priced and fuel efficient. The machine was appropriately sized for the small Indian farms with its small turning circle. In some cases it would likewise be utilized as a traveler vehicle for the family and also on hire.

Mahindra USA entered the US farm tractor market in 1994 (Mishra, 2013). The company has secured itself as a fruitful craft player utilizing innovative marketing and sales techniques.

Rather than attempting to develop a product that could compete with greater brands, Mahindra USA designated a more modest agricultural niche - hobby farmers, landscapers, and building contractors. It coupled this strategy with building close relationships with dealers, customers and the community at large. Through reverse innovation, Mahindra USA launched a two-wheel drive tractor in the market. Competitors and analysts did not expect it to succeed but today they have a very nearly 90% portion of that market segment. The company is now expanding beyond the US market. It recently opened a distribution centre in Canada followed by another in Mexico. It has acquired a distributor in Brazil.

Siemens Multix Select DR

Siemens developed a new digital X-ray system, the Multix Select DR, which is an entry level system that facilitates cost-effective access to X-rays (Agarwal and Bremm 2012).

At a price that is around 33% beneath the comparable predecessor of Siemens, Multix Select DR is appealing to small and medium-sized hospitals in recently industrializing nations as well as to small clinics and doctors' clinics in industrialized nations. Siemens also reduced the dose requirements of the system by 50%, making it safer for the patients & doctors. Select DR is being developed in China and promoted universally. The sales numbers for the product have been growing significantly and show a promising future.

General Electric

GE Healthcare is known for manufacturing top-of-the-line medical care products like X-ray machines, ECG, MRI scanners, or CT scanners that were sold for thousands of dollars in Western countries.

MAC 400 mobile ECG

In 2005 they started working on an ECG machine destined for the Indian market. Along these lines, in addition to other things, it must be affordable, durable, and portable. As there were other low-cost solutions on the market, their big challenge was to create a product that was both high quality and low cost.

In 2007 GE launched the ECG machine Macintosh 400 portable ECG and after some bumps on the road, they managed to get the product rolling through direct sales.

The device was completely conceptualized, designed, sourced and manufactured in India as per the prerequisites of local clients. With the Indian market in mind, the MAC 400 is priced at one-third that of imported ECG systems of similar quality. To manage blackouts in many regions of India and a lack of medical care experts, the Macintosh 400 is battery-operated. Clients in the medical care field maintained that the machine should be portable so they could reach more patients; hence, it is lightweight. The product immediately became successful in Europe also, with marketing projections identical to those in China and India. A better version soon followed with the Mac i being lighter, equipped with a smaller printer, and had an even lower price.

Lullaby baby warmer

In 2009 GE Launched the Lullaby baby warmer developed to further develop baby care in India. It's presently utilized in over eighty nations all over the planet, developed markets included (ge site).

During the birthing system, a newborn child's body mild drops rapidly once external to the controlled environment of the mother's womb. Without the physiological mechanisms to fight off cold, the availability of warmth is the first line to survival for the newborn.

In developing countries, where no less than 20 million low-birth-weight children are conceived consistently, warmers and incubators are critical lifesaving devices. However, good quality systems have to be imported and at a high cost.

Universally, 139 Million births happen every year, of which roughly 4 Million children neonates (less than 1 month old) die from mostly preventable causes. No less than half of worldwide births happen in underserved settings where admittance to access to affordable technology remains limited. 25% of the world's births happen in India.

Worldwide, an expected 37% of passings among kids under five happen in the primary month of life, most in the first week. Practically 53% of births in India go unattended by skilled people with no access to critical equipment like baby warmers, incubators, phototherapy systems.

Healthymagination is a GE business strategy to deliver and maintain sustainable healthcare globally, built on the core commitments of reducing costs and improving quality and access in healthcare.

Cradlesong Hotter is a healthymagination product. 70% more more cost effective compared to imported products and can increment medical care access by 15% to the under-served populace. It is designed and developed in India for India and the world.

GE's Lullaby Warmer is designed and made in Bangalore. The device is a bed an overhead heater, showering the newborn with delicate warmth while the child is washed after birth and checked for its first vital statistics. It also has a resuscitation (airway management, suction, etc) option available, which helps reduce infant deaths from hypothermia and asphyxia.

The Lullaby Warmer is priced 70% lower than imported child warmers of a similar class yet adheres to all the safety standards prescribed by the International Electro-technical Commission (IEC) for such life saving equipment.

P&G; cough syrup

P&G produced for the Latin American markets initially its cough syrup with honey (d-nb.info site). People in Latin America favored homeopathic remedies for colds and coughs. Thus, they supplanted artificial flavorings in their medicine, with natural honey. They first introduce VickMiel in Mexico and later expanded to Brazil. Throughout the long term, they effectively carried out the product in the US and Europe. The new product built up some forward momentum in developed markets as it was sold at a lower cost than Vicks, their brand in the US and Europe.

Speres, air-conditioning

The Italian company Speres, manufactures air-conditioning, commercial refrigeration, and humidification systems. It began its activity in China in 1997 (tesi.luiss.it).

The company took the choice of laying out a production plant in the territory together with a R&D center.. Speres' RD centre was to adjust European products to the Chinese market. In any case, since the company was not finding success, Speres China's general manager conducted an analysis of Chinese competitors. He found that He discovered that Chinese companies were providing products of high customization but low technical standards. Technical details of the Chinese auxiliary were shipped off Italy to provide something which would have been exceptionally acknowledged by local customers. The outcome was that the product was successful in Europe, in any case, it faced strong internal resistance justified by the risk of incurring in cannibalization of other products. The company chose to provide European markets with this product, by proposing it to those customers that can have not managed the cost of the superior European technology. This product was able to penetrate market segments in which Speres was not present, such as residential market.

Harman, automotive infotainment

Harman, a prominent player in the automotive infotainment market, which makes factory-installed systems that integrate GPS navigation, music, video, cell phone, and internet, led in the luxury-car segment, successfully created reverse innovation when they looked for new opportunities to expand their market reach.

Harman known for ultra-refined dashboard varying media systems designed by German specialists, developed a profoundly more straightforward and less expensive method for making products in developing markets and applied that technique to its product –innovation centres in the West. Harman did this utilizing a two-section approach: radical change from below combined with astute leadership from above.

