

HEALTH AND POLLUTION ACTION PLAN

United
Republic
of Tanzania

February 2019



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HEALTH AND POLLUTION ACTION PLAN

United Republic of
Tanzania

February 2019

In support of the
Joint Plan of Action for the Implementation of the **Libreville Declaration on
Health and Environment: 2013**

A project implemented by the
United Nations Industrial Development Organization
under the leadership of the **Vice President's Office - Division of Environment**
in collaboration with the **Ministry of Health, Community Development,
Gender, Elderly and Children**
of the **United Republic of Tanzania**

Completed as part of the UNIDO global project entitled
Mitigating Toxic Health Exposures in Low- and Middle-Income Countries
Funded by the European Union and
the United States Agency for International Development

FOREWORD

The negative impacts of environmental pollution on human health have been well known since at least the start of the industrial revolution. The World Health Organization reported in 2016 that 23% of all global deaths are attributable to living and working in an unhealthy environment; deaths due to non-communicable diseases (NCDs), mostly attributable to air pollution, amount to as much as 8.2 million of these deaths. Consistent with this is the 2017 report by the Lancet Commission on Pollution and Health, which forcefully emphasized the continuing damage caused by pollution to people's health, despite all the pollution mitigation efforts that have been taken to date. It estimated that diseases caused by environmental pollution were responsible for an estimated 9 million premature deaths in 2015. To put that in perspective, this number constituted 16% of all deaths worldwide. The Commission further noted that pollution disproportionately kills the poor and the vulnerable. By its estimates, 9 out of every 10 pollution-related deaths occur in low-income and middle-income countries. The Commission finally noted that children are at high risk of pollution-related disease.

For over ten years now, a number of efforts have been made in Tanzania to address the environmental and health challenges in the country. In 2008, Tanzania, along with the other African countries, signed the Libreville Declaration on Health and Environment in Africa. The Declaration represents a common framework of commitments for the implementation of eleven priority actions on health and environment including, among others, linking health and pollution better in policies, strategies, regulations and national development plans; building capacities to better prevent environment-related health problems; supporting education and training at all levels; establishing/strengthening systems for health and environment surveillance; enforcing compliance with relevant international conventions and national regulations; undertaking systematic assessments of health and environment risks; and undertaking advocacy on health and environment issues aimed at institutions and communities.

In 2013, the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) and the Vice President's Office - Division of Environment (VPO-DoE), in collaboration with other stakeholders and with support from the World Health Organization (WHO), prepared a Joint Plan of Action for the Implementation of the Libreville Declaration on Health and Environment. The overall objective of the Plan was to domesticate the eleven priority actions prescribed in the Libreville Declaration.

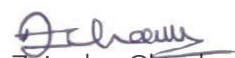
To enhance and complement the efforts made under this Joint Plan of Action, the Health and Pollution Action Plan (HPAP) initiative, funded by the European Union and the United States Agency for International Development and facilitated by UNIDO, has developed specific Concept Notes with an extensive set of actions to address five priority risk areas: outdoor air pollution, indoor air pollution, water contamination, heavy metals and other toxics from small scale mining and chemicals from agriculture (pesticides). This document is a valuable reference for environment and health partners in their efforts to implement the Joint Plan of Action under the Libreville declaration.

We look forward to a safer environment and better health in the near future as we put into action the key activities in the HPAP in furtherance of the government's efforts to meet the relevant targets of the Sustainable Development Goals and Universal Health Coverage.



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We wish to thank all the Technical Experts who participated in the HPAP development process, for their valuable inputs and constructive ideas in the course of developing this HPAP document. They include Technical Experts drawn from the President's Office - Regional Administration and Local Government; Vice President's Office-Division of Environment; Ministry of Health, Community Development, Gender, Elderly and Children; Ministry of Industry and Trade; Ministry of Minerals; Ministry of Water and Irrigation; Ministry of Energy; Ministry of Works, Transport and Communications; Occupational Safety and Health Authority; Government Chemist Laboratory Authority; Tanzania Pesticides Research Institute; Tanzania Atomic Energy Commission; National Environment Management Council; Muhimbili University of Health and Allied Sciences; National Institute of Medical Research; AGENDA for Responsible Environment; and the Cleaner Production Centre of Tanzania.

Furthermore, we wish to extend special gratitude to the initiators of the project concept notes that are included in the HPAP. These are Dr. Vera Ngowi (MUHAS), Dr. Simon Mamuya (MUHAS), Mr. Noel Mirwatu (CPCT), Eng. Raphael Immani (CPCT) and Mr. Haji Rehani (AGENDA).

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ABBREVIATIONS

AGENDA	AGENDA for Environment and Responsible Development
ARU	Ardhi University
ASGM	Artisanal and Small-scale Gold Mining
BATs	Best Available Technologies
BEPs	Best Environmental Practices
CBOs	Community Based Organizations
CHALIWASA	Chalinze Water and Sewerage Authority
COPD	Chronic Obstructive Pulmonary Disease
COSTECH	Commission for Science and Technology
CPCT	Cleaner Production Centre of Tanzania
CSOs	Civil Society Organisations
DALY	Disability Adjusted Life Year
DAWASA	Dar es Salaam Water and Sewerage Authority
eGA	e-Government Agency
EAC	East Africa Community
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EPZA	Export Processing Zones Authority
FAO	Food and Agriculture Organization
FEMATA	Federation of Miners Associations of Tanzania
FINNIDA	Finnish International Development Agency
GAHP	Global Alliance on Health and Pollution
GBD	Global Burden of Disease
GCLA	Government Chemist Laboratory Authority
GDP	Gross Domestic Product
GNI	Gross National Income

GST	Geological Survey of Tanzania
HCWMP	Health Care Waste Management Programme
IAP	Indoor Air Pollution
IHME	Institute of Health Metrics and Evaluation
IPM	Integrated Pest Management
JET	Journalists Environmental Association of Tanzania
LGA	Local Government Authority
MC	Mining Commission
MoA	Ministry of Agriculture
MoE	Ministry of Energy
MIT	Ministry of Industry and Trade
MIYCS	Ministry of Information, Youth, Culture and Sports
MLF	Ministry of Livestock and Fisheries
MoM	Ministry of Mining
MoEST	Ministry of Education, Science and Technology
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MORUWASA	Morogoro Urban Water Supply and Sanitation Authority
MoW	Ministry of Water
MRL	Minimal Risk Level
MUHAS	Muhimbili University of Health and Allied Sciences
MWTC	Ministry of Works, Transportation and Communication
NCCPF	National Climate Change Focal Point
NCPCs	National Cleaner Production Centres
NEMC	National Environment Management Council
NIMR	National Institute of Medical Research
NIT	National Institute of Transport
NORAD	Norwegian Agency for Development Cooperation
OSHA	Occupational Safety and Health Authority
PM	Particulate Matter
POPs	Persistent Organic Pollutants
PO-PSM	President's Office, Public Service Management
PO-RALG	President's Office - Regional Administration and Local Government
REA	Rural Energy Agency

RECP	Resource Efficient and Cleaner Production
RFPs	Request for Proposals
SANA	Situational Analysis and Needs Assessment
Sida	Swedish International Development Cooperation Agency
SMP	Sound Management of Pesticides
STAMICO	State Mining Corporation
TAEC	Tanzania Atomic Energy Commission
TAGLA	Tanzania Global Learning Agency
TAHA	Tanzania Horticultural Association
TANESCO	Tanzania Electric Supply Company Limited
TATEDO	Tanzania Traditional Energy Development Organization
TAWOMA	Tanzania Women Miners Association
TBS	Tanzania Bureau of Standards
TIRDO	Tanzania Industrial Research and Development Organization
TMA	Tanzania Meteorological Agency
TORs	Terms of References
TPF	Tanzania Police Force
TPRI	Tropical Pesticides Research Institute
UDSM	University of Dar es Salaam
UNIDO	United Nations Industrial Development Organization
SUA	Sokoine University of Agriculture
u-POPs	unintentional Persistent Organic Pollutants
VETA	Vocational Educational and Training Authority
VPO-DoE	Vice President's Office - Division of Environment
WAEO	Ward Agricultural Extension Officer
WASH	Water, Sanitation and Hygiene
WEO	Ward Executive Officer
WHO	World Health Organization
WMA	Weights and Measures Agency
WQMPCS	Water Quality Management and Pollution Control Strategy
WRBWB	Wami Ruvu Basin Water Board
WSSA	Water Supply and Sanitation Authority

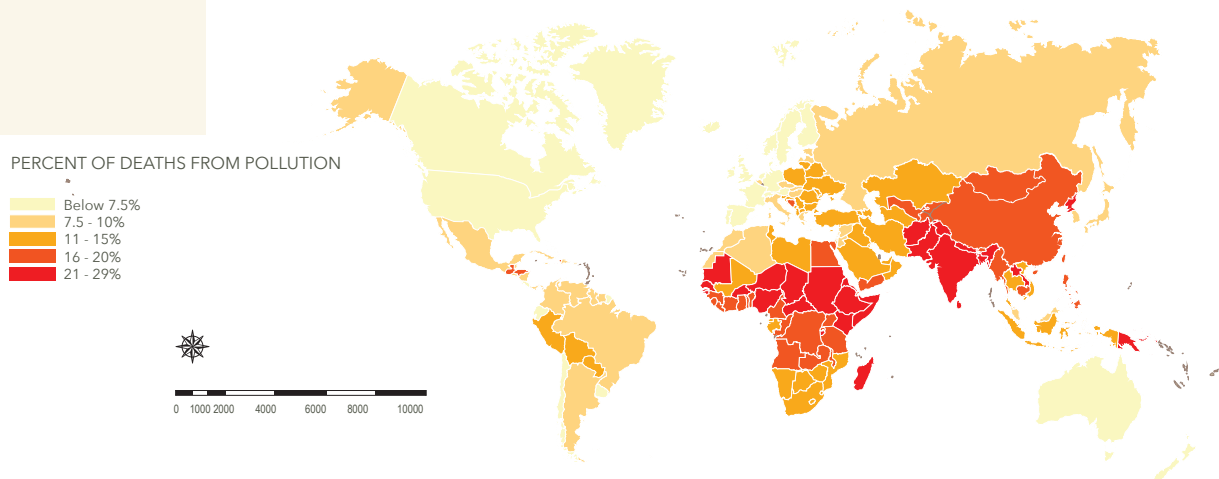
INTRODUCTION



POLLUTION AND HEALTH

The impacts of pollution on health have always been recognized, although the size of the impacts has consistently been underestimated. A recent report by the Lancet Commission on Pollution and Health¹ rectifies this erroneous impression and quantifies pollution's impacts on human health. The Commission finds that pollution is now one of the biggest drivers of death and disease in the world, causing 16% of all deaths globally. The overwhelming majority of the disease burden from pollution (92%) falls on people in low- and middle-income countries. Pollution's impacts are felt most acutely by communities that are poorly equipped to address the problem and recover from its impacts. Pollution has severe implications for sustainable development, exacerbates the poverty cycle, harms the environment and biodiversity, causes lifelong disability, and stagnates economic growth.

1 [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(17\)32345-0.pdf?code=lancet-site](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)32345-0.pdf?code=lancet-site)
free account registration required.

Figure 1: Percentage of all deaths in 2015 that were caused by pollution

“BY 2030,
SUBSTANTIALLY
REDUCE THE
NUMBER OF DEATHS
AND ILLNESSES
FROM HAZARDOUS
CHEMICALS AND AIR,
WATER AND SOIL
POLLUTION AND
CONTAMINATION.”

INTERNATIONAL AND REGIONAL NORMATIVE CONTEXT

The linkage between pollution and health has been recognized in the 2030 Agenda for Sustainable Development. Within Goal 3, “Ensure healthy lives and promote well-being for all, at all ages”, target 3.9 aims to “by 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.”

Libreville Declaration, 2008

In 2008, Tanzania, along with the other African countries, signed the Libreville Declaration on Health and Environment in Africa. The Declaration represents a common framework for the implementation of health and environment priority actions, with commitments to: linking health and pollution better in policies, strategies, regulations and national development plans; building capacities to better prevent environment-related health problems; supporting education and training at all levels; establishing/ strengthening systems

for health and environment surveillance; enforcing compliance with relevant international conventions and national regulations; undertaking systematic assessment of health and environment risks; undertaking advocacy on health and environment issues aimed at institutions and communities; achieving a balance in the allocation of national budgetary resources for inter-sectoral health-and-environment programmes.

Building on the Libreville Declaration, the Luanda Commitment of November 2010 outlines Africa's top health and environment priorities and requests governments to take further specific actions to address them. These priorities include: provision of safe drinking water; provision of sanitation and hygiene services; management of environmental and health risks related to climate variability and change including rise in sea level particularly affecting Small Island Developing States; sustainable management of forests and wetlands; management of water, soil and air pollution, and biodiversity conservation; vector control and management of chemicals (particularly pesticides) and wastes (including biomedical, electronic and electrical wastes); food safety and food security including the management of genetically modified organisms in food production; environmental health of children and women; health in the workplace; and management of natural and man-made disasters.

In the course of implementing the Libreville Declaration in the country, a Situational Analysis and Needs Assessment (SANA) was conducted in 2010. It revealed that Tanzania experiences a number of environmental risk factors including waste management, food contamination, chemical/ microbial pollution of drinking water, floods, marine pollution, disease vector and outdoor air pollution. Other risk factors include drought, declining soil fertility, erosion, hazardous wastes, indoor air pollution; deforestation and climate change adaptation.

In 2013, the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) and the Vice President's Office - Division of Environment (VPO-DoE), in collaboration with other stakeholders and with support from the World Health Organization (WHO), prepared a Joint Plan of Action for the Implementation of the Libreville Declaration on Health and Environment. The overall objective of the Plan was to domesticate the eleven priority actions prescribed in the Libreville Declaration on Health and Environment. However, this Joint Plan of Action, which is now almost six years old, has been imperfectly implemented mainly due to inadequate resources.

Other Relevant Regional and International Conventions

Basel Convention, 1989

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was adopted in 1989. This Convention came into force after a public outcry in 1980 in Africa and other parts of the developing world because of deposits of toxic wastes imported from abroad. Among the major aims of this Convention is that of reducing waste generation and ensuring proper disposal. This helps to ensure that waste disposal sites are protected from contamination of harmful products such as chemicals. Tanzania is a signatory to this Convention, which it ratified on 7th April 1993. The Convention came into force on 6th July 1993.

Bamako Convention, 1991

As a follow-up to the Basel Convention, the African nations entered into a regional treaty which contained stronger controls on the transboundary movement of wastes. The Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement

and Management of Hazardous Wastes within Africa (1991) prohibits the import into Africa of any hazardous (including radioactive) wastes. It protects water bodies such as oceans and inland water bodies from pollution, ensures proper waste management, promotes cleaner production and regulates the amount of emissions which helps to reduce air pollution. Tanzania is party to this Convention, which it ratified on 15th February 1993. The Convention came into force in 1998.

Rotterdam Convention, 1998

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade aims to promote shared responsibility and cooperative efforts among the responsible parties in the international trade of certain hazardous chemicals in order to protect human health and the environment. It also helps to provide an environmentally sound use of hazardous chemicals by ensuring that their characteristics and effects are discussed before they are put into use. Tanzania is party to the Convention. Tanzania ratified it on 26th August 2002, and the Convention came into force on 24th February 2004.

