

UNIVERSITY OF DAR ES SALAAM INITIATIVES AGAINST COVID-19 PANDEMIC

The University of Dar es Salaam, mandated with the task of teaching, research and community services, has always been in the forefront of cutting age research and innovation that gears toward improving the well-being of national, regional and international society. Upon confirmation of the first case of COVID 19 infection, the government of Tanzania immediately took measures to contain the disease including closure of universities and schools, imposing restrictions in public transport, restricting large public gatherings in order to observe social distancing as well as practicing hand-washing hygiene. From the first COVID-19 confirmed infection case on 16th March 2020, the country has been experiencing COVID-19 infection cases. In responding to this pandemic, different precautionary measures have been recommended and implemented by health experts, the Government as well as the University of Dar es Salaam. The University of Dar es Salaam (UDSM) in contributing to the Government's efforts in the fight against the spread of the coronavirus, has instituted different measures that are in line with the National Guidelines for Infection Prevention and Control (IPC). Different units of the University of Dar es Salaam have been in the forefront of conducting research, innovations and community outreach that are geared toward eliminating COVID-19 as stipulated below.

COLLEGE OF ENGINEERING AND TECHNOLOGY

The College of Engineering and Technology (CoET), was one of the first colleges to respond to the fight against COVID-19. Through its various units, the College created various interventions that geared toward stopping the spread of the coronavirus as is stipulated below.

1. Design and Fabrication of Automatic and Foot-activated Handwashing Machines

CoET through Technology Development and Transfer Centre (TDTC) has designed and developed two types of hand-washing machines (automatic and foot operated). These machines consist of a 250-litre storage water tank and are specifically designed for institutions that serve a large number of people such as hospitals, schools and colleges, factories and market places. The machines can dispense liquid soap and water by putting hands near the sensors for the automatic machine or by pressing the pedals for the foot-operated machine.

Some of these machines have been distributed to various locations at the University of Dar es Salaam as well as being supplied to different organizations such as AMREF, Bank of Tanzania (BoT), National Health Insurance Fund (NHIF), Tanzania Airports Authority (TAA), World Food Programme (WFP), Tanzania Oxygen Limited (TOL), *Tawala za Mikoana Serikali za Mitaa* (TAMISEMI), Tanzania Electric Supply Company (TANESCO), and religious institutions. In addition, TDTC has been contracted by WATERAID International to fabricate and install foot-operated hand washing multi-facilities each with 5-11 separate washing points at three (3) Dar es Salaam Rapid Transport (DART) Bus terminals at Kivukoni, Gerezani, and Kimara; and one (1) at Ubungu bus terminal. About 200 machines have been fabricated. [Plates 1, 2, and 3](#) show some of these fabricated hand washing machines.



Plate 1: *Foot-operated hand washing machine*



Plate 2: *Automated hand washing machine*



Plate 3: *Foot-operated multi-facilities hand washing machine*



University of Dar Es Salaam students using the hand washing machine

2. Production of Three-layer Hi-tech Face Masks

The Textile Unit of the Department of Mechanical and Industrial Engineering (MIE) in collaboration with the TDTC at CoET has produced three-layer hi-tech re-usable face masks for the University community and the general public. A team of six (6) staff members and five (5) undergraduate students were involved in the daily production of 250 masks. The masks are ironed and sealed in a package with an instructional manual on how to wear them. The masks are made from three layers of fabrics; two outer woven fabrics and a non-woven fabric embedded between them. The masks are user-friendly and washable allowing the user to wear them repeatedly after thorough washing and sanitizing by ironing. The properties of the mask materials are as follows:

- (i) The outer fabric (blue coloured) is a woven cotton fabric with a warp density of 22 ends/cm and weft density of 19 ends/cm
- (ii) The inner fabric (white coloured) - has a warp density of 45 ends/cm and weft density of 26 picks/cm.
- (iii) The intermediate layer is a lightweight nonwoven fabric made from spun bond technology.

Each fabric is responsible for prevention of penetration of aerosol containing the coronavirus, with the intermediate layer (non-woven layer) enhancing the filtration of the aerosol particles due to its much more closed pore structure. The University has already been awarded with quality certificate by Tanzania Medicines and Medical Devices Authority (TMDA). More than 15,000 masks have been produced and supplied for use. [Plate 4](#) shows face masks produced at the Textile Unit.



