**TANZANIA AGRICULTURAL RESEARCH INSTITUTE**

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**Quarterly Report on Research, Management and Coordination Progress**

**For the period of 1st January to 31th June2022**

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**TARI Mikocheni**

**31th June2022**

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# **Abbreviations and Acronyms**

AVRDC African vegetable research and development centre

BMGF Bill & Melinda Gates Foundation

BBSRC Biotechnology and biological sciences research council

CIMMTY International Maize and Wheat Improvement Centre

COSTECH Commission for science and technology

EAT East African Tall

EAV-IPMIL East African vegetable integrated pest management initiative laboratory

FAO Food Agriculture organization

NAB National Australia Bank

ICIPE International centre for insect physiology and ecology

IPM Integrated pest management

NaCRRI National crop research resources Institute

NCDP National coconut development program

NRI Natural Resource Institute

NCSU North Carolina state University

SPLCV Sweet Potato Leaf Curly Virus

TARI-MKN Tanzania agricultural Research Institute Mikocheni

TOSCI Tanzania official seed certification agency

USAID United State of Agency for International Development

# **1. Introduction**

Tanzania Agricultural Research Institute-Mikocheni (TARI-MKN) is one of the 17 research centres under TARI. It was established in March 1996 as a measure to sustain and institutionalize coconut research and development activities conducted by the then National Coconut Development Programme (NCDP). The NCDP was established by the Government of the United Republic of Tanzania in the fiscal year 1979/80 with the aim to promote coconut production and utilization in the country. The program covered the whole coastal belt of Tanzania and the Island of Zanzibar.

TARI-Mikocheni mandate is in two-folds, namely conduct and promote research for the development of the coconut sub-sector and promote research and utilization of agricultural biotechnology for socio-economic development in the country.

The centre’s head office is in Dar es, salaam at Mikocheni B, Plot 22 along the Coca cola Road. It has two sub-stations, namely Chambezi and Mkuranga, where most of the research activities are conducted. The former is located about 55 km north of Dar es salaam near Bagamoyo town at latitude S6.520 and longitude E 38.910, while Mkuranga sub-station is located at S 7.120 and longitude E 39.200, about 50 km south of Dar es salaam.

There are two departments: 1) Research and Innovation and, 2) Technology Transfer and Partnership. Under these departments there are six subprograms: crop research, natural resources, post-harvest management, socioeconomics and marketing, technology dissemination, commercialization and partnership, and knowledge management and communication programs. The institute is within the eastern zone together with TARI Kibaha and TARI Mlingano.

The Mikocheni centre basically has two research programs, which are its mandates: coconut and biotechnology. The coconut program is the main with 4 research units which include: agronomy, disease control, pest control, social economy, post-harvest and technology transfer, the biotechnology program accommodate 3 units: tissue culture, molecular diagnostics and genetic engineering laboratories. All the research activities in each unit in the coconut program are designed to address all agricultural challenges facing the coconut agro-ecological systems. whereas in biotechnology as a tool cuts across all crops and supports other research mandates.

Research at TARI-Mikocheni has mainly depended on government competitive grants through Commission for science and technology (Costech) and external support from different international funding organisations mainly the “Bill & Melinda Gates Foundation” (BMGF), Bio innovate Africa II, Biotechnology and Biological sciences research council (BBSRC), Food and agriculture organization (FAO) and International Centre for Insect Physiology and Entomology (*Icipe*). In this reporting quarter (1st April to 31stJune 2022), the institute operated four (4) research projects with financial support of Tshs. 441,161,605.77 of which, Tshs. 334,500,000.00(75.8%) is from the international donor support while (24.2%) Tshs. 106,600,000.00 is from Tanzania government through Costech.

