



# PROGRESS REPORT

Jan. 2017-Nov2021

## CREATES-FNS

African Centre of Excellence  
in Research Agriculture  
Advancement, Teaching  
Excellence and  
Sustainability in Food and  
Nutrition

**THE NELSON MANDELA  
AFRICAN INSTITUTION OF  
SCIENCE AND  
TECHNOLOGY**

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## **1. EXECUTIVE SUMMARY**

CREATES-FNS appreciate the support accorded by the Government of Tanzania through the Ministry of Education, Science and Technology (MoEST) and Ministry of Finance and Planning (MoFP), our host the Nelson Mandela African Institution of Science and Technology (NM-AIST) and our development partner the World Bank including the Regional Facilitation Unit (RFU) under IUCEA.

Despite of few challenges such as COVID -19 pandemic, delays in verification process and funds disbursement, CREATES-FNS has managed to accomplish and achieve some milestones including; establishment of center office and the team, provision of student scholarships, conducting short courses, curriculum development and review, students and staff exchanges, establish a number of research projects, resources mobilization, networking and forging partnerships as well as participating in regional and national forums. These has led to achievement of various Disbursed Link Results (DLRs) as defined in Project Appraisal Document (PAD).

Generally, the Centre performance is satisfactory, most of the activities are on track and some of the targets already attained. CREATES has provided excellent teaching and learning environment for its PhD and MSc beneficiaries in areas of Food and Nutritional Sciences, Sustainable Agriculture, Biodiversity Conservation, and Ecosystem management which contributed immensely to its development objectives. The trained scientists and researchers will transform

the society both in modern and traditional methods as far as the formal and modern sector of economy is concerned. These approaches will eventually support the skills-for-poverty reduction approaches.

## **2. INTRODUCTION**

CREATES-FNS is one of the 24 Eastern and Southern Africa higher education Centers of Excellence (ACEs) established through the ACE II Project. The Centre is hosted by the Nelson Mandela African Institution of Science and Technology (NM-AIST) based in Arusha, Tanzania. The focus of CREATES-FNS is to address food and nutrition insecurity as a development challenge facing the region and beyond. It addresses critical factors contributing to food and nutrition insecurity, including post-harvest losses, Climate change, unsustainable and overexploitation of natural resources and animal and crops diseases. In principle, the Center bridge the knowledge and technology gaps on how to mitigate food and nutrition insecurity factors through, Innovative research, training, and outreach programs.

Thus, to achieve those fundamental outcomes, CREATES-FNS needs to strengthen the capacity of NM-AIST to serve as an African Centre of Excellence for provision of post graduate training (Master and PhD), applied research and outreach programs for Food and Nutrition Security in the Eastern and Southern Africa region. Into more specific it seeks to build the capacity of NM-AIST to become a magnet environment that provides innovative opportunities and state-of-the-art learning environments for graduate students (PhD and MSc) as well as for faculty and; other relevant stakeholders in the area of Food and Nutrition Security. This enable NM-AIST produce high quality evidence-based research

products, technologies, and services with respect to agriculture, health, and nutrition.

Basically, CREATES interventions in achieving sustainable food and nutrition security are anchored in six pillars which align with the core programs offered by the School of Life Science and Bioengineering (LiSBE); (i) Biodiversity conservation and Ecosystems management (ii) Sustainable Agriculture (iii) Food and Nutritional Sciences (iv) Clinical Human Nutrition and Dietetics (v) Biomedical engineering and Industrial sciences and regulatory sciences and; (vi) Global Health and Biomedical sciences.

Officially, CREATES started in November, 2016 although its implementation in January 2017 and achieved some milestones despite the challenges in fund disbursement and Covid-19 pandemic. The NM-AIST and the community in general has experienced and harnessed the benefits of its establishment. The sustainability issue become a major challenge now as the funding from the World Bank is phasing out in December, 2023.

### **3. ACHIEVEMENT TOWARDS MEETING PROJECT DEVELOPMENT**

#### **OBJECTIVE (PDO)**

This section presents progress and achievement towards the ACE II Project Development Objective (PDO) as stated in the Project Appraisal Document (PAD) ***“To strengthen selected Eastern and Southern African higher education institutions to deliver quality postgraduate education and build collaborative research capacity in the regional priority areas”***. The PAD clearly defined the performance indicators to measure the achievement of the PDO are; Students enrollments (Regional and National), Partnerships and collaborations, accreditation of education programs, and project beneficiaries.

Therefore, the section highlights cumulative achievements and progress towards achieving the PDO and the implementation of core functions of ACEs under the Component1 of the project.

#### **3.1 Build institutional capacity to provide quality post-graduate education with relevance to the labor market**

The Centre has implemented some of the activities aiming at improving the capacity of NM-AIST in delivering quality post-graduate education as described below;

##### **a) Enrollment of Students (Master, PhD and Short Courses)**

The Centre has contributed to the increase in enrollment rates of the students to MSc and PhD Programs offered by the School of Life Science and

Bioengineering (LiSBE). This is through provision of scholarships, review and development of new demand-driven programs, improvement of teaching and learning environments which attracted the students from different countries.

A total of 242 students (MSc 152: PhD 90) enrolled in CREATES supported programs since its inception in 2017 as detailed in table 1. Among the students 109 (MSc 66: PhD 43) were directly sponsored by CREATES which is equivalent to 45 % of the total enrollment.