A small team situated in India and China set audacious goals, created a new organizational structure, and adopted new design methods. This approach at last empowered Harman to offer an unprecedented range of products along a continuum of markets, from low-end to luxury. To improve flexibility and reduce costs, the teams in India were coordinated around functions they would create, to come up with, in just one year, an entirely new architecture for the infotainment system. It was all the while fulfilling excellent standards, yet in addition, met cost and cost targets and was adequately adaptable to scale to the vehicle makers' various necessities.

Harman supplied premium, cutting edge infotainment technology, found in luxury brands such as Mercedes-Benz and BMW.

In 2009 Harman rethought the equipment plan, the method for drawing closer and developing programming, and made the Centre in India enter the Indian market and further to other developing nations.

Today, each of the four of Harman's business divisions is addressed in India. Of the organization's worldwide headcount of 29,000 representatives, 8,000 are situated in India alone. Large numbers of these are chipping away at different parts of product improvement - including what's known as 'reverse innovation'.

For emerging market customers, the solution could instead harness smartphone capabilities. Harman SmartAppsLink, allows the navigation app on the phone to communicate with the head unit, and then project the map information. Tata Engines was one of the first to debut the system in India. The platform solution has also integrated projection mode technologies from Baidu, Google and Apple.

Comparable methodologies were taken on for different systems. What Harman can do is efficiently offer the end client the most important highlights at a sticker cost that is

satisfactory for that market, basically by being smarter in the manner in which it deploys the innovation.

A basic model is the CD mechanism where we were able to convince customers to drop the CD player. In its place, Harman focused on supporting streaming music protocols.

The media utilization design didn't warrant the US\$10 or US\$15 cost to incorporate it. In its place, Harman focused on supporting streaming music protocols.

Today, Harman has a few different stage initiatives inside the associated vehicle space. Inside infotainment, it has premium platform as well as an entry level platform. In the telematics space, it is looking to harness over-the-air (OTA) technology to branch out into update gateway solutions. Harman looking at a box that can securely and safely update every electronic unit within the car so you save the OEMs and the clients the cost of updates in the field. With its new acquisitions, they are able to deliver the complete value chain.

Harman likewise heads up another platform drive called Digital Cockpits, which points on the next generation cockpit experience. Engineers are inspecting different sorts of client encounters as well as the sort of required devices behind that experience.

Harman engineers are always looking at how to differentiate between a high, premium and entry offering, and at how to maintain discipline accordingly.

40% of the product utilized on a display-level audio can be carried forward to a premium. These commonalities could include aspects such as the operating system, the middleware technology, the drivers and the infrastructure parts

In general, Harman is quick to create multi-use platforms that can then be customised. The outcome is a shorter time to market, higher quality and lower cost.

Huawei's C & C08 conversion

In 1987, during the phase of innovation and imitation, Huawei started to create PBX as an agent (Xiaomei and Shanshan. 2020) and promoted domestically the system. Huawei supplanted some parts with local ones for localization and chose optical fiber with SDH technology as the connection method to connect the remote operation module of the switch central control. Huawei launched the the rural digital switching solution in 1992.

This sort of technology product that is not difficult to work with became well-known in the rural market. In 1994, Huawei effectively developed the C& C08 switch independently and entered Hong Kong through cooperation with Hutchison Telecom. In 1996, Huawei presented IBM's product integration development and integrated supply chain management model, which rapidly improved the functions of C & C08. In 1997, because of the prepaid market interest, Huawei executed modified business processes and charging policies on C and C08 machines. In 1998, Huawei launched 128-module C and C08, which further developed mix and adaptability. Through participation with 3Com and Siemens, Huawei has opened the European and American markets.

Galanz's "Black Diamond" microwave oven

Galanz presented China's experienced and trend-setting innovations from abroad, technological innovation, and localization of parts and components (Xiaomei and Shanshan. 2020). To additionally develop the market, Galanz has improved the traditional microwave oven window and designed it as a large-screen window. In 2000, University launched "Black Diamond" which was famous in China. Galanz's convection oven and "double frequency conversion" microwave oven are products in the stage of independent innovation. In 2001, after breaking through the light wave technology, Galanz developed the world's first digital light wave microwave combination oven, setting a new standard for the microwave oven industry.

Mindray mobile ultrasound

In 2002, Mindray and the Chinese Ministry of Science and Technology jointly established the National Medical Diagnostic Instrument Engineering Center (Xiaomei and Shanshan, 2020). In 2004, Mindray saw that the domestic maternal and kid medical care system required portable ultrasound products. In light of the DP-9900 innovation platform, Mindray has developed a portable all-digital black and white ultrasonic instrument. In 2008, Mindray and Fujitsu a key collaboration in the field of radiation to improve and upgrade their technical health and market seriousness in the field of in the field of radiation X-ray photography systems.

BYD, electric car

BYD is a latecomer in the car industry with battery background (Bowen, Xianjun, Donghui, and Lewis, 2016). It was set up in 1995 by a battery researcher, Chuanfu Wang, in Shenzhen, China. It engaged in rechargeable battery business, mobile phone components and assembly. Taking benefit of the world battery industry move, BYD partook in a quick innovation: it took BYD enjoyed a fast growth: it took BYD 7 years to become the 2nd world largest nickel-cadmium batteries manufacturer. BYD also became the first Chinese lithium ion battery supplier of Motorola in 2000 and the first Chinese supplier of NOKIA in 2002. To look through additional innovation, Wang put up his energy into entering the auto industry in 2003 by acquiring Qinchuan Auto, going-bankrupt manufacturer with poor technology accumulation. After the acquisition, BYD continued to developing gasoline vehicles inherited from Qinchuan, at the same time it set up a research center for EV, trying to take advantages of its battery background. After 12 years, BYD has gained a lot of headway in the auto business. It even turns into the champion of world EV sales during Jan 2015 to Nov 2015.

Though doing a lot of imitation, BYD has kept doing R&D to innovate the moment it entered automotive industry. Since it had innovation amassing in the battery field, it developed its car batteries and attempted to consolidate its battery technology and car business.