Plate 4: *Face masks produced by the UDSM Textile Unit*



University of Dar Es Salaam students wearing udsms three-layer hi-tech masks

3. Production of Ethanol for Hand Sanitizers

The Department of Chemical and Mining Engineering (CME) at CoET is equipped with an industrial plant for production of ethanol. One of the University interventions to fight COVID-19 is the production of hand sanitizer. The protocols for producing hand sanitizers follow the WHO's recommendations, which among other ingredients, require not less than 80% of ethanol. The production of sanitizers is an interdisciplinary effort involving different departments as follows:

- (i) Molasses is procured from Mtibwa Sugar Estates as the main raw-material for ethanol production;
- (ii) Viable yeast cultures are isolated and propagated at the Department of Molecular Biology and Biotechnology (MBB);
- (iii) Fermentation and distillation processes are done using an industrial ethanol plant, (producing 1500 liters per day, i.e. 24 hours) fabricated and installed at the Department of CME
- (iv) The ethanol so obtained from distillation is mixed with other ingredients to produce hand sanitizers at the Department of Chemistry in the College of Natural and Applied Sciences (CoNAS).

Plate 5 shows the industrial ethanol plant and **Plate 6** is the laboratory ethanol plant.



Plate 5: *Industrial ethanol plant*



Plate 6: *Laboratory ethanol plant*

4. Design and Fabrication of Electro-mechanical Ventilator

A team of four (4) staff members from the MIE, CoET, one (1) staff from University Health Centre together, with two (2) Undergraduate students have designed an electro-mechanical ventilator. This is an automatic machine to provide respiration to critically ill patients. It has a control process strategy for driving the machine to convert the input energy into output energy in form of pressure and flow of air. The control strategy will also monitor the air pressure and flow, the timing and volume of breathe of the patient, the output performance of the machine, and the condition of the patient. The work is currently in the development stage. The design of the automatic ventilator is shown in [Plate 7](#).

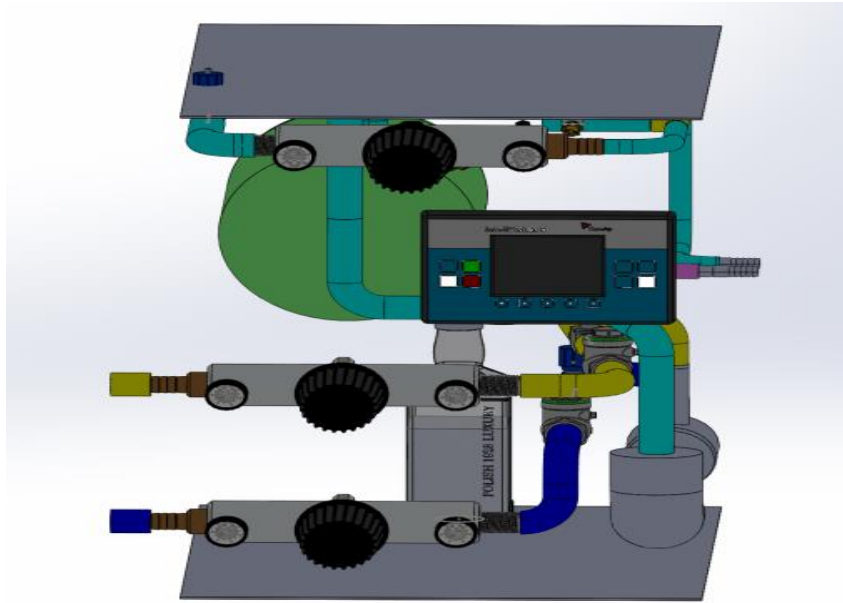


Plate 7: *Design of electro-mechanical ventilator*

5. Design and Fabrication of Automatic Sanitizer Spraying Machine

A team of three staff members from the Department of MIE, CoET and two undergraduate students have designed and fabricated an automatic sanitizer spraying machine. The machine sprays sanitizer in vapour-like form to the whole body of a person passing through the entry of the booth to the exit. It has a control process strategy for driving the pump, which sucks the sanitizer from a 20-litres tank and delivery to the booth through a set of nozzles. The input signal is activated through a sensor mounted on the machine. Once the signal is activated, the pump delivers the sanitizers to the booth. This machine can be installed at service centres such areas at hospitals, schools, banks, bus terminals, and super markets. A prototype has been fabricated and tested; it is working properly. The fabricated sanitizing spraying machine is shown in [Plate 2.8](#).



