STI SECRETARIAT CONTRIBUTIONS TO THE 2021-2026 NRM MANIFESTO

Presented by the Minister for Science, Technology & Innovation. May, 2023

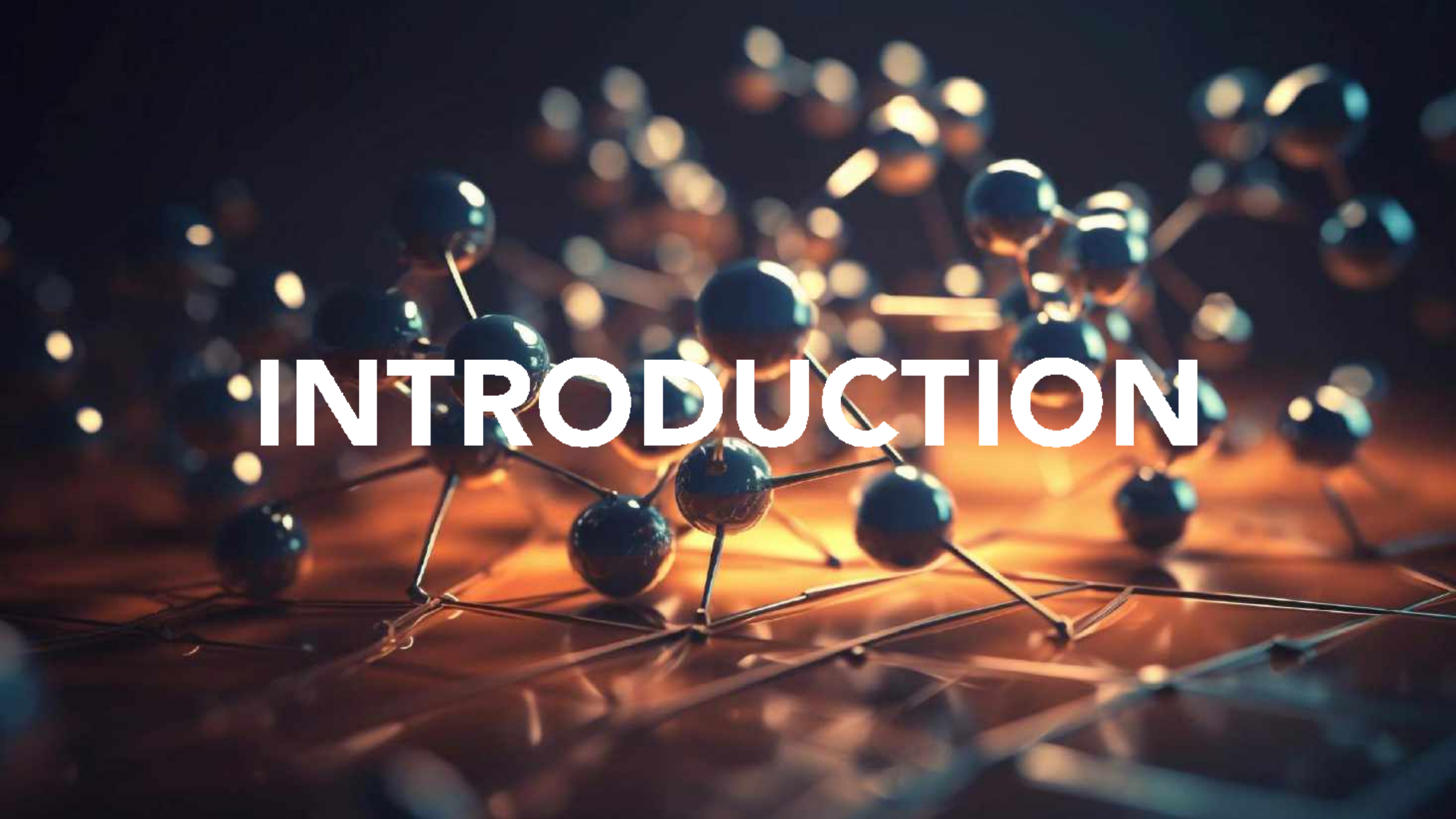
SCOPE OF THE PRESENTATION

01 Introduction

02 Executive Summary

03 Accomplishments 2021-2023

04 Challenges & Recommendations


INTRODUCTION

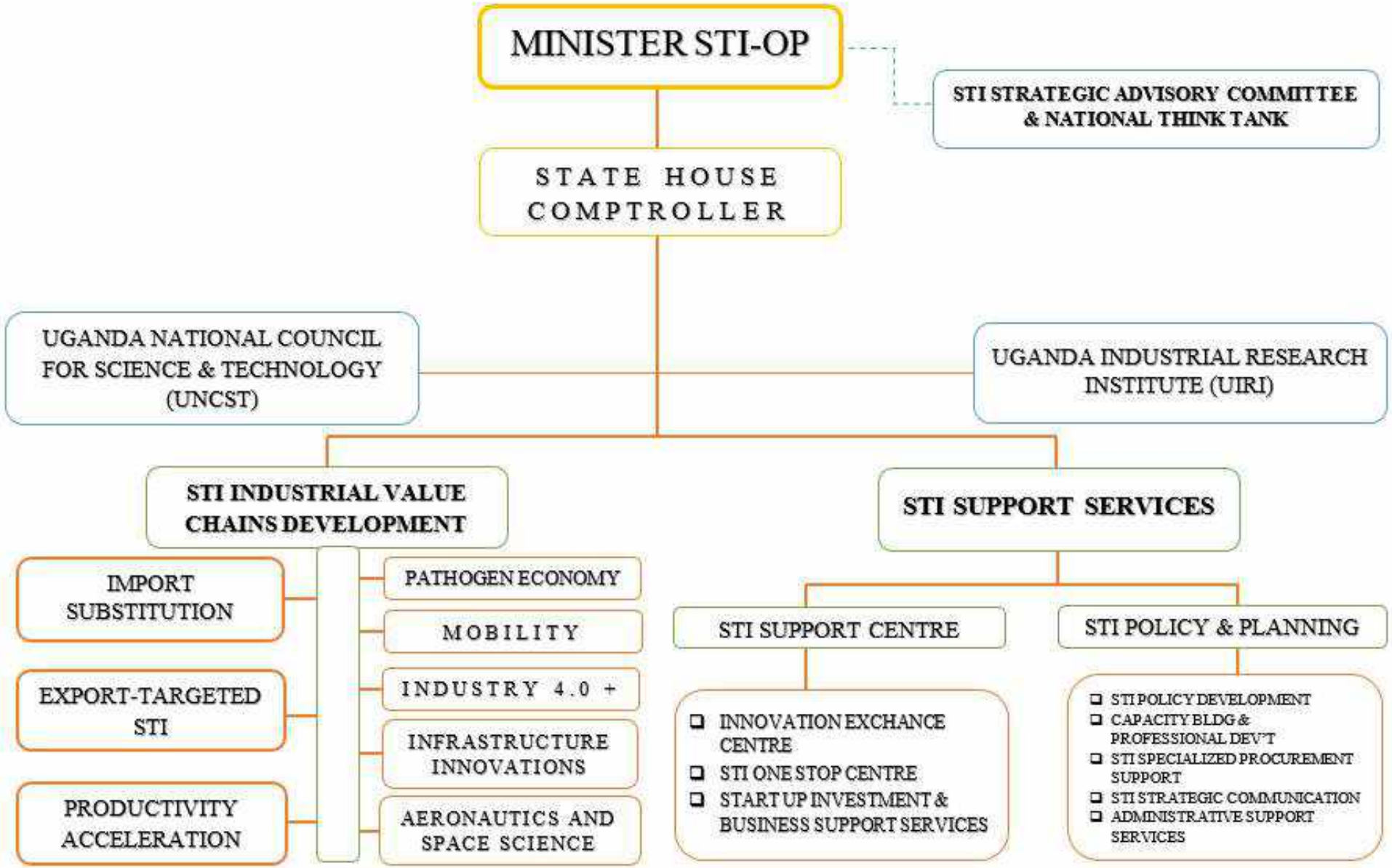
THE STI SECRETARIAT

- The **NRM Manifesto emphasizes Science, Technology, and Innovation** (STI) as a driver for our nation's socio-economic transformation

- To make STI work for our nation, Government has established the **National Science, Technology, and Innovation System** (NSTIS) coordinated by the Science, Technology and Innovation Secretariat at the Office of the President (STI-OP)

- The STI Secretariat (STI-S) headed by the Minister for Science, Technology and Innovation, Office of the President, leads the National STI System (NSTIS), and is itself under the direct oversight of H.E the President

STRUCTURE OF SCIENCE TECHNOLOGY AND INNOVATION, OFFICE OF THE PRESIDENT



STI MANDATE

To **mobilize, coordinate** and provide **strategic oversight** and **policy guidance** to scientists and stakeholders in MDAs, local governments, academic and research institutions, private sector, schools and vocational Institutions, regulators, development partners, media, and the public **along the prioritized industrial value chains** to increase productivity, import substitution and export of knowledge-based products and services.

MAKING UGANDA THE BEST

STI IMPLEMENTING AGENCIES

UGANDA INDUSTRIAL RESEARCH INSTITUTE (UIRI)

STI FUNCTIONS:

- Undertake applied research to support Industrial Development
- Carrying out STI incubation
- Provide technical support to SMEs
- Provide specialized STI training and skills

UGANDA NATIONAL COUNCIL FOR SCIENCE & TECHNOLOGY (UNCST)

UNDER RESTRUCTURING TO:

- Regulate all aspects of STI
- Translate STI policies into regulations and standards to guide operations of the entire STI System
- Monitor and evaluate STI activities and compliance to STI regulations
- Home science professional institutions and continue professional development

STI ENTERPRISES, CORPORATIONS & INVESTMENTS

PRESIDENTIAL INITIATIVE FOR BANANA INDUSTRIAL DEVELOPMENT (PIBID)

TARGET:

Commercialize value added banana products for export promotion.