Stockholm Convention, 2001

The Stockholm Convention on Persistent Organic Pollutants aims to protect human health and the environment from persistent organic pollutants (POPs). The Convention focuses on eliminating or reducing releases of POPs. It helps to tackle the problem of hazardous chemicals which are harmful to humans and their health especially those which remain intact in the environment over long periods of time. Thus, it helps to prevent diseases such as cancers, dysfunctional immune systems and birth defects. Tanzania is a signatory to this Convention, which it ratified on 30th April 2004. The Convention came into force on 29th July 2004.

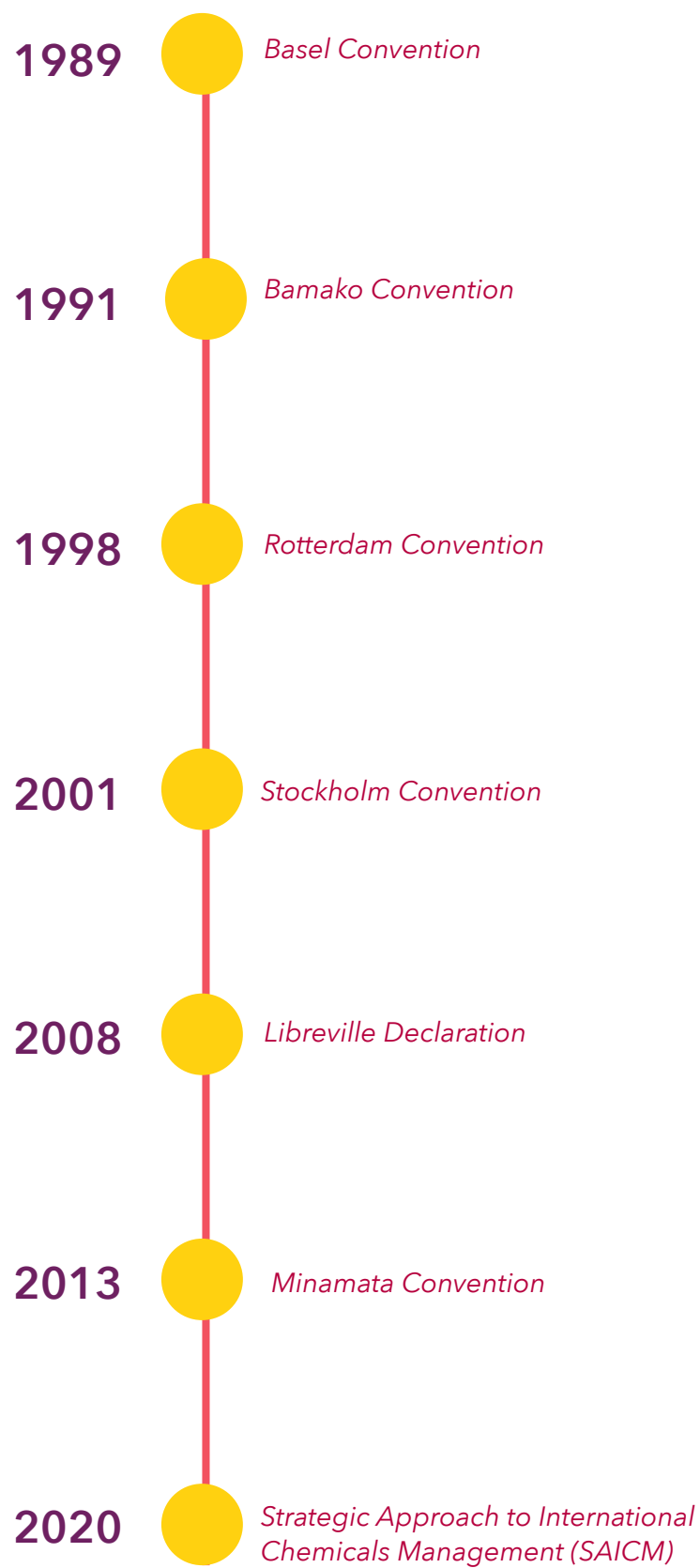
Minamata Convention, 2013

The Minamata Convention on Mercury aims to protect human health and environment from the adverse effects of mercury. This treaty came into force in 2017. The convention's major aim is to control releases of mercury from human activities; it also addresses mercury disposal, site contamination and health issues posed by mercury. Tanzania signed this Convention on 10th October 2013 but has not yet ratified it.

Strategic Approach to International Chemicals Management (SAICM)

The Strategic Approach to International Chemicals Management (SAICM) is a policy framework to promote chemical safety around the world. SAICM supports the achievement of the 2020 goal agreed at the 2002 Johannesburg World Summit on Sustainable Development.

The overall objective of SAICM is to achieve the sound management of chemicals throughout their life cycle so that by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health. Tanzania participated in the development and adoption of SAICM, represented by the GCLA which is the National Focal Point for SAICM.



Health and Environment Framework in Tanzania

Tanzania has put in place a number of policies, laws, regulations and standards to address the environment and health issues in the country. This section describes the existing legal, regulatory and institutional framework in the country to ensure that the environment and human health are protected from the adverse impacts of pollution sources such as indoor air pollution; outdoor air pollution; water pollution from biological and non-biological contamination; soil pollution from heavy metals and toxic chemicals; and occupational exposure to pollutants.

Policies

National Environmental Policy, 1997

The National Environmental Policy provides a way for integrating the environment, including environmental health, into planning and implementation frameworks. It also specifies the six major environmental problems facing the country. These are: land degradation; lack of accessible, good quality water for urban and rural inhabitants; loss of biodiversity; deterioration of aquatic systems; deforestation; and environmental pollution. The Policy also stresses the need to improve sanitation services in the country for the purpose of promoting health and maintenance of a clean and safe environment.

The policy makes provision for the development of different policy instruments for environmental management, including environmental impact assessments (EIAs), environmental legislation, economic instruments, environmental standards and indicators, the precautionary approach and international cooperation. The policy also establishes institutional arrangements for environmental management and recognizes the impact of other sectoral policies and their respective Acts on environmental management. The institutional arrangements include: Ministry responsible for environment, lead ministries, advisory bodies, National Environment Management Council (NEMC), local authorities, and environmental committees.

The policy emphasizes the importance of international cooperation with regard to environmental issues, the context in which Tanzania participates and implements several bilateral, sub-regional, regional and international treaties and programmes that are related to environmental protection including the control of toxic substances.

National Health Policy, 2007

The National Health policy 2007, among other things, stresses the importance of a healthy workforce for social and economic development. It recognizes the need for a clean and safe environment which promotes good health for individuals and families. Specifically, the policy promotes participation of the private sector in preserving the environment through sound disposal of healthcare waste generated at health facilities and research institutions as well as of obsolete drugs and reagents. It also emphasizes the prime importance of observing a hygienic disposal of human excreta and personal hygiene.

National Land Policy (1997) and National Human Settlements Development Policy (2002)

The National Land Policy of 1997 provides a framework for the enforcement of sanitation and housing standards in the country. Together with the National Human Settlement Development Policy (2002), the National Land Policy recognizes the existence of unplanned

settlements in most urban areas in Tanzania, and calls for infrastructural upgrading in these areas. Emphasis is on the provision of roads, water supply and sanitation services.

Community Development Policy, 1996

The policy provides a framework for community involvement in development including on matters related to environment and health. In addition, the policy stipulates the need for community participation in development activities of which health and environment are part and parcel.

Women and Gender Development Policy, 2000

The policy provides a framework for the participation of women and men in development matters including water, environmental health, and hygiene and sanitation activities. The policy stresses the active participation of women in household water treatment and storage. It also highlights the specific gender needs of toilets. The policy is a good reference document to guide planners on how to involve women in deciding sites for water points and toilet facilities so that women can have easy access.

Technical Education and Training Policy, 1996

The policy contains statements on inclusion of Environmental Health, Hygiene and Sanitation in education curricula and programmes. It also contains policy statements on the provision of adequate sanitation facilities and hygiene education in all educational institutions.

Mineral Policy of Tanzania, 1997

The policy contains policy statements to protect the public from health risks arising from mining activities. Examples are the use of mercury, overcrowding, and HIV/AIDS. The policy proposes that special interventions be developed to raise awareness of the mining stakeholders on proper environmental health practices, and provision of sanitation and hygiene facilities.

Legislation

Tanzania has a number of Acts which cater for Health and Environmental issues as highlighted in this section.

Environment Management Act, 2004

The Environmental Management Act No. 20 of 2004 provides the legal and institutional framework for sustainable management of the environment in line with the National Environment Policy of 1997. The Act outlines principles for management, impact and risk assessment, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement. It also provides different enforcement actions for non-compliance with environmental requirements.

Public Health Act, 2009

The Public Health Act No.1 of 2009 deals with the promotion, preservation and maintenance of public health with a view to ensuring the provisions of comprehensive, functional and sustainable public health services to the general public, and provides for other related matters. This Act also prohibits the pollution of water bodies with hazardous waste materials such as chemicals which affect human health and the surrounding environment.

Tanzania Food, Drugs and Cosmetics Act, 2003

The Tanzania Food, Drugs and Cosmetics Act No.1 of 2003 provides for the efficient and comprehensive regulation and control of food, drugs, medical devices, cosmetics, herbal drugs and poisons, prohibited drugs and cosmetics. Under this Act, all importers, distributors, users and dealers in drugs and cosmetics are required to register with the regulating authority and apply for an import license when they want to import registered products.

Occupational Health and Safety Act, 2003

The Occupational Health and Safety Act No. 5 of 2003 makes provisions for the safety, health and welfare of persons at work in factories and other places of work. It also provides for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work, and it provides for connected matters. This Act protects employees from toxic materials and harmful work environments which endanger human health in their respective environments.

Industrial and Consumer Chemicals (management and control) Act, 2003

The Industrial and Consumer Chemicals (management and control) Act No.3 of 2003 provides for the management and control of the production, import, transportation, export, storage, dealing and disposal of chemicals and for matters connected therewith. This Act ensures that chemicals are handled properly in order to safeguard human health and protect the environment.

Local Government (District Authorities) Act, 1982 as amended on 30th June 2000 and the Government (Urban Authorities) Act, 1982 as amended on 30th December 2000.

The Local Government Acts of 1982 for both District and Urban Authorities state that the respective authorities may perform functions in respect of environmental health and sanitation, where Health Officers work for the interest of the health sector. These Acts prohibit the pollution of water in any river, stream, watercourse, well, or other water supply in the area. They also give powers to health inspectors to ensure proper waste management (solid and liquid), and for the detection and abatement of nuisances.

Environmental Health Practitioners (Registration) Act, 2007

This Act No. 20 of 2007 provides for the establishment of a Council to regulate the conduct of and registration of Environmental Health Practitioners and to provide for related matters.

Water Supply and Sanitation Act, 2009

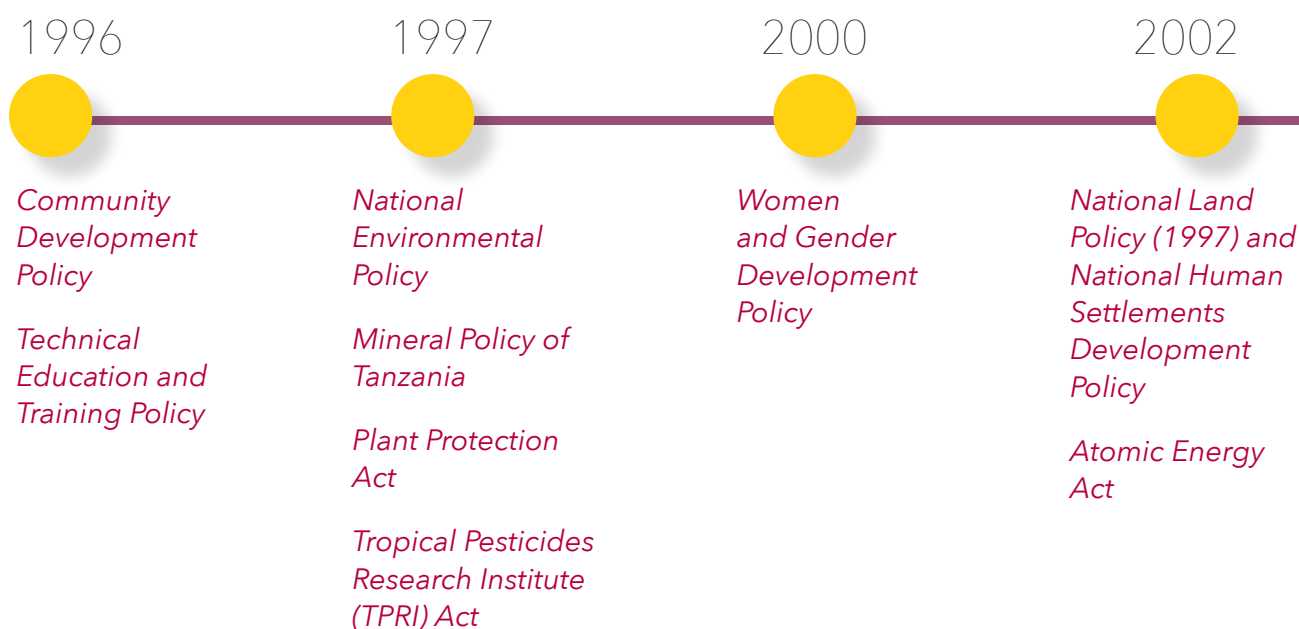
This Act No.12 of 2009 provides for the sustainable management and adequate operation and transparent regulation of water supply and sanitation services, with a view to give effect to the National Water Policy of 2002 to provide for the establishment of water supply and sanitation authorities as well as community-owned water supply organizations and provide for the appointment of service providers, and to provide for other related matters. This Act enables the protection and conservation of water resources as well as the promotion of public health and sanitation.

Water Resources Management Act, 2009

This Act No. 11 of 2009 provides the institutional and legal framework for the sustainable management and development of water resources, outlining the principles for water resources management, providing for the prevention and control of water pollution, providing for the participation of stakeholders and the general public in the implementation of the National Water Policy. This Act helps to protect national waters and prevent their degradation, and ensures the existence of safe water sources free from pollution.

Plant Protection Act, 1997

The Plant Protection Act No.13 of 1997 makes provisions to prevent the introduction and spread of harmful organisms so as to ensure sustainable plant and environmental protection, to control the import and use of plant protection substances, to regulate export and import of plants and plant products, and ensure the fulfilment of international commitments, to entrust all plant protection regulatory functions to the government; and for matters incidental thereto or connected therewith.

