THE 19th MEETING OF COMSATS COORDINATING COUNCIL
(17th – 18th May 2016, Islamabad, Pakistan)

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Director of Engineering Development
1. INTRODUCTION

- The Tanzania Industrial Research and Development Organization (TIRDO) is a multi-disciplinary research and development organization established by an Act of Parliament No. 5 of 1979 and it became operational on 1st April, 1979.

- TIRDO is a semi autonomous organization under the Ministry of Industry, Trade and Investment.
1.1 Mission

- To conduct research, development and technical services on industrial processes and products, while utilizing local materials in partnership with industries
1.2 CORE FUNCTIONS

- To carry out research in various aspects of local and foreign industrial techniques and technologies and evaluate their suitability for adaptation and alternative use in local industrial production.

- To provide to the firms engaged in industrial production advisory technical services so as to improve performance and to avert or minimize the sources of industrial pollution.
### 1.3 STAFF PROFILE

TIRDO has 85 workers including 35 Researchers (scientists, engineers), 17 technicians and the rest consist of administrative personnel.

*PhD 12 (4 Studies); MSc 15 (2 Studies)*

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>FEMALE</th>
<th>MALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers</td>
<td>18</td>
<td>17</td>
<td>35</td>
</tr>
<tr>
<td>Technicians</td>
<td>6</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Administration and Finance</td>
<td>10</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>34</strong></td>
<td><strong>51</strong></td>
<td><strong>85</strong></td>
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</tbody>
</table>
# 1.4 Annual Budget (2014/15)

(1 US. $ = TSHS 2,200)

<table>
<thead>
<tr>
<th>Budget Item</th>
<th>Amount in TSHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td>2,337,825,000</td>
</tr>
<tr>
<td>Operating Cost</td>
<td>778,000,000</td>
</tr>
<tr>
<td>Salaries</td>
<td>1,803,299,000</td>
</tr>
<tr>
<td>Other Income</td>
<td>1,000,000,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,919,124,000</strong></td>
</tr>
</tbody>
</table>
1.5 ORGANIZATIONAL STRUCTURE

COUNCIL

DIRECTOR GENERAL

INTERNAL AUDITOR

Corporate Service & Planning Division (Head)

PMU

DEPARTMENTS (5) (Directors)
DIR/DED/DICT/DAP/FINANCE

HEADS OF DIVISIONS (12) and SECTIONS (4)
1.6 CORE DEPARTMENTS

- **Industrial Research (Director)**
  - Food & biotechnology Division (Head)
  - Industrial Chemistry and Agro-processing Division (Head)
  - Environment and Occupational Safety Division (Head)
- **Engineering Development (Director)**
  - Materials Science and Technology Division (Head)
  - Textile and Leather Division (Head)
  - Energy Division (Head)
- **Information, Communication Technologies and Technology Transfer (Director)**
  - ICT Division (Head)
  - Instrumentation Division (Head)
  - Technology Transfer Division (Head)
2. ENGINEERING DEVELOPMENT

DIVISIONS

- Engineering Materials Technology
- Textile and Leather Technologies
- Energy Technology
2.1 Engineering Materials Technology

Non Destructive Testing Laboratory at TIRDO Premises

We carry out the following NDT methods:

1. Radiography testing
2. Visual inspection
3. Magnetic particle inspection
4. Ultrasonic testing
5. Liquid penetrant inspection
Our Role is to ensure quality and safety.

Boiler tubes inspection
.../ Engineering Materials Technology

Ultrasonic testing

Our role: Quality assurance in materials
Quality assurance of gas pipeline system by using radiography method

Our Role: To ensure quality of pipelines and environmental safety.
Quality assurance on a gas pipelines.
TIRDO inspected Tanzania 1st off shore gas pipelines at Mnazi Bay, Mtwara
2.2 Energy Technology

OUR ROLE
We carry out energy audits and offer advice on ways to reduce energy consumption and bills

Energy auditing to a municipal water pumping station
AIM
Dissemination of renewable energy technologies

Wind water pumping
3. ICT AND TECHNOLOGY TRANSFER

DIVISIONS

- Information and Communication Technology
- Electronics and Instrumentation Technologies
- Technology Development and Pilot Plant.
Role

- Cyber security and forensics training
- Research on industrial sector ICT applications (sensor, network, mobile)
- Support SME’s in the application of ICT in their businesses
- Future plans: Calibration of different scientific equipment
3.1 Information and Communication Technology

Website designing for SME’s

Our role:

Help SME’s advertise their business to expand market reach.
3.2 Technology Development and Pilot Plants

Recycling Plant

Unsorted plastic collected at the extruder recycling processing centre

Layout of machines at the recycling processing centre
Technology Development and Pilot Plants

AIM

Recycling leather solid waste into valuable products

Leather recycling plant at TIRDO
Technology Development and Pilot Plants

Food processing plant
OUR ROLE:
Technology transfer to SME’s on good processing methods that results to better products.