BYD caught up to the auto industry with both reverse innovation in auto industry and high tech innovation practice in battery industry. It quit developing and began to do imitation after acknowledging it was too difficult to even think about enhancing with

restricted innovation aggregation in the car field. Simultaneously, it continued to develop in auto technology connected with the battery where it can exploit its innovation capabilities. With the growth of its technology accumulation, it combined both technology and make more innovations.

BYD is showing a lot of promise as it surpassed Tesla sales in the first half of 2022. Even though in terms of profit Tesla is currently still leading, BYD has the potential to disrupt Western markets as it provides solid value at a lower cost.

PepsiCo's Gatorade

Gatorade was a tasty drink that speeded up the replenishment of electrolytes and carbohydrates that players lost through sweat and exertion (Clarity).

The beginning of Gatorade lay in the pandemic of cholera in Bangladesh. The way to keep cholera patients alive was to keep them hydrated. Western doctors went there to help and found a centuries-old regional solution for diarrhoea caused by cholera was a concoction that included things such as coconut water, carrot juice, rice water, carob flour and dehydrated bananas. Western medicine thought carbohydrates would cause bacteria to multiply and the cholera to get worse. Yet for millennia, this was the typical treatment utilized in Ayurvedic medicine. By giving carbohydrates and sugar in the solution with salt, take-up was speedier and patients rehydrated quicker.

This finding was reviewed in the Lancet, a world-medical journal. A common problem between cholera and sports medicine was – rehydrating rapidly; a doctor in the University of Florida created Gatorade, a reverse innovation, adopted first in the developing world. Why Gatorade? The University of Florida sports teams are known as the "Florida Gators" - there are lots of alligators in Florida. Gatorade was purchased by Pepsico in 2001.

Gatorade ingredients include water, sugar, dextrose, citric acid, salt, sodium citrate, monopotassium phosphate, gum arabic, glycerol ester of rosin along with flavorings.

PepsiCo's Gatorade, the fourth-largest liquid refreshment beverage brand in the US, is getting ready to launch a caffeinated energy drink formulated specifically for athletes

(Beverage Digest). The product, called Fast Twitch, could rightfully be described as a cross between an energy drink and a sports drink.

The product, called Quick Jerk, could legitimately be portrayed as a cross between a caffeinated drink and a sports drink.

Visual Inspection with Acetic Acid (VIA), India

VIA is a vinegar test to the fight against cervical cancer. It was spearheaded in India during the 1980s and is currently utilized in Latin America, the Caribbean, and Africa yet there are still a lot of women all over the planet who are not being screened.

The cervical disease is brought about by the human papilloma virus (HPV) infection, so many medical care institutions presently centre on HPV testing, which is more precise than VIA likewise more costly, putting it far off for women in low-and - income nations.

Some countries have provided drop boxes in which women can deposit samples they have taken themselves. In Peru, community workers went into street markets and passed out testing kits to women, who would quickly take their own samples behind market stalls. VIA is used with vulnerable populations in United States (Vanderbilt, 2019).

Suzlon Group, Wind power

When Tulsi Tanti found that energy was 40% of his material processing plant costs and supply was questionable, he attempted different choices prior to settling on wind power (Khan, 2021).

Tulsi Tanti, a mechanical engineer, was watching out for his family material business in Surat, Gujarat (suzon site). The business was not in that frame of mind of health, essentially because of to high operating costs caused by expensive electricity and the frequent power outages. Mr Tanti needed to investigate different roads for energizing his business' requirement for power. In 1994, he bought two wind turbines and in a real sense delivered his power. Different proprietors revealed interest in his answer, which inspired Mr. Tanti to leave the textile business and go into the energy sector

with Suzlon. In 1995, Suzlon was formed with the idea of giving customers a complete package of wind energy services.

Suzlon Group has a market capitalization of over USD 1.5 billion and an international presence across 18 countries in 6 continents (suzlon site). Tulsi Tanti spearheaded the wind revolution in India with the founding of Suzlon Energy in 1995.

His vision has prompted Suzlon to set up its R&D centers in Germany, Netherlands, Denmark and India that employ over 200 engineers. In the short span of 22 years, Suzlon has established a global installation of over 17 GW with over 11 GW being installed in its home country, India and over 2 GW installed in its second largest market, U.S.A.

Tata – Swacch water purifier

The term Swacch signifies "clean" in Hindi. Tata developed the water purifier to serve the rural sector. It doesn't need running water, power, or in any event, bubbling. The device is made from paddy husk debris and utilizes silver nanotechnology. It can supply sufficient clean water for a family of five for a year.

It is portable, fits into an existing storage unit and meets US Environmental Protection Agency standards.

Husk Power System, microgrid

In India, the Husk Power microgrid is utilizing is using locally grown rice husks to produce power (a unique and cost-effective biomass gasification technology) to illuminate rural areas (more than 50,000 individuals). In 2009, the firm got seed subsidizing from the Shell Foundation to expand operations and is also in talks with agricultural cooperatives and NGOs for partnership.

Biomass gasification - using biomass waste, for example, rice husks, maize, and cobs - could deliver six to eight hours of AC capacity to rural clients.

In 2015 Husk Power Systems pioneered a hybrid system that could generate 24/ power throughout the year by synchronizing solar and biomass gasification power plants.

Husk proprietary biomass gasification system a proprietary gasification process wherein the produced gas goes through a water-less scrubbing and filtration process. The company developed a new heat exchanger process that has eliminated any need for water, making it the only company in the Indian gasification industry that does not waste even a single gallon of clean water.

In October 2020 Dutch entrepreneurial development bank FMO has invested USD\$5 million in the company, while also spotlighting CEO Manoj Sinha as an “energy disruptor” in the latest FMO (huskpowersystem site)

FMO considers mini-grids as the way to open a successful rural distributed energy sector, both off- and under-the-grid, as as it brings affordable and reliable clean power to MSME’s and residential customers in rural areas in developing markets. The \$5 million investment from FMO, which was conveyed from its Infrastructure Development Fund, followed a \$20 million investment in 2018 by Shell, Swedfund, and ENGIE Rassembleurs D’Energies.