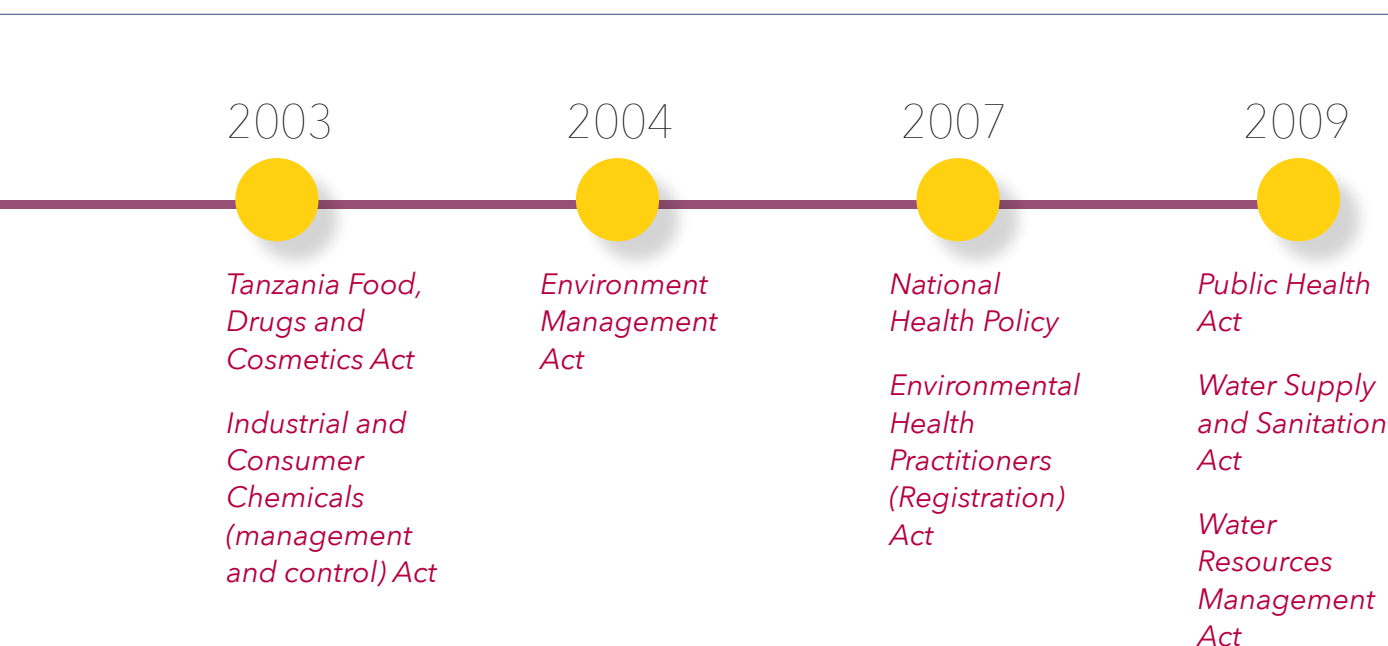


Tropical Pesticides Research Institute (TPRI) Act, 1997

This Act provides for the establishment of the Tropical Pesticides Research Institute (TPRI) which controls and regulates the import, registration, transportation, handling, use and disposal of all pesticides in the country.

Atomic Energy Act, 2002

This Act No. 7 of 2003 establishes the Tanzania Atomic Energy Commission and provides for its functions in relation to the control of the use of ionizing and non-ionizing radiation sources, and the promotion of safe and peaceful uses of atomic energy and nuclear technology. This Act helps to safeguard the environment and human beings against the impacts of radioactive materials. This Act also safeguards agriculture as it helps to protect plants from harmful pollutants as well as protect human health and the environment.



Inter-Ministerial Committees

Chemical Emergency Response Committee

The committee is established under the Industrial and Consumer Chemicals (Management and Control) Act. It comprises of members from both the Government and the private sector. The Members of this committee are:

- a) The Prime Minister's Office (the Director of Disaster Management who is the Chairperson of the Committee);
- b) Ministry responsible for Home Affairs (Fire and Rescue Brigade, Police forces);
- c) Ministry responsible for water;
- d) National Environment Management Council;
- e) Ministry responsible for Regional Administration and Local Government (Chemical or Environmental Expert);
- f) Occupational Safety and Health Agency;
- g) Ministry responsible for Health, (Head of Disaster Management, Regional Medical Officer);
- h) Tanzania Food and Drug Authority;
- i) Tanzania Harbours Authority (Fire and Safety Department);
- j) Private Fire Rescue Services Company;
- k) Co-opted other members according to the case; and
- l) The Registrar who is the Secretary to the Committee.

The main roles of the committee are to deliberate and respond to various aspects related to chemicals incidents including chemical accidents. In addition, the committee has the following specific roles:

- a) to prepare chemical disaster preparedness and contingency plans;
- b) to implement the approved contingency plans in case of emergencies;
- c) to advise the Government on how to deal with chemical emergencies and accidents; and
- d) to liaise with any other Disaster Management Authorities or institution and ensure collaboration with stakeholders.

Chemicals Management Technical Committee

This committee is also established under the Industrial and Consumer Chemicals (Management and Control) Act, and it is comprised of members both from the Government and the private sector. The main role of the committee is to advise the Government on matters related to:

- a) Classification, labelling and packaging of chemicals;
- b) Protection of health and the environment from the adverse effect of chemicals;
- c) Substances, preparations or products and processes that are not or less hazardous to health and the environment; and
- d) Registration of chemicals and chemical dealers.

National Environmental Advisory Committee

The committee is established under the Environment Management Act. The members of the committee are drawn from various institutions within and outside the government. The committee is established at national, regional, District and Ward levels. At national level, the committee is coordinated by NEMC, while at regional to Ward levels it is coordinated through the Local Governments. The main role of this committee is to advise the Minister on matters relating to the protection and management of the environment, make recommendations on degradation of the environment, review environmental standards, guidelines and regulations as well as perform environmental advisor services to the Minister.

In addition, the committee establishes the Chemicals Management Advisory Committee as a sub-committee. This sub-committee also comprises stakeholders with different backgrounds and knowledge in chemicals and environmental management from within and outside the Government. The main role of this sub-committee is to advise the Government on matters related to chemicals and environmental management.

HPAP PROCESS IN TANZANIA: ACTIVITIES AND TIMELINE



The HPAP process focused on five pollution risk factors with known health impacts:

- a. Indoor air pollution;
- b. Outdoor air pollution;
- c. Contamination of water (biological and non-biological contamination);
- d. Soil pollution from heavy metals and toxic chemicals (contaminated sites); and
- e. Occupational exposure to pollutants.

The HPAP process was led by the Vice President's Office - Division of Environment (VPO-DoE) in collaboration with the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC). The HPAP process was facilitated by UNIDO and followed the five-step process detailed in *Annex 2*. The outcome of the HPAP process has been this



“THE BASIC OBJECTIVE OF THE HPAP PROCESS IS TO HELP TO ACHIEVE REAL ACTION AND MEASUREABLE OUTCOMES FOR SOME OF THE HIGH PRIORITY CHALLENGES.”

concise Action Plan for the Government of Tanzania to review, validate and implement.

The basic objective of the HPAP process is to help to achieve real action and measureable outcomes for some of the high priority challenges. Therefore, in addition to describing the process used to prioritize issues and create the Plan, and describing the pollution challenges and associated health impacts that were identified as priorities through the consultative and analytical process, this Action Plan includes brief recommended actions, programmes, and projects that would reduce the impacts on public health from priority pollution issues.

The activities implemented or to be implemented in Tanzania are outlined below.

DATA COLLECTION AND ANALYSIS: APRIL – JUNE 2018

Data collection and analysis of health and pollution effects was conducted through desk research and review of relevant documents, interviews, consultations with key stakeholders, study questionnaires and stakeholders' meetings and workshops.

Review of Documents

Relevant documents were reviewed in order to understand the extent of the problem at global, regional and national levels; the existing mechanisms to address the problem; and approach and objectives of the HPAP.

General information and data on health and environmental impacts with respect to the five pollution risk factors were obtained from public websites of international organizations that deal with health and environment issues and their impacts such as the World Health Organization (WHO), UN-Environment, Basel Action Network, etc.; as well as relevant international and regional conventions such as the Stockholm Convention on Persistent Organic Pollutants (POPs) and Minamata Convention on Mercury. Data on the estimated deaths and Disability-Adjusted Life Years (DALYs) in Tanzania caused by the five pollution risk factors were obtained from the Global Burden of Disease (GBD) database coordinated by the Institute of Health Metrics and Evaluation (IHME).

Existing international, regional and national policies, legislations, strategies and programmes related to the five pollution risk factors were also reviewed for purposes of assessing the strengths, weaknesses and gaps of the national legal and institutional framework in place to address the five pollution risk factors and support implementation of HPAP. Priorities for actions established under the Joint Action Plan for implementation of the Libreville Declaration were also reviewed.

Stakeholders' Consultations

Bilateral consultative meetings with key stakeholders were conducted mainly between April and June 2018. The consultations aimed at introducing the project/activity, soliciting support and collecting information and data related to the five pollution risk factors. Sixteen key stakeholders were identified for bilateral consultations, of which thirteen were consulted during the period of April to June 2018. Further consultations with other stakeholders continued throughout the project period as deemed necessary. The consulted stakeholders included key government Ministry/Departments, NGOs dealing with environment and health issues, Academic and Research Institutions, International Organizations, UN Agencies and Development Partners (the Donor Community). A list of the consulted stakeholders during the HPAP development process is shown in *Annex 1*.

IDENTIFICATION OF PRIORITY ISSUES

High-Level Stakeholders' Inception Meeting

After the initial consultations, UNIDO, in collaboration with the Division of Environment of the Vice President's Office (Lead Ministry), organized two stakeholders' inception meetings for the stakeholders. The first meeting was held in Dodoma on 21st August 2018 and brought together a total of 42 high-level officials from the relevant institutions including key

Government Ministries/ Agencies, Universities and NGOs. The main objective of the meeting was to discuss and identify overall priorities for action within the five pollution areas of the HPAP based on their health impacts, existing national priority programs and plans, as well as emerging environmental challenges with significant health impacts. The stakeholders' meeting identified the following priority issues to be considered in the HPAP: *water and waste water pollution, indoor air pollution, outdoor air pollution, exposure to chemicals from agriculture, and exposure to heavy metals from mining activities.*

Technical Experts' and Donors Meeting

The second meeting, whose venue was in Dar es Salaam, was held on 23rd August 2018 and was attended by 37 technical experts from the relevant key Ministries/Agencies, Academia, R&D Institutions, NGOs, as well as Development Partners. The meeting discussed available solutions for addressing the priority pollution issues identified in the High-Level Stakeholders' Meeting and possible project proposals for collaborative action by the stakeholders.

PREPARATION OF HEALTH AND POLLUTION ACTION PLAN

Drafting of Project Proposals and HPAP Document

A dedicated team of experts from the Cleaner Production Centre of Tanzania (CPCT), MUHAS and AGENDA came up with five zero draft Project Proposals for addressing the identified priority issues. A zero draft HPAP document was also prepared by the CPCT which highlights the priority pollution issues in the country, pollution sources, health impacts, cost-effective interventions to reduce exposures, resources needed and potential sources of funding.

Technical Experts' Consultative Meetings

The zero draft documents (i.e., Project Proposals and HPAP Document) were presented at a first Technical Experts' Working Group Meeting, which was held in Morogoro from 23rd to 25th October 2018. The Technical Experts were drawn from key Ministries, Agencies, Universities, R&D Institutions and NGOs. The main objective of the meeting was to present and discuss the concept notes for the purpose of improving them. Thereafter, the improved versions were submitted to the international consultant at UNIDO, Vienna, for review and comments.

The technical experts' team from the same institutions reconvened from 29th to 30th November 2018 at the same venue, to review the draft Project Proposals as well as the draft HPAP document in order to integrate the comments from UNIDO. Thereafter, the National Coordinator finalized the draft HPAP document.

Specifically, the technical team of experts which provided inputs in the preparation of the HPAP comprised representatives from the following Ministries and Organizations:

- President's Office - Regional Administration and Local Government (PO-RARG);
- Vice President's Office;
- Ministry of Health, Community Development, Gender, Elderly and Children (MoCDGEC);
- Ministry of Industry, Trade and Investment;

- Ministry of Minerals;
- Ministry of Water and Irrigation;
- Ministry of Energy;
- Ministry of Works, Transport & Communications;
- Occupational Safety and Health Authority (OSHA);
- Government Chemist Laboratory Authority (GCLA);
- Tanzania Pesticides Research Institute (TPRI);
- Tanzania Atomic Energy Commission (TAEC);
- National Environment Management Council (NEMC);
- Muhimbili University of Health and Allied Sciences (MUHAS);
- National Institute of Medical Research (NIMR);
- AGENDA for responsible Environment; and
- Cleaner Production Centre of Tanzania (CPCT).

CIRCULATION OF THE HPAP TO NATIONAL AND INTERNATIONAL STAKEHOLDERS

The final draft of the HPAP approved by the technical experts' team in collaboration with the international experts at UNIDO, Vienna, was distributed to a wider audience of national and international stakeholders for their comments. A stakeholders' validation workshop was then organized to officially endorse and validate the Action Plan as well as discuss the next steps toward implementing the suggested actions.

DISSEMINATION AND PROMOTION OF THE HPAP

The Final HPAP document will be disseminated and promoted to the donor community under the guidance of a joint coordinating team between the Vice President's Office and the Ministry of Health, Community Development, Gender, Elderly and Children for purposes of soliciting funding to implement the Action Plan and the Project Proposals.

The National Health and Pollution Action Plan is based on inputs from national agencies, national and international data on pollution sources and impacts, and on an analysis of existing studies and reports describing pollution challenges in Tanzania and the resulting burden of disease.

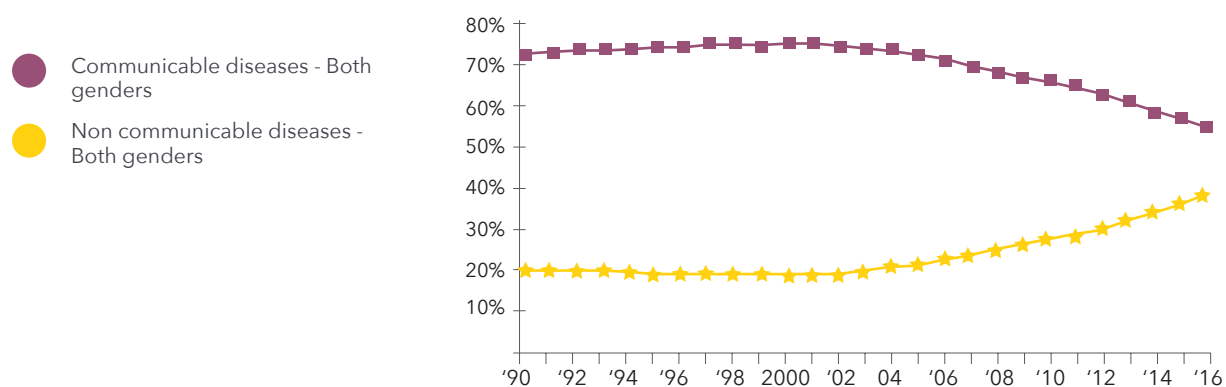
SUMMARY OF HEALTH IMPACTS FROM MAJOR POLLUTION CHALLENGES



POLLUTION IMPACTS DATA FROM IHME 2016 GBD STUDY

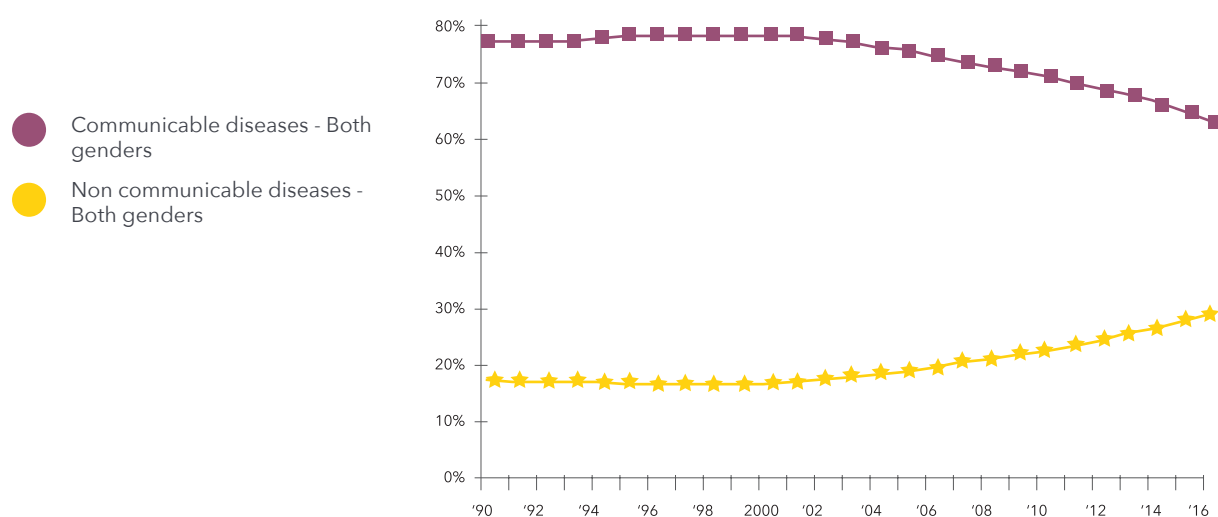
The assessment of health impacts from pollution in Tanzania relies on data on deaths and Disability Adjusted Life Years (DALYs) from Global Burden of Disease studies currently coordinated by the Institute for Health Metrics and Evaluation (IHME) – see *Annex 3*.