*Table 1: Enrolled students since 2015-2020*

Academic Year	MSc		PhD	
	Total Enrollment	CREATES- Sponsored	Total Enrollment	CREATES- Sponsored
2015	1	0	2	0
2016	17	0	15	0
2017	44	18	35	17
2018	56	24	34	13
2019	25	2	13	2
2020	27	22	8	11
<b>TOTAL</b>	<b>170</b>	<b>66</b>	<b>107</b>	<b>43</b>



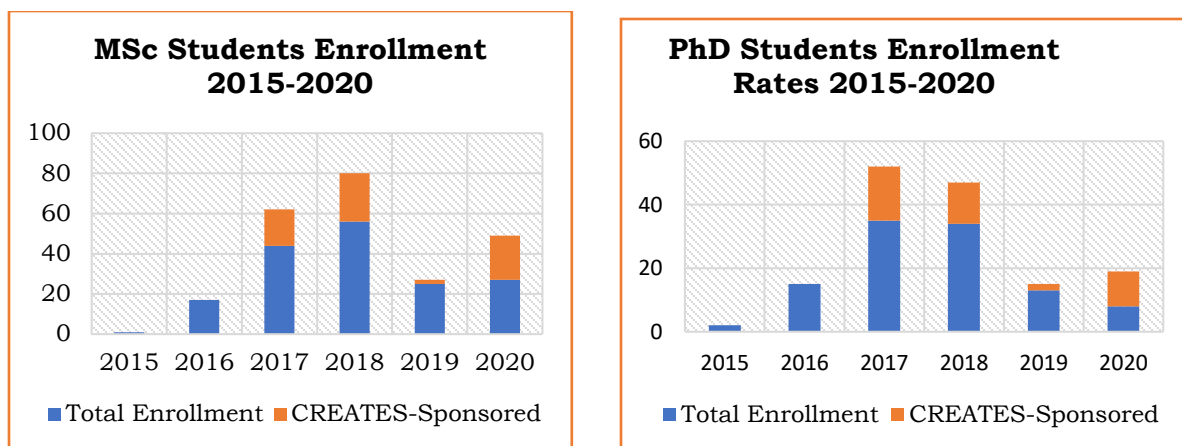


Figure 1: MSc students' enrollment 2015-2020 Figure 2: PhD Students enrollment 2015-2020

In terms of gender the Center also ensured female students are given priority in its scholarship program. Among the students who benefited from the scholarship 50.45% were female (55% MSc and 44 % for PhD students).

Facilitated students are from different African countries including; Nigeria, Cameroon, Zambia, Mozambique, Rwanda, Kenya, Uganda and Ethiopia. Out of the 109 sponsored students 12 were from other nationalities.

Table 2: CREATES Sponsored students by Gender

Level	Female	Male	% Of Female	<b>Total</b>
MSc	36	30	54	<b>66</b>
PhD	19	24	44	<b>43</b>
<b>Total</b>	<b>55</b>	<b>54</b>	<b>50.45</b>	<b>109</b>

*Table 3: CREATES Sponsored students by Regionality*

Level	National	Reginal	<b>Total</b>
MSc	37	6	<b>43</b>
PhD	60	6	<b>66</b>
<b>Total</b>	<b>97</b>	<b>12</b>	<b>109</b>



*Photo 1 and 2: CREATES Sponsored students at the NM-AIST 6<sup>th</sup> graduation*

### **b) Accreditation of education programs**

CREATES supported review and development of the new 13 Programs (8 MSc & 5 PhD) for the School of Life Science and Bio-Engineering (LiSBE). Initially the school had only two programs; MSc and PhD in Life Science.

This was done through a systematic and rigorous process involved series of meetings and consultation workshops with national and international

partners and stakeholders to identify the gaps and needs to address by the new programs.

The Centre facilitated inception workshops, needs assessment, courses development workshops, and stakeholder consultation and validation workshops. Also, the Centre payed all the cost related to Accreditation fee by Tanzania Commission for Universities (TCU). As a result, 10 Programs already accredited and offered by the school since 2019 (5 MSc and 5PhD). The remained two programs which are still under the review by TCU will be offered jointly with our International academic partners. These two programs are *MSc in Industrial Pharmacy and Regulatory Science* will be jointly offered by NM-AIST and Purdue University and *MSc in Biomedical Engineering* which will be jointly offered with Hunan University of Technology (HUT).

The Centre is also supporting, accreditation of a *MSc in Conservation Management of African Ecosystems* that will be offered jointly with University of Glasgow in Scotland. The students enrolled in this program will attended the coursework in University of Glasgow and research study at NM-AIST. This partnership will also facility faculty mobility between the institutions.

*Table 4: New MSc & PhD Programs Under the School of LiSBE*

<b>Level</b>	<b>MSc Programs</b>	<b>PhD Programs</b>
Accredited Programs	1. MSc in Sustainable Agriculture 2. MSc in Food and Nutritional Science	1. PhD in Sustainable Agriculture 2. PhD in Food and Nutritional Science

	<ol style="list-style-type: none"> <li>3. MSc in Clinical Nutrition and Dietetics</li> <li>4. MSc in Biodiversity and Ecosystem Management</li> <li>5. MSc in Global Health &amp; Biomedical Sciences</li> </ol>	<ol style="list-style-type: none"> <li>3. PhD in Clinical Nutrition and Dietetics</li> <li>4. PhD in Biodiversity and Ecosystem Management</li> <li>5. PhD in Global Health &amp; Biomedical Sciences</li> </ol>
Under TCU Review	<ol style="list-style-type: none"> <li>1. MSc in Industrial Pharmacy and Regulatory Science – with Purdue University USA</li> <li>2. MSc in Biomedical Engineering -with Hunan University of Technology China</li> <li>3. MSc in Conservation Management of African Ecosystems- University of Glasgow</li> </ol>	

**c) Students and Faculty Exchanges**

The Centre organized and facilitated the students and faculty members to participate into the exchange programs. The students were attached to partner institutions for either research activities or short-term trainings. The same to Faculty members were facilitated to attend short term trainings organized by partner institutions, but also short-term teaching and collaborative research. The Centre also facilitated the NM-AIST to host students and faculty members from different national and international institutions.