- Transitioning into a commercial enterprise owned by Government

KIIRA MOTORS CORPORATION (KMC)

Target: 500,000 vehicles produced annually with 65% localization by 2030

promoting environmentally friendly transport solutions

STI BUREAUS

The STI agenda prioritizes 8 Industrial Value Chains structured under Bureaus that each have different priorities that focus on driving tradable STI, leading to industrialization
through uptake by the public or private commercial

STI BUREAUS

- PATHOGEN ECONOMY
- MOBILITY
- INFRASTRUCTURE INNOVATION
- INDUSTRY 4.0 +
- PRODUCTIVITY ACCELERATION
- AERONAUTICS & SPACE SCIENCE
- IMPORT SUBSTITUTION
- EXPORT TARGETED STI

Each Bureau hosts a Think Tank which brings together a vast repertoire of experts from across academia, research, private sector, civil society, and investors to engage in purposeful coordination, thinking, planning & peer review of projects under the specified value chain. The STI-OP is the first institution of Government to implement Think Tanks

EXECUTIVE SUMMARY

This presentation highlights the major achievements made by the Science, Technology and Innovation Secretariat over the Manifesto period 2021-2026, in line with the sectors manifesto commitments, and is presented in relation to the Secretariat's priority industrial value chains.

The Secretariat is on track to meet and in some areas surpass the manifesto targets, as this presentation outlines in detail, notably in supporting 103 projects across Uganda, and creating thousands of jobs across varied value chains since 2021.

ACHIEVEMENT OF MANIFESTO GOALS

- where we are to-date

COMMITMENTS	% PERFORMANCE OF FY 22/23 TARGET	% PERFORMANCE OF FY 25/26 TARGET
Effectively coordinate institutional synergies to avoid fragmentation and working in silos	94	61
Acquire State-of-the-Art technologies by institutions to facilitate R&D & productive activities	79	15
Enhance Commercialization of innovations to address productivity, import substitution and export value addition	75	46
Invest in the development and commercialization of technology along the Prioritized Industrial Value Chains	76	53
Provide funding to support Innovation in the country	35	13
Retain and motivate Scientists to Stay and work in the country	70	25
Provide effective support services to innovators to transform ideas into marketable products	50	25
Provide a supportive regulatory ecosystem for STI	45	15
Develop relevant human capital to drive R&D and commercialization of STI products	100	21

STI SUPPORTED PROJECTS

COMMITMENTS	NUMBER OF PROJECTS
Presidential Scientific Initiative on Epidemics (PRESIDE)	26
National Research and Innovation Program (NRIP) 2021-2022	38
National Research and Innovation Program (NRIP) 2022-2023	25
Specific Value Chains (Sweet Potato and Shea Butter)	2
Long-term EU- Africa research and innovation Partnership on food and nutrition security and sustainable Agriculture (LEAP-Agri)	12
TOTAL	103

ACCOMPLISHMENTS

2021-2023

01 | PATHOGEN ECONOMY

FOCUS:

Coordinate and facilitate research, development, technology transfer, and commercialization of innovations targeting disease control and management for plants, humans and animals - vaccines, diagnostics, therapeutics - and the attendant ecosystem

I. VACCINES

KEY ACCOMPLISHMENTS

- **3 candidate human vaccines** developed for acute respiratory tract infections
- 2 vaccines have **completed pre-clinical trials, human trials for 2023-24**

NEXT STEPS

- Human clinical trials for vaccines planned for FY 23/24
- Pilot plant for vaccine manufacture under construction
- Tanzania collaboration to manufacture Foot and Mouth Disease vaccines locally
- NDA to issue license to start vaccine manufacture for clinical trials

Vaccine Benchmarking Visit

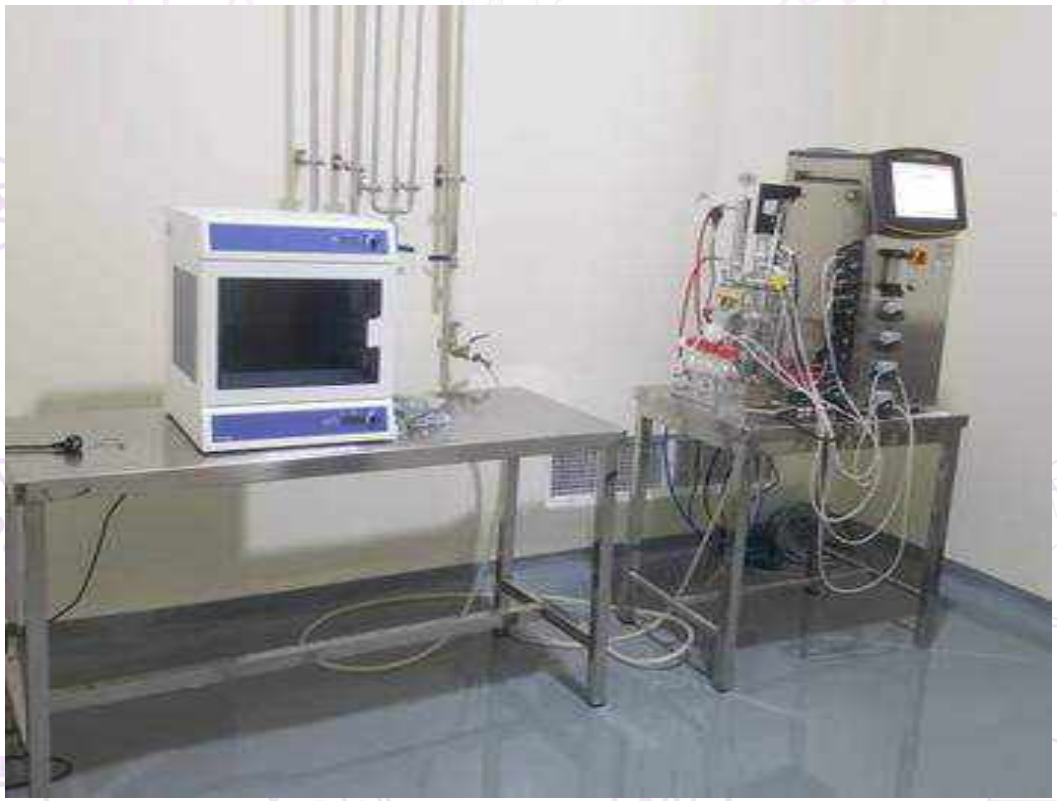
STI Minister and the Principal Program Officer visiting the VACSERA vaccine manufacturing plant in Egypt

1st End-to-end Vaccine Manufacturing Line In Uganda

- Collaboration with Alfasan
- Good manufacturing Practice Plant is operational in Namanve
- To manufacture the Makerere University developed anti-tick vaccine, & other locally developed vaccines.

SCIENCE, TECHNOLOGY & INNOVATION - SECRETARIAT
REPUBLIC OF UGANDA

BIOPROCESS MACHINERY PURCHASED BY ANTI-TICK VACCINE INITIATIVE NOW INSTALLED AT ALFASAN



Machinery for fermentation and expression of the proteins

Biosafety cabinet GMP bioprocess in the media preparation room.

Packaging machines installed including washing, sterilization, fill and packaging, labeling and inspection machines

Bioshaker for production of Sub-Unit Vaccines. Facility has capacity to produce 10,400,000 doses a year.

NGOMA FARM

The farm undergoing transformation into a **vaccine clinical trial site**

II. THERAPEUTICS

ACCOMPLISHMENTS

- ✓ First ever **clinical trial of a locally developed natural therapeutic,** UBV-01N completed
- ✓ **Clinical Trials for Natural Therapeutics (CONAT) platform**, the first of its kind in Africa, hosted by Makerere University Lung Institute, developed to fast-track multiple therapeutics through clinical trials
- ✓ 2 therapeutics currently in the CONAT pipeline
- ✓ 24 Several therapeutics being supported through the pre-clinical phase

Focus is on harnessing the potential of our Natural Therapeutics which have gone ignored since colonization.

Therapeutics Benchmarking Visit

A team from Busitema University benchmarking on the Good Manufacturing Practices (GMP) facility for Natural Therapeutics in South Africa, fully supported by STI-OP- Pathogen Economy

III. DIAGNOSTICS

ACCOMPLISHMENTS

- ✓ 5 PCR and 7 rapid diagnostics kit prototypes are ready for industrial production for use with humans; and the cassava/sweet potato/banana wilt (plants)
- ✓ 4 projects working to produce inputs and reagents that go into the use of test kits, which are currently imported
- ✓ Pilot plant to manufacture the locally made diagnostics under construction
- ✓ All equipment has already been procured

IV. RESEARCH INFRASTRUCTURE

The Secretariat has set up several state-of-the-art central research facilities to support research and development of vaccines, diagnostics and therapeutics

STATE-OF-THE-ART LEVEL-2 BIOBANK FACILITY

Makerere University

A repository for human biological materials (blood, saliva, urine, faecal matter) for R&D and testing of vaccines, drugs and diagnostic kits

- ✓ Over **20,000 samples collected**
- ✓ Supported over **8 therapeutics and 3 diagnostics projects** that required COVID-19 samples
- ✓ **Positioned for upgrade to Biosecurity Level-3** and approvals are being sought

B

IN-VITRO STUDIES FACILITY

UVRI

To carry out pre-clinical studies at cellular level to support development of vaccines, therapeutics and diagnostics