An analysis of the types of disease causing mortality in Tanzania shows that the percentage of annual deaths attributable to communicable diseases has decreased from 72% in 1990 to 56.1% in 2016, while the percentage of annual deaths attributable to non-communicable diseases has increased from 22.1% to 36.1% in 2016.

Figure 2: Percentage of annual deaths attributable to communicable and non-communicable diseases.

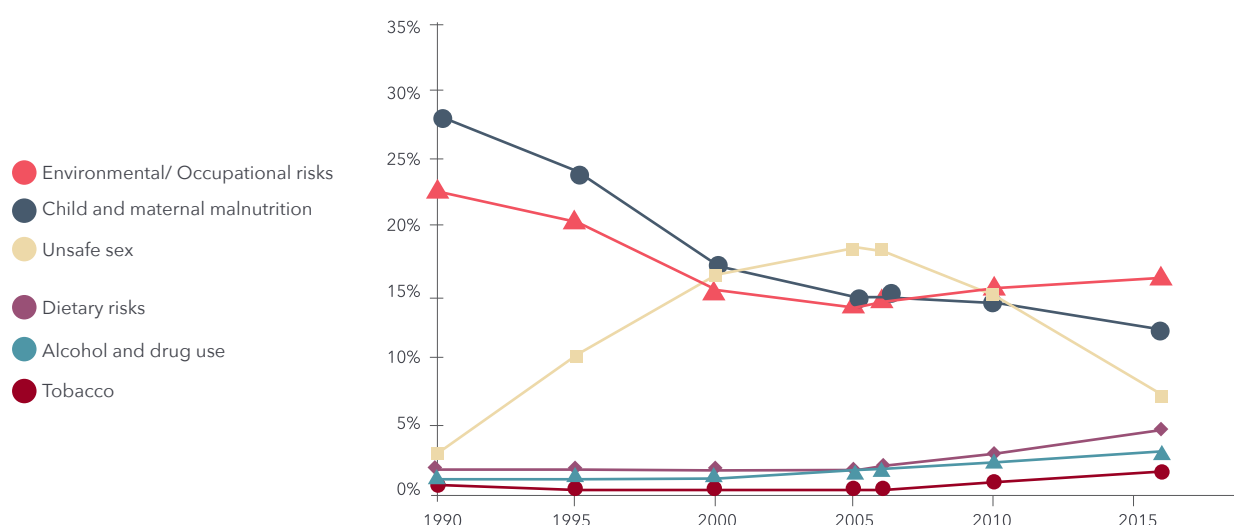
Source: IHME 2016 GBD Study

There are similar trends in the percentages of annual disability adjusted life years (DALYs) attributable to communicable and non-communicable diseases during the same period. The percentage of DALYs attributable to communicable diseases has dropped from 77% in 1990 to about 62% in 2016 while the percentage of DALYs attributable to non-communicable diseases has increased from 17.6% in 1990 to 30.8% in 2016.

Figure 3: Percentage of total annual DALYs attributable to communicable and non-communicable diseases.

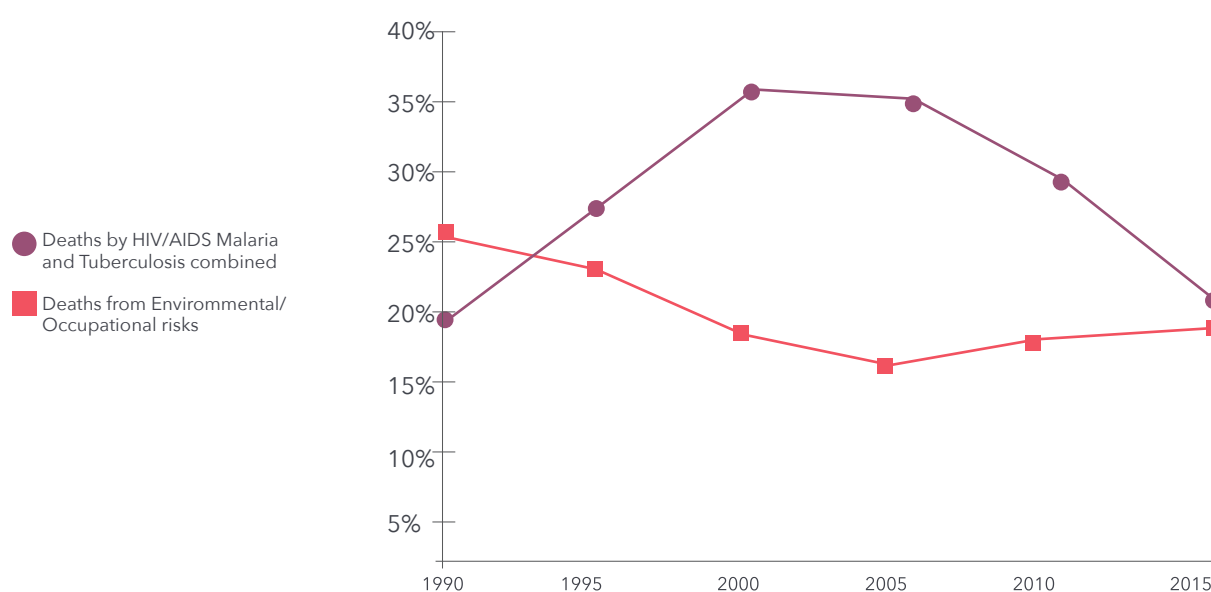
Source: IHME 2016 GBD Study

Pollution exposures contribute significantly to deaths and disabilities from non-communicable diseases. Pollution accounts for 19.1% of all annual deaths, followed by Child and maternal malnutrition (15.1%) and unsafe sex (10.3%).

Figure 4: Percentage of all annual deaths in Tanzania caused by leading risk factors

Source: IHME 2016 GBD Study

When deaths attributable to pollution exposures are compared with the combined deaths from such high-profile communicable diseases as HIV/AIDS, malaria and tuberculosis, deaths due to pollution's impacts show an increasing trend over the past ten years, from 17.09% in 2005 to 19.07% in 2016. In contrast, the percentage of deaths from these three major communicable diseases show a tremendous decreasing trend from 35.52% in 2005 to 19.11% in 2016 as shown in figure 3.4 below.




Figure 5: Percentage of annual deaths attributable to pollution vs. HIV/AIDS, Malaria and Tuberculosis (combined).

Source: IHME 2016 GBD Study

Note that this chart compares a risk factor (pollution exposures) to diseases

The following table summarizes the annual deaths in Tanzania from various sources of pollution, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

Table 1: Summary of annual deaths from Pollution in Tanzania in 2016

Summary of Annual Deaths from Pollution in Tanzania		
Pollution Type	Annual Deaths	As % of all Deaths
	AIR	
	Household air	33,024
	Outdoor air	14,314
	Total Air	41,554
	WATER	
	Unsafe sanitation	16,509
	Unsafe water	19,279
	Total Water	30,847
	CHEMICALS	
	Lead	1,254
	Mercury	-
	POPs	-
	Other Chemicals	-
	Occupational Carcinogens	2,043
	Total Chemicals	5,688
Total - All Pollution		74,170
		19.07

Source: IHME 2016 GBD Study

The following sections give more details on the deaths and disabilities attributable to specific sources of pollution according to the GBD Study and available national/regional data.

Burden of disease from Outdoor Air Pollution

The following table summarizes the annual deaths and DALYs from outdoor air pollution, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

Table 2: Annual deaths and DALYs from Ambient particulate matter pollution as estimated in the GBD study

Outdoor Air Pollution				
Demographic	Deaths	As % of all Deaths	DALYs	As % of all DALYs
Sex				
Male	7,405	3.56	307,342.3	2.43
Female	6,909	3.81	274,406.1	2.48
TOTAL	14,314	3.68	581,748.4	2.45
Age				
<5 years	3,540	3.26	303,842.8	3.12
5-14 years	285	1.84	22,196.2	1.05
15-49 years	1,654	1.66	83,547.6	1.08
50-69 years	3,868	5.15	107,887.8	3.95
70+ years	4,967	5.50	64,274.0	4.70
TOTAL	14,314	3.68	581,748.4	2.45

Source: IHME 2016 GBD Study

The table above shows that the annual deaths resulting from outdoor air pollution was 14,314 in 2016, equivalent to 3.6% of all deaths in Tanzania. It also shows that children below the age of five and elderly people above 50 years are highly impacted in their health by outdoor air pollution.

Burden of disease from water and wastewater pollution

The diseases caused by unsafe water are well known. They include cholera, typhoid, dysentery, and diarrhoea. All these contribute to the global burden of disease, sometimes leading to deaths and disabilities. The following table summarizes the annual deaths and DALYs from unsafe water, sanitation and hand washing, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

Table 3: Annual deaths and DALYs from Unsafe water, sanitation, and hand washing as estimated in the GBD study

<i>Unsafe water, sanitation, and hand washing</i>				
Demographic	Deaths	As % of all Deaths	DALYs	As % of all DALYs
Sex				
Male	14,792	7.12	767,772.1	6.07
Female	16,055	8.87	754,860.7	6.82
TOTAL	30,847	7.93	1,522,632.8	6.42
Age				
<5 years	8,250	7.60	729,147.5	7.49
5-14 years	1,974	12.77	163,097.3	7.75
15-49 years	6,039	6.07	354,375.8	4.57
50-69 years	6,034	8.04	170,546.9	6.24
70+ years	8,551	9.48	105,465.3	7.71
TOTAL	30,847	7.93	1,522,632.8	6.42

Source: IHME 2016 GBD Study

Table 3 shows that children below the age of 5 and the elderly above 70 years old are more vulnerable to the effects of water pollution. More deaths occur during those years than other years. However, the percentage of all deaths is much higher in children between the age of 5 and 14 years.

Burden of Diseases from Heavy metals and other Toxics from Small Scale Mining

Exposure to heavy metals such as arsenic, cadmium, chromium, copper, lead, mercury, nickel, uranium, thorium and zinc cause diseases such as peripheral vascular diseases, restlessness, anxiety, numbness in the hands and feet, various types of cancer, haemolysis, kidney stones, liver damage, various systems disorders, DNA damage, haemolytic anaemia, nausea, loss of IQ, Low sperm count, loss of hearing, asthma, tremor and may cause death.

There is no data in the GBD study database which shows the disease burden from exposure to heavy metals and other toxics in Tanzania.

Burden of diseases from Indoor Air Pollution

The following table summarizes the annual deaths and DALYs from Indoor Air Pollution, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

Table 4: Annual deaths and DALYs from Household air pollution from solid fuels as estimated in the GBD study

<i>Indoor Air Pollution</i>				
Demographic	Deaths	As % of all Deaths	DALYs	As % of all DALYs
Sex				
Male	16,221	7.80	719,042.7	5.68
Female	16,803	9.28	695,656.7	6.28
TOTAL	33,024	8.49	1,414,699.4	5.96
Age				
<5 years	9,236	8.51	792,678.1	8.14
5-14 years	762	4.93	59,457.7	2.82
15-49 years	3,625	3.64	185,282.3	2.39
50-69 years	8,311	11.07	232,127.5	8.49
70+ years	11,091	12.28	145,153.7	10.61
TOTAL	33,024	8.49	1,414,699.4	5.96

Source: IHME 2016 GBD Study

As can be noted in the above table, health impacts caused by indoor air pollution are high among elderly people and children below 5 years of age. This is mainly because of long term effects of smoke exposure that exacerbates chronic disease outcomes during the older age and the fact that children at those ages spend more time indoors and remain vulnerable to shorter term health effects than the rest of the age groups.

Burden of disease from Exposure to Pesticides

There is no data in the GBD study database which shows the disease burden from exposure to pesticides in Tanzania.

POLLUTION IMPACTS DATA FROM AVAILABLE NATIONAL STUDIES

Local data on health impacts due to pollution is scanty. However, at least two studies in Tanzania have explored the negative effects of indoor smoke on mortality and morbidity among children. Kilabuko *et al.* (2007)² observed that children less than 5 years of age who

2 Kilabuko, J.H., Matsuki, H. & Nakai, S., 2007. Air Quality and Acute Respiratory Illness in Biomass Fuel using homes in s in Bagamoyo, Tanzania. *Int. J. Environ. Res. Public Health*, 4(1), 39-44.

were exposed to higher indoor pollution from cooking sources had 5.5 times more chance of developing acute respiratory illness (ARI) compared to unexposed children. Mtango *et al.* (1992)³ documented various causes of deaths where they observed that young children who are exposed to higher indoor pollution levels had 2.78 more chance of dying compared to less exposed children. This signifies that indoor air pollution is potentially contributing to at least one-third of under-fives morbidity due to Acute Respiratory Infections (ARI) as well as to their overall mortality.

An inventory of contaminated sites in Tanzania which was prepared by the Blacksmith Institute (now known as Pure Earth) in 2014 estimated that a total of 2,164,851 people were at risk of exposure to toxic pollutants at 112 identified contaminated sites in seventeen regions in Tanzania, and that the exposures at some of these sites resulted in a total of 79,273 DALYs⁴.

ECONOMIC COSTS OF POLLUTION IN TANZANIA

Diseases resulting from pollution and for which data are available are estimated to have cost Tanzania between US\$384 million and US\$540 million in 2015 due to lost productivity - the equivalent of 0.8% to 1.2% of the country's 2015 Gross Domestic Product (GDP). The welfare damages from pollution-attributable diseases equal US\$3,665 million, or 7.5% of the gross national income (GNI) for the same year. National data on direct healthcare spending on treatment of pollution-attributable diseases is not available in Tanzania. These figures were based on estimated data from The Lancet Report 2016; a complete description of the cost estimate methodology can be referred at the Supplementary appendix of the Lancet 2017⁵.

Premature death and disease due to pollution impose great costs on national budgets and health-care spending, especially in industrializing low-income countries such as Tanzania. Diseases caused and exacerbated by pollution result in medical expenditures and in pain and suffering. Pollution-related disease can reduce labour force participation, labour market productivity, and economic output. In children, pollution-related disease can cause failure in school and perpetuate intergenerational poverty. Early life exposures to neurotoxic pollutants such as lead and mercury can impair cognition, diminish the ability to concentrate, and disrupt behaviour, thus reducing lifetime earnings. The costs of disease and premature death caused by pollution, especially the more modern forms of pollution, are rising rapidly.

The costs of pollution-related disease are often overlooked and undercounted because they are associated with non-communicable diseases that appear and extend for many years after the initial exposure, are spread across large populations, and are not captured by standard economic indicators. These costs are much more difficult to calculate than the costs of pollution control, which are usually tangible and concrete. Although the costs of pollution-related disease can have large effects on the budgets of health ministries and increase spending in health systems, they are typically buried in general health expenditures and hospital budgets, hidden in productivity reports, do not affect the budgets of environment ministries, and are not attributed to pollution.