A total 30 Students from NM-AIST were attached to other international research and academic institutions in Italy, Germany, Belgium, China, Kenya, and South Africa to undertake research studies. The Centre also

hosted 63 students from other partner institutions who attended short-term trainings at NM-AIST. It also supports mobility of 12 Faculty members from NM-AIST to other institutions and hosted 11 faculty members from other institutions.

The exchange programs contributed to knowledge and skill sharing amount the partner institutions but also sharing of the learning and teaching facilities such as laboratories and Libraries.

#### **d) Short courses**

To complement the trainings offered to students through their MSc and PhD programs CREATES in collaboration with its partners organized and conducted 15 Short courses attended by 338 Participants. Though the trainings targeted students, but the participants were also from industries, NGOs, government authorities and research institutions from different African Countries. These short courses aimed to equip the participants with special knowledge and skills relevant to their areas of professionalism.

The Centre acknowledge the role of partnership in supporting teaching and learning as most of the course's Facilitators and Instructors were from different institutions. Some of these partner institutions include Purdue University (USA), Rhodes University (South Africa) Hamburg University of Applied Sciences (Germany), International Center for Theoretical Physics -

ICTP (Italy), University of Dar es Salaam (Tanzania), University of Dodoma (Tanzania) and St. John University (Tanzania).

Despite the movement restriction caused by Covid-19 Pandemic which also affected the attendance of the students to short courses, the Centre managed to conduct the courses virtually. Some of the students attended the trainings virtually but also the Facilitators managed to offer the trainings virtually.



*Photo 3: Short Course Students*



*Photo 4: ICTP Summer School Program*

### **e) Recruitment of Adjunct professors**

Development of the new MSc and PhD Programs has resulted into demand for more faculty to support trainings. To address this challenge CREATES, supported recruitment of 48 Adjunct professors from different to support teaching and student's supervision. These Adjunct Professors support training to the programs offered under the School of Life Science and Bioengineering.

### **3.2 Build institutional capacity to conduct high quality applied research, relevant to addressing a key development challenge/priority**

CREATES, has built the capacity of NM-AIST in conducting the demand driven research through establishing different research projects, development of the research groups and improving the research facilities. The Centre has supported publications of 163 research papers in reputable journals. These research publications are the results of research studies conducted by both students and researchers. In addition, the Centre has supported establishment of the research projects as explained below.

#### **a) Support Development of Research Agenda**

The process of reviewing and development of new MSc and PhD programs which was supported by CREATES enable the School of LiSBE to develop research agenda or priorities in Food and Nutrition Security. The research priorities were developed through stakeholder's consultation to accommodate their demands and gaps to be addressed. These research priorities guide all the research studies undertaken by the students and Researchers under the School of LiSBE. The areas also fall with the six pillars of CREATES which are.

- Sustainable Agriculture
- Clinical Human nutrition and Dietetics

- Global Health and Biomedical sciences
- Food and Nutritional Sciences
- Biodiversity conservation and Ecosystems management
- Biomedical engineering and Industrial sciences and regulatory sciences

#### **b) Commercialization of research outputs**

In order to ensure the research outputs are transformed into commercially viable products or businesses the Centre through the support from ICUEA and World Bank established an Incubation Centre “Data Driven Innovations Incubation Centre (DDI)” in 2019.

The Centre has recruited six incubatees with potential innovations which are; Vuruga Biopesticide, Nutrano flour, Omega-3DHA, Smart-farming Software, Plagiarism software and Botanical Pesticide. The Centre has constructed a Mini factory at NM-AIST for starting producing the two incubated products; Nutrano and Omega-3DHA.

The Centre has built the capacity of the incubate by provided training on Business management and legal issues. All the incubates has been linked to different mentors who are from private sector. The NM-AIST had no IP management framework in place, hence the Centre facilitated the process of developing all the important tools that will be used during the incubation and commercialization of research outs.



The Centre has continued to promote the innovations through different platforms but also linking the innovators with capital ventures.

**c) Cage Fish Farming & Research and Innovation Center of Excellence-  
Kagera**

NM-AIST in collaboration with Ministry of Livestock's and Fisheries, Tanzania Agricultural Catalytic Trust (TACT) and Kagera Region Administrative Secretary establish a joint Project that focus on Research and promotion of Tilapia Cage fish farming in Lake Victoria.

The project will also involve establishment of a new research and innovation Centre in Bukoba. In this project NM-AIST through CREATES will spearhead the research component by provide solutions facing the fish farming sub-sector including; Quality fish feeds, fingerlings and also farm management technologies. A detailed Implementation plan and budget for the project has already developed by the parties.

CREATES, has also conducted a feasibility study to assess the viability of establishing a cage fish farming in Bukoba. Also, the Centre as conducted a Value chain Analysis study for the Tilapia Cage Fish farming. These two studies highlighted opportunities for investment and gaps to address through research and other interventions.

The NM-AIST secured 50 hectares of land in Kagera for construction of Research and Innovation Centre. This research Centre will be used by the students and researchers carrying researches on different areas including; fish farming, livestock's, crop production and natural resources management.