Arbutus Medical, Machinery-fund drills

The significant £20–30K cost of current clinical surgical drills has meant that trauma and orthopaedic surgeons in LMICs resort to using imprecise and slow hand drills or unsterile hardware drills, with serious consequences, including disfigurement, severe infection and loss of life. In 2012 Matthew Prime affiliated to Imperial College London undertook an orthopaedic fellowship at Beit-CURE International Hospital in Malawi, where he noticed the act of wrapping an economically accessible equipment drill with an unsterile unrefined cover; a typical practice across LMICs. Simultaneously, in Uganda, a meeting of biomedical designing students from the University of English Columbia likewise saw similar ways of behaving.

Arbutus Medical, a Canadian startup, was established in 2014 after a group of biomedical engineering students from the University of British Columbia working in Uganda observed local surgeons using cheap hardware-store drills rather than traditional clinical drills, which can cost upward of thirty thousand dollars wrapped in unsterile towels (Vanderbilt , 2019).

The group molded a better, sterile version of the drill cover that attached to a DeWalt drill, is more than ninety per cent cheaper. The Arbutus Drill Cover System a sterilisable and reusable cover that fully encloses a hardware drill, transforming it into

a surgical grade drill. The Drill Cover System consists of a robust, double-layered surgical-grade textile which attaches to a drill's mechanics via a waterproof chuck adapter interface.

This makes a fixed obstruction between the non-sterile drill within and the clean careful field external. The chuck has a lifetime of at least 600 use cycles when reprocessed appropriately. It can be autoclaved up to 75 times and will be sterile after 30min exposure of steam autoclave at 121°C, or after 15min at 131°C, either by using gravity displacement or prevacuum autoclaves.

The device was originally intended for low-resource settings but has attracted interest from the Canadian and U.S. military, and hospitals in the U.S., Canada, and the U.K. are considering trials.

University Hospital in San Antonio, Texas is now (2022) using the all-in-one kit from Arbutus Medical for all skeletal traction procedures that come into their emergency room, saving the hospital time, money, and making this orthopedic procedure faster and less painful for patients (arbutusmedical site). The hospital's emergency department (ED) usually performs 3-5 skeletal traction procedures each week.

The company has delivered products prepared to securely treat more than 53,000 human patients and 38,000 animal patients across 36+ nations around the world.

Reverse innovation, failure stories

Tata Nano Car

Tata Engines presented its affordable car 'Nano' (signifying "small one" in Hindi and Gujarati) in 2009. The Tata Nano is a rear-wheel drive, four-door car with a petrol engine that seats up to five people. It has a length of a small more than three meters.

The Nano was intended for India's congested cities, where most individuals utilize public transport wanted to produce an affordable car, which would ease traffic congestion and pollution by bringing more people onto the roads. To accomplish this

objective, low production costs were fundamental - thus its plan for India's manufacturing industry, instead of that of Western nations.

Nano has been designed explicitly for creating markets like India, China, and Brazil.

An upscale Nano idea vehicle called Nano Europa was displayed at the 2009 Geneva Engine Show. However, there was no progress towards producing or marketing this upscale specification.

The Nano a mixed reception from Indian purchasers; reasons provided incorporated that it was still excessively costly contrasted with a motorcycle, and the lengthy hanging tight time for delivery (a couple of months). Despite the fact that it was distinguished as the most affordable vehicle, a secondhand car that was more costly when it was new gave more societal position. The fires and other safety issues were also a concern.

Nano remains evaluated at a reach where it is excessively costly for the lower working class and excessively ratty for the upper working class. The class in between always looks to the upper class and upper middle class, and thus avoided the product altogether. Within a few months of initial sales, technical problems were found in the product and reports of Nano catching fire weakened the trust for the brand as a whole.

Godrej – Chotukool Refrigerator

In February 2010, Godrej Group's appliances division, Godrej and Boyce Manufacturing Co Ltd, test-promoted a low-cost fridge pointed basically at rural regions and impoverished customers in India. The product is controlled by batteries and utilizations cooling chips.

The Chotukool fridge is an illustration of unsuccessful reverse innovation since it was intended to address the needs of customers in developing nations, as opposed to developed nations.

Notwithstanding, the truth was very unique. Godrej sold fifteen thousand units following two years (Klement, 2017).

Recognizing it was a flop, Godrej engaged in a costly redesign of the chotuKool. As of 2016, it's still being sold, but it's no longer targeted at low-income Indians. Instead, it's being advertised to middle-class Indians as a high-end, feature-rich portable cooler.

Navroze Godrej, the director of innovation and strategy, depicted the new chotuKool as a lifestyle product that people use in cars.

It had wanted a disruptive innovation that offered millions of Indians an inexpensive alternative to the household refrigerator, but the company now makes a luxury alternative to the inexpensive Styrofoam cooler.

Rural Indians in Godrej's objective market saw competition for an electric cooler as follows: Purchasing vegetables consistently for guaranteed utilization; Bubbling milk to keep it from ruining; Keeping water in soil pots at home; Involving a pot-in-pot to keep food and water cold; Utilizing other earth-based cooling innovations, like the MittiCool thus no need of Chotukool fridge.

Reverse innovation process

The different phases of the reverse innovation process are Execution of radical change, rethinking location, staffing, incentives, and reporting structure, setting audacious targets, rethinking engineering processes, overcoming resistance, changing from below and above, Leveraging global resources, team leaders without conflicting interests. (Govindarajan et al, 2012).

Execution of radical change

The project took an entirely new approach with a low-cost design and manufacturing platform.

Rethinking location, staffing, incentives, and reporting structure.

The company deliberately placed the initiative, named Saras ("("adaptable" in Sanskrit), inside developing markets. The team consisted of a software group in India and a more modest hardware group in China. The head count was kept low to guarantee adaptability and encourage the members to take.

To keep up with in the division's traditional product-development centers, the team included three engineers from Germany and three from the US. To work with sharing, the legacy engineering units were compensated for transfers of needed technology.

Setting audacious targets

The team put forth the objective of making products whose usefulness would look like that of the division's current infotainment systems, but at half the price and one-third the cost.

Rethinking engineering processes.

To meet the scalability goal as well as the audacious cost target, the team adopted several principles, including simplicity, modularity, and third-party solutions. It decided to work with standard technologies. Instead the products would be assembled from a menu of predesigned features and functions. Modularity was extended to the systems' software.