3 Mtango FD, Neuvians D, Broome CV, Hightower AW, Pio A,. 1992. Risk factors for deaths in children under 5 years old in Bagamoyo district, Tanzania. *Trop Med Parasitol.* 43(4):229-33

4 Blacksmith Institute: Report on the Inventory of polluted sites in Tanzania, 2014

5 [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(17\)32345-0.pdf?code=lancet-site](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)32345-0.pdf?code=lancet-site) free account registration required.

The costs of pollution-related disease include: 1) direct medical expenditures, including hospital, physician, and medication costs, long-term rehabilitation or home care, and non-clinical services such as management, support services, and health insurance costs; 2) indirect health-related expenditures, such as time lost from school or work, costs of special education, and the cost of investments in the health system (including health infrastructure, research and development, and medical training); 3) diminished economic productivity in persons whose brains, lungs, and other organ systems are permanently damaged by pollution; and 4) losses in output resulting from premature death.

Pollution-related disease is responsible also for intangible costs, such as those of poor health in people made ill by pollution, disruption of family stability when a person of working age becomes disabled or dies prematurely as a result of pollution, and the loss in years of life to the person themselves.

SUMMARY OF PRIORITY POLLUTION MANAGEMENT CHALLENGES AND RECOMMENDATIONS



The following sections summarize the priority issues chosen after the deliberations of the High-Level Inception Meeting, Initial Technical Experts' Meeting and the Technical Experts Working Group Meetings.

PRIORITY ISSUE 1: OUTDOOR AIR POLLUTION

Sources and characteristics

The degrading air quality in Tanzania is attributable to different sources of emissions including open burning of forests, open burning of solid waste, exhaust from automobiles and motorcycles, emissions from power plants, industrial activities, improper waste management, construction



activities, domestic activities, fumigation, and emissions from un-tarmacked roads. Table 5 below summarizes the sources and characteristics of outdoor air pollution in Tanzania.

Table 5: Sources and Characteristics of outdoor air pollution in Tanzania

Source	Characteristics
Vehicles and motor cycles	SO ₂ , NO _x , CO, VOCs, PM
Industrial facilities including manufacturing factories, mines, and oil refineries	SO ₂ , CO, NO _x , VOCs, dust, PM
Municipal and agricultural waste dumping sites	Methane, dioxins and furans
Inadequate waste incineration especially in health care centres	Unintentional POPs (e.g. dioxins and furans)
Open burning of fake, sub-standard and expired products	PM, Unintentional POPs (e.g. dioxins and furans)
Wildfires	PM, CO, smoke
Fumigation	Hazardous chemicals

Roles and responsibilities in addressing Outdoor Air Pollution

Vice President's Office – Division of Environment

The Vice President's Office – Division of Environment has the function of overall coordination and management of the environment (including air pollution) and is also responsible for the articulation of environmental policy and legislation.

The Minister responsible for Environment is responsible for matters relating to environment and in that respect is responsible for articulation of policy guidelines necessary for the promotion, protection and sustainable management of environment in Tanzania.

The National Environmental Advisory Committee is an advisory body established with the mandate of advising the Minister responsible for Environment or any sector Ministry in all matters related to the protection and management of environment.

The Director of Environment is responsible for coordinating various environment activities being undertaken by other agencies and promotes the integration of environment considerations into development policies, plans, programmes, strategies, projects and undertakes as well as process or issue several environmental permits.

National Environmental Management Council (NEMC)

The National Environment Management Council is responsible for the implementation of the Environmental Management Act (EMA) of 2004. EMA gives NEMC the mandate to undertake enforcement of environmental standards (including air quality standards), compliance review and monitoring of environmental impacts assessments, research, and to facilitate public participation in environmental decision-making, raise environmental awareness and collect and disseminate environmental information.

Occupational Safety and Health Authority

The main function of OSHA is to advise the Government on all matters related to Occupational Safety and Health activities in the country by enforcing the Occupational Safety and Health Act No. 5 of 2005. It also conducts research, consultancy and training in Occupational Safety and Health. With regard to indoor air pollution, the role of OSHA is to monitor the ambient air quality in workplaces.

Sector Ministries

Each ministry includes an environmental section/unit with responsibilities of ensuring compliance with environmental laws in the sectors which they cover and which reports their implementation to the Director of Environment and NEMC.

Local Government Authorities

The role and responsibilities of Local Government Authorities, coordinated by Environment Management Officers at City, Municipal, District and Town levels of administration, are to monitor and enforce compliance of environmental laws (including air quality standards) in their respective areas.

Tanzania Bureau of Standards (TBS)

The role of TBS in addressing outdoor air pollution is to develop air quality standards.

Government Chemist Laboratory Authority (GCLA)

The role and responsibilities of GCLA in addressing outdoor air pollution is to provide laboratory testing analyses of outdoor air pollutants such as SO₂, NO_x, CO, VOCs, PM, methane, dioxins, and furans.

Tanzania Industrial Research and Organization (TIRDO)

TIRDO provides in-situ monitoring and testing services of outdoor air pollutants such as SO₂, NO_x, CO, VOCs, PM₁₀, PM_{2.5}, NO and NO₂.

Actions taken to date to address Outdoor Air Pollution

Actions taken to address air pollution issues in Tanzania are undertaken within the context of the National Environmental Policy of 1997, the Environmental Management Act of 2004 and other related policies and legislation. At national level, the Vice President Office - Division of Environment (VPO-DoE) is responsible for all air pollution related issues.

In addition, Tanzania has adopted and implements various other policies, legislation, strategies, plans and programmes which are relevant for addressing air pollution matters. Some of these are: the Natural Gas Policy (2013); the Renewable Energy Strategy (2014); the Natural Gas Act (2015); and the National Transport Master Plan (2013).

Furthermore, the Environmental Management Act provides for the establishment of various committees at both national and local levels which stimulate more coordinated actions of actors and broadens the participation of various actors in addressing environmental pollution related matters including air pollution.

Other initiatives which have been or are being undertaken by the government and other stakeholders to address outdoor air pollution in the country are summarized in the following Table.

Table 6: Initiatives taken to address Outdoor Air Pollution

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Implementation Period
1	GEF funded project on "Passive Air Sampling of POPs" under the Global Monitoring Plan of the Stockholm Convention	UN-Environment; Tanzania Bureau of Standards (TBS).	2018 - 2020
2	GEF funded project on "Promotion of BAT and BEP to reduce u-POPs releases from waste open burning in the participating African countries of SADC sub-region"	UNIDO Vice President's Office - Division of Environment	May 2016 - 2021
3	RAF7016: Establishing and Improving Air Pollution Monitoring	International Atomic Energy Agency (IAEA) Tanzania Atomic Energy Commission (TAEC)	2016 -2019

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Implementation Period
4	National project URT/02/2004 Establishment of analytical laboratory (XRF and XRD).	International Atomic Energy Agency (IAEA) Tanzania Atomic Energy Commission (TAEC)	2004-2008
5	Baseline studies of outdoor air pollutants at various project sites including Ngozi and Kiejo-Mbaka Geothermal Exploration Drilling projects in Mbeya region; Karanga Leather Industries in Kilimanjaro region; Simiyu Medical Cotton Products in Simiyu region; and Chato Airport in Chato District.	Tanzania Industrial Research and Development Organization (TIRDO)	2017 – 2019 (each study 3 months)
6	In-situ monitoring and testing of outdoor air pollutants at TANESCO substations in Arusha, Kigoma and Ubungu	Tanzania Industrial Research and Development Organization (TIRDO)	2015 – 2016 (each station month)

Further actions proposed for addressing Outdoor Air Pollution

The following are among the further actions that have been proposed by the stakeholders to address the outdoor air pollution in the country:

- i. Periodic testing of vehicles for pollutant emissions;
- ii. Installation of high-tech incinerators in health facilities lacking such incinerators for the safe destruction of health care wastes in order to reduce releases of unintentional Persistent Organic Pollutants (u-POPs) such as dioxins and furans;
- iii. Installation of solid waste storage bays in urban areas for their collection and storage prior to transportation for disposal, to minimize their ending up in dumps and risking to be burned;
- iv. Construction of engineered sanitary landfills, to properly dispose of wastes and minimize their open burning;
- v. Training of health and environment staff in outdoor air pollution, to upgrade government oversight and so reduce non-compliance with the relevant regulations;
- vi. Training of staff from the Tanzania Bureau of Standards (TBS), Tanzania Police Force (TPF), National Institute of Transport (NIT) in regular testing and maintenance of vehicles, to minimize emissions from poorly maintained vehicles;
- vii. Supporting improvement of the transport system in urban areas such as the Rapid Bus Transport systems, trams and trains (especially underground trains), to reduce the number of vehicles on the roads;
- viii. Collaborating with the private sector on the provision of wider roads, to minimize slow traffic and thus increased emissions;

- ix. Promotion of the use of alternative clean energy in industries to reduce emissions of noxious gases;
- x. Promotion of waste management best practices in municipalities and industries (e.g., RECP and symbiosis concepts), to reduce solid waste disposal and open burning practices;
- xi. Monitoring the quality of fuels and lubricants; and
- xii. Conducting public awareness campaigns through TV, Radio, newspapers, blogs, social media, mobile phone and public meetings on the health impacts of outdoor air pollution.

These further actions have been summarized in the Action Plan provided in Table 17.

PRIORITY ISSUE 2: WATER POLLUTION

Sources and characteristics

Water pollution in Tanzania emanates from a number of point and non-point sources. Municipal effluent, mining, and industrial discharges are the main sources of point source pollution. These activities are the major sources of heavy metals, low pH values, high sulphide content and turbidity, in both surface and groundwater bodies.

Many urban areas in Tanzania lack wastewater treatment facilities and where they exist they are inefficiently operated. As a result, wastewater emanating from residential areas is disposed of on land, and into streams, lakes, or the sea, mostly without prior treatment.

Industrial activities are also regarded as the major point sources of water pollution in urban areas in Tanzania because about 80% of industries in Tanzania are located in urban areas, mainly Dar es Salaam, Mwanza, Arusha, Tanga, Morogoro and Mbeya. Many of these industries have inefficient water management practices and inadequate wastewater treatment facilities. As a result, they generate and discharge large quantities of wastewater which do not meet the quality limits set in the national standards, leading to pollution of the receiving water bodies and the environment as a whole.

Non-point source pollution in the country is largely attributable to agricultural activities which are the backbone of the Tanzania's economy. Agro-chemicals are heavily used in major river basins and watersheds. Intensive and somewhat indiscriminate use of agro-chemicals in these basins is causing deterioration of water quality and soil pollution due to contamination with agro-chemicals.

The table below summarizes the sources and characteristics of water pollution in Tanzania.

Table 7: Sources and Characteristics of water pollution in Tanzania

Source	Characteristics
Inadequate sanitation especially in unplanned settlements	Microbial pollutants (e.g., cholera)
Wastewater from water intensive industrial and mining activities e.g. ASGM, textiles, tanneries, etc.	Heavy metals (e.g., mercury, lead, cadmium, etc.) and toxic chemicals
Leachate from dumpsites	Chemicals
Water run-off from agricultural activities	Nutrients
Untreated wastewater discharges from motor vehicles' garages and workshops	Oils and inorganic pollutants

Roles and responsibilities in addressing Water Pollution

The table below gives a summary of the roles and responsibilities of the key institutions in Tanzania which address water pollution.

Table 8: Summary of Roles and Responsibilities of Key institutions in addressing water pollution

Name of Institution	Roles & Responsibilities
Government Ministries	
Vice President's Office	Coordination of all environmental management issues at national level
Ministry of Water	Developing policies for water resources management, commercial water supply and sewerage, community water supply. Provision of laboratory services for analysing the quality parameters of water and wastewater samples.
Ministry of Health, Community Development, Gender, Elderly and Children	Formulation of policies related to health, community development, gender, elderly and children. Provision of hospital services, preventive services, chemical management services, forensic science services, food and drug quality services, reproductive health services, promotion of traditional medicine, inspection of health services and environmental health services. Promotion of WASH in schools
President's office - Regional Administration and Local Government (PO-RALG)	Monitoring and enforcement of wastewater quality discharge standards at local level.

Name of Institution	Roles & Responsibilities
Government Authorities and Agencies	
National Environment Management Council	Enforcement of environmental compliance including wastewater discharge standards
Tanzania Bureau of Standards (TBS)	Formulation and promotion of environmental standards
Government Chemist Laboratory Authority	Laboratory testing of water and wastewater quality parameters; Enforcement of the registration and inspection of chemical industries and chemicals used.
Tanzania Atomic Energy Commission	Developing Guidelines for monitoring natural radioactivity levels in water Providing consultancy and collaborative work with other sectors of research and development on radiation and environment Monitoring Public exposure to ionizing radiation in the Environment Laboratory for testing for natural radioactivity in water and environment
Urban Water and Sewerage Authorities	Ensuring that water is continuously supplied to consumers in urban areas in acceptable standards both in terms of quantity and quality. Treatment of wastewater and sewerage
Water Basin Boards	Monitoring and enforcement of water use, discharge permits and pollution prevention measures at basin level
Academia and R&D Institutions	
UDSM	Provision of academic courses in environmental management including water and wastewater management Undertaking research and consultancy services on issues related to environmental management including innovative methods to manage wastewater from various sources.
MUHAS	Provision of academic courses in public health including prevention of waterborne diseases Undertaking research and consultancy services on issues related to public health including effects of water pollution on human's health.

Name of Institution	Roles & Responsibilities
NGOs/CBOs	
CPCT	Promotion of Resource Efficient and Cleaner Production techniques and technologies in industries, SMEs and other stakeholders
JET	Dissemination of information related to the environment to the public through the relevant media

Actions taken to date to address Water Pollution

A number of initiatives have been or are being undertaken in Tanzania to address the issue of water pollution and sanitation. The initiatives undertaken over the past five years are summarized in the following table.

Table 9: Initiatives undertaken in Tanzania to address unsafe water and sanitation

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution
1	National sanitation campaign for construction and use of sanitary facilities at community level: - Water, Sanitation and Hygiene (WASH) project.	Ministry of Health, Community Development, Gender, Elderly and Children
2	National Water Sector Development Strategy 2006-2015	Ministry of Water
3	National Water Quality Management and Pollution Control Strategy (WQMPCS).	Ministry of Water
4	Monitoring of water pollution in industrial areas (e.g. Vingunguti and EPZA Ubungu) and selected polluting industries as part of enforcement activities	National Environment Management Council (NEMC)
5	Construction/Improvement of wastewater treatment facilities in Municipalities within the Lake Victoria Basin - under the Lake Victoria Environmental Management Project Phase II	Mwanza City & Bukoba Municipal Council (funded by the World Bank)
6	Promotion of Resource Efficient and Cleaner Production (RECP) in industries within the Lake Victoria Basin	NCPCs within EAC Lake Victoria Basin Commission World Bank
7	Supply of radio-analytical equipment to upgrade Tanzanian Atomic Energy Commission (TAEC) laboratories	European Union (EU) Tanzania Atomic Energy Commission (TAEC)

Further actions proposed for addressing Water Pollution

Despite the past and ongoing initiatives that have been or are being implemented in the country to address water pollution issues, water pollution is still a major health risk factor. The following are some of the further actions that have been proposed by various stakeholders to address the issue of water pollution in Tanzania:

- a) **Sensitization of all stakeholders on the protection of water sources.** There is need to sensitize all stakeholders on the locations of major sources of water in their respective areas as well as the major sources of pollution. This will enable the various stakeholders, including the local communities, to better understand the problem and hence come up with collaborative strategies to prevent pollution of their local water bodies.
- b) **Strengthening the monitoring systems for the quality of water and wastewater.** There is a need to strengthen the government systems for monitoring the quality of water and wastewater pollution, especially the water laboratories, in order to have reliable and accurate data on the state of the nation's water.
- c) **Strengthening the enforcement of relevant laws and regulations pertaining to water pollution.**
- d) **Establishing efficient wastewater treatment systems in cities and municipalities.** This could be implemented by developing standard designs for wastewater treatment plants that can be used by the Water Supply and Sanitation Authorities when developing their own.
- e) **Promoting the application of Resource Efficient and Cleaner Production techniques and technologies** in major polluting industries and SMEs in order to reduce the quantity and quality of wastewater discharges from industries.
- f) **Creating awareness in local communities on safe storage of water in households** to ensure that the water storage is done in a manner which prevents its contamination.
- g) **Improving the construction of Tailings Storage Facilities (TSF)** at mining sites to avoid flooding and seepage.