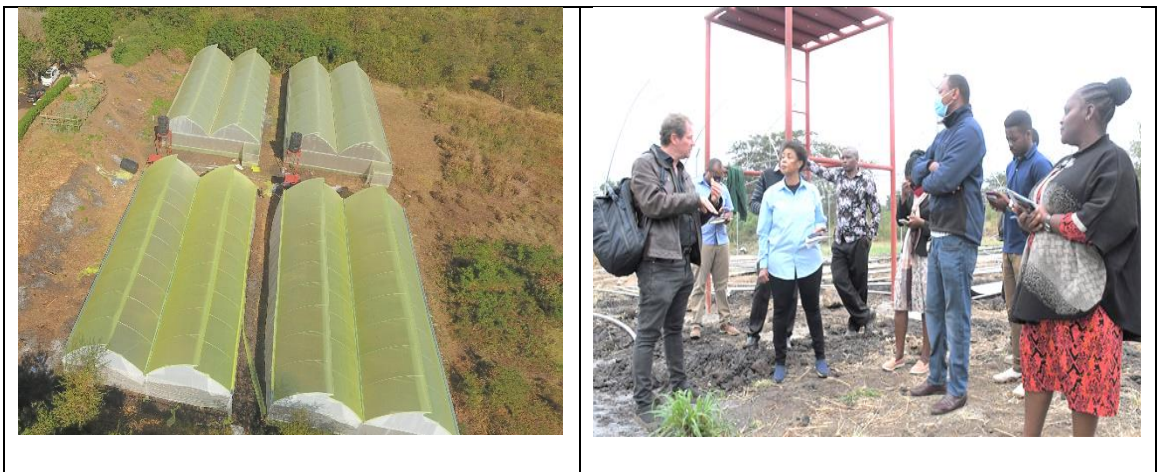
*Photo 5: MoU signing among MLF, NM-AIST, RAS -KAGERA and TACT.*

**d) Establishment of Agri-Tech Horticultural Research training, Business Hub**

CREATES has established a business hub that will serve as a research, community training and income generating unit for NM-AIST. Named as *Agri-Tech Horticultural Research, Training and Business Hub* it will focus

on research, community training mostly youth and women on best practices for management of horticultural crops. To cement the income-generating component, the hub will focus on public-private partnership with experienced gurus in the horticultural business. In the hub there will be different farming practices as part of research to compare different crop productivity. It consists of greenhouse farming and open-field farming. In future the hub will also have a building for cold storage unit for the harvested crop and training unit for community training.

Currently, four Green houses have been established and planted with tomatoes, Sweet papers and sweet melons. Production of these crops is done under different farming technologies to test their productivities. In this project CREATES is collaborating with two Private companies Tanzania Horticulture Association (TAHA) and Rijk Zwaan to support product commercialization and technical backstopping on seed production.



*Photo 6 and 7: The screen houses project initiated by CREATES in NM-AIST*

#### **e) Research, Manufacturing and Development of Herbal Medicines**

CREATES established a partnership agreement with Tanzania Health Laboratory Service Solutions Organization (TANHELISO). This partnership is focusing on undertaking researches and manufacturing of herbal medicines. Also, it aims to establish the Herbarium of different Medicinal plants at NM-AIST. The facility will be used by students and researchers undertaking studies on development of drugs from indigenous plants.

Two products (Chai Kinga & Nusa) addressing respiratory disease already developed and are currently produced at NM-AIST. These products already registered are planned to be produced in large quantity and sold in pharmacies. The revenue collected will support other Centre's activities and ensure its sustainability.

#### **f) O. R. Tambo Africa Research Chairs Initiative (ORTARChI)**

Centre Leader for CREATES Prof. Hulda Swai won a prestigious award of hosting a Research Chair Under the O. R. Tambo Africa Research Chairs Initiative (ORTARChI). The Chair focus on the development of Antimalarial drugs and optimizing Agricultural products using Nanoscience and Nanotechnology. This is the program that will run for

15 years in two phases. The phase one of the program will take five years, and its total funding is US\$ 1M.

The Financial agreement between South Africa National Research Foundation (NRF), the funder and CoSTECH on behalf of the Recipient already signed, and funds will be disbursed for implementation soon.

**g) Farming As A Business (FAAB) Project:**

Tanzania, like other Sub-Sahara Countries is facing a challenge of reliable data on agriculture activities for planning and decision making. To release this challenge, CREATES, in collaboration with its partners, LITENGA Holding Co., and SAGCOT-CTF (TACT) established a *Farming as Business (FAAB) Project* that focused on establishing a Regional data Hub for agriculture and related fields. Using the available High-Performance Computers (HPC) at NM-AIST. Researchers and students will collect and analyze the farming or agriculture data to develop solutions addressing farmers' challenges. This will ensure precious farming, planning and decision making. The PHC already configured to host the data and the Centre is planned to start data collection from next year i.e. 2022.

**3.3 Develop and enhance partnerships with other academic institutions (national, regional, and international) to pursue academic excellence**

Regarding the nature of our activities, center's focus area and the normal operating procedure, we have attracted many collaborations from the public entities, where 70% (18 MoUs) of the collaborations/partnerships are from Public Institutions – Academic and Research Institutes. Through this partnership CREATES has managed to do the following:

- Curricular Development process & establishment of Joint degree programs – with Purdue University and St Luke Foundation, facilitation of students and faculty members Exchange i.e. with ICTP-Italy & Hunan University of Technology (HUT),
- Development and undertaking of joint short courses -Partnering with Rhodes University (South Africa), Hamburg University of Applied Sciences (Germany) and University of Dar es Salaam, students' Co-supervision – Partnering with Kenyatta University and University of Dar es Salaam, Joint Teaching, and academic outreach activities - Haw-Hamburg University. As research and learning is one of our core areas of operation, we are still to engage potential University/Higher education institute in the same to remain goal focused and ensure center's sustainability.

### **3.4 Develop and enhance partnerships with industry and the private sector to generate greater impact.**

CREATES has managed to engage with NGOs, CBOs, CSOs and Private Companies in establishment of joint projects for Centre Sustainability i.e.-

- TACT, LITENGA and AEBW Ltd -Farming as A Business Project. Products, development, and commercialization
- TANHELISO – Research, Development and Manufacturing of Herbal Medicine and Innovations, and community outreach programs
- UNDP - Technology accelerator lab – Nurturing African innovators through Funguo Project. The plan is still to engage likeminded and potential private partners with the same vision or even higher to increase our scope and compose a working consortium which will lead to ensure center’s sustainability.