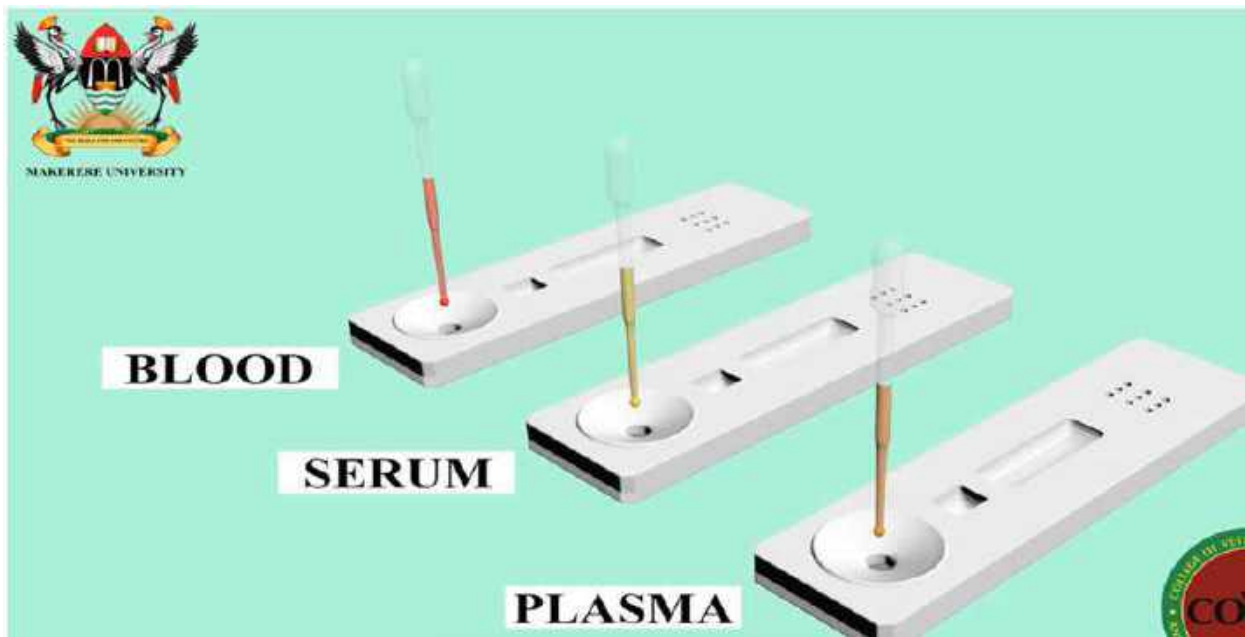
- ✓ Facility established with Studies focusing on safety and toxicity of the candidate products
- ✓ Candidate drugs and antibodies induced by vaccine candidates are tested for efficacy against target pathogens
- ✓ Completed analysis of 23 natural drug products for COVID-19, RTIs, Kidney disease, Influenza
- ✓ More products for cancer, asthma, ulcers, diabetes, malaria in the pipeline for FY 2023/24

BIOMARKER RESEARCH CENTRE

Makerere University

Goal to strengthen Uganda's capacity to develop point-of-care disease diagnostic and prognostic assays kits, to reduce over dependence on the importation of diagnostic kits and also innovate better diagnostic technologies locally

- ✓ Developing local capacity to use biological molecules in blood, urine, saliva to develop rapid diagnostic kits for early disease diagnosis including cancer; to diagnose or predict severe patients; and monitor response to treatment
- ✓ Developing prototype kits for predicting severe COVID-19, and disease staging for sleeping sickness, and training junior scientists in the technology
- ✓ Future planned kits: malaria urine diagnostic test and cervical and prostate cancer screening kits


MAKERERE UNIVERSITY
BLOOD
SERUM
PLASMA

D

LABORATORY ANIMAL HOUSE

Makerere University

A Biosafety Level-3 facility for animal breeding and care (mice, rabbits etc) to support pre-clinical studies for therapeutics and vaccines.

- ✓ At College of Veterinary Medicine, Animal Resources and Biosecurity to **conduct in-vivo studies**
- ✓ Upgraded from biosafety level-2 to level-3
- ✓ Swiss & transgenic **mice breeding and pre-clinical studies** for therapeutics and vaccines

NANOPARTICLE RESEARCH CENTRE

Makerere University

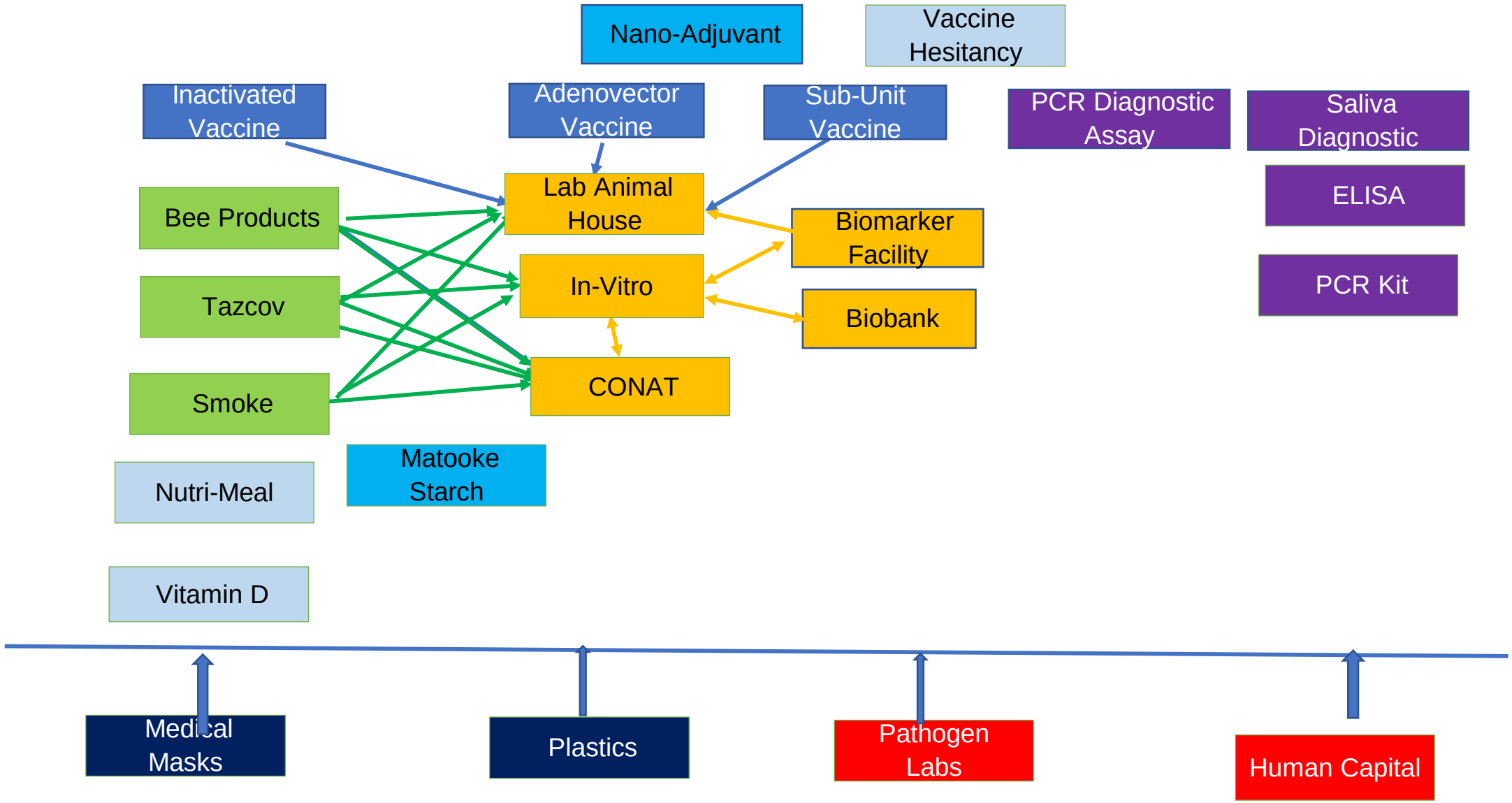
- ✓ Has a state-of-the-art **Structure Electron Microscope** (SEM), to support analysis of materials for production of medicine, vaccines, forensic examinations
- ✓ Facility has **developed nano-adjuvant materials** for vaccine delivery tested in the Subunit Candidate Vaccine, with more testing to be done on other vaccines

PROPOSED PATHOGEN ECONOMY SCIENCE PARK

Top Left: STI team with scientists from NDIYO Biosciences Ltd on a field inspection visit in Nakasongola.

Bottom Left: STI Minister and Secretariat staff visit the land in Nakasongola land for the proposed National Science Park

PATHOGEN ECONOMY: Value Chain Linkages of Projects



SUPPORTED PROJECTS

Aspect	Outcome	Institution/District
VACCINES	**HUMAN:** **3 prototype candidate vaccines** for Respiratory Tract Infections	2 - Uganda Virus Research Institute 1 - The College of Veterinary Medicine, Animal Resources and Bio-security (COVAB)
	ANIMAL: **1 Anti-tick Vaccine**	The College of Veterinary Medicine, Animal Resources and Bio-security (COVAB)
DIAGNOSTICS (testing)	**HUMAN:** **6 diagnostic kits** testing COVID-19, Ebola, Marburg developed and established	Makerere University College of Engineering, Design and Technology (CEDAT) Joint Clinical Research Centre (JCRC) Makerere University College of Health Sciences (CHS)
	PLANT: **4 diagnostic tools**	Gulu University ASPA Medical Supplies Ltd. Mbarara Soroti University

Aspect	Outcome	Institution/District
THERAPEUTICS (medicines)	**HUMAN:** 6 therapeutics	1 - Busitema University 2 - Natural Chemotherapeutics Research Institute (NCRI) 1 - Mbarara University (MUST) 1 - Presidential Initiative on Banana Development (PIBID) 1 - Medical Research Center Ltd.
	ANIMAL: 4 therapeutics	The College of Veterinary Medicine, Animal Resources and Bio-security (COVAB) Karamoja Christian Ethno Veterinary Program Katosi Fish Pharmaceuticals and Nutraceuticals (KAFIPAN) ABI Zonal Agricultural Research and Development Institute, National Agricultural Research Organisation

Aspect	Outcome	Institution/District
SURVEILLANCE & SURVEYS	**3 Surveillance Projects:** Antimicrobial Resistance Modelling, research and development for therapeutics and PCR kits **2 Ethnobotanical Surveys** on local malaria treatment, COVID-19 Vaccine Safety and Efficacy	1 - Mbarara University of Science and Technology (MUST) 1 – Makerere University College of Health Sciences 1 - Makerere University Lung Institute
NUTRACEUTICALS	**2 Neutraceuticals**	1 - Makerere University School of Public Health 1 - Yunga Technologies Ltd, Ntinda
MEDICAL DEVICES	**2 Medical Devices:** - Baby Resuscitator - Hospital Disinfection Device	1 - Sanyu Africa Research Institute Mbale 1 - Makerere University Biomedical Engineering Unit