These further actions have been summarized in the Action Plan provided in Table 17.

PRIORITY ISSUE 3: POLLUTION FROM HEAVY METALS AND OTHER TOXICS FROM SMALL SCALE MINING

Sources and characteristics

The sources of pollution from heavy metals and other toxics in small scale mining activities are mainly the different unit operations undertaken during gold processing as summarized in the Table below:

Table 10: Sources and extent of heavy metals and other toxics releases in small scale mining

Source	Levels/Extent of Pollution
Extraction of ores	Medium (mainly affects miners)
Crushing and milling; disposal	Affects both the workers and the surrounding community (mainly women and children)
Sluicing, panning and amalgamation	High. Affects both the workers and the surrounding community (mainly women and children)
Separation of gold from amalgam (Evaporation of mercury by burning)	High. Affects both the workers and the surrounding community
Recovery and refining activities	Low (done in confined rooms with few people)
Vat leaching (carbon-in-pulp - CIP and carbon-in-leach - CIL)	Low (combination of cyanide and heavy metals)
Improper waste rock and tailings disposal	Very High

Roles and responsibilities in addressing Releases of Heavy metals and other Toxics from Small Scale Mining

There are a number of government Ministries/agencies and other organizations in Tanzania that playsome role in regulating, managing, controlling, reducing and/or monitoring pollution from heavy metals and other toxics in small scale mining. The roles and responsibilities of the various institutions are described in the Table below:

Table 11: Roles and Responsibilities of Key institutions in addressing Heavy Metals and other Toxics from Small Scale Mining

Name of Institution	Roles & Responsibilities
Government Ministries	
Ministry of Minerals	Formulation of policies related to development of the mining sector
Vice President's Office	Coordination and Oversight of environmental management issues including environmental pollution from mining activities; National Focal Point for international conventions related to management and control of hazardous chemicals used in mining activities, e.g. Minamata Convention, Rotterdam Convention.
Ministry of Water	Developing policies for water resources management, commercial water supply and sewerage, community water supply, and provision of water laboratory services; Ensuring water sources are not polluted by mining activities.

Name of Institution	Roles & Responsibilities
Ministry of Health, Community Development, Gender, Elderly and Children	<p>Formulate policies related to health, community development, gender, elderly and children;</p> <p>Monitoring heavy metals health effects (body burden) among the community;</p> <p>Provision of preventive and curative health services to the community.</p>
President's office - Regional Administration and Local Government (PO-RALG)	Coordination, Monitoring and enforcement of environmental and health related standards at the local level.

Government Authorities and Agencies	
National Environment Management Council	Enforcement of environmental compliance including permissible limits of heavy metals in ambient air and waste water
Tanzania Atomic Energy Commission (TAEC)	<p>Regulate and control importation, transportation, distribution, storage, handling, use and disposal of all radioactive materials;</p> <p>Regulate and control release of radioactive materials to the environment;</p> <p>Issue licenses to dealers of radioactive materials.</p> <p>Provision of analytical service (Elemental composition & Mineral characterization) to various sectors such as Industrial, Mining, Education, Agriculture and Research Institute.</p>
Government Chemist Laboratory Authority (GCLA)	<p>Regulate and control management of industrial and consumer chemicals including those used in mining, through registration, inspection and promotion of chemical safety;</p> <p>Provide scientific advice to the government based on laboratory analysis of samples including those from the mining activities;</p> <p>Designated national authority for international conventions related to chemicals management such as the Rotterdam Convention.</p>
Tanzania Bureau of Standards (TBS)	Formulation and promotion of environmental standards.
GST, STAMICO and Mining Commission	<p>Assess the training needs of the miners and their communities;</p> <p>Preparation of training materials;</p> <p>Conduct trainings;</p> <p>Preparation of reports for training activities;</p> <p>Preparation of checklists and testing protocols (a) Environmental (b) Biological;</p> <p>Preparation and training of field teams;</p> <p>Collection of environmental samples used to establish environmental concentrations;</p> <p>Undertaking laboratory analysis of collected samples in accredited laboratories (locally).</p>

Name of Institution	Roles & Responsibilities
Occupational Safety and Health Authority (OSHA)	<p>Enforcement of laws and regulations on health and safety at work places;</p> <p>Surveillance of working conditions and workers' health and welfare in the mining areas;</p> <p>Assess the training needs of the miners and their communities related to health and safety in the mining areas;</p> <p>Conduct the required trainings.</p>
Small Industries Development Organization (SIDO)	Development of small scale industries including small scale mining.

Academia and R&D Institutions	
UDSM	<p>Provide long and short academic courses on mining engineering and other natural sciences;</p> <p>Conduct research on impacts of toxics from mining to human health;</p> <p>Acts as a reference resource centre.</p>
MUHAS	<p>Train Public Health professionals including environmental health practitioners;</p> <p>Conduct research on impacts of toxics from mining on human health;</p> <p>Conducts community outreach and consultancy;</p> <p>Acts as a reference resource centre.</p>
VETA	<p>Trainings on applied technologies;</p> <p>Equipment Innovation.</p>

NGOs/CBOs	
AGENDA	Advocacy, awareness creation, research and consultancy services related to environmental pollution
CPCT	Promotion of Resource Efficient and Cleaner Production techniques and technologies in industries, SMEs, small scale mining and other stakeholders to reduce pollution and improve OHS
JET	Sensitization and awareness creation
HakiMadini	Awareness creation among miners
FEMATA	Coordination of small scale miners
TAWOMA	Coordination of Women Miners

Actions taken to date to address the release of Heavy metals and other Toxics from Small Scale Mining

Among the actions that have been/are being taken in the country by Ministries and other government agencies to address pollution from heavy metals and other toxics from small scale mining are the following:

- Building of Mining demonstration Centres and Centres of Excellence in the regions with high populations of small scale miners for technology transfer and trainings;
- Periodic trainings by the Ministry of Minerals, OSHA, NEMC and Mining Commission on issues related to pollution, health and environment;
- Funding of small scale miners (Government Grants) to upgrade them to medium scale miners who use less polluting technologies.

Other initiatives that have been/are being implemented by various stakeholders are listed in Table 12 below.

Table 12: Initiatives undertaken in Tanzania to address Releases of Heavy Metals and other Toxics from Small Scale Mining

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Implementation Period
1	Reduction of mercury emissions from small scale gold refining facilities in Tanzania	AGENDA for Environment & Responsible Development	2008
2	Sustainable Management of Mineral Resources Project	Ministry of Minerals	2009-2018
3	Training of trainers on alternatives to mercury and best available techniques BATs) and best environment practices (BEPs) in artisanal and small-scale mining in Tanzania	AGENDA for Environment & Responsible Development	2010
4	Mercury measurements in educational, health and artisanal & small scale mining in Tanzania	AGENDA for Environment & Responsible Development	2014
5	Reducing mercury exposures and transitioning artisanal and small-scale gold miners away from mercury use - project funded by the Swedish society for nature conservation (SSNC)	AGENDA for Environment & Responsible Development Swedish society for nature conservation (SSNC)	2014-2015
6	Multi-Stakeholders Partnership Initiative - support formalisation and co -existence of large scale and small scale mining	Ministry of Minerals	2014-2015
7	National Action Plan Preparation	Vice President's Office - Division of Environment	2016-2018
8	Promotion of Resource Efficient and Cleaner Production (RECP) in small scale mining plants within the Lake Victoria Basin	NCPCs within EAC Lake Victoria Basin Commission World Bank	2018-2019

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Implementation Period
9	Inspection and training of supervisors of chemical handling facilities to promote chemical safety, including small scale miners	GCLA	2012-2018
10	Inventory of polluted sites in Tanzania, including small-scale mining sites	Pure Earth (formerly Blacksmith Institute)	2014

Further actions proposed for addressing releases of Heavy metals and other Toxics from Small Scale Mining

Further actions proposed by various stakeholders for addressing the exposure to heavy metals and other toxics from the small-scale mining activities include assessing the extent of pollution and the health impacts in small scale mining areas. These further actions have been summarized in the Action Plan provided in Table 17.

PRIORITY ISSUE 4: INDOOR AIR POLLUTION

Sources and characteristics

The most widespread form of indoor air pollution arises from indoor cooking using unprocessed biomass energy sources (fuel wood, cow dung, agricultural residues, charcoal and coal). An estimated 75% of population in Sub-Saharan Africa uses biomass sources for cooking.

The majority of families in rural Africa live in small and poorly ventilated houses, which exposes them to high levels of indoor air pollutants (Naeher et al. 2007)⁶. Mean kitchen PM₁₀ concentrations of 656 µg/m³ have been measured in Tanzanian homes, with maximum values of 2,565 µg/m³ and peak levels reaching 10,048 µg/m³ during cooking. These levels far exceed globally tolerable limits for indoor pollution exposure.

Other sources of indoor air pollution include emissions from chemicals used in households such as those used for control and prevention of vector-borne diseases (e.g., malaria), household cleaning, fumigation, painting (e.g., solvent-based paints) and other consumer products. In areas with the right geology, radioactive radon gas can also be present in houses.

Roles and responsibilities in addressing Indoor Air Pollution

The roles and responsibilities of the relevant Ministries/agencies and other organizations in regulating, managing, controlling, reducing and/or monitoring indoor air pollution are described in the Table below:

⁶ Luke P. Naeher, Michael Brauer, Michael Lipsett, Judith T. Zelikoff, Christopher D. Simpson, Jane Q. Koenig, and Kirk R. Smith, 2007, Woodsmoke Health Effects: A Review, *Inhalation Toxicology* 19(1):67-106. DOI:10.1080/08958370600985 875

Table 13: Roles and Responsibilities of Key institutions in addressing Indoor Air Pollution

Name of Institution	Roles & Responsibilities
Government Ministries	
Vice President's Office	Coordination of all environmental management issues. Provides leadership and coordination of multi-sectoral activities aimed at reducing pollution to the environment including indoor air pollution
Ministry of Health, Community Development, Gender, Elderly and Children	Formulates policies related to health, community development, gender, elderly and children. Oversees public health protection from all causes including health impacts caused by indoor air pollution. Oversees curative and preventive services as well as environmental health services to the public.
Ministry of Energy	Formulation of policies and regulations related to energy. Oversee and coordinate interventions related to energy including energy efficient cook stoves which reduce indoor air pollution.
President's office - Regional Administration and Local Government (PO-RALG)	Promotes and supports interventions at the local level.
Government Authorities and Agencies	
National Environment Management Council (NEMC)	Enforcement of environmental compliance issues including indoor air quality standards inside industrial facilities.
Tanzania Atomic Energy Commission (TAEC)	Regulates and controls importation, transportation, distribution, storage, handling, use and disposal of all radioactive materials. Regulates and controls release of radioactive materials to the environment. Issues licenses to dealers of radioactive materials.
Tanzania Bureau of Standards (TBS)	Formulation and promotion of environmental standards.
Occupational Safety and Health Authority (OSHA)	Enforcement of laws and regulations on health and safety at work places including indoor air quality in factories. Surveillance of working conditions including workers' health, safety and welfare in factories.
Academia and R&D Institutions	
Muhimbili University of Health and Allied Sciences (MUHAS)	Provides academic courses in public health including prevention of indoor air pollution. Undertakes research and consultancy services on issues related to public health including effects of indoor air pollution to human's health in order to come up with innovative methods, strategies and approaches to reduce indoor air pollution.
National Institute of Medical Research (NIMR)	Undertakes research and consultancy services on health related issues including effects of indoor air pollution on human health.

Name of Institution	Roles & Responsibilities
NGOs/CBOs	
CPCT	Promotes Resource Efficient and Cleaner Production techniques and technologies including use of alternative energy sources in industries, SMEs and other stakeholders in order to reduce emissions to the environment.
TATEDO	Designs, develops and supplies improved cook-stoves and clean electric cooking appliances. Promotes and facilitates distribution of improved cook-stoves and clean electric cooking appliances in the society from national to community levels.
Other relevant NGOs	Advocacy, promotions, and facilitation of distribution of improved cook-stoves and clean electric cooking appliances in the society from national to community levels

Actions taken to date to address Indoor Air Pollution

Very limited initiatives have been undertaken by the relevant Ministries/agencies to address indoor air pollution. However, other organizations, mainly NGOs, have implemented a number of interventions in the country that address indoor air pollution. Some of the past and ongoing projects are listed in the following table.

Table 14: Projects undertaken in Tanzania to address Indoor Air Pollution

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Implementation Period
1	Assessing impact of cook stove intervention on respiratory health of women and children exposed to biomass smoke, in Tanzania	MUHAS, NIMR, University of KwaZulu-Natal, University of Michigan Ann Arbor	2012-2015
2	Integrated Fuel wood Services for Poverty Reduction in Tanzania	TATEDO/ HIVOS	2003-2009
3	Households Efficient Woodstove in Rombo and Hai Districts- A voluntary Carbon Market Initiative	TATEDO/HIVOS	2008-2010
4	Promoting pro-poor low carbon development strategies	TATEDO-Tanzania /VE-Denmark	2014-2016
5	Households efficient stone made woodstoves in Northern part of Kilimanjaro, Tanzania	TATEDO/DANIDA	2008
6	Promotion of Improved Fuel-wood Stoves and private tree nurseries Promotion Project	FINNIDA/TATEDO	2003-2004
7	Integrated Agroforestry and Wood fuel Conservation Programme	TATEDO/HIVOS	1996-1999
8	Morogoro Fuel wood Stove Project	SUA	1995

Apart from the above listed projects, a number of studies have been carried out by academic and research institutions in the country that are related to indoor air pollution. These include:

- Indoor air pollution, social inequality and acute respiratory diseases in children in Tanzania (Umeå International School of Public Health, Umeå University, Sweden);
- Assessing impact of biomass pollution from cook stoves on respiratory health of women NIMR/MOH/UKZN/MUHAS (2012-2014);
- Assessment of air pollution in residential areas (Case Study of Kinondoni Municipality, Tanzania);
- Indoor air pollution and delayed measles vaccination increase the risk of severe pneumonia in children: results from a case-control study in Mwanza, Tanzania;
- Cooking as a source of indoor air pollution in rural areas of Tanzania (case of Msangani, Chahua and Kazimzumbwi villages in the Coast Region, Tanzania);
- Maasai Clean cookstoves and solar project, Monduli, Tanzania, Planeterra Foundation (2014);
- Assessment of Indoor Radon-222 Concentrations in the vicinity of Manyoni Uranium Deposit, Singida;
- Indoor Radon concentration levels and annual effective doses for residence of houses near Uranium deposit In Bahi District, Dodoma, Tanzania;
- Radon mass exhalation rates of selected building materials in Tanzania (The International Institute for Science, Technology and Education (IISTE)).