### **3.5 Improve governance and management of the institution and set up a role model for other higher education institutions**

In order to equip and improve governance, performance, and management of NM-AIST, CREATES Supported recruitment of 48 Adjunct professors from all over the world, bought a land cruiser Hard Top vehicle for research and other field activities, bought and install electric power generator and purchase of related technical equipment, renovated the former student building into ACE Offices, the Centre supported \$ 200,000 for construction of student hostel for lactating mothers, supported 12 NM-AIST staff to attend short courses and conferences, also handed a drone for aerial research.

In order to ensure the NM-AIST has effective financial management system the Centre facilitated purchase of VOTEBOOK the Financial management

system and also Training of the NM-AIST staff on the new System “Mfumo wa Malipo Serikalini” (MUSE).

### 3.6 Deliver outreach, and create an impact, to society by delivering excellent teaching and producing high quality applied research.

In order to perfectly disseminate research findings and solutions CREATES has tried to build relationship with the collaborators who has resources in order to reach the targeted population. Over the years various outreach activities have been conducted and produced seemingly impact to the community. Through these activities more than 620 individuals were reached. The Individuals included farmers, animal keepers, food processors and community in general.

The table bellow highlights some of the outreach activities facilitated by CREATES.

*Table 5: CREATES Outreach Programs.*

<b>SN</b>	<b>Outreach Activity</b>	<b>Collaborators</b>	<b>Targeted Audience</b>
1.	Wildlife-livestock interactions (vigilance) – participatory rangeland use mapping, growing cages, wildlife behavior studies	Ngorongoro Crater Conservation Authority (NCCA)	Communities, Village Game Scouts (VGS) and Village Leaders



<b>2.</b>	Impact of the invasive Parthenium hysterophorus (gugu karoti) on local communities and management options	Tropical Pesticide Research Institute (TPRI)	Communities -Agro-Pastoralists
<b>3.</b>	Importance of Oysternut / Kweme ( <i>Telfairia pedata</i> ) for local income generation and nutrition, enhancing biodiversity in agricultural systems	Forestry Training Institute (FTI), & Lushoto District Council	Smallholder Farmers
<b>4.</b>	Giraffe foraging behaviour in bush-encroached areas of different protection status in the Tarangire-Manyara Ecosystem	Tanzania Wildlife Management Authority (TAWA),	Students, Teachers, Parents(community)
<b>5.</b>	Sensitizing farmers on the application of the novel biopesticides which are nontoxic to human and other organisms.	District councils from Mvomero, Sanya and Bariadi	District extension officers and small holder farmers
<b>6.</b>	Participation in Various exhibition as Nanenane Simiyu 2020, Makisatu, TCU Exhibition Dar es Salaam 2020	Simiyu Region, TCU	Smallholder farmers, community, scholars, students, and general Public
<b>7.</b>	Organizing of Annual Arusha Conservation Agriculture Forum (ACAF)- 2020 and 2021 – Raising awareness on conservation and partnership with research institution on	ECHO, NM-AIST, Arusha Region.	Agro-pastoralists and the general Public

	solving various agriculture issues		
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*Photo 8 and 9: Outreach programs in northern Tanzania (Arusha Region), supported by CREATES*

#### **4. SOCIAL AND ENVIROMENTAL SAFEGUARD.**

##### **4.1 Social Safeguard**

**Grievances Redressal Mechanisms:** The Centre has ensured there are guidelines, procedures and measures intends to prevent, reduce and mitigates and social negative impacts caused by the project to its beneficiaries. This was through establishment of the Grievances Redressal Mechanisms Guideline. The Guidelines put in place the mechanisms of receiving, reporting and addressing any kind of grievance either from the students, staff and community. The Complains are received via Centre

emails, or Grievance platform in CREATES Website (iReport), Grievance reporting form, and Suggestions box.

Based on the nature of the grievance, can be addressed by the Centre management or discussed at the Grievances Redressal Committee (GRC). If the decision made by the GRC not satisfactory, the matter is then forwarded to Grievance Appeal Committee. The Complainer is then given feedback on the measure taken.

The Centre also has established a logbook for recording all the grievances; include; Name of Complainer, Sex, Occupations, Nature of grievance, date reported, and feedback. In every six months the Centre prepare the report on the performance of the Grievances Redressal Mechanisms using the template developed by IUCEA. Since, the Centre Inception one major complain from the students was delay in their research fund which was caused by delay in fund disbursement. No any kind of sexual harassment was reported from both students and staff.

**Gender Equity training and Awareness for Staff and Students:** To improve gender equality and raise awareness of gender related issues CREATES supported The Nelson Mandela African Institution of Science and Technology (NM-AIST) through the NM-AIST Gender Committee to organize two workshops on Gender Issues Sensitization. The workshops brought together about 120 NM-AIST community members. The workshop aimed at

creating awareness on gender matters through experiences sharing, gender equality and emerging challenges of gender related matters at our Institution.

**Launching of NM-AIST gender desk:** The Centre supported the Implementation of one of the objectives of the NM-AIST Gender policy by supporting establishment and Launching of the NM-AIST Gender Desk. These unit focus on addressing all gender violence related issues include sexual harassment at NM-AIST. The unit is accessible to both students and staff.