Thus, in this quarter, using the available support, the institute recorded significant achievements in research activities by: conducting impact surveys in vegetable growing areas to assess the impact of IPM strategies, coconut mini surveys and dissemination of quality coconut seedlings to districts community nurseries for the rehabilitation of coconut cultivation, and provision of laboratory services to Seed sector through GMO testing of all imported seeds and DNA extraction service from vegetables samples for World vegetable Centre.

In line with technology dissemination , the institute also continued with the production of quality sisal, and banana and pineapple, as well as dissemination of coconut seedlings to distrcts for the rehabilitation of production

# **2.0 Research Programs/Activities conducted in this quarter**

## 2.1 Coconut research program

The centre continued to maintain its coconut germplasm, seed nursery and weeding in coconut orchards. Currently, the coconut nursery is selling its 10,000 seedlings raised last year.

The planned activities in this reporting period were:

* conducted a mini survey to understand the existing situation in coconut industry with Mtama district as a case study in order to establish the bases for future interventions in coconut industry rehabilitation
* Maintenance of coconut nursery and selling of seedlings
* Dissemination of coconut seedlings to Mkuranga, Mtama, and Mkinga distrcts for rehabilitation of coconut cultivation

**Achievement**

* A total of 63 farmers were interviewed in Same and Mtama district and the preliminary analysis shorted the coconut cultivation s affected by the incidence of pest and diseases, unavailability of seedlings and poor market for the coconuts (analysed report is being finalised)
* A total of 1,150 coconut seedlings were distributed to the districts authorities (**Table** 1) to initiate district nursery for the distribution to farmers for easy access of seedlings. The seedling were delivered through DED.

**Table 1: Number of coconut seedling disseminated to district community nurseries for easy access of seedlings to farmers**

|  |  |  |  |
| --- | --- | --- | --- |
| **SN** | **Region** | **District** | **No. of seedling distributed** |
| 1. | Tanga | Mkinga | 150 |
| 2 | Muheza | 150 |
| 3 | Coast | Mkuranga | 150 |
| 4 | Lindi | Mtama | 250 |
| 5 | Kilimanjaro | Same | 100 |
|  | **Total** |  | **1,150** |

**Table 2: Quantity of Seed/seedling and coconut by product sold as of 31st June 2022**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product** | **Categories** | **Quantity sold** | **Price per unit** | **Total amount realised (TZS)** |
| Coconut | Seeds | 100 | 1000.00 | 100,000.00 |
| Coconut | Seedlings | 968 | 2,500.00 | 2,420,000.00 |
| Dead coconut | Logs | 3 | 20,000.00 | 60,000.00 |
| Coconut | cooking | 1400 | 500.00 | 735,500.00 |
| Oil palm | Bunches | 152 | 400.00 | 60,800.00 |
| **Grand total** |  |  |  | **3,376,300.00** |

* The program continued to interacts with different partners in soliciting for funds. Two proposals were reviewed, one targeting the European Union and the other development funds. The second, a small proposal is requesting funds to update the coconut data base with status of lethal diseases in the southern zone, production data, and prospecting mission for germplasm collection to enrich the national germplasm at Chambezi substation.

### **Disease control unit**

* + 1. **Pest control unit**

The unit continued to implement a project on ‘Combating Arthropod Pests for Better Health, Food and Climate Resilience (CAP) in Tanzania’. The objective is to generate knowledge on common arthropod pests affecting avocado, tomato and cucurbit to enable growers plan crop calendar and their measures.