Overcoming resistance

Go up against inside doubt that the products were substandard, meant only for India and China. Solely after invited clients visited the i development centres for introductions and demos were they reassured that the new methodology was strong. After Toyota acknowledged Saras, these worries dissolved away.

Change from Below and Above

Harman's management of reverse innovation shows that the two-part approach—with local teams generating radical change from below and CEOs orchestrating

companywide changes from above—helps organizations bypass traditional thinking and integrate new logic into product offerings.

Harman's services of reverse innovation show that the two-section approach — with local groups creating revolutionary change from underneath and CEOs coordinating companywide changes from a higher place — assists institutions with bypassing conventional reasoning and incorporating new logic into product offerings

Leveraging global resources.

Innovation teams in developing markets should take full advantage of multinationals' broad resources and keep on communicating with legacy units. By selecting a few of Harman's German engineers to join his group, they had the alternative to take advantage of Harman's worldwide mastery in route innovation.

Team leaders without conflicting interests.

The team should be led by an executive whose highest, if not only, priority is the project.

The President is liable for supporting project level activities and guaranteeing that they usefully ensuring that they have a constructive impact on the company—specifically, by: Rebranding the company's future; Shifting people and power to emerging markets; Increasing R&D spending in emerging markets and focusing it on local needs; Bulking up on emerging-market knowledge and expertise; Ensuring that legacy businesses continue to thrive and calming fears of product cannibalization.

Educate to innovate

Education policies to foster innovation recognise the contribution of a wider set of skills and disciplines than STEM. Developed and developing countries recognize the importance to integrate the educational programmes the ability to be creative and innovate.

Introduction

Education policies to to encourage innovation have generally centered around expanding cooperation in science, technology, engineering, and mathematics (STEM) disciplines (OECD, 2016). A more far-reaching perspective on innovation has arisen which perceives the commitment of a wider set of skills and disciplines. Skills interact synergistically with other inputs to the innovation process, including capital investment.

Beginning around 2009, the Republic of Korea anticipates that its schools should encourage innovativeness as a feature of subject-based learning, yet in addition to also to devote almost 10% of of overall school time to projects and other transversal activities that foster creativity.

Toward the finish of secondary school, students in Singapore are supposed to have developed basic and innovative reasoning skills. Singapore has likewise embraced a science instructional plan based on metacognitive ways to deal with complex critical thinking.

Instructional plan change and organisational innovation have begun to show up in India. The Apeejay school network technologies education projects for creativity and innovation, with practices, for example, inquiry-based projects intended to develop inventiveness and unique reasoning. Today, the Apeejay family contains around 40,000 students, 60,000 graduated classes, more than 2,500 resources, and infrastructure that includes over 4,000 PCs for well-equipped laboratories that provide education from pre-nursery to doctoral level. Apeejay institutions granting advanced education incorporate schools and expert institutions that propose over 85 projects at the undergraduate, postgraduate, and doctoral levels in Management, Bio-Sciences, Pharmaceuticals, Legal Studies, Architecture, Engineering, Information Technology, Fine Arts, Design, Education, Journalism & Mass Communication and Humanities.

In Costa Rica, the Innovating at Home programme means to teach parents how to develop their children's creativity from an early age.

Denmark's 2012 National Innovation Strategy promotes the integration of innovation and entrepreneurship into the standard instructional plan and increments practice-based showing in schools and innovation courses in teacher training programs.

Herewith selected educating innovation initiatives in developed and developing countries.

Innovation education initiatives in developed countries

Education Endowment Infrastructure (EEF), U.K.

EEF is an independent grant-making charity that upholds innovative initiatives with the possibility to build the achievement of hindered students in schools in Britain (van der Elst, 2016). The EEF welcomes propositions with a particular spotlight on early literacy and numeracy. The EEF processes are accomplished through different channels, for example, by providing guidance for teachers and schools on how best to use their resources to improve the attainment of pupils.

MindLab, Denmark

MindLab is a cross-governmental innovation unit that includes citizens and businesses in making new solutions for society. MindLab's center staff comprises six project managers with a background in design, political science, anthropology, sociology and communication; seconded project managers (as long as one year); as well as a number of support staff. The Board sets the necessary bearings and provides the last endorsement to projects. It is upheld by an Advisory Board made up of 10 national and international experts. Entrepreneurship, digital self-service, education and employment are some of the areas addressed, helping key decision-makers and employees view their efforts from a citizen's perspective and thereby co-creating better ideas. Its physical space is a neutral zone for inspiring creativity, innovation and collaboration.

Fonds d'expérimentation pour la jeunesse (FEJ) - Experimental Fund for Youth, France

The FEJ was made in 2008 by the French national government (Ministry of Youth) to improve children's educational achievement and social and professional integration. The Fund upholds the mainstreaming of project results into the policymaking system to advance understudy accomplishment and improve the social and professional integration of young people.

The FEJ has supported 716 projects somewhere in the range of 2009 and 2014, involving around 620,000 children and 150,000 adults.

Entrepreneurship education in Sweden

Sweden took on an entrepreneurship education strategy in 2009, which has been reconsidered in 2012 (schooleducationgateway site). Skolverket, the Swedish Agency for Education is tasked with the implementation of the strategy. The Agency provides funding to municipalities, independent schools, as well as various institutions working with entrepreneurship education to promote the implementation. The Agency additionally upholds research activities and the development of guidance materials on entrepreneurship education. Entrepreneurship education is embedded across all levels and types of education.. It is essential for compulsory education as a cross-curricular objective in primary, lower secondary and vocational education. It is often taught as a separate subject.

Snilleblixtarna (Flashes of Genius)

Snilleblixtarna (Flashes of Genius) is an organisation that upholds entrepreneurial education in practice by focusing on training school teachers to raise children's interest in entrepreneurship, technology, natural sciences and inventions. It upholds the Swedish Education plan for elementary schools. The Snilleblixtarna concept is pointed fundamentally at educators who can want to build the interest of students in technology, natural sciences, inventions and entrepreneurialism. The program has rules for educators that they can use in their day-to-day work and assist them with handling the subjects 'everyday technology' and 'entrepreneurship'. The principal goal

of the concept is to help children at thinking freely and innovatively, expand kids' knowledge by allowing them to work with their own inventions.