Plate 8: *Automatic sanitizer spraying machine*

6. Production of Tents for Temporary Isolation

With an anticipation that the available space in hospitals would be overwhelmed with patients or people in need, two (2) tents have been produced for the University and two more are being made for the University Health Centre. The tents are of waterproof Canvas material and are 5 m long, 4 m wide and 2.5 high with windows and doors that can be opened and closed. [Plate 2.9](#) shows a tent installed at the University Health Centre.

COLLEGE OF NATURAL AND APPLIED SCIENCES

The College of Natural and Applied Sciences (CONAS), through its different departments has produced several products and engaged in interventions that contribute to the fight against COVID 19.

COVID-19 Related Interventions by the Department of Botany

The Department of Botany has been carrying out four research and innovation-related tasks designed to contribute to interventions against COVID-19. These include:

- (i) Evaluation of suitability and efficacy of combination of plant species commonly used for steam inhalation
- (ii) Designing and fabrication of portable low-cost herbal steaming nebulizer
- (iii) Formulation of herbal supplements (**Mlimani tea** and **Mlimani herbal tonic**) for stimulating appetite and boosting body immunity. In addition, the formulations have anticoagulant, anti-inflammatory and antimicrobial activities with potential to alleviate complications associated with COVID-19
- (iv) Formulation of herbal based liquid antiseptic and disinfectant (**Dethol**)
- (v) The department is also working with incubate (**Uzima herbal drop**) to improve the product

Methods and materials in the processes include literature review for secondary data, herbarium search and survey of the current local herbal steam inhalation practices and collection of identified fresh plant samples and screening for their antioxidant activities and synergies in view of determining their suitability and efficacy as steam inhalation remedy for alleviation of COVID-19 associated complications. They also include evaluation of temperature range for detection of antioxidant/flavonoids and optimization of specific temperature for steam inhalation of selected plant species to avoid wasting of low molecular weight antioxidants and harmful effect of inhaling hot vapour. Hence, designing and fabrication of a user friendly and low-cost steam nebulizer with capacity to regulate both temperature and vapour to accommodate the above requirements. The department has also done a thorough review of COVID-19 associated health complications, establishing edible plant resources containing multi-vitamins and mineral salts reported to have the ability to address the loss of appetite, inflammation of the lining of respiratory system, micro-clots and to remove free radicals as well as boosting body immunity. Moreover, the research includes screening and selection of plant extracts with antiseptic and disinfectant activity, blending them and testing for their effectiveness against viral, fungal, and bacterial growth. The work is underway to optimize **Uzima Herbal drop** combination and associated ingredients for problems.

The following outputs on evaluation of suitability and efficacy of combination of plant species commonly used for steam inhalation have been attained including a checklist of 32 commonly used plants for steam inhalation practices; a checklist of 16 suitable plants for use in steam inhalation practices (10 plant species for decongesting the respiratory system, 3 for reducing fever and 3 for maintaining temperature of the infusion); checklist of suitable plant combination in steam inhalation practices and a guideline on best practices for herbal steam inhalation. Other outputs on designing and fabrication of a user friendly and low-cost steam nebulizer device include prototype of regulatable, portable and low-cost steam nebulizer (UD-Smart Nyungu). The prototype has been tested and it is working. The work is still underway to perfect it and submit it to UDSM (TDTC) for mass production. Outputs on formulations of herbal supplements are a prototype of herbal tea (Mlimani tea) rich in Zinc, Iron, dietary fibres, antioxidant, Vitamin C and B complex for stimulating appetite and boosting body immunity; a prototype of herbal tonic (Mlimani herbal tonic) rich in antioxidants with potential to boost body immunity and output on herbal based liquid antiseptic and disinfectant is a prototype of herbal based liquid antiseptic and disinfectant (Dethol) effective against viral, fungal and bacterial growth.