Further actions proposed for addressing Indoor Air Pollution

Further actions required for addressing indoor air pollution that have been proposed by the stakeholders include the following:

- Promotion of alternative clean energy in households to reduce the use of fossil fuel or biomass for cooking and lighting;
- Advocacy on the use of mosquito nets in households to reduce chemical sprays;
- Advocacy on elimination of lead in paints;
- Promotion of RECP in SMEs and other stakeholders including the use of alternative energy sources which reduce the generation of indoor air pollution;
- Undertaking a comprehensive national programme to address varieties of socio economic and stove exposure saturations;
- Inclusion of radon radiation exposure among national priority programs with introduction of effective control measures in the country;
- Addressing the challenges of production of clean cooking technologies and the use of alternative clean energy technologies for the reduction of indoor pollution in the country.

These further actions have been summarized in the Action Plan provided in Table 17.

PRIORITY ISSUE 5: EXPOSURE TO PESTICIDES, ESPECIALLY IN AGRICULTURE

Sources and characteristics

Exposure to pollution from pesticides mainly occurs through their use in agriculture, vector control and other domestic uses as highlighted below.

Agriculture and public health use

The greatest exposure to highly hazardous pesticides is for agricultural and public health workers during handling, dilution, mixing and application. Exposure is mainly by the dermal route for preparation of sprays and by the dermal and inhalation routes during application. Ingestion might occur through consumption of contaminated food during or following work or through oral contact with contaminated hands. Contaminated clothing is a significant source of exposure. Bystanders might be exposed to the sprayed pesticides, dermally and via inhalation. Stocks of obsolete pesticides can still represent a hazard, in particular if their storage or disposal is inappropriate.

Studies carried out in some areas of Tanzania have indicated that farmers spray pesticides in mixtures without regard to the active ingredient, thus mixing three to four insecticides in one mixture, which is a misuse. Others overuse pesticides by increasing the frequency of spraying in order to deal with pests which have become resistant to pesticides, and sometimes they use the wrong type of pesticides. Farmers in Tanzania use various types of pesticides, some of them are persistent organic pollutants, which are highly toxic products and endocrine disruptors. It is estimated that agriculture provides 80% of the country's employment. The application of pesticides is extensively distributed in 5 out of the country's 7 agro-ecological zones

Domestic use

The general population controls pests in gardens or smallholdings or in their houses. Products intended for domestic use are generally weaker than professional products, so exposure of the general population to highly hazardous pesticides is lower. In countries where regulation is poor, agricultural-strength pesticides may regularly be used at home.

Occupants of homes sprayed with highly hazardous pesticides might be exposed through residues on internal surfaces and contamination of food and water. Moreover, children regularly undertake agricultural labour in many areas of the world. Children are particularly at risk of being exposed to highly hazardous pesticides because of their immature behaviour. Young children playing may also be exposed to pesticide containers, to residues on surfaces and through ingestion of contaminated soil.

Food and drinking water

Residues of highly hazardous pesticides can be found in food and environmental media. The general population is exposed mainly through consumption of residues of pesticides in food and, sometimes, drinking water.

Roles and responsibilities in addressing Exposure to Pesticides from Agriculture

The roles and responsibilities of the relevant Ministries/agencies and other organizations in regulating, managing, controlling, reducing and/or monitoring exposure to pesticides are described in the Table below:

Table 15: Roles and Responsibilities of Key institutions in addressing Exposure to Pollution from Pesticides

Name of Institution	Roles & Responsibilities
Government Ministries	
Vice president's Office	<p>Coordination of all environmental management issues.</p> <p>Provides leadership and coordination of multi-sectoral activities aimed at reducing environmental pollution</p> <p>Coordination and National Focal Point for Multilateral Agreements (Basel, Stockholm and Rotterdam Convention).</p>
Ministry of Health, Community Development, Gender, Elderly and Children	<p>Formulation of policies related to health, community development, gender, elderly and children.</p> <p>Monitoring of health-related impacts from pesticides application</p> <p>Prevention of health hazards related to unsafe pesticides application</p> <p>Provision of medical care for affected population</p> <p>Conducting regular operational biological research to ascertain health effects associated with pesticides use.</p>
Ministry of Agriculture	<p>Formulates, regulates and enforces pesticides laws and regulations</p> <p>Plans and implements pesticides related interventions</p>
Ministry of Livestock and Fisheries	<p>Formulates, regulates and enforces pesticides laws and regulations</p> <p>Plans and implements pesticides related interventions</p>
President's office - Regional Administration and Local Government (PO-RALG)	Promotes and supports interventions at the local level.
Government Authorities and Agencies	
National Environment Management Council (NEMC)	Enforcement of environmental compliance of environmental standards (i.e. air, water, soil)
Tanzania Pesticides Research Institute (TPRI)	<p>Registration of pesticides</p> <p>Research on the efficacy and fate of pesticides on agriculture and public health</p> <p>Pre and Post registration assessment of pesticides</p> <p>Training of pesticide dealers and users</p>
Tanzania Bureau of Standards (TBS)	Formulation and promotion of environmental standards as well as quality standards on products.
Government Chemist Laboratory Authority (GCLA)	<p>Laboratory analysis of pesticides and samples for monitoring of human exposure;</p> <p>Coordination of poison prevention and control initiatives through the National Poison Control Centre (NPCC)</p>
Occupational Safety and Health Authority (OSHA)	<p>Enforcement of laws and regulations on health and safety at workplaces</p> <p>Surveillance of working conditions and workers' health and welfare.</p>

Name of Institution	Roles & Responsibilities
Academia and R&D Institutions	
Muhimbili University of Health and Allied Sciences (MUHAS)	Trains Public Health professionals including environmental health practitioners Research on pesticides impacts Conducts community outreach and consultancy Acts as a reference resource centre
NIMR	Undertakes research and consultancy services on health-related issues
NGOs/CBOs	
CPCT	Promotion of Resource Efficient and Cleaner Production techniques and technologies in industries (including chemical industries), SMEs and other stakeholders in order to reduce chemical emissions to the environment
Agenda, TAHA, ENVIROCARE, SAT and Tanzania Organic Agricultural Movement (TOAM)	Advocacy on effects of pesticides among the community Lobbying for policy changes and law enforcement Promotion of organic agriculture

Actions taken to date to address Exposure to Pesticides in Agriculture

Some of the actions taken to address pesticides from agriculture that are related to health issues are listed in the following table.

Table 16: Initiatives undertaken in Tanzania to address Pesticides from Agriculture

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Sponsor	Implementation Period
1	Identification and removal of Highly Hazardous Pesticides (HHP) in Tanzania	TPRI	Sida	March 2018 - 2019
2	Reduction of HHP in coffee cultivation site in Kilimanjaro Regions in Tanzania	TPRI	Sida	Nov 2018 - June 2019
3	Biological Monitoring of human health pesticide exposure in Tanzania	TPRI	Clients	Ongoing
4	Reduction of injuries and diseases at workplaces in Tanzania and Ethiopia. Capacity building in higher learning Institutions (MUHAS) to do research on pesticide exposure and impact	MUHAS	NORAD	2014 - 2019
5	Fall armyworm management by using IPM approach	MoA	FAO	2017 - 2018

S/N	Program/Project/Activity	Implementing Agency / Coordinating Institution	Sponsor	Implementation Period
6	Community- based Fall armyworm focusing on the monitoring and early warning systems	MoA	DLCO/ FAO	March 2018 – Dec 2019
7	Inventory of polluted sites in Tanzania, including sites contaminated with pesticides	Pure Earth (formerly Blacksmith Institute)		2014

Further actions proposed for addressing Exposure to Pesticides in Agriculture

Further actions have been summarized in the Action Plan provided in Table 17. They include to: assess the intensity level of pesticide exposure in humans; consolidate the pesticides laws and policies; conduct pesticide residuals analysis in the environment, food and feeds; build capacities on sound management of pesticides among farming communities; conduct self-surveillance of pesticide incidence cases of pesticide poisoning not normally reported to the local health care system; promote alternative pest control methods; establish levels of pesticide body burdens and pesticide residues; and streamline sound management of pesticides at all levels.

INCREASING DATA ACCURACY AND RELIABILITY



MONITORING INTERVENTIONS

The stakeholders have further proposed that, in order to increase the accuracy and reliability of data on pollution and its impact on health, the following interventions should be considered for implementation under each of the identified priority areas:

Outdoor air pollution

- i. Development and operationalization of periodic air quality management news made available through news outlets e.g. establishment of online/ printed news;
- ii. Installation of air quality monitoring centres; and
- iii. Development, testing and operationalization of an air quality management database.



“THE STAKEHOLDERS
HAVE FURTHER
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ORDER TO INCREASE
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AND RELIABILITY OF
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AND ITS IMPACT ON
HEALTH.”

Water pollution

- i. Testing of water and wastewater for water quality assessment;
- ii. Developing a database for monitoring water quality system;
- iii. Building capacity of basin laboratory human resources; and
- iv. Establishing surveillance on biodiversity balance of water basins' species.

Exposure to heavy metals and other toxics from small scale mining

Strengthen the health centres and other institutions that offer laboratory and analytical services through capacity building in terms of human, equipment and financial resources.

Indoor Air Pollution

- i. Equipping analytical laboratories with a combination of particulate and gaseous air monitoring instruments. This could begin with the provision in research and academic institutions of real-time monitors for particulate and gaseous pollutants and portable instruments for gravimetric analysis of particulate samples;
- ii. Equipping selected medical research, academic institutions, and hospitals with the capacity to monitor indicators of related health problems, in particular lung function measurements and radiological measurements;
- iii. Conducting training and sensitization programs for technical personnel from medical and non-medical areas on the impact of indoor air pollution on health and how to relate with certain diseases like COPD and lung cancer;
- iv. Facilitating implementation of environmental and epidemiological measures by including them as a component in the current programs; and
- v. Establishing sentinel sites for monitoring both indoor air pollution and public health among the community in selected areas of concern.

Exposure to pesticides from agriculture

- i. Accreditation of laboratory and methods for pesticide residuals analysis;
- ii. Establishment of quality assurance systems such as sample exchange with reference laboratories and double data entry; and
- iii. Capacity building for technical staff (laboratory technicians, data collectors and analysts).

POSSIBLE SUPPORT FROM GAHP SECRETARIAT AND MEMBERS

Following the completion of the HPAP document, facilitators from GAHP will continue working with relevant government agencies and development partners to identify possible technical or financial assistance mechanisms that can advance the recommendations and programmes designed in the HPAP. While the ultimate success of the HPAP goals relies primarily on the political will and actions of the government, GAHP members are available to assist with the development of full proposals for funding based on the HPAP concept notes, to identify calls for proposals that match the proposed programmes, to provide technical advice on the design of nationally-funded activities, and to facilitate communications with development partners that may be able to provide financial support to programmes outlined in the HPAP. The specific role of GAHP members following the HPAP development process will depend on the requests of the government and on the interest and capacities of the relevant development partners.

ACTION PLAN

Table 17: Action Plan for the Priority Pollutants

No.	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
Outdoor Air Pollution						
1	Prepare awareness raising materials	VPO	PO-RALG, MoHCDGEC, MIT, MIYCS, ARU/UDSM, CPCT	Jan-Mar 2020	20,000	Awareness raising materials Report
2	Reproduce awareness and publicity materials for target groups and general public	VPO	PO-RALG, MoHCDGEC, MITI, MIYCS, ARU/UDSM, CPCT	Jan-Jun 2020	400,000	Awareness raising materials, Report
3	Disseminate awareness raising materials through seminars, trainings, campaigns/ meetings and media (TV and radio sessions)	VPO	PO-RALG, MoHCDGEC, MIT, MIYCS, ARU/UDSM, CPCT	Quarterly (2020-2021)	300,000	TV and Radio programs Report
4	Build capacities for personnel involved in air quality management	VPO	PO-RALG, NEMC, MIT, MoHCDGEC, COSTECH, ARU/UDSM, CPCT, GCLA, TIRDO	Jul 2020-Jun 2021	150,000	Report
5	Establish specifications for outdoor air quality monitoring stations and air quality testing instruments	PO-RALG and VPO	MoHCDGEC, MIT, MIYCS, COSTECH, ARU/UDSM, CSOs, GCLA, TIRDO, TAEC	Jan-Mar 2021	10,000	Report

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
6	Procure, install, test and commission the monitoring stations and testing instruments	PO-RALG and VPO	MoHCDGEC, MIT, MIYCS, COSTECH, ARU/UDSM, GCLA	Jan-Dec 2021	2,000,000	30 Monitoring Stations Installed and functioning 100 Air quality Testing Instrument procured
7	Develop template for periodic reporting of air quality trends and forecasts	VPO	PO-RALG, COSTECH, eGA, TMA, MIT, MoE, MoM, MWTC, ARU/UDSM, CSOs, TAEC	Jul 2020-Jun 2022	20,000	Air quality reporting mechanism in place
8	Publish air quality trends and forecasts in the media outlets	VPO	PO-RALG, MIYCS, NEMC	Apr 2021-Dec 2023	50,000	Air quality reports
9	Carry out baseline study on air quality in the country	VPO	MoHCDGEC, MIT, ARU/UDSM, CPCT, GCLA, TIRDO, TAEC	Jan-Jun 2020	500,000	Air quality baseline report
10	Develop centralized database system at PO-RALG in Dodoma	PO-RALG	POPSM, VPO-DoE, eGA, TAGLA, COSTECH, TMA, MIT, MoE, MoM, MWTC	Jul 2020-Jun 2022	300,000	Air quality management database developed
11	Conduct training for data clerks and system administrators	PO-RALG	eGA	Jul 2020-Jun 2022	20,000	
12	Facilitate approval for air quality management database and launch	PO-RALG	POPSM, VPO-DoE, eGA, TAGLA, COSTECH, TMA, MIT, MoE, MoM, MWTC	2022-2023	20,000	Database Air quality management database in place
13	Analyse and publish air quality data for policy advocacy related to health and environment protection	MoHCDGEC	PO-RALG, VPO, NEMC, MIT, COSTECH, ARU/UDSM, CPCT, TIRDO	2022-2023	20,000	Reports

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
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Water Pollution

1	Sensitize all stakeholders on the protection of water sources and identification of pollution sources	MoW	WRBWB, LGAs, NEMC, CPCT, GCLA, TAEC	2020-2021	500,000	Map and report
2	Strengthen the monitoring systems for the quality of water and wastewater	MoW	WRBWB, NEMC, MoHCDGE, GCLA, TAEC	2021-2025	500,000	Water quality Laboratory Report and database
3	Establish efficient wastewater treatment systems in cities and municipalities	PO-RALG	MoW, WRBWB, WSSAs, LGAs, TAEC	2020-2023	2,000,000	Survey report
4	Promote the application of Resource Efficient and Cleaner Production techniques and technologies	MoW	CPCT, WRBWB, LGAs	2021-2025	500,000	Assessment report
5	Create awareness in local communities on safe storage of water in households, proper water use and hygiene practices	MoW	MoHCDGE, LGAs, GCLA	2020-2025	500,000	Training report

Releases of Heavy Metals and other Toxics from Small Scale Mining

1	Choose areas of small-scale mining which are of concern and upon which it is decided to focus attention. In these areas, carry out the following set of activities	MC	MoHCDGE, GCLA, GST, STAMICO, NEMC, CPCT, AGENDA, TAEC	Jan-Dec 2020	200,000	
1 a	Establish baseline information on the level of heavy metals as well as of other toxic chemicals and substances found in the chosen areas and in the miners and members of their community	MC	MoHCDGE, GCLA, GST, TAEC	Apr 2020-Sep 2023	900,000	Reports Checklists