**Promote STEMi for Female students:** In order to increase the number of female students to undertake Science, Engineering, Mathematics and Innovation studies the Centre organized sensitization events for primary, secondary and university students. Some of these events include;

- “Soap-Box: CREATES initiated a special Campaign “Soap-Box” that aims at sensitizing and encouraging young schoolgirls to joint Sciences, Technology, Engineering and Mathematics subjects. This activity is organized by Female students and researchers, and special events for sensitizing are conducted in public areas within Arusha region. It has been run for three years and received a positive feedback from community and won a first prize in 2019 at northern zone Nanenane exhibition held in Njiro Arusha.
- On the similar initiative the Centre established collaboration with African Women in Agricultural Research and Development (AWARD)

which works toward inclusive, agriculture-driven prosperity for the African continent by strengthening the production and dissemination of more gender-responsive agricultural research and innovation. The two has agreed to build the capacity of women students and researchers in mentoring and leadership skills training. The Centre leader is among the participants attended short course on Gender Mainstreaming and Leadership organized by AWARD. One of CREATES PhD student was selected as Fellow for two years term from 2019 – 2020.

- **Teenagers Sensitization Program:** This is the special program aiming to sensitize girls' students at primary and secondary schools to studies STEMi subjects. Also, train the teenagers on life skills, health issues, sexual Harassment, stress management and goals setting. The program is led by CREATES Centre Leader prof. Hulda Swai and a total pf 52 Teenagers in Arusha participated.

#### **Facilities and Infrastructures to support People with Special Needs;**

**The** Centre office put in place structures that allow disabled to access the office easily and fixed washrooms facilities to easily support the use for the disabled. The Centre also supported construction of the Lactate mothers at NM-AIST. This is aiming to increase the number of enrollments of the female students.

## **4.2 Environmental Safeguard**

Based on CREATES Environmental Management Plan (EMP) as part of ACE II ESMP (2016). The EMP identified two main Risk areas and proposed Mitigation

Measures. The environmental risks identified are; Handling and management of medical waste and; hazardous toxic materials. These are resulted for the research works and especially laboratory studies. The Centre is implementing the proposed mitigation measures by put in all the research laboratories appropriate storage facilities for medical waste; and Incinerator facility for disposal of hazardous wastes. The laboratory has also policy and guidelines include the Standards Operating Procedures (SOPs) which issue safe of the students and researchers but also the environment.

Base on the nature of the projects established by the Centre, there is a need pf reviewing the EMP to accommodate the newly established activities. The activities include contraction of the Research Centre, establishment of the Green house farm and promotion of use of bio pesticides. The Centre also monitor implementation of its EMP and in every six months prepare and submit the report to IUCEA. Generally, there is not any environmental degradation incidence recorded.

## **5. FIDUCIARY ACTIVITIES**

### **5.1 Financial Management Systems**

CREATES uses the Financial Management system and all the internal controls as stipulated in the institution Financial manuals, regulation and Government Financial Act. The Accounting Information Systems changed from EPICOR Version 9.05 to Vote Book and then currently to MUSE increase efficiency. However, Centers are still using Vote Book. To ensure there is effective financial

management system Centre supported Purchase and installation of VOTE BOOK and Training of Staff on MUSE. The Performance Audits were conducted for both internal and external. The internal Auditing is being conducted by the Internal audit Unit on quarterly basis. The internal Audit report is table to the NM-AIST Audit committee which also meet in each quarter. The external Audit has been conducted by the Chief Auditor General (CAG) this involve the general project performance and eligible expenditures.

In all the Internal and External performance Based Audits- the Centre Received Satisfactory and Unqualified Audit report. The Centre also prepare and submit the Semi-annual IFR & EEP to the World Bank.

**Fund Disbursements:** The total amount triggered to date is USD 4,587,753.93 (76.46%) and the Amount disbursed in the Centre account is USD 3,482,196.

Credit Amount/Allocation (USD)	USD 6,000,000
Amount Verified/earned (USD)	USD 4,587,753.93
Amount Disbursed to Centre Account (USD)	USD 3,482,196
Amount waiting Approval (USD)	USD 1,105,558
<b>Total Expenditure (USD)</b>	<b>USD 2,582,195.99</b>

Challenges for Financial Management: The major challenges experienced were;

- Delay in fund disbursement
- Changing in Financial Management systems from Epicor Version 9.05 to VOTE Book and now MUSE

## 5.2 Procurement performance

The Centers under NM-AIST is following Public Procurement Acts of 2013 and its regulations of its 2016 in the Procurement Proceedings. To Enhance

transparency in its operations, the Centers adopted the use of TANEPS in all stages of procurement as directed by the PPRA. All Tenders are channeled through TANEPS, However, in previous years, Minor value was not incorporated in TANEPS, but as of now it is within the TANEPS, which is also the advantage in ensuring transparency and value for money in our procurement.

**The centers have made initiatives to achieve the DLR 4.2** (Timely Procurement Progressive report), Particularly in year 2017-20, where most of Supporting documents like;

- Contract register, Quarterly report for tender board and Management meeting on Implementation of Annual Procurement Plan was not available when we sent the progressive report for the first time on August for verification.
- As of now, most of the mentioned documents needed for verifications have been found and we will be sharing them in a nearest future for verifications.

**For DLR 4.1 (Timely Procurement Audit)**, We have noticed that PPRA will come to audit NM-AIST next year, we have planned to use the opportunity for the centers to be audited for all years which were not audited (This will serve the cost).

**Procurement Challenges:** The following are challenges related to Procurement

- Delays in disbursement (led to poor implementation of Annual Procurement Plan)
- Bureaucracy in the internal procedures (Approvals).