Aspect	Outcome	Institution/District
CLINICAL TRIALS	**A Clinical Trials Platform** for therapeutics from natural products	Makerere University Lung Institute
BIOMEDICAL INPUTS	- **2 Personal Protective Equipment** - **1Medical and Laboratory Supplies** (syringes, catheters, gauze, centrifuge tubes)	Uganda Industrial Research Institute (UIRI) College of Engineering, Design and Technology (CEDAT), Makerere
ECO-FRIENDLY INITIATIVES	- **2 Plastic Waste as a Cheap Construction Material Project,** Mosquito Larva to fight Malaria	Mbarara University of Science and Technology (MUST) Uganda Virus Research Institute (UVRI)

Aspect	Outcome	Institution/District
CENTRAL RESEARCH FACILITIES	- 1 Central Laboratory Animal House - 2 Central Biomarker Facilities - - - Central Research Bio Bank - - - - - Inaugural National Invitro Studies Platform - Central ICT for Pathogen Economy Labs	College of Veterinary Medicine, Animal Resources and Bio-security (COVAB), Makerere Makerere University Biomedical Research Centre (MacBRC) Uganda Cancer Institute (UCI) Uganda Virus Research Institute (UVRI) AI Laboratory, Makerere University
HUMAN CAPITAL DEVELOP MENT	Specialized STI Human Capital with Industrial STI competences	College of Veterinary Medicine, Animal Resources and Bio-security (COVAB), Makerere

02 | AERONAUTICS & SPACE SCIENCE

FOCUS:

Coordinate and facilitate research, development, technology transfer, and commercialization of innovations in space exploration, earth observation systems such as satellites, and establishment of a National Aerospace Program

UGANDA SPACE PROGRAMME

- ✓ Uganda's first satelitte **designed and manufactured by 3 Ugandan Engineers**, in Kyushu Institute of Technology, Japan and approved by JAXA, the Japan Aerospace Exploration Agency on 10th May 2022
- ✓ Developed to **provide data for development of earth observation** - weather monitoring and forecasting, land mapping, wetland monitoring and security applications
- ✓ **PearlAfricaSat-1 launched** into the Low Earth Orbit by NASA, from the International Space Station on 2nd December 2022

Left: **PearlAfricaSat-1 at the Handover Ceremony**

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REPUBLIC OF UGANDA

NATIONAL AEROSPACE STRATEGY

Ugandan Engineers (left to right): Edgar Mujuni, Derrick Tebusweke, Bonny Omara

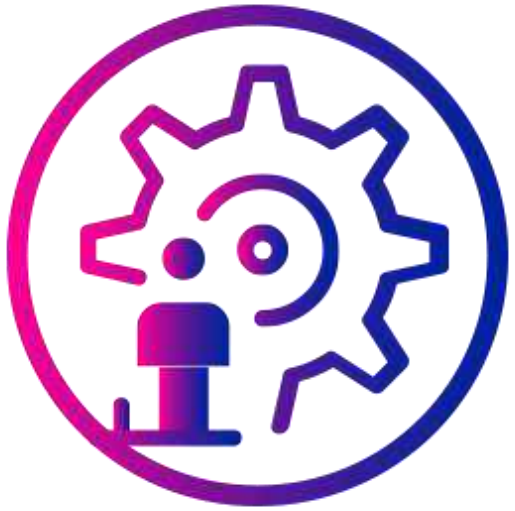
✓ **Inter-ministerial taskforce set up** to propose a roadmap to establish Uganda's Aerospace Program

✓ <u>Ongoing activities include</u>:

- 4 Engineers undergoing training in Egypt as part of an Africa Initiative

- **stakeholder mapping** and needs assessment
- human capacity and infrastructure **audits**
- **market surveys** for products and pilots in sectors that can be supported
- drafting the **Uganda Aerospace Policy and Strategy** in line with international requirements for outer space exploration
- R&D in development of **Uganda's second satellite**

HUMAN CAPITAL DEVELOPMENT



- ✓ Uganda committed to a **partnership agreement with Kenya and Egypt** to send engineers to the Egyptian Space Agency to develop and test a remote sensing payload that will be mounted on the International Space Station
- ✓ 4 Ugandans from 3 public universities travelled to Egypt in March 2023, to spend 9 months undergoing **specialized hands-on training supported by Airbus-UNOOSA**, to design, build, test and validate the remote sensing camera system – fully government funded
- ✓ Engineers will **replicate the remote camera system** as part of the sub-component development project and participate in **knowledge transfer programs** at their universities, in collaboration with the aerospace laboratory at Mpoma
- ✓ A team of 10 Ugandans who form the sub-committee of the task force on aerospace in Uganda, has received **training in Space Policy** (April 2023) via an online 8-week short course

MPOMA EARTH STATION

Previously defunct, has been refurbished and operationalised to host the ground station command center, a geospatial data center, a space laboratory and a coordination office for education and outreach

GROUND STATION

The command centre for Uganda's assets in space that collects satellite imagery from satellites belonging to Uganda and other partners

GEOSPATIAL DATA CENTRE

Generates earth observation products and services and coordinates their usage and distribution in the government and private sector

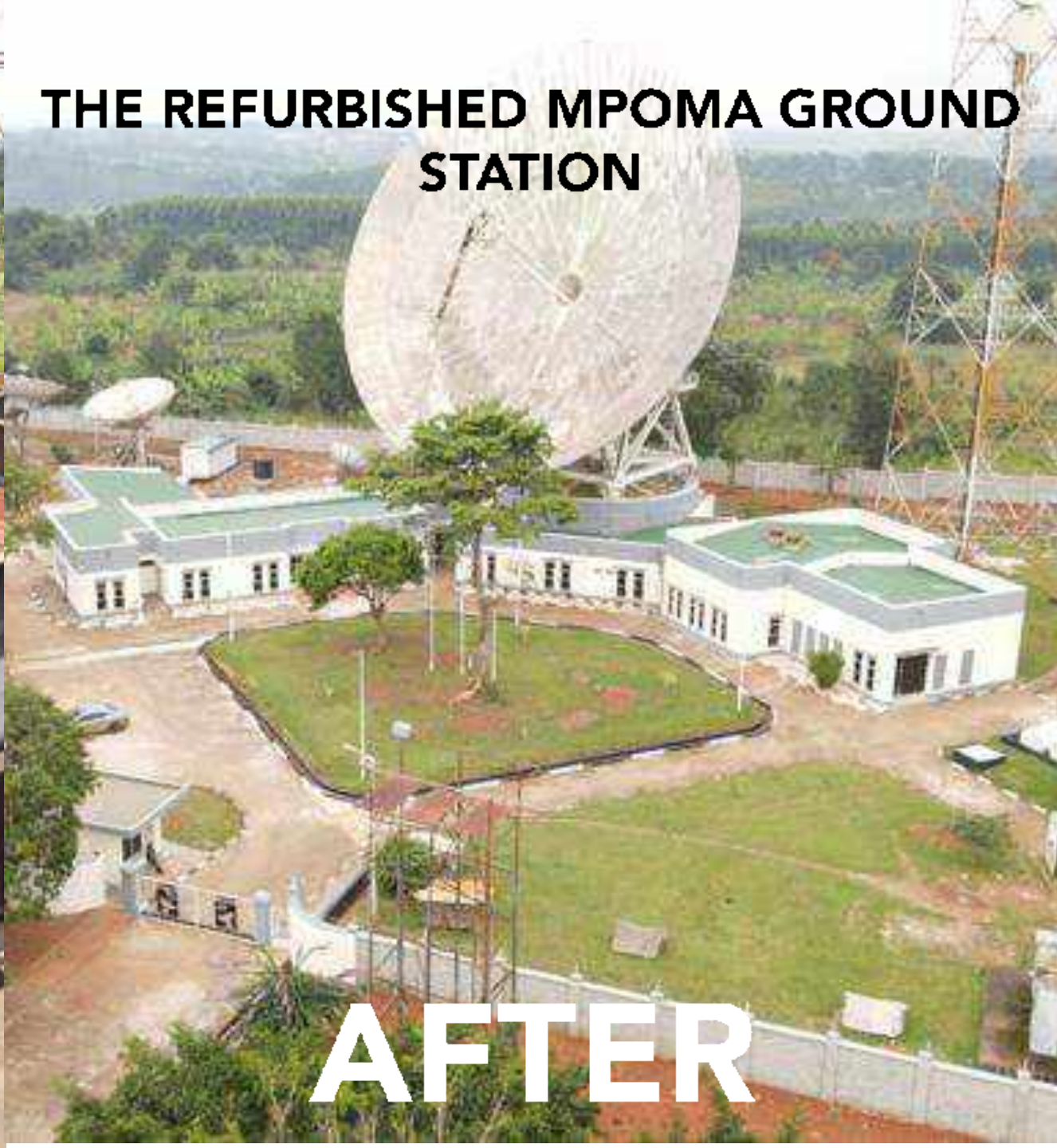
AEROSPACE LABORATORY

Develop subcomponents in the space industry starting with low-cost prototypes

EDUCATION AND OUTREACH

Coordinate internship and training programs with universities with a plan for student site visits and other marketing strategies in reaching the public


BEFORE


THE REFURBISHED MPOMA GROUND STATION
AFTER

03 | MOBILITY

FOCUS:

Coordinate and facilitate research, development, technology transfer, and commercialization of innovations that augment the national mobility ecosystem to develop, make, sell and use sustainable mobility solutions

KIIRA MOTORS CORPORATION (KMC)

- ✓ Mobility Enterprise operationalised in 2018 and fully owned by the Government of Uganda.
- ✓ Started delivering to market both Electric and Diesel Buses built at Luweero Industries, Nakasongola, including:

- 5 Tondeka, buses for Tondeka
- 1 Kayoola EVS bus delivered to Uganda Airlines
- 2 Kayoola Diesel coaches purchased by a bus operator plying the Kampala-Kasese route

TARGET:

Locally produce 65% of vehicle parts and components for the Kayoola Bus by 2030.