Snilleblixtarna in Sweden manages local and regional partners with whom they have signed an agreement. There are around 60 certified operators around Sweden and the operators are the extended arms of Snilleblixtarna at local schools, making the implementation easier. The certified operators are explicitly prepared as partners and licensed to prepare and ensure educators. The objective set is to arrive at around 100 partners engaged in the work of the network. The organisation is operated by volunteers and is funded through different funds, including EU funding.

Examples of ongoing initiatives addressing entrepreneurship education

uf-enterprise

The uf-enterprise drive is for children who wish to acquire insight from the genuine business world, including finding out about an organization's life process, writing a business plan, experiencing sales management and composing an annual report. The program targets upper secondary school students between the age of 16 to 20 years. With assistance from educators and business agents, students start their own companies and run them throughout the program. The program requires an elevated degree of involvement from instructors combined with critical inspiration from the students. Out of the participants 24% of the students subsequently started their own company.

Summer Challenge

Summer Challenge is a program executed by Staffan Secondary School in Sweden. The principal point is to develop the pioneering skills of children. Students spend a mid-year obtaining experience in different parts of an existence of a business visionary by going to courses as well as running their companies. The companies can be run either by individuals or by teams. Toward the start of the program, students have a grant and a tutor who will direct them through the program. Summer Challenge targets secondary school students.

Future seeds (FramtidsFrön)

Future seeds (FramtidsFrön) is a non-profit association, which supports and trains educators and provides different tools to make it easier to start working with entrepreneurship in schools. FramtidsFrön cooperates with municipalities and schools to plan activities and training courses for teachers, especially adapted for each municipality. Educators additionally work with FramtidsFrön in the generation of material to guarantee it is pedagogically solid and of excellent quality.

Finn Up

Finn Up is a traditional Swedish competition for children matured 12-15. The students identify a problem in their everyday life and then try to solve it with an invention. Thusly, they find out about society, technology and themselves. The objective is to increment interest in science and innovation among children. Finn Up is subsidized by the Swedish government. The competition is open to both high-level technical innovations as well as straightforward and savvy solutions to everyday problems. A range of pedagogical methods is applied - brainstorming, designing and implementation. The students can work in groups or separately

The national curriculum explicitly incorporates IE as a subject where students are prepared to distinguish needs and problems in their environment and find solutions, a process alluded to as ideation. The fundamental accentuation of IE is to expand students' creativity and autonomous reasoning to prepare them better to manage their reality and take a functioning part in the public eye through innovation.

Innovation education was presented inside mandatory tutoring in Iceland in the mid-1990s and shaped part of the National Curriculum in 1999 (Thorsteinsson and Jónsdóttir). Its official name within the curriculum is 'Innovation and the Practical Use of Knowledge', but the term 'Innovation Education' is more commonly used, or 'Entrepreneurship/Entrepreneurial Education' at upper secondary level.

.At first, IE was acquainted together with elementary school students to participate in the new Young Inventors' Competition, which was influenced by the Swedish Finnup Competition. IE teaching method was developed inside make illustrations as after-school classes and a mid-year school for youthful engineers and was upheld by The

Society of Icelandic Inventors, The Technological University and educational authorities in Reykjavik. IE was impacted by the standards of Nordic Sloyd, in that it was designed to teach kids comprehensively by means of a carefully structured system (Thorsteinsson and Olafsson, 2009). Inside the setting of innovation, Sloyd offered a carefully structured system through craftsmanship and supporting ideation skills (Thorsteinsson and Denton, 2008).

One illustration of this is a thought introduced by two small kids in Gnúpverjaskóli in South Iceland, who found an answer for the issue of the trouble of students holding up their hands for quite a while sitting tight for help from the educator. They designed a straightforward relic called Hand-e which can be dismantled and kept in a school pack. At the point when an understudy needs the support of their instructor, they collect the Hand-e directly in front of them and bring it down once the educator has helped them.

Smart Schools' Project, US

In 1984, Perkins and his partners at Harvard offered a smart school project as another involvement with education programs by ICT (Mirzajani et al, 2016). As per Perkins (1992) in smart school learning is the result of thought and all students can learn all around the thought, and that learning requires profound comprehension and adaptable and dynamic utilization of information. This plan was carried out slowly in various schools and later extended to some degree.

Smart school is one of the embraced ways to deal with and meet the present current requirements (Millton, 2003). The fundamental accentuation of IE is to expand students' innovativeness and autonomous reasoning to prepare them better to manage their reality and take a functioning part in the public arena through innovation.

Smart school is an instructive methodology that led to key changes in learning and teaching process with the joining of information technology and curriculum, in the methodology educator plays the part of an aide, not a transferor of knowledge, and the role of students rather than passive consumption of organic knowledge is as an active, creative, critical and participation person. Evaluation system changes a process-driven inquiry (Attaran, 2011). Shrewd School is a Practical and designated proposition to

run the most developed and new showing techniques and logical glance at the present status of the educational system (Yoong and Lew, 2009).

Educating innovation initiatives in developing countries

Smart school Malaysia

The Malaysian Smart School project was launched in January 1999 and the trial finished in 2002. In the pilot project, 78 million dollars was thought of and the biggest portion of 38% of the spending plan was dedicated to the preparation of training materials (Puteh and Vicziany, 2004).

In Malaysia in 1996 with an emphasis on getting ready students to enter the data age likewise, uncivil changes were viewed in Malaysian schools and accepted that eventually, all schools become Smart. In these schools learning depends on the speed of the individual, organization, and self-lucidness between the subjects, and the course content is not restricted to printed books yet additionally digital books, software, multimedia courseware and databases. At the same time, a few plans are being ready for individual differences in learning styles of every student. Pilot execution finished in 2002 (Attaran, 2011).

Toward the finish of this experience, it was concluded that such schools must be designed in light of the accompanying components: - Search-based instructional programs and related materials composed for courses in Malay, English, science, and math. - PC the board frameworks of Smart Schools. - innovation framework of smart schools includes the use of IT and non-IT equipment, local area network and virtual private network with the ability to connect the pilot schools, data centers and services of the Ministry of Education. - centralized support centers across the country to support and maintenance. - Specialized support such as integrated systems, project management, re-engineering business process and change management (Foong, 2002).