In this reporting period they planned to achieve the following activities:

1. to conduct an Arthropods surveys in Tanga and Kilimanjaro regions in collaboration with *ICIPE* scientists from Nairobi-Kenya. The objective of the surveys was to identify and document important insect pests, pollinators and natural enemies that are found in tomato, avocado and cucurbits crops.
2. to introduce Integrated Pest Management (IPM) strategies as a sustainable practice for improving produce quantity and quality of cucurbits
3. to continue with project proposal writing for soliciting research funds on entomology

**Achievements**

* No activities were conducted as planned because the donor had temporarily stop disbursement until the financial report is reconcile

### **Agronomy Unit**

### The unit has been running 2 projects on horticultural crop since 2018 in collaboration with AVRDC. These projects ended officially May 2022

#### **Amazing Amaranths and Eggplant projects**

In this reporting unit planned to achieve the following activities:

* Sampling and analysing wilt data of African egg plants
* Conduct final dissemination meeting to stakeholders to wind up the project.
* Preparation of project final report

**Achievements**

* Wilted African eggplants sampled, analyzed and findings disseminated in the end of project meeting
* SASSA end of project meeting was successful conducted; progress and project research findings were shared to 43 stakeholders (25 males and 18 females

**Post-harvest technologies unit (PHT)**

### **Table 3: Production of coconut virgin oil self-help project for the period ending 31th June 2022**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Total nuts used** | **Production costs (Tshs.)** | **Virgin oil Production (Lts.)** | **Total gross sales (Tshs.)** | **Net Profit (Tshs.)** |
| Nil |  |  |  |  |

## 2.1.6 Socio-Economic and Marketing Research Unit

The unit in this reporting period planned to achieve a number of activities as follows:

### Preparation of MTEF

* Coordinating Centre' sales through FABU
* Data analysis of whitefly project
* Preparation of annual comprehensive income statement of SASSA Project backstop

**Achievement**

* The MTEF budget for 2022/23 was prepared adhering to MUSE format
* Sales of the centre's products through Farm Business Unit (FABU) were well coordinated whereby total collected amount was 9,906,910 shillings
* The analysis of data of whitefly project for the technological cost and revenues for controlling of whiteflies was effectively done

1. **Marketing and value chain studies**

In this reporting period the unit carried out the following activities:

1. Preparation of African cassava whitefly project checklist for conducting cost benefit analysis and administering checklists to key informants in the two districts Muheza and Chalinze
2. Data collection on *Mandis Plus* filed trial from contact farmers in miono village Bagamoyo for computation of Cost benefit analysis of the promoted technology of cassava cutting dressing with limited chemical and frequencies for the control of whitefly infestation

## 2.1. 7 Biotechnology program

The program has been running 2 biotech related projects and provision of biotech laboratory services to stakeholders’ peer institutions. In this quarter the implemented activities include:

### **Molecular entomology**

**2.1.7.2 East Africa IPM Innovation Lab: Research and Technology Transfer for Vegetable Crops Project**

TARI-MKN has also been implementing a USAID-funded project titled “East Africa IPM Innovation Lab: Research and Technology Transfer for Vegetable Crops since 2018 to date. The project is implemented in collaboration with regional and in country partners for 4 years from 2018 until 2020 and extended on No cost until 22nd May 2022. In this project TARI has been implementing:

1. Preparation of the final project report
2. Completing farmer field guide for recognition of tomato disease and control in swahili version “Muongozo wa Mkulima kuhusu Magonjwa yashambuliayo Nyanya na Udhibiti Wake”
3. Conducted a final impact survey to the project intervention distrcts

**Other activities of the program include:**

1. Application of tissue culture techniques for mass propagation of pineapple
2. Provision of diagnostic services to different stakeholders

**Achievements**

**2.1.5.1 Mass propagation of Planting materials**

The unit had implemented a new project funded by the government through costech titled ‘Tissue culture-based massive production and unrestricted access to high quality pineapple planting material’ with a goal to contribute to increasing income and improving livelihood of farmers in the pineapple growing areas through enhanced productivity and competitiveness of the pineapple industry in Tanzania

**The objective of the project are:**

1. To pilot the developed tissue culture protocol, and guidelines for massive multiplication of adequate quality pineapple planting material,
2. To institutionalize a reliable seed delivery system for market preferred MD2 and Smooth cayenne pineapple planting material to farmers, and