Kayoola Buses on Entebbe Express Way

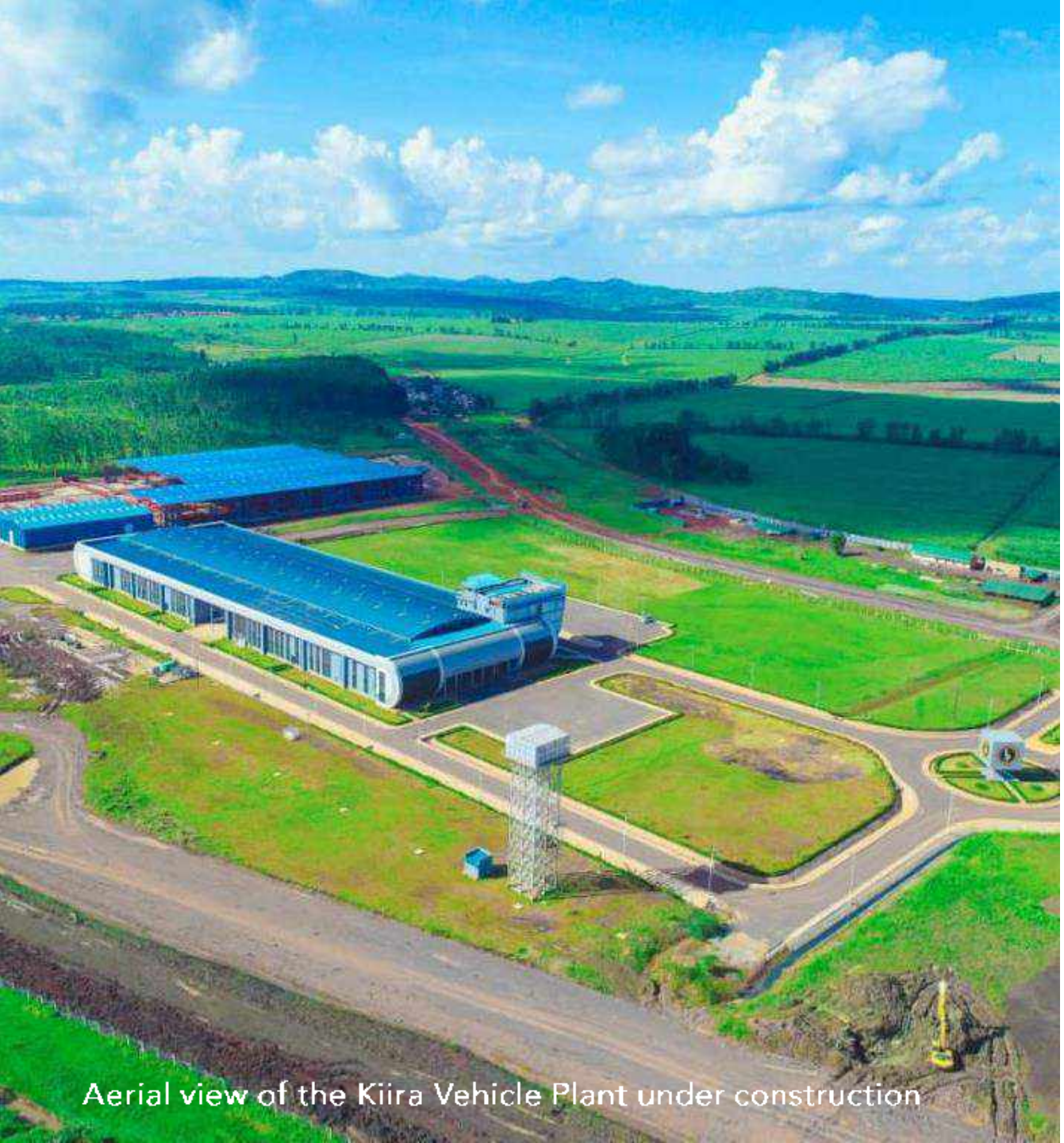
Tondeka Buses on Kampala Road

KAMPALA MASS TRANSIT SYSTEM

- ✓ 2 *Kayoola* EVS electric buses deployed on Kampala Northern Bypass on 28th August 2022 have transported over 150,000 passengers
- ✓ 5 *Tondeka* buses deployed on the Ntinda-Wandegeya-City Center-Nakawa Ring Road

3-in-1 Trike

- ✓ For Mobility, Power Generation and Irrigation
- ✓ Built around a locally developed engine
- ✓ Design, engineering and manufacturing specifications complete
- ✓ Development of the engineering and manufacturing prototypes ongoing
- ✓ Project implemented by the *Jua Kali* with institutional support from KMC



Aerial view of the Kiira Vehicle Plant under construction

KIIRA VEHICLE PLANT
JINJA

- ✓ Over USD 80m invested in construction and tooling, now at **70% completion**
- ✓ Design of **plant production system complete** and supply is ongoing
- ✓ Construction undertaken by UPDF National Enterprise Corporation (NEC) supervised by Technology Consults from Makerere University
- ✓ Plant **commissioning in November 2023**

AUTOMOTIVE INDUSTRIAL & TECHNOLOGY PARK - KAYUNGA

- ✓ Master Plan completed and approved by District Council
- ✓ Pre-Feasibility Study and Business Plan completed

THE E-MOBILITY ECOSYTEM

- ✓Under STI Secretariat coordination, the E-Mobility Ecosystem has been defined through the E-Mobility Consortium
- ✓Currently comprises over 80 E-Mobility value chain actors in Uganda

NATIONAL E-MOBILITY STRATEGY

- ✓ To achieve **sustainable mobility and economic development**, while addressing current development like decarbonizing transportation; reducing air, noise pollution and reliance on imported fossil fuels; and creation of green jobs
- ✓ **To position Uganda as net source, rather than a consumer of E-Mobility tools and solutions**

Expected Outcomes:

- ✓ **Industries Creation:** 65% localization of the Sector, utilizing Uganda's abundant mineral resource
- ✓ **Production:** 10,000 electric buses, 1,000,000 electric motorcycles by 2030 for export and import substitution. 12.5% sector contribution to national GDP
- ✓ **Job Creation:** 500,000 Green Jobs created directly and indirectly by 2040
- ✓ **Environmental Stewardship:** Reduction in Transport-Based Emissions by over 25% by 2040

TARGET:

Full transition to e-mobility for public transit by 2030 and passenger vehicle sales by 2040.

GOAL: Full transition from fuel engines to e-bikes in Kampala City by 2025.
E-motorbikes made in Uganda by various companies

04 | INDUSTRY 4.0+

FOCUS:

Coordinate and facilitate research, development, technology transfer, and commercialization of innovations in electronics, artificial intelligence, cybersecurity, robotics, big data and analytics, Internet of things, additive manufacturing and nanotechnology

LOCAL ELECTRONICS R&D, MANUFACTURING & INCUBATION FACILITY

- ✓ Under establishment at the National Science and Technology Engineering Innovation and Skills Enhancement Project (NSTEI-SEP) in Namanve
- ✓ Access to an electronics lab to **design, prototype and test new innovations** for Ugandan engineers
- ✓ **Manufacturing Facility for Smart Electronics** including consumer electronics like portable computers and radios, smart meters for water and electricity, Electronic Control Units for vehicles and medical devices.

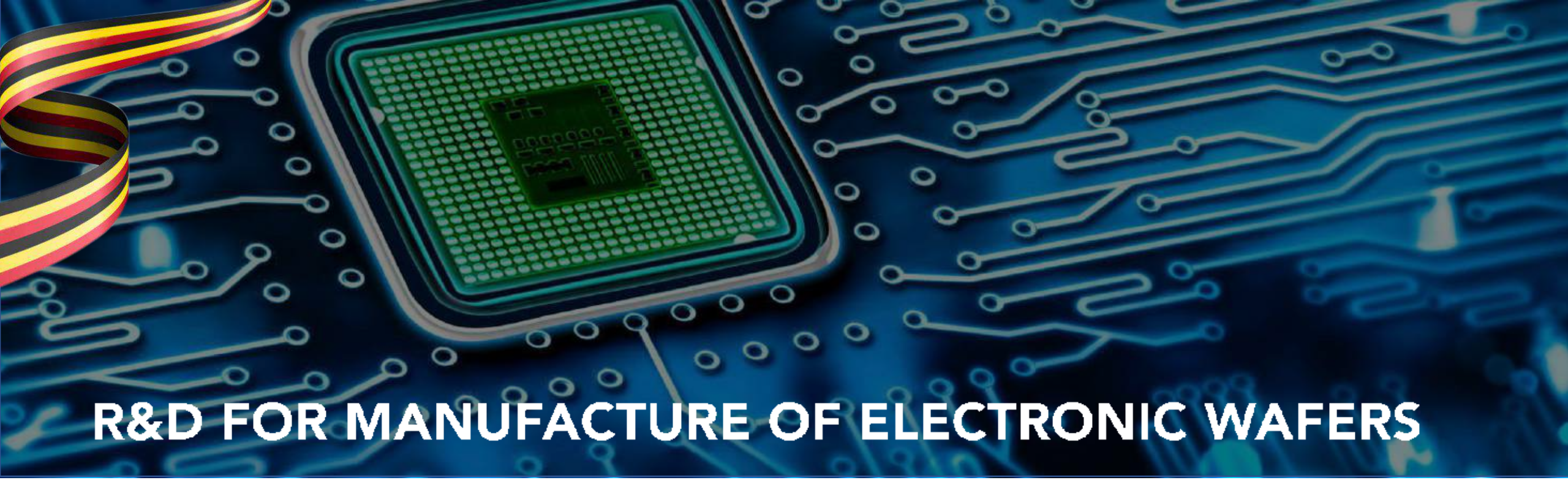
Industry 4.0+ Academia to Business Framework

- ✓ In collaboration with Universities, to identify and incubate innovations emanating from student research