## 6. SUSTAINABILITY STRATEGIES

CRETEAS is working towards sustainability after the phaseout of World Bank financial support. The Centre has identified strategic actions and revenue projections for its sustainability as indicated below;

Strategic Action Plan	Forecast Net Income (Revenue projection/year)		
	2022(US\$)	2023(US\$)	2024(US\$)
<u>Strategic Action 1</u> : Accumulating funds to support Centre activities through developing funded project proposals	400,000	500,000	800,000
<u>Strategic Action 2</u> : Collecting revenues from Commercialization and licensing of products, prototypes and services	100,000	150,000	200,000
<u>Strategic Action 3</u> : Establishing Income Generating sub-Projects	80,000	60,000	75,000
<u>Strategic Action 4</u> : Provision of consultancy services	30,000	35,000	40,000
<u>Strategic Action 5</u> : Developing payable short courses/trainings	12,000	18,000	20,000
<u>Strategic Action 6</u> : Collaboration with other partner Institutions	30,000	32,000	40,000
<b>Total</b>	<b>652,000</b>	<b>795,000</b>	<b>1,175,000</b>

The Centre already generated revenues through implementation of these strategies. There also initiatives established specifically for revenue generation as indicated below;

Sn	Strategic Action Plan	Project/Progress/ Achievements
1	<u>Strategic Action 1:</u> Accumulating funds to support Centre activities through developing funded project proposals	<ul style="list-style-type: none"> <li>• OR-Tambo Chair (US\$ 1,000,000)</li> <li>• DDI-Incubation Centre (US\$ 250,000)</li> <li>• ESIDA-Project (EUR 100,000)</li> <li>• AMRS -Conference (US\$ 172,000)</li> <li>• ICTP – joint workshops</li> </ul>
2	<u>Strategic Action 2:</u> Collecting revenues from Commercialization and licensing of products, prototypes, and services	<ul style="list-style-type: none"> <li>• Establishment of Data Driven Innovations (DDI) Incubation Centre</li> <li>• Establishment of container-based factory at NM-AIST</li> </ul>
3	<u>Strategic Action 3:</u> Establishing Income Generating sub-Projects	<ul style="list-style-type: none"> <li>• Green House construction</li> <li>• Aquaculture Research; Fish cage farming and fishpond</li> <li>• Farming As A Business project</li> </ul>
4	<u>Strategic Action 4:</u> Provision of consultancy services	<ul style="list-style-type: none"> <li>• Centre allocated US\$ 8,000 to support operationalization of NM-AIST consultancy Bureau</li> </ul>
5	<u>Strategic Action 5:</u> Developing payable short courses/trainings	<ul style="list-style-type: none"> <li>• 3 Short courses conducted and raised US\$ 37,000</li> </ul>
6	<u>Strategic Action 6:</u> Collaboration with other partner Institutions	<ul style="list-style-type: none"> <li>• 26 Partnerships established and Joint interventions initiated</li> </ul>

## 7. UPDATED RESULTS ACHIEVEMENT AGAINST ANNUAL TARGET

The tables below present the achievements per each performance indicators.

Table 7: Results achievements per each year

Indicators			Baseline	Year 1 (2017)		Year 2 (2018)		Year 3 (2019)		Year 4 (2020)		Year 5 (2021)	
				Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target (No planned Target)	Actual
<b>PDO</b>	1. Regional students enrolled in ACEs: (i)	Masters (Total)	0	8	8	8	1	8	2	10	0		0
		Masters (Female)	0	2	4	3	1	2	2	4	0		0
		PhD (Total)	0	4	15	5	0	4	1	6	0		0
		PhD (Female)	0	1	6	2	0	2	1	2	0		0
	(ii)	Masters (No. of Female)	0	9	19	9	45	9	3	9	0		0
	(ii)	PhD (No. of female)	0	2	6	3	15	3	2	3	0		0

	courses (Female)												
2. Students (national and regional) enrolled in ACEs: (i) Masters (No. of female) (ii) PhD (No. of female)	Masters (Total)	73	37	100	40	25	45	27	45	39		39	
	Masters (Female)	24	11	46	10	12	9	12	15	20		20	
	PhD (Total)	51	10	68	15	12	16	8	17	10		10	
	PhD (Female)	13	3	31	5	3	5	4	6	5		5	
	Short-term courses (Total)	0	30	39	30	101	30	16	30	2		2	
	Short-term courses (Female)	0	12	15	15	42	15	8	25	1		2	
	3. MOUs on partnerships for collaboration in applied research and training entered into by the ACEs	0	8	15	4	4	4	4	4	5		2	
	Total	2	1	0	3	6	2	4	2	0		0	

	4. Accredited education programs offered by the ACEs	National	2	1	0	3	6	2	4	1	0		
		Regional	0	0	0	0	0	0	0	0	0		0
		International	0	0	0	0	0	1	0	1	0		0
		Short-term Courses	0	0	0	0	0	0	0	0	0		0
	5. Direct Project Beneficiaries (of which female)	Total	124	103	225	139	156	176	101	216	77		41
		Female No.	37	36	97	49	62	55	44	94	42		13
		Female (%)	30%	35%	43%	35%	40%	31%	44%	44%	55%		32
<b>Component 1</b>	1. Faculty and PhD students exchanges to promote research and teaching (No.	Total	0	26	18	54	18	85	50	124	26		22
		Female	0	10	5	19	5	26	20	48	16		6

	of female)												
	2. Amount of externally generated revenue by the ACEs	0	31,000	-	351,700	255,688	722,700	#####	602,700	120,613		22308	
	3. Internationally recognized research publications in disciplines supported by the ACE Program and with regional coauthors												
	Total	0	15	30	25	25	28	30	38	32		32	
	No. co-authored with regional collaborators.	0	4	3	7	10	8	10	11	17		14	
	4. No. of institutions hosting ACEs participating in the PASET	0	0	0	1	1	0	0	0	0		0	

	benchmarking exercise											
<b>Component 2</b>	1. Events that foster partnerships between ACE and private sector/industry	0	2	1	2	2	2	1	0	0		0
<b>Component 3</b>	1. Knowledge sharing events with ACEs, partner institutions, academia and diaspora	0	1	1	1	3	1	0	0	1		0
	2. Reports by ACEs on Beneficiary Satisfaction	0	1	0	1	0	1	0	1	0		0
	3. Timely verification of ACE achievement of DLIs	0	2	0	2	4	2	1	2	2		0
	4. Biannual reporting on M&E of the ACEs	0	2	2	2	2	2	2	2	2		2