What can be deduced from these interventions by the Department of Botany is that based on the literature and screening carried out on suitability and efficacy of plants used for herbal steam inhalation, the most commonly used plants have scientific basis for remedy of complications of respiratory system. Some plant species work more effectively as a remedy for complications of respiratory system when are in combination with other species. Flavonoids in studied plants vaporize at different temperature ranges. In order to ensure maximum harnessing of flavonoids in steam during inhalation it is important to understand the optimal temperature for maximum flavonoids yield. To realize the anticipated results in steam inhalation the use of regulatable herbal steam nebulizer such as **UD-Smart Nyungu** is recommended. With regard to complications associated with COVID-19 such as loss of appetite, inflammations of the lining of respiratory system and micro-clots, as such the use of antioxidants and immune booster supplements such as **Mlimani tea** and **Mlimani herbal tonic** is recommended. Due to anticipated high demand of proposed prototypes, a meticulous assessment to scale up the production is deemed necessary and inevitable. As such, the department has developed a research proposal to address various issues among others, further research for product perfection, mass production and sustainability strategies for submission to UDSM call for Competitive Research and Innovation Grants for year 2020/2021.

Impact of these interventions contribute to an increased visibility of the UDSM both local and international in terms of publications, product innovation, income generation and employment, Staff career development, strengthening UDSM-Public and Private sector partnership (strengthening the UDSM and community engagement), value addition to plant species products, improved health, capacity building through incubation programmes and reduced plant-based wastes. [Plate 2.10](#) shows some products of the interventions.



Mlimani Herbal Tonic

Mlimani Tea

Dethol

Plate 9: COVID-19 Intervention products by the Department of Botany

2. Production of Instant Hand Sanitizers

The Department of Chemistry has been formulating and producing hand sanitizers that aim to ensure that UDSM community and other members outside the University are assisted in protecting themselves against the infection of Corona virus. The production of hand sanitizers is performed according to the World Health Organisation (WHO) and TMDA guidelines. The produced hand sanitizers contain Ethanol (80%), hydrogen peroxide, glycerol and distilled water as the main ingredients with some minor additives like colour (blue) and perfume. The produced sanitizer, which is registered by TMDA with registration number; TZ 20 AD 0117 is packaged and distributed in different sized containers; i.e., 5 L, 500 mL, 250 mL, 100 mL and 50 mL.

The methodology is simply mixing of the required ingredients at an appropriate ratio with a focus to have a product of 80% ethanol. The amount mixed depends on the volume one needs to produce at that batch. [Table 1](#) shows an example for production of 10 L of hand sanitizer.

Table 1: Production of 10 L of Hand Sanitizer

Ingredients	Composition (% v/v)	Amounts (mL) e.g. for 10 L preparation
Ethanol 96%	80%	8333 mL
Hydrogen peroxide 3%	0.125	417 mL
Glycerol 98%	1.45	145 mL
Distilled water	Up to the mark	Up to 10 L

Produced sanitizers which are currently used within and outside UDSM, are of high quality as the production protocol is that of the WHO and TMDA. [Plate 10](#) below shows bottles of different sizes containing the UDSM instant hand sanitizer.



Plate 10: *UDSM Instant Sanitizer*

3. Mathematical Model for COVID-19 Pandemic Projections

Two staff members from the Department of Mathematics were invited by the National Institute for Medical Research (NIMR) to collaborate with its epidemiology team to develop mathematical model for COVID-19 pandemic projections in Tanzania. A COVID-19 mathematical model was formulated for the Tanzanian context. It is a compartmental model for Susceptible, Exposed, Infected and Recovered (SEIR) individuals. The basic reproduction number was approximated using the exponential growth and the maximum likelihood estimator. The model equations were solved numerically using Matlab and the R software. Model simulation was done using given initial data. The model could be used to assess the impact of different COVID-19 control strategies. The effective reproduction number was established, which is useful in predicting the disease dynamics. The team is currently in the process of preparing research paper(s) on the dynamics of COVID-19. The work and the results are for the national use. The role of UDSM in the use of mathematics in solving societal problems was recognised.