Local Electronics R&D, Manufacturing and Incubation Facility

UIRI: State of the Art Manufacturing & Machining Center, Namanve

UIRI: State of the Art Manufacturing & Machining Center, Namanve



R&D FOR MANUFACTURE OF ELECTRONIC WAFERS

- ✓Supporting a consortium of researchers, to create electronic chips for smart devices using silicon
- ✓Will input into the Namanve electronics manufacturing facility

Global market for wafers was USD16.87bn in 2020 and is projected to reach USD27.13bn by 2030

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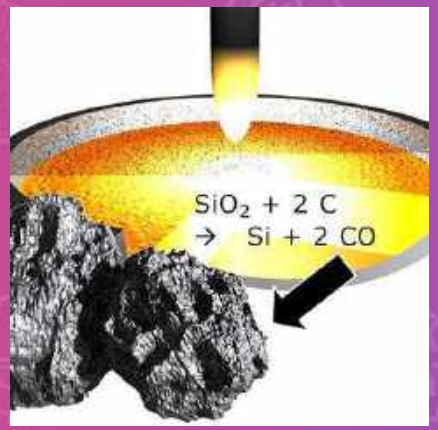
TRANSFORMING SILICA SAND INTO WAFERS

SILICA SAND

Abundant Resource in Uganda



METALLURGICAL GRADE SILICON

Process takes place in a furnace

INGOT

Silicon Ingot

WAFERS

Wafers are sliced from Ingots & used to make chips

SUPPORTED PROJECTS

	Project	Institution / District
1	**Yo Waste:** a mobile and cloud-based hauler and garbage collection service app	Yo-Waste Limited, Kampala
2	**KAWU Financial Platform**	Lira University
3	**V-CHEMLAB:** a virtual chemistry laboratory simulator	Kabale University

05 | INFRASTRUCTURE INNOVATIONS

FOCUS:

coordinate and facilitate research, development, technology transfer, and commercialization of innovations for energy, railway, roads, airports, nanotech and minerals, materials, STI and communications infrastructure

NATIONAL SCIENCE, TECHNOLOGY, ENGINEERING & INNOVATION CENTRE (NSTEIC)

Aligning with the NRM manifesto and Uganda's Vision 2040 agenda of setting up **science and technology parks, engineering centers**, and **technology, and business incubation centers** that meet international standards

- ✓ Established under the National Science Technology Engineering Innovation and Skills Enhancement Project (NSTEI-SEP) that is being implemented by UNCST
- ✓ Located in Rwebitete, Kiruhura District, **76% civil works complete**
- ✓ To function as the **National Engineering Development Center**
- ✓ To support upskilling of engineers using the Learning Factory Model - **enhancing the Engineering Capacity of Ugandans**
- ✓ Provide **tailor-made programs**, targeting high-precision manufacturing technologies, like design and Computer Numeric Control (CNC) Programming

TECHNOLOGY INNOVATION AND BUSINESS INCUBATING CENTRE (TIBIC)

A platform for **technology development via the Process Industry Learning Factory model** that provides common user facilities and shared workspaces for scientists and innovators

- ✓ Located in Namamve, **98% civil works complete**
- ✓ To host the **electronics manufacturing facility**
- ✓ To accelerate business growth and success and **decrease the likelihood of failure among early-stage technopreneurs** in finished leather products, textiles, fashion and design, ICT and multi-media, and Industry 4.0
- ✓ Creating **new quality jobs and** supporting government efforts in import substitution and export promotion
- ✓ Providing **specialised engineering and technical support services** to companies and individuals

Learning Factory Model / Learn by Producing Model

Providing an actual manufacturing environment for training, research, and production

Design for Manufacturing and Assembly

Training engineers to design and produce products using state-of-the-art equipment

Local Infrastructure Projects

Providing opportunities for Ugandans to participate in road construction, electricity distribution, and Oil & Gas Pipeline Construction to reduce on foreign expertise dependency in these areas

OTHER ACCOMPLISHMENTS:

- Commissioned the **use of machinery and equipment for oil and gas production** in partnership with NEC and a local private company, ROHI Investment Ltd

- Provided **Technical and Business Support to operationalise the Gulu Cassava Incubation Center** that will produce cassava starch for food and for use in medicines and ethanol

- Establishing a **lab-scale facility to develop the technology for local iron beneficiation** using hydrogen reduction technology

SUPPORTED PROJECTS

	Project	Institution/District
1	**Direct Reduction technology** for metallization of Ugandan Iron Ore	Makerere University, Kampala
2	**Recycling of plastic waste** into interlocking blocks	Mbarara University of Science and Technology
3	**Eco-Friendly Beneficiation of gold ore** by substituting Mercury with cassava in Artisanal Gold Mining	Uganda Martyr's University, Nkozi, Mpigi
4	**Harnessing gravitational potential energy** for domestic and precision agriculture apps	Gulu University
5	**Design and fabrication of a continuous flow reactor** for production of biodiesel from locally available waste	Makerere University, Kampala

	Project	Institution/District
6	**MakSol Cooker:** Smart solar-electric cookers Production, scaleup and commercialisation	Makerere University, Kampala
7	**The Parish Level Night** - a Day Solar crop dryer and 30tonne silo storage system	Busitema University, Busia
8	**Development of Iron Oxide Nanoparticles** from steel waste for Applications in Water Treatment	Makerere University, Kampala
9	**Bioelectricity production** for wastewater treatment and soil fertility enhancement	Gulu University, Gulu
10	**Valorization Of Cassava Peels Into Nano Adsorbents** For Wastewater Treatment In Uganda	Makerere University, Kampala

06 | IMPORT SUBSTITUTION & EXPORT TARGETED STI

FOCUS:

Coordinate and facilitate research, development, technology transfer, and commercialization of innovations targeting domestic production of goods and services, to reduce dependence on importation, and boost the value of exports while deepening value addition in the country

PRESIDENTIAL INITIATIVE ON BANANA INDUSTRIAL DEVELOPMENT (PIBID)

- ✓ Collaborated to fast-track the entry into market of banana value-added products and implementation of go-to-market strategy
- ✓ Successfully supported the establishment and registration of 22 Tooke cooperatives with 6,440 farmers
- ✓ Carried out environmental impact assessment to establish community collection centres, community processing units and an information centre
- ✓ Carrying out technology transfer to viable communities for primary processing and bakery projects through business incubation
- ✓ Constructing a model Community Dryer for Matooke Chips for uptake by the communities so as to increase on their incomes from the value-added products

READY TO MARKET BANANA VALUE-ADDED PRODUCTS - PIBID

RESEARCH AND DEVELOPMENT

The Secretariat is undertaking R&D into value addition for:

- Bee industry such as propolis
- Sweet potatoes: recipe, formula and handling protocols for new ready for market products including bread, chapati, baby foods, and confectionaries
- Shea Butter: prototype products for mosquito repellants (lotions, candles, vaseline) and plans to support the next phase in the journey to market
- Local manufacture of school laboratory supplies: collaboration framework developed with the Science and Technology Production Unit (STEPU) of the National Curriculum Development Centre (NCDC)

SUPPORTED PROJECTS

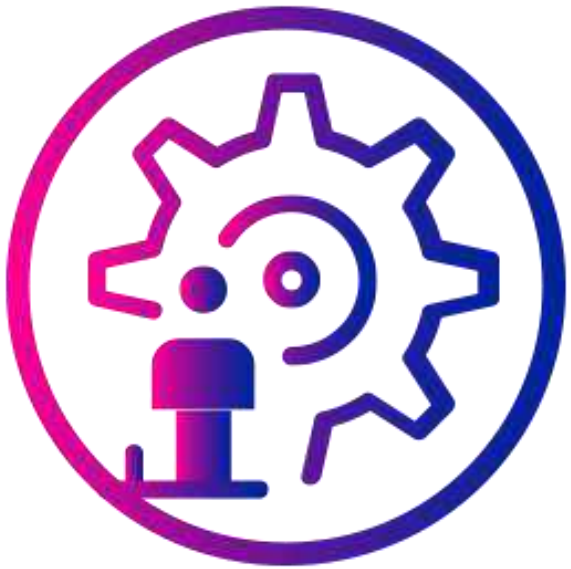
	Project	Institution/District
1	**Development and commercialisation of Bee Products** for increased income and Export in Uganda	Muni University, Arua
2	**Apokor Cassava Value Addition Project** (ACAVAP)	Apokor Farmers SACCO, Tororo
3	**Sweet potato value chain development** through technology transfer and promotion	The Consortium for enhancing University Responsiveness to Agribusiness Development Ltd (**CURAD**), Namanve

07 | PRODUCTIVITY ACCELERATION

FOCUS:

Coordinate and facilitate research, development, technology transfer, and commercialization of innovations aimed at increasing output, through innovative agricultural mechanization, value addition to produce, innovative inputs and processes, and innovations that enhance quality of life

COMMUNITY PRODUCTIVITY ACCELERATION MODEL



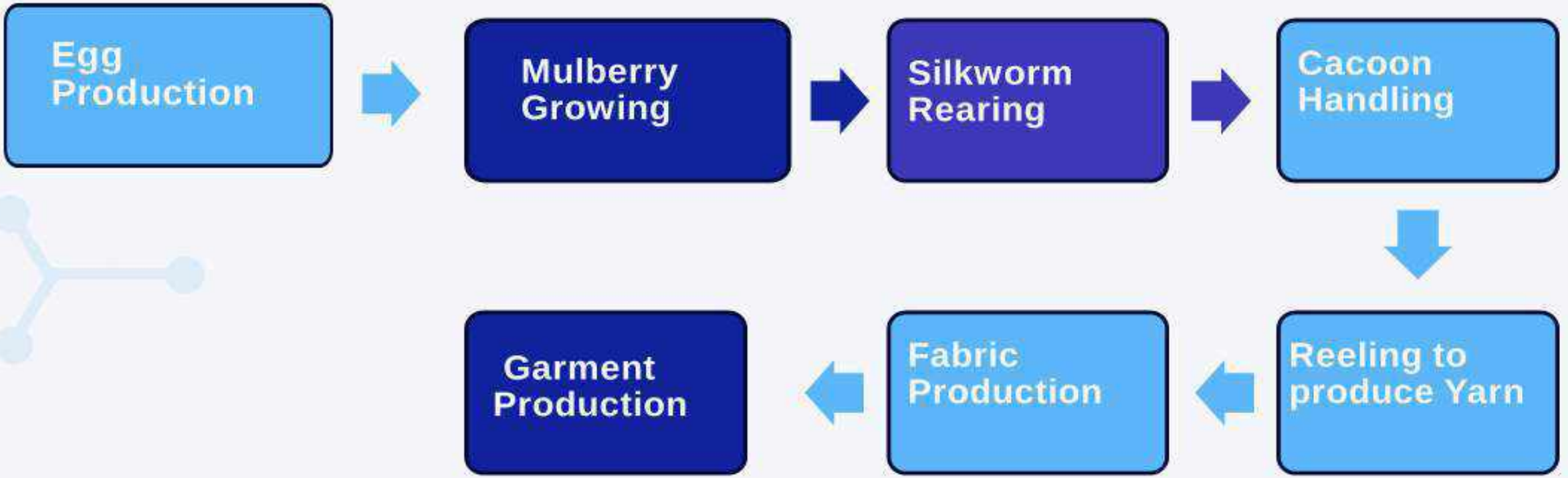
Community Productivity Acceleration Model