**In this reporting period the planned activities were:**

1. Conduct initiation meeting
2. Collect germplasm for market preferred varieties
3. Establish demonstration fields to train GAPs for pine apple in on station and on farm
4. Initiate mass multiplication of pineapple seedling in tissue culture

**Achievements**

1. Conducted a project initiation meeting with its stakeholders and collaborators
2. Collection of superior germplasm for pineapple sweet cayenne and MD variety for mass multiplication of materials. A total of 6,000 mother stocks have been raised and will be multiplied to produce 750,000 seedlings
3. Establishment of 2 demonstration fields each on station at Chambezi fields station with 6,000 tissue culture raised seedlings on station, and on farm at Fukayosi (4,500 seedlings) village in Bagamoyo to demonstrate good agronomic practice for pine production
4. Capacity building a tailor-made training to 2 TARI staff was done at our collaborator the Crop bioscience solution lab at Arusha for

**2.1.5.2 Provision of diagnostic services**

In this reporting period the biotech lab planned to process 500 seed samples for GMO screening service. In this reporting period a total of one hundred and fifty four (154) various seed samples from TOSCI-Northern zone (Arusha), and TOSCI-Southern Highland-(Njombe and Mtwara) were received, analysed and results submitted to TOSCI headquarter for decision making.

**2.1.5.3 Screening for customers samples**

In the reporting period the World vegetable center based in Tengeru Arusha also procured a DNA extraction service from our biotech laboratory. A total of 145 leaf samples from spider plants (Mgagani), their DNA were extraction *(See table xx for revenue collected*).

# **Technology Dissemination and Partnership unit**

This unit serves as a link between on-station research, extension services and the farmer. It functions as subject matter specialist in disseminating research results and technical packages to the farmers through: Farmer’s Field Days Demonstration and research verification plots on farmers’ fields.

### In this quarter the unit successfully promoted and disseminated developed technologies as reported in the TTP quarter report June 2022

### **Organizing Training and Workshops to farmers**

### **Collecting news (Radio / TV programmes aired)**

**Table 4: Broadcasted program on different media by 31st June 2022**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Numbers prepared/hired/made/received** | | | | | | |
| **TV** | **Radio** | **Newspapers** | **Social media** | **Short Messages** | **Phone calls** | **Others specify** |
| 10 | 9 | 12 | 48 | 20 | 10 | - |

### **Participating in Agricultural related shows**

The institute participated in the No participation was conducted in this reporting period

### **Partnership established**

In the Pineapple project, a new partnership has been initiated between TARI-Mikocheni and Crop Bioscience Solution (CBS) Arusha in implementing the project. The draft MOU is being reviewed by TARI-legal officer prior to signing.

### **Visitors**

### In this quarter, the institute received a total of 51 (37 male and 14 female) visitors who visited to seek agricultural advises.

### **Number of projects documented**

In this reporting period a total of 8 projects have been going on. Seven are donor-funded and 1 are government funded projects (**Table 5**)

### **Table 5: Total number of projects executed up to 31st June 2022**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SN** | **Project title** | **Year started** | **Year ending** | **Source of funds** |
| 1 | Tissue culture-based massive production and unrestricted access of high-quality pineapple planting material | 2022 | 2023 | Govt./Costech |
| 2 | African Cassava Whitefly: Outbreak Causes and Sustainable Solution | 2018 | May 2022 | BMGF/NRI |
| 3 | Integrated pest management of Avocado and cucumber pest in East Africa | 2018 | 2022 | ICIPE |
| 4 | Vegetable Crops IPM for East Africa | 2016 | May 2022 | USAID |

### **Table 6: Undocumented Knowledge, communication and Documentation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Media** | **Status** | **Users** | **Remarks** |
| Library | Working | Scientist | Small outdated, need librarian |
| TEEAL | Working | Offline access | Internet service is not available |
| AGORA | Journals Available | Scientists | Easily available |
| Video conferencing facilities | Working | Scientist | Internet service is not available |