Smart schools in Malaysia has been effective in its in its technology part but the training has progressed slowly. Educators oppose such schools and are not ready to

show up in such schools. They likewise stress that the emphasis on the utilization of ICT in educating, increment how much work (Puteh and Vicziany, 2004). Yoong and Lew (2009) in such a manner, revealed that in many schools, educators don't have adequate skills in that frame of mind of ICT applications. The joining of ICT in the Malaysian classroom is still in the beginning phase and a great deal of educators can utilize ICT-based instructive techniques, while for the fruitful execution of the project, preparation of teachers and schools, was a key issue.

Smart school Senegal

In 2015 the Senegal Ministry of Education and Samsung Electronics Africa have launched a Smart school mobile education solution aimed at creating positive change and providing an advanced and interactive classroom experience for learners (Khumela, 2015).

Installed at the Plan Jaxaay Secondary School, the Samsung Smart School initiative is an integrated platform that incorporates a monitoring and controlling component - which permits instructors to monitor educational content on their students' screens - a screen-sharing element and a real-time question-and-answer feature.

Smart schools have additionally been introduced in nations like Mali, South Africa, Kenya, Rwanda, DR Congo, and Sudan.

Mobile internet school, South Africa

In October 2011, Samsung unveiled its first solar-powered mobile Internet school in South Africa (Khumela, 2015). This is a 12-meter-long container intended for up to 21 students, it is furnished with a 50-inch electronic board, Internet-enabled solar-powered notebooks, multi-function printers, Samsung Galaxy tablet computers and Wi-Fi cameras. The container is powered by a solar panel roof generating nine hours of electricity a day to address the challenges of power supply in African nations.

The Innovation Edge, South Africa

The Innovation Edge provides a platform for resourcing, testing the plausibility and viability of innovative ideas to further develop to improve early childhood development (ECD) and is centred on establishing an environment in which innovation prospers.

There is the web-based Innovation Exchange, a platform integrated on the Innovation Edge website where explicit challenges are recognized, and ideas to be shared are advanced and examined online. Partnerships amongst applicants are encouraged prior to funding and/or technical support.

Bertha Education Innovation Initiative, South Africa

Laid out in 2011 as a Centre for civil rights, the Bertha Center is devoted to propelling social innovation and entrepreneurship. Its central goal is to uncover, connect, pioneer and advance social innovators and entrepreneurs who share an enthusiasm for creating inclusive opportunities and accomplishing civil rights in Africa. Situated at the the University of Cape Town's Graduate School of Business (GSB), its work is coordinated into the GSB's curriculum, adding considerably to its reach and capacity. One of a few initiatives connects with education. The program joins innovation specialists with NGOs, government, and funders to share knowledge and facilitate collective impact.. Focus areas include: early childhood development, literacy and numeracy, teacher development, curriculum development, productive partnerships with government, marketbased solutions and narrowing the gap between education and employment.

Atal Innovation Mission (AIM), India

AIM is a government of India's flagship initiative to advance a culture of innovation and business projects in the nation and was setup in 2016 (point site). AIM guarantees the creation of a problem-solving innovative mindset in schools mentality in schools and and creates an ecosystem of entrepreneurship in universities, research institutions, private and MSME sectors. AIM is at present having its projects audited by external agencies to guarantee continuous improvements.

Atal Dabbling Lab (ATL) program launched by AIM is a state-of-the-art space laid out in school with an objective to cultivate interest and innovation in youthful personalities, between grade sixth to twelfth of the nation through 21st-century devices and innovations, for example, tools and technologies such as Internet of Things, 3D printing, rapid prototyping tools, robotics, miniaturized electronics and do-it-yourself kits. The point is to invigorate a critical thinking innovative outlook inside the offspring of the ATL and alongside communities.

AIM has chosen 10,000 schools in around 680 districts of the country for the establishment of ATLs. In excess of 7000 schools are supported till now and over 2 million students approach ATLs

To create an ever-evolving ecosystem of start-ups and entrepreneurs, AIM has been establishing world class incubators called Atal Incubation Centres (AICs) at universities, institutions and corporates among others. These centres aim to foster and support world class innovation, dynamic entrepreneurs who need to construct scalable and sustainable enterprises. To date AIM has effectively operationalized Atal Incubation Centres with universities / institutions / private players.

C-STEMP Learning Management System (LMS) with Multimedia education resources translated into regional languages, Nigeria

This innovation will address explicit necessities such as unaffordability of and inadequate access to acquiring construction skills and barriers of language and literacy levels in training delivery (AU, 2020). The innovation is a LMS custom-made to the requirements of the needs of construction skills and the vast population of Nigerians who make up the construction labor. This LMS is the first to be designed for vocational skills in a sector for which the major mode of learning in Nigeria is traditional apprenticeship through physical contact. for professional skills in a sector

for which the major method of learning in Nigeria is conventional apprenticeship through physical contact. The innovation is likewise the first learning platform in Nigeria with multimedia training resources translated into major local languages (Pidgin English, Hausa, Igbo, Yoruba, subtitled in the widely used Arabic type Ajami script) for delivering accelerated construction skills training and assessment in line with the National Occupational Standards. Construction companies can use the resources to train new hires onsite wherever they are starting new projects, making it possible to deploy local labor.

ICT schoolplus innovation, Nigeria

ICT Schoolplus is transforming Nigeria School System by utilizing Information Communication & Technology Development tools (AU, 2020). The Innovation Functions School++ Innovation functions as a cloud-based and integrated online educational mobile automation system that interfaces schools, parents, instructors, and students with present-day innovations. The application permits teachers to transfer results, produce students' ID cards, upload timetables, and handle understudy's participation. The School++ helps in working on the nature of education by upgrading the instructing and growing experience, which achieves better execution and expands the norm of instruction in Africa. The application has 4789 students on the platform and 75% of the students were successful when WASC results were delivered in September 2020.

Voltschool in Ghana, Nigeria, Liberia, Sierra Leone, The Gambia, South Sudan, and Uganda, Vilsquar

Voltschool addresses a shortage of schools comparable to the populace, lack of expert educators, and costs of educating and learning materials in secondary school education in Africa (AU, 2020). VoltSchool provides high quality digital learning for secondary school level learners across Africa. It upholds asynchronous learning, providing an inclusive platform for learners, particularly girls, and other vulnerable people, to learn at their speed and accommodation.