- ✓ Undertaking R&D
- ✓ **Pilot underway** in Butebo, Pallisa, Kibuku, Kamuli and Kakumiro under the PDM
- ✓ Value chains in development in this model align with the Parish Development Model
- ✓ Over **1,500 participating families** registering over **70% increase in annual household income**

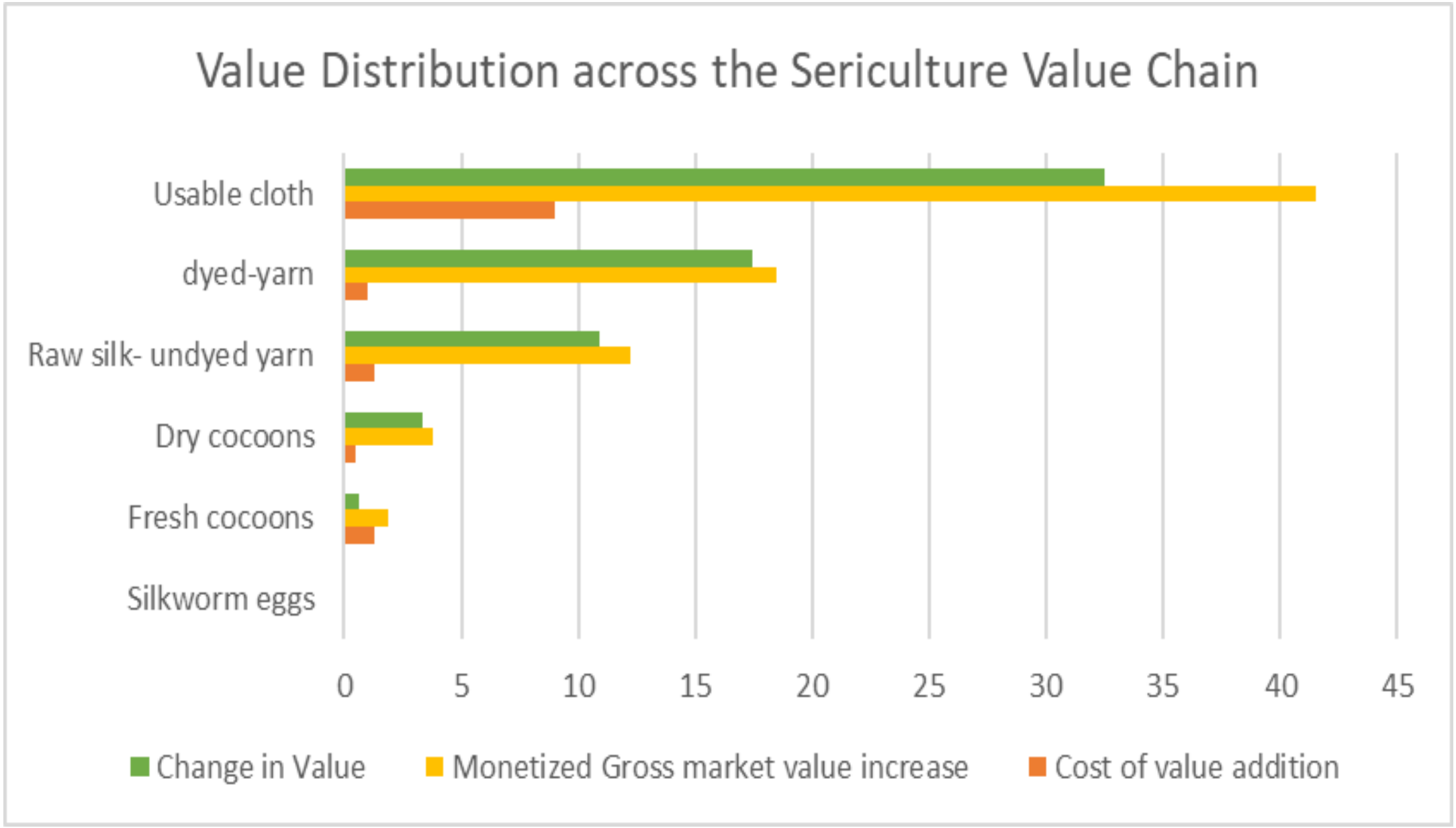
SERICULTURE INDUSTRY

- Restructured framework to fast-track sustainable development in the industry in partnership with STI ecosystem players
- Embarked on revitalising Sericulture Development Center at Kawanda to supply silkworm eggs and organise stakeholders to standardise production and marketing

Overview of the Sericulture Industrial Value Chain

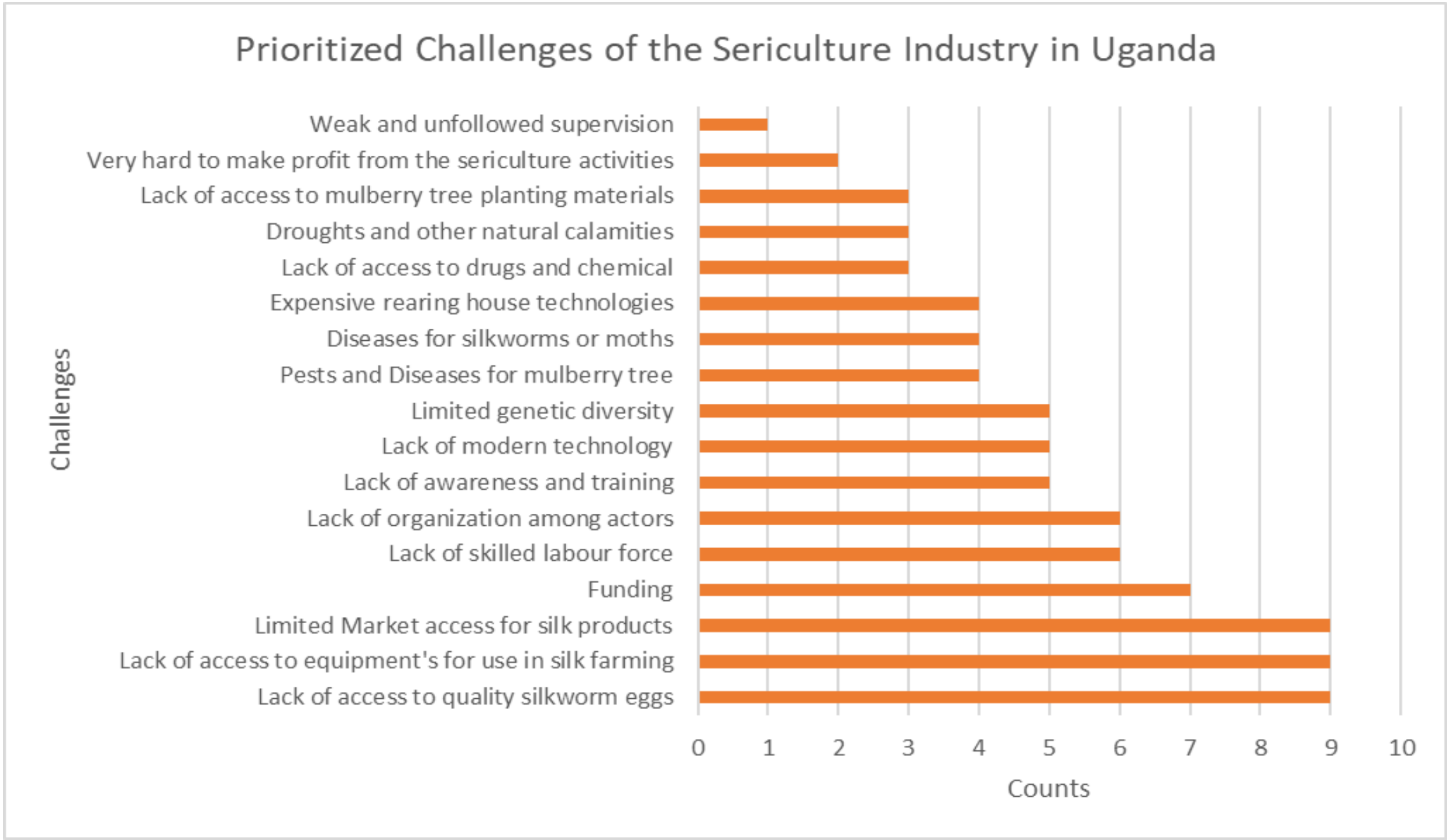


SERICULTURE VALUE CHAIN: WHERE IS THE MOST VALUE?