# **Newsletters and Publication**

In this reporting period, 2 publications have been published in International peer reviewed journals:

1. Bachwenkizi H.S., Temu G.E., **Mbanzibwa D.R.** **Lupembe M.D.,** Ngailo S., **Tairo F.D** and Massawe D.P (2022). Recombination and darwinian selection as drivers of genetic diversity and evolution of sweet potato leaf curl viruses in Tanzania Physiological and Molecular Plant Pathology 120 (2022) 101853
2. Bachwenkizi H.S., Temu G.E., **Lupembe M.D.,** Ngailo S., **Tairo F.D** and **Mbanzibwa D.R.** (2022). Development of molecular-based detection tool for sweet potato leaf curl viruses and determination of their incidence levels in Tanzania. African crop science journal doi: <https://dx.doi.org/10.4314/acsj.v30i3.8>

# **Research technical Resources**

### **Table 6. Total number and category of research technical resource**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Profession** | **PhD** | | **MSc** | | **BSc** | |
|  | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| Agronomy | 1 | 0 | - | 1 | 0 | 0 |
| Plant breeding | 0 | 0 | 1 | 0 | 0 | 0 |
| Entomology | 0 | - | 1 | 1 | - | - |
| Biotechnology | 0 | 0 | 1 | 0 | 0 | 2 |
| Plant Pathology/Virology | 1 | 1 | 1 | 5 | 1 | 0 |
| Agricultural Engineering | 0 | 0 | 1 | 0 | 1 | 0 |
| Food Science and Nutrition | 0 | 0 | 0 | 0 | 0 | 0 |
| Socio/Agricultural Economics | 0 | 0 | 2 | 1 | 0 | 0 |
| Agricultural Extension and Education | 0 | 0 | 0 | 3 | 0 | 0 |
| **Total** | **2** | **1** | **7** | **10** | **2** | **2** |

## Human resource capacity building

### **Long Term-Training**

Three (3) students supported by different projects are continuing with their studies in various universities (**Table 7**). Three of them 1 of them is expected to defend her PhD on 2022.

### **Table 7: Total number of Researchers in long term training and their status by 31th June 2021**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No** | **Name** | **Sex** | **Program** | **University** | **Start Date** | **End Date** | **Sponsor** | **Remarks** |
| 1 | Vailet Mwaijande | Fe | PhD | Wagengen, Holland | 2015 | 2019 | CIMMTY-TAMASA/BMGF | Graduating April 2022 |
| 2 | Evangelista Chiunga | Fe | PhD | NCSU-USA | 2017 | 2020 | BMGF/NCSU | Writing thesis in TZ |
| 3 | Emmanuel Mrema | Fe | PhD | Accra-Ghana | 2019 | 2022 | BMGF/Next Gen. | Doing research work in TZ |
|  | **Total** | **3** |  |  |  |  |  |  |

## Research Infrastructure

In this reporting period, the GMO testing laboratory has received equipment and reagents for GMO testing worth Tshs. 356,384,496.89 procured by the government to strengthen the laboratory services .

* 1. **Funding**

In this reporting period TARI-MKN received funds from two main sources: government as operation charges (OC) amounting to Tshs. 11,500,000.00and from donors amounting Tshs. 334,561,00.77 (**Table 9**). The available funds were utilized primarily on research activities and normal operations.