4. Measurements of Pore Size of Cloth Fabrics for Fabrication of Face Masks

Departments of Geology and Physics conducted measurements of pore size of common cloth fabrics used to make local face masks worn as a protective gear against corona virus. A number of locally made cloth face masks were collected in different parts of Dar es Salaam, and a ZEISS Primate Polarising Microscope was used to measure pore size and to compare these to typical droplets that may carry corona virus. The findings of this work revealed that most cloth fabrics have pores larger than the size of the corona virus carrying droplets, and therefore single layer cloth fabric is not recommended. Three-layer fabric, with the two outer fabrics of different patterns, and the middle layer being non-woven fabric, like the one used as suit lining fabric is suitable. This work contributed to the fabrication of higher quality cloth face masks by the Textile Unit in the College of Engineering and Technology, UDSM (see [Section 2.1.2](#)).

5. A Research Project on Repurposing of Natural Products from Medicinal Plants and WHO Approved Drugs to Combat COVID-19 using Computational Approach

The aim of this project is to perform drug repurposing from natural products with antiviral properties and WHO approved drugs utilizing different computational methods to identify new drugs to treat patients infected with coronavirus. A timely resolved crystal structure of SARS-nCoV-2 and other proteins will be used as the drugs target described in the methods. A preliminary work has been done to screen drug-like molecules from two medicinal plants in Tanzania using a main protease crystal structure available in the protein data bank. The preliminary results are very promising, but further work is still needed. The powerful computers have been purchased and availed in the department to strengthen and mobilize computational chemistry/Science research group in the department for further research endeavors in this field.

The following outputs are expected by the end of the project:

- (i) Existing drugs and other drug agents with potential to treat COVID-19 will be identified through the envisaged computational approach.
- (ii) The identified molecules will provide candidates for immediate clinical trials.

- (iii) Natural products available in the library of or reported by Natural Products Research Group (NPRG), Chemistry Department, UDSM with potent antiviral activities will be identified, hence providing chemical agents for medicinal chemistry towards drug discovery revealed.
- (iv) The identified natural product drug agents will entice their re-isolation for further wet laboratory testing towards drug development discovery as their value addition initiatives.
- (v) Enrichment of computational scientific knowledge through continuous exchange of ideas and resources between the institutions with the expertise.
- (vi) Research outputs in terms of publications (at least 2 journal articles), policy briefs and other dissemination outlets will be produced.

COLLEGE OF AGRICULTURAL SCIENCES AND FISHERIES TECHNOLOGY

The College of Agricultural Sciences and Fisheries Technology (CoAF) has developed various interventions that employ natural agricultural ingredients to combat the spread of the coronavirus.

1.Essential Oil Hand Rub Sanitizer

Researchers from the Department of Food Science and Technology have developed a sanitizer using *Aloe vera* which is replacing glycerine for skin moisturizer and essential oil from orange peels is replacing hydrogen peroxide. The developed hand sanitizer is a mixture of ethanol, *Aloe vera* and essential oil and it was screened for its antimicrobial activity. The number of viable bacterial microbes present after application of the hand rub sanitizer was used to calculate the efficacy of alcohol based hand rub sanitizer prepared by the Department. Efficacy testing was carried out step by step as described in the European Standard (EN) 1500:2013. The standard non-pathogenic Organism used were *Escherichia coli*, *Staphylococcus aureus*, and *Cryptococcus neoformans*.

The effectiveness of developed hand rub sanitizer indicated 98.73% to 100% (percentage removal of standard strains). The product has been submitted to TMDA for certification. Because of its high antimicrobial activity and efficacy of *Aloe vera* and essential oil from orange peels and combination of alcohol it can be used in the preparation of hand sanitizer on commercial scale. Using locally available raw materials, this will reduce dependence of chemical from outside and will also create employment. [Plate 2.12](#) shows a hand rub sanitizer.



Plate 11: Bottles of hand rub sanitizer made of ethanol, Aloe vera and essential oil

2.Sugarcane Juice

Researchers from the Department of Food Science and Technology developed a drink which contains different nutrients such as vitamins and minerals which are useful for patients who are suffering from COVID-19 early infections. Sugarcane juice, *Allium cepa* (red onions) and *Moringa oleifera* leaves juice were used in this intervention. Sugarcanes were collected from the Sugarcane Research Institute (SRI) in Kibaha. Red onions were obtained from the Mabibo market in Dar es Salaam and *Moringa oleifera* leaves were collected from Yombo area at the University of Dar es Salaam. The juice was extracted using a stainless steel roller machine fabricated at the TDTC, University of Dar es Salaam. The concentrations for onion and *Moringa oleifera* leaf juice were chosen based on recommended dietary allowance (RDA) where design expert software was used to establish the ratios.