VoltSchool is viable with assistive computer technology for visually challenged and hearing impaired learners. It is accessible on digital devices of all screen sizes and on

mobile networks with a minimum of 2G connectivity. An embedded virtual science lab permits students to simulate experiments. Launched in June 2020, VoltSchool had toward the finish of November 2020 over 5000 students from across 12 African nations enlisted on the platform with an average completion rate of 85% completion per topic recorded. More established students (over 19 years) were utilizing the platform to prepare for private School Leaving Exams (GCE). It was embraced by the Class of Imams in Liberia for use in Koranic schools. NGOs in South Sudan and Uganda were utilizing VoltSchool resources to help their offline teaching in rural areas and parts of the refugee community respectively. Obafemi Awolowo University Ile-Ife and Federal University of Agriculture Abeokuta to deploy virtual science labs. VoltSchool at present offers 2 plans - free fundamental and subscription-based premium.

Mobile Schools, Kenya

In certain parts of Africa, the custom of traveling pastoralism is as yet alive. People move from one location to another in search of grazing lands for their livestock (SLA).

For kids who experience childhood in such families, the on-the-go way of life ends up being a hindrance to education as they battle to routinely go to class.

Luckily, for some nomadic younger students in Kenya, admittance to education has become simpler as they can now move around with their school.

In 2010, the Kenyan government and UNICEF launched mobile schools which brought education to learners whose families had to relocate frequently in order to survive. Educators presently live and go with the itinerant groups, setting up tents and temporary schools.

The mobile schools ordinarily plan their schedule around rainfall patterns. The greater part of the learning happens during the stormy seasons when kids do not have a lot of household chores.

Learning Through Robotics, Ghana

Ghanaian company, Metro Institute of Innovation and Technology (MIT), offers school children training in robotics and mobile app development. They want to advance their science and business knowledge.

Offering lessons to children of all ages, MIT established the National Robotics Summer School. Attending this school, learners can take their science skills to the next level by programming robots and designing games.

Innovation policy for developing countries

The proposed model of innovation policy for developing countries is based on the experience of wide range of countries analyzed in the different parts of our research. GIAN is an efficient model supporting grassroots policy. International organizations are involved in programs supporting inclusive innovations and new technology integration in developing countries. Some developing countries have their local institutions supporting inclusive and high tech innovation initiatives.

Towards a policy framework for Grassroots Innovation (GRIs)

Public-initiated programmes offers direct support and incentives to grassroots innovations, for example, The Honey Bee Network (HBN), India which points around the commitments of non-formal innovators, and the the Grassroots Innovations Augmentation Network (GIAN) which helps to commercialize grassroots innovations.

Generic programs leverage community social innovation like In the Philippines the Innovation for Inclusive Development (GRIND) which aims to empower marginalized communities by by creating and reinforcing its current grassroots innovations. In Thailand, the Social Innovation Platform (SIP) platform is focused on transforming local food systems by encouraging new forms of collaborations between local farmers, fisherman, SMEs, municipalities, consumers, academic institutions, young creative groups and local business associations and market managers.

Inclusive Innovation policy

The institutional inclusive innovation initiatives are centered around financing Tech-Empowered SMEs and entrepreneurial/innovation ecosystem capacity.

The main areas

The main areas covered by those programs are productive and market-integrated smallholder agriculture, end malnutrition, Health, Government Innovation, Education, Arts and the Creative Economy, and Innovation Policy.

The authorities provide its community of start-ups, investors and ecosystem players with capacity building programs, market & funding opportunities and regulatory assistance.

The Youth Technology innovation programme (YTIP) increases the support of children in the economy by giving financing for the improvement of techno-projects.

Regional Inclusive Innovation Centres help establish an inclusive innovation and entrepreneurship ecosystem in the country.

Targeted frontier technologies

AI-based solutions, Pest Management, Tuberculosis, Automated reading of TB LPA test results, Newborn Anthropometry, water and food security, Energy and Environment, GSMA Mobile for development in financial services, health, agriculture, digital identity, energy, water, sanitation, disaster resilience and gender equality.

The targeted frontier technologies relevant for developing countries are in the following domains: Drones, Education, Digital communication platforms for informed decisions, Financial and ordering digital services, Energy, Agriculture and Healthcare

Reverse innovation

Reverse innovation is rethinking engineering processes improving basic features, cutting costs and opens new markets in developed countries in the following domains. Here with some examples.

Health: GE MAC 400 mobile ECG, Lullaby baby warmer, Mindray mobile ultrasound, Detecting cervical cancer with vinegar, Ultrasound Machine ElastPQ

Transport: Mahindra and Mahindra tractor, BYD electric car,

Environment: Automotive Air Purifiers (GoPure), Philips Tata – Swacch water purifier, and Husk

Energy: Power microgrid

Educate to innovate

The principal accentuation of Innovation Education is to build students' creativity and free reasoning in order to prepare them better to manage their reality and take a functioning part in the public eye through innovation.

Smart Schools is an educational approach that leads fundamental changes in learning and teaching process with the integration of information technology and curriculum, in the approach teacher has the role of a guide, not a transferor of knowledge, and the role of students rather than passive consumption of organic knowledge is as an active, creative, critical and participation person.

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Grassroots innovations are innovative products or processes produced for and by the low-income group, normally aimed toward conquering the hardships and difficulties of life.

Inclusive innovations improve the supply of fundamental necessities by offering higher added benefits. Some are restricted in their point of view to small applications executed locally with not many opportunities to be updated and adapted to regional or global markets. Others open new markets in other developing nations and may likewise compete in developed nations. Some grassroots or inclusive innovations are social innovations that further develop the well-being of society using innovations to address social needs.

High-tech innovations are imported from developed nations by developing nations and adapted to the necessities of the local market. A part of those adaptations could be reverse innovations applicable for the low-hand market or professional in developed markets requiring less costly good enough solutions for their necessities.

Reverse innovations open new markets in developed nations, since they arrive at the cost-value level for certain applications, for example, mobile scanning or blood pressure frameworks in ambulances

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