Table Cumulative achievements

Indicators			Cumulative (2017-2021)			
			Cumulative Target	Cumulative Actual	Achievement (%)	
PDO	1. Regional students enrolled in ACEs: (i) Masters (No. of Female) (ii) PhD (No. of female)	<b>Masters (Total)</b>	<b>34</b>	<b>11</b>	<b>32</b>	
		Masters (Female)	11	7	64	
		PhD (Total)	19	16	84	
		PhD (Female)	7	7	100	
		<b>Short-term courses (Total)</b>	<b>36</b>	<b>67</b>	<b>186</b>	
		Short-term courses (Female)	11	23	209	
	2. Students (national and regional) enrolled in ACEs: (i) Masters (No. of female) (ii) PhD (No. of female)	<b>Masters (Total)</b>	<b>167</b>	<b>230</b>	<b>138</b>	
		Masters (Female)	45	110	244	
		<b>PhD (Total)</b>	<b>58</b>	<b>108</b>	<b>186</b>	
		PhD (Female)	19	48	253	
		<b>Short-term courses (Total)</b>	<b>120</b>	<b>160</b>	<b>133</b>	
	Short-term courses (Female)	67	68	101		
	3. MOUs on partnerships for collaboration in applied research and training entered by the ACEs			20	30	150
	4. Accredited education programs	<b>Total</b>	<b>8</b>	<b>10</b>	<b>125</b>	
		National	7	10	143	
		Regional	0	0	0	
International		2	0	0		



	offered by the ACEs	Short-term Courses	0	0	0
	5. Direct Project Beneficiaries (of which female)	<b>Total</b>	<b>634</b>	<b>600</b>	<b>95</b>
		Female No.	234	258	110
		Female (%)	1.4	33	55
<b>Component 1</b>	1. Faculty and PhD students exchanges to promote research and teaching (No. of female)	<b>Total</b>	<b>289</b>	<b>134</b>	<b>46</b>
		Female	103	52	50
	2. Amount of externally generated revenue by the ACEs		<b>1,708,100</b>	<b>594,443.34</b>	<b>35</b>
	3. Internationally recognized research publications in disciplines supported by the ACE Program and with regional coauthors	<b>Total</b>	<b>106</b>	<b>149</b>	<b>141</b>
		No. co-authored with regional collaborators.	30	54	180
	4. No. of institutions hosting ACEs participating in the PASET benchmarking exercise		<b>1</b>	<b>1</b>	<b>100</b>
<b>Component 2</b>	1. Events that foster partnerships between ACE and private sector/industry		6	4	67

<b>Component 3</b>	1. Knowledge sharing events with ACEs, partner institutions, academia, and diaspora	3	5	167
	2. Reports by ACEs on Beneficiary Satisfaction	4	0	0
	3. Timely verification of ACE achievement of DLIs	8	7	88
	4. Biannual reporting on M&E of the ACEs	8	10	125

### 8. DLIs/DLRs updates

For the accumulative time the total amount triggered to date is USD 4,587,753.93 (76.46%) and the Amount disbursed in the Centre account is USD 3,482,196. See the bellow DLIs/DLRs Update table.

Table 8: DLIs/DLRs Update table

<b>DLI</b>	<b>DLR #</b>	<b>Total Amount Allocated</b>	<b>Total Verified Amount</b>	<b>% of Completion</b>	<b>Remark</b>
DLI # 1	DLR # 1.1	600,000	600,000	100	Completed
	DLR #1.2	500,000	500,000	100	Completed
DLI # 2	DLR # 2.1	N/A	N/A	N/A	Dropped and funds reallocate to other DLIs (DLI2.2=100,000, DLI 2.5=200,000, DLI 2.6=200,000)
	DLR #2.2	1,300,000	1,281,775	98.6	On Good Progress
	DLR #2.3	600,000	300,000	50	International Accreditation-On Progress

	DLR #2.4	200,000	200,000	100	Completed
	DLR #2.5	500,000	500,000	100	Completed
	DLR #2.6	700,000	266,000	38	Due to travel restriction caused slow pace of exchange
	DLR #2.7	900,000	599,978.93	66.66	Center won US\$ 1M from ORTAMBO research Chair Initiative
	DLR #2.8	100,000	100,000	100	Completed
DLI # 3	DLR #3.1	75,000	60,000	80	On good progress
	DLR #3.2	75,000	60,000	80	On good progress
	DLR #3.3	75,000	60,000	80	On good progress
	DLR #3.4	75,000	60,000	80	On good progress
DLI # 4	DLR # 4.1	150,000	0	0	Reports are prepared for Verification
	DLR #4.2:	150,000	0	0	The center preparing for Audit &Verification
<b>Total</b>		<b>6,000,000</b>	<b>4,587,753.93</b>	<b>76.46</b>	

## **9. CHALLENGES AND RECOMMENDATION.**

For the past five years CREATES-FNS has made remarkable achievements and sufficient progress achieving the DLRs. We believe before the project closure will be able to trigger the remaining funds. However there has been a few challenges along the way:

- The Novel Pandemic Covid-19 has cause strong delay of activities and specifically achieving DLR #2.6, because of travelling restrictions it has been impossible to trigger the funds. We recommend the Bank to allow Virtual exchange.