The intervention discovered L-ascorbic acid (anti-viral vitamin i.e. vitamin c), polyphenols and zinc concentrations in sugarcane juice fortified using onion juice and *Moringa oleifera* leaf juice in specific concentrations. Formulated beverage has adequate concentration of L-ascorbic acid, polyphenols and zinc sufficient to support/prevent early viral infections when consumed. Consumptions of fortified sugarcane juice by using onion juice and *Moringa oleifera* leaf juice is recommended for preventing/supporting early COVID-19 infections. However, other measures including washing hands with soaps and clean water, use of sanitizers, wearing sterilized face masks in populated areas and avoiding crowded places should be adhered to. Eating nutritious food as a preventative medicine and make our immune system strong for fighting different diseases such as COVID-19 is one of the most important way which is recommended worldwide. Due to presence of different nutrients discovered in this intervention, it will help the community to fight different various diseases not only COVID-19 but also diseases such as diabetics, heart diseases etc. The flavonoids and polyphenols found in sugarcane juice prevent the cell damage from free radicals and reactive oxygen species, which are a major source of tumors, coronary diseases and diabetes. This will reduce diseases and lower healthcare costs in the community. [Plate 12](#) shows bottles of the juice.



Plate 12: *Bottles of Juice made from sugarcanes, red onions and Moringa oleifera leaves*

COLLEGE OF SOCIAL SCIENCES

The College of Social Sciences (CoSS) is currently carrying out research aiming at examining the effectiveness of healthcare systems in protecting people at high risk and another research on preventive measures against COVID-19 pandemic in the context of scarcity and collective cultures.

1. Effectiveness of Healthcare Systems in Protecting People at High Risk

A team of researchers from Population Studies and Research Centre (PSRC) together with the University Health Centre are studying the effectiveness of healthcare systems in protecting people at high risk (health workers; pregnant women; people with chronic diseases such as diabetics, respiratory diseases etc.) from COVID-19 in Tanzania. This research has been commissioned by the University of Dar es Salaam. Key methods include Key Informant Interviews; Social Network Analysis and Geospatial Analysis. The study is currently at data collection stage and the findings and conclusions of the study are expected to provide input to policies on viable practical options and actions to safeguard people with high-risk to COVID-19 pandemic and other health-related issues. The research findings will be disseminated through policy briefs and scholarly publications.

2. Preventive Measures against COVID-19 in the context of Scarcity and Collective Cultures

The Department of Sociology and Anthropology, University of Dar es Salaam and the University Health Centre are carrying out a joint research project titled “Preventive measures against the spread of COVID –19 in the context of scarcity and collective cultures in Tanzania”. This research has been commissioned by the University of Dar es Salaam. The primary assumption for the research project is based on the understanding that collective culture is always linked to a deep sense of duty to the group, interdependence, harmony and working with the group, hence

group goals surpass individual goals. In collective cultures, people are not seen as isolated individuals hence this has great sociological, psychological and anthropological implications to COVID-19 control and intervention measures (Oyserman, Coon, and Kimmelmeier, 2002).

The research uses a mixed methodology which allows the collection of both qualitative and quantitative data. This information is currently collected through desk-based review, indepth interviews and social survey. The expected outcome of the research include Policy brief, Newspaper article on the results, a publication of special issue of COVID–19 and publicity and advertisements (radio, television, print and electronic-social media e.g. YouTube). The research anticipates behavioural and practical changes including positive way of community voluntary reporting and testing for COVID–19, positive way of community preventing from the disease without socio-cultural ramification; recommendation and/or mitigation of community socio-cultural norms that have social ramifications and implementation of government intervention measures and formulation of guidelines that demonstrate positive prevention mechanism. The research will inform UDSM guidelines on the current and future control of pandemics.