The success of the sericulture industry lies in the success of the base of the value chain: quality silkworm eggs

SERICULTURE: CHALLENGE PRIORITIZATION



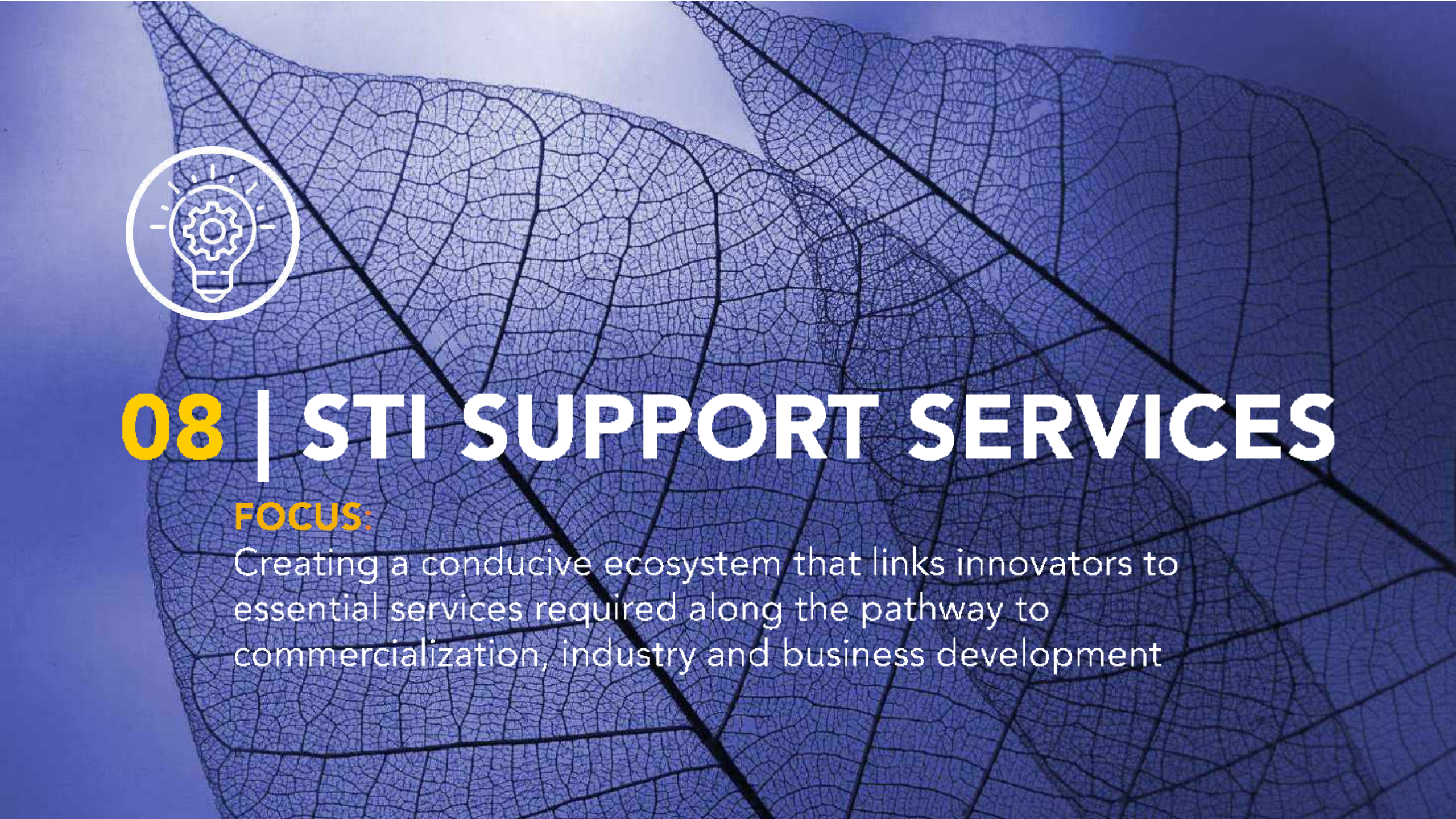
SUPPORTED PROJECTS

	Project	Institution/District
1	**Science-Led Productivity Accelerator Tool** for Fast-Tracking Parish Development Model	AFRISA, Makerere Univerity-CoVAB, Kampala
2	**Neem powder/oil/ cake, as an organic pesticide and fertilizer** for Karamoja crop farmers	Karamoja Christian Ethnoveterinary Program (KACHEP), Nabilatuk
3	**Optimizing Suitable Substrates for Mass Production of Black Soldier Fly Larvae** (BSFL) as Ingredient for Quality Cost Effective Fish Feeds	NARO, Buginganya, Bulambuli
4	**Improving livelihoods of poultry agribusiness entrepreneurs** through egg processing and value addition	Kyambogo University, Kampala

	Project	Institution/District
5	**Production of Mosquito Repellent Lotions** from Ethnomedicinal Plants and Shea Butter	Gudie Leisure Farm, Wakiso
6	**Participatory Pathways to Sustainable Intensification**. Innovation platforms to integrate leguminous crops and inoculants into small-scale agriculture and local value chains	Makerere University, Kampala
7	**Education and Training for Sustainable Agriculture and Nutrition** in East Africa	Makerere University, Kampala

	Project	Institution/District
8	**University-based Community Action Research** to Increase viability of cereal-legume value chains towards improved nutrition and livelihoods	Makerere University, Kampala
9	**Genetic characterization of cattle populations** for optimized performance in African ecosystems	Makerere University, Kampala
10	**Innovative approaches to value-addition/commercialization of climate smart crops** for enhanced food security and nutrition	Makerere University, Kampala
11	**Enhancing food and nutrition security** through promotion of edible insects value chain in Eastern Africa	Makerere University, Kampala

	Project	Institution/District
12	**On-site air-to-fertilizer mini-plants relegated by sensor-based ICT technology** to foster African agriculture	NARO-MUZARDI, Mukono
13	**Phenotyping the banana biodiversity** to identify climate smart varieties with optimal market potential in Africa and Europe	NARO-NARL Kawanda, Wakiso
14	**Small Fish and Food Security**: Towards innovative integration of fish in African food systems to improve nutrition	NARO-NAFIRRI, Jinja
15	**Sustainable Transition to Entrepreneurial Production in Agriculture** through Upgrading project	Environmental Alert, Kampala



08 | STI SUPPORT SERVICES

FOCUS:

Creating a conducive ecosystem that links innovators to essential services required along the pathway to commercialization, industry and business development

STI ONE STOP CENTRE

- **Operational and available** to walk-ins, at the Secretariat Head Office
- A friendly and welcoming **Contact** and **Dialogue interface** between the NSTIS and all categories of innovators
- Developing a **digital platform** to export the OSC online
- **Innovation awards** issued at the 2021 National Science Week

INNOVATIONS EXCHANGE CENTRE

- A **marketplace for ideas and innovations**
- Innovators interact with scientists, private sector, and other stakeholders to facilitate further development and commercialization of their ideas and innovations
- Developing a **digital platform** to export the OSC online


INNOVATOR
PITCHING
SESSIONS
SCIENCE, TECHNOLOGY & INNOVATION - SECRETARIAT

START-UP INVESTMENT/ BUSINESS SUPPORT SERVICES

- Available services that support innovators in transforming innovations into industries
- STI working with business development experts to link start up businesses with suitable financing options - grants, angels, equity, debt and other investors
- Exploring innovative capitalization **options** around credible persons such as **Harambe Models**

THE STI IDEA TO MARKET JOURNEY

Phase 1: Idea to Prototype

- Ideation and Concept Formation
- Basic and Exploratory Research
- Proof of Concept
- Testing
- Technical Validation
- Intellectual Property Rights

This process may run many cycles before getting a desirable output.

Output: Prototype

Phase 2: Prototype to a Viable Product

- Product Development
- Market Analysis
- Corporate Formation
- Business Case, Model and Strategy Dev't
- Licensing and Certification
- Technology Transfer
- Pilot Plant
- Team Development and Management
- Supply Chain Dev't
- Value Chain Positioning and Optimization

Output: Start-Up Enterprise

Phase 3: Viable Product to Competitiveness

- Market Expansion
- Product Optimization
- Process Optimization
- Product Diversification
- Scaling Production
- Break Even
- Investor Sounding
- Supply Chain Management

Output: Profitable Enterprise

Phase 4: Competitiveness to Maturity

- Mature Products
- Market Expansion
- Initial Public Offering
- Mergers and Acquisitions
- Profitability

Output: Mature Brand

NATIONAL SCIENCE WEEK 2022

09 | STI HUMAN CAPITAL DEVELOPMENT

FOCUS:

Training & Skilling to ensure appropriate human capital development for STI

HUMAN CAPITAL DEVELOPMENT PROGRAMMES

- Mobility Ecosystem Programme design complete, to support capacity development and skilling through the value chain. Electric Bus Operator Training Program piloted
- Specialised STI Ecosystem Programme implemented in collaboration with the Massachusetts Institute of Technology (MIT), to target market creating innovations
- STI ecosystem database started, to identify the skills level, and those the country requires

MARKET-CREATING INNOVATIONS BOOTCAMP

Intensive bootcamp for STI Secretariat Staff, facilitated by Christensen Institute (Harvard University) on how to identify and leverage MCIs for socio-economic transformation

FOUNDRY PROGRAMME

- A specialized **Human Capital Development Programme for Recent Graduates** towards developing the nation's STI Human Capital

- **Mentees work with mentors** in STI institutions (Academia, Research, Industry, STI Secretariat, and other MDAs) to gain **transformative hands-on skills and the mindset change necessary for supporting the STI ecosystem** and fast-tracking the national STI Agenda

- **15 mentees onboarded** in the first cohort

CHALLENGES & RECOMMENDATIONS

Challenge	Recommendations
Funding for STI remains below Commitments made in Planning Documents	Continued Government support for STI is essential, especially now that investments are beginning to bear fruit
Public scepticism about Ugandan-made products	Sensitisation required, to get public buy-in. High-quality products to elicit consumer confidence. BUBU should not be sympathetic
Lack of a clear understanding of the idea-to-market journey and Grant-preneurship	Training of key actors on the idea-to-market journey framework that has been developed
Supportive inter-relationships are not apparent in the STI ecosystem between the vast array of stakeholders	Dedicated stakeholder engagement
The impact that STI should have on our country is not obvious to many.	Mass sensitization and promotion to inform and educate about STI

THANK YOU!

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