Training on fruit processing
Processors being instructed on the use of a hydraulic press to remove water and cyanide from grated cassava
Demonstration on the use of the grating machine
4. INDUSTRIAL RESEARCH

DIVISIONS

- Agro Processing and Industrial Chemistry
- Environmental Technology and Occupational Safety
- Food Processing and Bio-Technology
4.1 Agro Processing and Industrial Chemistry

OUR ROLE

Analysis of food composition, Nutrition composition including toxic substances.
Analysis of pesticide on food materials.

High performance liquid chromatography (HPLC)
AIM

Obtain Iodized mushrooms

Digester
AIM

Determine metals in different samples.

.../ Agro Processing and Industrial Chemistry

atomic absorption spectrometer (AAS)
We teach SME’s on the functions of solar dryer and how to construct the dryer.

Agro products solar dryer
AIM: Monitoring toxic gases from generators, boilers, vehicles and incinerators.
XRF machine for quantifying inorganic materials content
AIM:
Measure amount of dust that is tolerable according to NEMC and international standards.
4.3 Food Processing and Bio Technology

Role

- Physical, chemical and microbiological testing of foods and water quality
- Training on hygiene for food premises
- Training on HACCP applications and food safety quality management systems
ROLE
Ensure food safety and security

Scientists analyzing samples
AIM

Microbiological Analysis of food samples.

Inoculation process
Mushroom Farming:
Help SME’s grow nutritional and medicinal mushrooms

Ganoderma Lucidum mushroom harvested from banana leaves substrate
Traceability Concept

Traceability is the ability to follow the movement of food or feed through specified stages of production, processing and distribution.

This is referred to as External- or Chain Traceability.
Reasons for implementing traceability in Tanzania

- Supply management improvement
- Safety and quality
- Brand value protection
- Expanded market/market share
- Regulation
- Customer requirements
Reception and washing of Nile perch prior to processing at fish factory in Mwanza.
Packaging of fish fillet in boxes with traceability code and code date ready for export.
AIM
Create market access in international market

Fish fillet packed with Bar Code to ensure traceability ready for transport
.../ Traceability Concept

ROLE

Ensure traceability and quality

Single grade tea packed, labeled and stacked ready for export at Kibena tea factory.
Coffee packing and labeled with batch number to ensure traceability.
Cut-flowers packed in boxes and properly labeled ready for export
Traceability Spin Off Company, GS1

ROLE

Introducing bar coding to Tanzania product for accessing international markets

GS1 offices hosted by TIRDO
5. ONGOING RESEARCH

- Production of value added products and biofuels (glycerol, ethanol and bio methane) from agro waste.
- Quality improvement of locally produced reinforcing steel bars
- Value addition on the leather solid waste to produce leather boards
- Coal quality assessment and coal technologies development
- Energy management in industries
- Environment management
6. CHALLENGES TO TIRDO

- Meager allocation of research funds
- Food lab only accredited
- Inadequate specialized equipment
- Absence of strong private sector that appreciates R&D contribution for adopting local innovations and technologies
- Technology transfer and commercialization problems
STRATEGIES TO OVERCOME THE CHALLENGES

- TIRDO has prepared land use plan, business plan and feasibility study for investment on the available land (22 ha).
- Utilization of meager consultancy income for skills development and enhancement of marketing activities.
- Proposals for laboratories accreditation
- Strengthening of collaboration with other R&D and academia locally and internationally to compliment each other.
7. COMSATS COLLABORATION ACTIVITIES

- Acquisition of adiabatic bomb calorimeter through COMSATS
- TIRDO – TUBITAK Initiative
  - DG accompanied by 2 technical Directors visited TUBITAK in Aug. 2015
  - TUBITAK Team schedule to visit TIRDO in 25th – 28th May 2016
  - Draft MoU for collaboration prepared
TIRDO – TUBITAK AREAS OF COLLABORATION

- Energy technologies
- Environmental technologies
- Food and Microbiology
- Chemical technologies

15 concept notes covering the four research areas have been prepared
8. PRIORITY AREAS OF RESEARCH COLLABORATION UNDER COMSATS

- Agro processing, food and micro-biology
- Renewable energies
- Gas and petrochemical technologies
- Coal technologies
- Iron and steel technologies
- Textile and leather technologies
- Natural and medicinal products
- Biotechnologies
- Pollution prevention and control
- ICT
CONTACTS

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