### **Table 8. Total funds received (Tshs.), their sources and expenditure for the period ending 31th June 2022**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **OC** | **\*Donor** | **Govt./Res.** | **Sales** | **Com. Levies** |
| 11,500,000 | 334,561,605.77 | \*106,600,000.00 | 3,448,000.00 | 115,000.00 |

# ***\*IUSD-2300Tshs.***

*\* Government source (Tshs. 89,600,000-Costech-funded project and Tshs. 17,000,00 for coconut development)*

# **Seed Produced (in Kgs) including cuttings**

Of the Tshs. 2,600,000.00 generated in this reporting period from the sold products, Tshs. (**Table 9**) were from selling of high-quality coconut seedlings

### **Table 9. Total amount of seed/seedlings produced and sold by 31th June 2022**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product** | **Categories** | **Quantity sold** | **Price per unit** | **Total amount realised (TZS)** |
| Coconut | Seeds | 100 | 1000 | 100,000.00 |
| Coconut | Seedlings | 2,110 | 2,500 | \*2,500,000.00 |
| **Grand total** |  |  |  | **2,600,000.00** |

# ***\**** *of the 1,710 seedlings 1,150 were distributed to the 4 districts as a kind donation to establish a community based nurseries in Mkinga, Muheza, Same and Mtama*

# **Monitoring and Evaluation**

In this reporting period, no monitoring and evaluation exercise was conducted due to COVID 19 pandemic, there was restricted movement.

# **Annexes (2022)**

**Annex 1a: TARI-Mikocheni Researchers Status by Highest Qualifications**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Zones** | **Station** | **Highest qualification** | | | **Total** |
| **BSc** | **MSc** | **PhD** |  |
| Eastern | TARI-Mikocheni | 4 | 17 | 3 | **24** |

**Annex 1b: TARI Field Officers and Support Staff**

|  |  |  |
| --- | --- | --- |
| **Zones** | **Field officers** | **Support staffs** |
| **TARI-Mikocheni** | 10 | 12 |

**Annex 2: Recruited Researchers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | **SN** |  |  |  | | **Name** | |  | | --- | | **Gender** | | **Designation** | **Station** |
|  | Nil |  |  |  |

**Annex 3a: Researchers Employed on Contracts and those retired**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | **SN** |  |  |  | | **Name** | **Gender** | **Highest Degree** | **Discipline** | **Status** | **Station/Project** |
| 1 | Ruth Minja | Female | Ph.D | Agronomy | Retired | TARI-HQ |
| 2 | Geofrey Mwingira | Male | Dip. |  | Retired | TARI-Mkuranga |

## Annex 3b: List of Researchers on Leave without Pay by Station

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **S/N** |  | | |  | | --- | | **Name** | | **Gender** | |  |  | | --- | --- | | **Higher Degree** |  | | |  |  | | --- | --- | | **Discipline** |  | | **Station** | **Current Affiliation** |
|  | Nil | **-** | **-** | **-** | **-** | **-** |

## Annex 4a: Researchers on Long-Term Training for the period by June 2022

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SN** | **Name** | **Sex** | **Univ.** | **Station** | **Degree/ Discipline** | **Year of Study** | **Sponsor** |
| 1 | Ms. Vailet Mwaijande | Fe | Wagengen-Holland | TARI-MKN | PhD | 2015 | CIMMTY/BMGF |
| 2 | Mr. Emmanuel Mrema | Ma | Accra-Ghana | TARI-MKN | PhD | 2018 | NextGen |
| 3 | Ms. Evangelista Chiunga | Fe | JKUAT-Kenya | TARI-MKN | PhD | 2018 | BMGF/NCSU |

## Annex 4b: Support Staff on Long-term Training for the period by JuneJune . 2022

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | **S/N** |  |  | | |  | | --- | | **Name** | | |  |  | | --- | --- | | **Sex** |  | | **Research Station** | **Degree and Discipline** | **Sponsor** | **Amount of money** | **Year of Study** |
| 1. | NIL | - | - | - | - | - | - |

## Annex 5: Short-term Training for Staff

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SN** | **Course Title** | **Staff Category** | |  |  | | --- | --- | | **Number of Participants** |  | | **Duration** | **Year of Study** | **Sponsor** |
|  | Pineapple tissue culture for mass multiplication | Research assistant and Lab technician | 2 | 7d | 2022 | NFAST-Project-Pineapple- |