UNIVERSITY OF DAR ES SALAM BUSINESS SCHOOL

The University of Dar es Salaam Business School (UDBS) has conducted an important research on banker’s perception of COVID 19.

Bankers’ Perception on the Impact of COVID-19 in the Banking Sector

The Center for Banking and Financial Services Research conducted a research in order to collect Bankers’ perception of the contagion effect of COVID-19 pandemic risk on banking activities and strategies utilized by the bankers to manage the risk. This is because COVID 19 pandemic risk caught many governments and institutions including the banking sector unprepared.

A quick survey was conducted from 1st to 17th May 2020. A total of 127 banker officers of which 31% were Senior Bank Managers participated in the study. An online data collection tool known as Kobotoolbox which can be freely accessible upon registration from www.kobotoolbox.org was used for data collection. Key findings of the research included (i) COVID-19 pandemic risk might have long impact and effect to almost every type of business in the economy; (ii) Sectors that are likely to be mostly affected are Tourism, Hotel and Restaurants, Education, Health & other services and Trade; (iii) Bank profitability, Foreign exchange exposure, new savings and risk profile of current investments are likely to be affected; (iv) Banks are likely to close maturing investments; and (v) Banks have instituted various measures to mitigate COVID-19 pandemic risk and sustain their operations. However, more communication to customers and employees engagement is needed. More studies to establish the actual impact and its trends should be done given the fact that the pandemic still exists.

The study recommends that Banks need to create awareness and review its Business Continuity Plan (BCP) by including measures to handle pandemic such as COVID-19; to attract and maintain savings, to waive some charges/fees and strongly entice customers to utilize digital solutions and alternative delivery channels. Also the study further recommends that banks are advised to improve physical security of its branches during this time, and cut down new products

development and sustain the ones in place; Bank communications channels and working conditions are likely to change. More utilization of online, ‘work from home’ and likelihood of offering leave to some employees, banks need to get prepared for possible financing of its capital during and after the crisis and this might affect more of small banks, intervention by Central Bank on policies related matters, special minimum reserve, liquidity support, revision of net open position is highly recommended and intervention by the Government to facilitate revamping of the most affected businesses in different sectors is also recommended.

COLLEGE OF HUMANITIES

The College of Humanities (CoHU) is carrying out research on the use of the fabric-designed masks during the COVID-19 pandemic.

The use of the Fabric designed Masks during the COVID-19 Pandemic

Since the first reported case of Coronavirus disease in Tanzania on 16th March 2020, the use of face masks was one of the advice given by the government and the health sector personnel to prevent further spread of the pandemic disease. The government and other stakeholders provided directives on how to produce fabric mask so that to meet the high demand of masks in the country. The locally designed fabric masks were not well manufactured as per the required standards. People were free to wear any kind of mask produced by any kind of designer. Using the consumer behavior theory (Schiffman & Kanuk, 1997), this study examines different used fabric designed masks in the country on basis of materials, styles and functions.

The study has collected data from 10 fabric mask designers in Dar es Salaam, observed different 50 pieces of fabric masks collected from different areas and from electronic sources such as YouTube, Twitter, Facebook and is currently reviewing the relevant documents categorized to determine the quality, styles, types of fabrics and factors behind their production and their implications. The anticipated output of this study is a policy brief and articles for journal publications.



Plate 13:“Kitenge” face mask

Source: <https://www.tanzaniaschoolfoundation.org/product/kitenge-face-mask/>



Plate 14: Types of fabric masks

Source: <https://www.youtube.com/watch?v=wqDyPGzjyhQ>

MBEYA COLLEGE OF HEALTH AND ALLIED SCIENCES

The Mbeya College of Health and Allied Sciences (MCHAS) is currently carrying out three research projects as outlines below;

The impact of Obligatory Sanitization and Face Masking against COVID-19 Pandemic on other Infections within the Southern Highlands

Currently in Tanzania COVID-19 diagnosis relies on WHO provided tools and procedures to detect cases, which is usually complicated due to a few skilled laboratory technicians and readily availability of these tools. In Tanzania like in other countries, COVID-19 prevention depends on mainly on public awareness on frequent sanitization and wearing face masks; avoiding crowds and social distancing. Furthermore, early detection of suspicious patients, isolation and supportive care of positive cases face even major challenges in many African settings. It is therefore high time that UDSM-MCHAS conduct a study to establish the impact of all measures taken to prevent the contraction of COVID-19 on other bacterial and viral infections in the Southern Highlands. Specifically, the study intends:

- (i) To establish the effectiveness of the sanitizers and face masks (both local and imported) currently in the market
- (ii) To establish the status of the main common infections in the Southern Highlands
- (iii) To assess the effect of public sensitization programmes and proper usage of sanitizers and face masks in the Southern Highlands
- (iv) To assess the affordability of both sanitizers and face masks within the communities of the Southern Highlands

Community Awareness and Clinical Screening for COVID-19 Suspicion in Tanzania: The Role of Medical Students in the Disease Outbreaks Control

In this study, a cross-sectional assessment of awareness, suspicion and hematological screening of COVID-19 suspects will be conducted in 30 regions of Tanzania, using 80 medical students at various health facilities. A total of 800 community members and outpatient hospital clients from different settings of Tanzania will be interviewed and 300 patients at the hospital settings with respiratory complaints and fever will be screened for COVID-19 suspicion in 2 weeks. All suspects will be screened for hematological clotting indices and referred for the disease confirmation at the recommended laboratory.

The aim is to collect data on awareness for COVID -19 prevention in parallel with community screening of COVID -19 suspects and link them to nearby hospitals for further medical investigation. The specific objective of the program are;

- (i) To assess the community awareness of the preventive measures of COVID-19 in Tanzania
- (ii) To disseminate validated guide for community prevention measures of COVID-19 in Tanzania
- (iii) To screen community members for the clinical respiratory suspicion of COVID-19
- (iv) To identify suspects with risk of sudden COVID-19 disease progression by hematological scores in Tanzania

The proposed project will facilitate further prevention of COVID-19 disease spread and reduce mortality rates attributed to the SARS COV-2 infections in Tanzania. It will disseminate validated scientific information on the causes, risks and control measures before contacting the disease, after being infected the SARS COV-2 or when someone in the household has been

infected with SARS COV-2 that causes COVID-19. The results will provide information on the risk of poor clotting indices among those who are suspected COVID -19. The study intends to suggest relative bigger interventions for tracking the hematological indices related to blood clotting in Tanzania.

INTERVENTION FROM THE UNIVERSITY MANAGEMENT

An Applied Research on Alternative Indigenous Medicines (Get an update from Dr Kibazohi. The product is ready)

The University management, through the Office of Deputy Vice Chancellor – Research, appointed and supported a multi-disciplinary team comprising different expertise of staff members from various UDSM units to conduct applied research on alternative indigenous medicines for treatment of symptoms associated with COVID-19, particularly respiratory diseases. Traditional medicines have been used since ancient time. These medicines are largely from plants and are used to treat disease and enhance general health and wellbeing. Some plants have strong ingredients in the same level of pharmaceutical medications. The team of experts has come up with a steaming essential oil remedy (*Fukiza Udanol*) made from five plant sources which were analysed in order to determine their chemical profiles. A total of about 35 different compounds were revealed. These compounds are reported to exhibit various medicinal properties including antimicrobial (antiviral, antibacterial, antifungal), anticancer, antioxidant, anti-inflammatory, anticoagulant, analgesic, anesthetic, among others. The team has investigated and has come up with the desirable properties for treatment of the acute respiratory disease caused by COVID-19. [Plate 15](#) shows samples of the indigenous medicine *Fukiza Udanol*.



UDSM Research Grant on COVID-19

The University has set aside research and innovation grant amounting to **TZS 1,900,000,000/-** (One Billion Nine Hundred Thousand Tanzanian Shillings) in the 2020/2021 financial year and it is encouraging its researchers to do more research related to the global pandemic of COVID-19. The research is to focus on economic, political and social implication of COVID-19.

CONCLUSION

Following the COVID 19 pandemic, the UDSM has increased its efforts on community engagement and outreach, thus continued to effectively execute its role in research, learning and public service. Various interventions have been carried out that demonstrate the readiness of the University to respond to various disasters. To a great extent, the engagement of the UDSM in such interventions have contributed to the nation's efforts in planning and executing appropriate measures to protect citizens' health amidst the spread of the pandemic.