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
1 b	Raise awareness and disseminate information among miners, their family members, and surrounding communities in the chosen areas on the health risks from toxic chemicals and substances to which they are exposed	MC	STAMICO, OSHA, NEMC, CPCT, AGENDA, GCLA, TAEC	Jul 2020-Dec 2024	800,000	Awareness and publicity materials Event Reports
1 c	Conduct trainings for ASG miners and their communities in the chosen areas on best practices to adopt to more safely extract, process, recover, and refine gold-bearing minerals	MC	STAMICO, NEMC, OSHA, CPCT, GCLA, TAEC	Apr 2020-Mar 2022	1,600,000	Needs assessment report Training Manuals Training Reports
1 d	Monitor body burdens in the chosen areas to assess if exposure levels are decreasing	MoHCDGEC	GCLA, LGAs, TAEC	Apr 2020-Dec 2023	800,000	Field Reports Laboratory reports
2	Strengthen participating institutions by building their capacity in terms of human resources, equipment and facilities	VPO-DoE	MoHCDGEC, GST, STAMICO, OSHA, NEMC, CPCT, AGENDA, GCLA, TAEC	Apr 2020-Jun 2023	645,000	Training reports Equipment

Indoor Air Pollution

1	Increase awareness in communities on the health effects of indoor pollution and ways to minimize it through various means.	MoHCDGEC	MUHAS, NIMR	Jul 2019-Jun 2021	800,000	Number of communication message units delivered eg. No of radio broadcast, number of community events, and number of people received messages
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No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
2	Create enabling environment through positive policy change towards increased use of alternative clean energy in households to reduce the use of fossil fuel or biomass for cooking and lighting (biogas, fossil gas, solar and electricity cooking)	Ministry of Energy	REA, TaTEDO, MUHAS, NIMR	Jul 2019-Jun 2022	250,000	Report on policy changes MoUs Agreement Policy documents developed
3	Strengthen monitoring and evaluation through generation of high-quality data and credible research outputs on the health impact of, and benefits of reducing indoor air pollutants in Tanzania domiciles.	MoHCDGEC	NIMR, MUHAS, ARU, NGOs, NEMC, GCLA	Jul 2019-Jun 2024	500,000	Presence on databases, Technical reports from monitoring activities, Number of scientific publications
4	Increase access to emission efficient stoves using varieties of fuels through innovative designs and production of good quality, and standardization of domestic stoves for rural and urban households.	MoEST	ARU, REA, Dar Es Salaam Institute of Technology.	Jan 2020-Dec 2021	400,000	Number of stove designs created, Level of emissions reduced, Numbers appliances produced
5	Increase adoption and usage of cleaner energy sources and cooking appliances through promotion, education, and product supply programs in rural and urban areas within the intervention districts	MoHCDGEC	Health Promotion Unit, Environmental Health Unit, MUHAS, TaTEDO, NIMR, ARU	Mar 2020-Jun 2023	450,000	Percentage of population using improved stoves and cleaner energy sources in intervention communities, Reports on progress

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
6	Promote improved housing through healthy designs and structural modifications that improve indoor ventilation and pollutants removal in intervention districts.	MoHCDGEC	ARU, National Housing Cooperation, NIMR, MUHAS	Mar 2020-Jun 2023	300,000	% of houses adopting positive changes in communities
7	Advocacy on the use of mosquito nets in households to reduce chemical sprays	MoHCDGEC	National Malaria Control Program, Environmental Health Unit, NIMR, MUHAS	Jul 2019-Dec 2024	100,000	Number of mosquitoes nets supplied through the program Percentage coverage of net uses in intervention areas
8	Advocacy on elimination of lead and other indoor air pollutants in construction products	VPO	MoHCDGEC, NEMC, MUHAS, NIMR, GCLA	Jul 2019-Dec 2024	150,000	Reports on legal and regulatory measures adopted
9	Develop and disseminate manuals, catalogues, guidelines, and other technical and educational materials on reduction of indoor pollution for varieties of audiences including program implementation and government entities, schools, and communities.	MoHCDGEC	MUHAS, ARU, TaTEDO, NIMR	Jan 2020-Dec 2021	250,000	Number of manuals produced and disseminated
10	Conduct technical training on methods of controlling indoor pollution and how to making use of varieties of available means including gender mainstreaming to reduce the burden of indoor pollution in communities among implementers at various levels from National to Grass root levels.	MoEST	MUHAS, ARU, TIRDO, NIMR, NEMC	Sep 2019-Dec 2023	300,000	Number of people trained on various technical aspects

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
11	Support development of centres of excellence for controlling of indoor pollution including stove designs, promotion, and performance monitoring; and assessment of related effects on human health in 3 selected institutions.	MoHCDGEC	MUHAS, NIMR, NEMC, ARU	Jan 2021-Dec 2023	915,000	Presence of the physical units in identified institutions, Report on the different capacities strengthened

Exposure to Pesticides in Agriculture

1	Consolidate the existing legal framework for pesticides and develop new pesticides laws and policies, if required	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS	Mar-Sep 2019	302,000	Legal Analysis Report, Draft Regulations, Guidelines Protocols
2	In areas of concern, undertake the following programmes:					
2.a	Establish pesticide exposure and poisoning surveillance and reporting system	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS	Apr 2019-Dec 2021	1,466,000	Surveillance Reports MoUs Workshop/ Meetings Reports
2.b	Create mechanism for determination of pesticide residues in crops to inform markets and in feed for livestock to inform farmers	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS	Jul 2019-Jun 2020	624,000	Reports
2.c	Obtain baseline information on pesticides use and practices to assess farmers' pesticide risk perceptions	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS and LGAs	Apr-Sep 2019	62,000	Report

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
2.d	Conduct relevant and tailor-made trainings, demonstrations and mentoring to various target groups including farming communities, pesticides dealers and service providers (pesticides registrar, environmental health practitioners, medical officers, pesticides inspectors) on health and safety issues as well as sound management of pesticides in order to increase their knowledge and understanding on best practices	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS and LGAs	Jul 2019-Jun 2023	440,000	Training manuals Training Reports
2.e	Develop and disseminate promotional materials on sound management of pesticides among the farming communities and other stakeholders	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS and LGAs	Jan 2020-Jun 2023	134,000	Promotional materials Dissemination seminar reports
2.f	Identify and promote the use of alternative pest control methods in selected areas	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS and LGAs	Oct 2020-Sep 2023	625,000	Demonstration plots Report
2.g	Monitor the levels of pesticide body burdens and pesticide residues by repeating the tests conducted under activities 2.a & 2.b	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS and LGAs	Jan-Mar 2022	525,000	Report

No	Activities	Lead agency	Partner Agency/ies	Time frame	Required resources (EUR)	Deliverables
3	Develop policy briefs and conduct policy dialogue for up-scaling nationwide the results of activity 2.	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS, GCLA, and LGAs	Oct 2020-Sep-2023	104,000	Report Policy briefs
4	Develop strategic guidelines to streamline sound management of pesticides in relevant areas at all levels	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS, LGAs, and NGOs	Jan 2022-Oct 2023	420,000	Guidelines
5	Promote implementation of sound management of pesticides (SMP) nationwide	MoHCDGEC and VPO	MoA, MLF, TPRI, MUHAS, LGAs, and NGOs	Jan 2022-Dec 2023	410,000	Report

PROJECT PROPOSALS ON OUTDOOR AIR POLLUTION



PROJECT SUMMARY

The proposed project aims at improving human health and environment from emissions of harmful air pollutants in cities and municipalities, where there are major issues of outdoor air quality due to these urban areas' economic activities and rapid urbanization. The project will involve awareness creation of the general public on air pollution and good management practices for waste; installation of outdoor air pollution monitoring stations; procurement of outdoor air quality monitoring instruments; and capacity strengthening of the staff of government and local authorities on outdoor air pollution, including practical training in the application of air quality monitoring instruments. Among other things, the project is expected to reduce emissions of harmful air pollutants resulting from the open burning of wastes by

Project title:	Air Quality Management for Improving Human Health and Environment in Urban Cities and Municipalities in Tanzania
Location(s):	Arusha Dar es Salaam, Dodoma, Mwanza Cities and Mtwara Municipality
Planned start date:	2020
Duration:	4 years
Government coordinating agency and Executing agency/cooperating agency:	VPO-DoE, PO-RALG, PO-PSM (e-Gov), MoHCDGEC, MIT (WMA), MoEST (ARU), CPCT, TAEC, TIRDO
Budget (in EUR):	4,900,000

“THE PROPOSED PROJECT AIMS AT IMPROVING HUMAN HEALTH AND ENVIRONMENT FROM EMISSIONS OF HARMFUL AIR POLLUTANTS IN CITIES AND MUNICIPALITIES WHERE THERE ARE MAJOR ISSUES OF OUTDOOR AIR QUALITY DUE TO THESE URBAN AREAS’ ECONOMIC ACTIVITIES AND RAPID URBANIZATION.

the general public. Moreover, the project will enhance the capacity of the government institutions responsible for combating air pollution by installing monitoring stations and development of the air quality database management.

RELEVANT BACKGROUND

Rapid urbanization, fuelled by rural-urban migration, is a common phenomenon in many developing countries, and Tanzania is no exception. According to the 2012 National census report, Tanzania had a total population of about 45 million people, with an average annual growth rate of 2.7%. Major cities and municipalities (the cities of Arusha, Dar es Salaam, Dodoma, and Mwanza Cities, and the municipality of Mtwara) are experiencing over 2% average annual growth rate. If not managed

properly, urbanization can lead to, among other things, increasingly poor air quality in the growing cities, with resulting impacts on the health of their residents and environmental pollution.

In Tanzania, the degradation in air quality is attributed to different sources of emissions, including exhaust from automobiles and motorcycles, stack emissions from energy power plants, industrial activities, improper waste management, construction activities, domestic activities, open burning of forests, and dust from un-tarmacked roads.

Air pollution is a stressor for human health. Various diseases such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease (COPD), lung cancer, and acute lower respiratory infections in children have been shown to be caused by air pollution. According to the Institute for Health Metrics and Evaluation (IHME), the annual deaths resulting from ambient pollution from particulate matter alone was 14,314 in 2016, equivalent to 3.6% of all deaths in Tanzania.

Air quality management in Tanzania faces various challenges, including inadequate data related to air pollution, low awareness related to air pollution, an inadequate number of qualified personnel, lack of technology, inadequate law enforcement, and limited finance for implementing and monitoring air quality management.

The proposed project will enable government to measure levels of air pollutants and analyse air composition from various sources in selected areas. Analysis of this data will enable government to take preventive measures to protect human health (as well as the environment more generally).

PROJECT DESCRIPTION

The project will be implemented in four cities (Arusha, Dar es Salaam, Dodoma, and Mwanza) and one municipality (Mtwara). The project will assist in putting in place equipment and accessories for air quality measurements that will strengthen the capacity of experts to undertake activities related to air quality management. Moreover, the project will assist in establishing air quality database management as well as creating awareness in the general public on air quality and the application of best environmental practices in the management of wastes. The duration of the project will be four years starting from 2020.

Project beneficiaries

The greatest beneficiaries of the project will be:

- Direct beneficiaries: the populations of the four cities and the municipality which will be targeted by the project: over ten million people;
- The individuals/institutions who will be trained in how to conduct measurements and how to ensure compliance with the relevant laws and regulations, e.g. environmental inspectors-LGAs, motor vehicles inspectors along the highways, and the police force.

Overall project objective

The overall objective of the project is to reduce emissions of harmful air pollutants in the targeted cities (Arusha, Dar es Salaam, Dodoma, Mwanza) and municipality (Mtwara) through

capacity strengthening of the relevant institutions and awareness creation in the general public on the impacts on their health of air pollution.

The project's specific objectives are as follows:

- i. To create public awareness on the importance of reducing the release of harmful air pollutants;
- ii. To strengthen the capacities of the relevant government institutions and local authorities on understanding, analysing and predicting air pollution trends; and
- iii. To enhance the capacities of relevant government institutions on monitoring and preventing air pollution in cities and municipalities.

Intervention strategy

The issue of air pollution and its effects on human health are relatively little known in Tanzania, and as both cause and consequence of this there is little data on air pollution levels in the country. Therefore, the focus of the project will be on raising awareness and on beginning to build up the necessary network of monitoring stations. The project will focus on a number of target cities as well as one target municipality. This focus on cities is driven by the fact that currently major sources of air emissions are vehicles and industrial activities, both of which are generally concentrated in cities. To help in the extension of the monitoring network to the national level, the lessons learned during the project's implementation will be used to develop policy recommendations which the government can use to develop the necessary national legislation and regulations.

Implementation partnership(s)

The following table describes the entities which will be the main partners in the project and their main roles and responsibilities in the project.

Key Institution(s)	Role/Responsibility
President Office, Regional Administration and Local Government (PO-RALG);	Provide policy guidance Organise and oversee a number of the project activities Provide leadership and oversight
President Office Public Service Management-PO-PSM	Conduct monitoring and evaluation
Vice President's Office, Division of Environment (VPO-DoE);	Provide technical backstopping Procurement process and approval
National Environment Management Council (NEMC)	Organise joint review
Ministry of Health Community Development Gender Elderly and Children (MoHCDGEC).	Prepare for end of project evaluation Facilitate installation, testing and commissioning Disseminate awareness raising through seminars, trainings, campaigns/meetings and media (TV and Radio session)

Key Institution(s)	Role/Responsibility
Ministry of Industry (MIT), National Environment Management Council (NEMC), Ardhi University (ARU), Tanzania Commission for Science and Technology (COSTECH) Tanzania Atomic Energy Commission (TAEC) Tanzania Industrial Research and Development Organization (TIRDO)	Facilitate installation, testing and commissioning Provide equipment specifications Provide technical input on requirement of air quality management database
Cleaner Production Centre of Tanzania (CPCT)	Disseminate awareness raising through seminars, trainings, campaigns/meetings.

Project outputs

- Public knowledge and understanding regarding air pollutants and their health impact have been increased:
 - Targeted groups (general public, relevant government institutions and local authorities) are made aware of methods to properly manage waste to combat release of harmful air pollutants and so improve community health;
 - The general public in the targeted cities and municipality are made aware of air pollution issues and its impacts on health.
- The capacities of relevant institutions on outdoor air quality management have been improved:
 - The capacities of government and local authorities (inspectors) have been strengthened to allow them to understand, analyse and predict trends in air quality.
- Outdoor air quality monitoring stations and air quality test instruments have been procured and installed in the targeted cities and municipalities; Air quality baseline report is in place;
- Air quality management database has been developed, tested and operationalised.

Key project activities

Component	Activities	Locations	Timing	Partners
Public awareness raising on air pollution issues	Output 1: Public knowledge and understanding regarding air pollutants and their health impact has been increased			
	Prepare awareness raising materials	4 targeted cities and targeted municipality	Q1-Q2, Y1	PORALG, VPO-DoE, MoHCDGEC, MIT, MIYCS, Higher Learning Institutions, CPCT. GCLA
	Reproduce these materials for target groups and general public			
	Disseminate awareness raising materials through seminars, trainings, campaigns/meetings and media (TV and Radio session)		Quarterly (Q3Y1-Y2)	PORALG, VPO-DoE, MoHCDGEC, ME, MM, MIT, MIYCS, Higher Learning Institutions, CPCT and media outlets, GCLA
Institutional capacity strengthening on combating air pollution	Output 2: The capacities of relevant institutions on outdoor air quality management have been improved			
	Build capacities for personnel involved in air quality management	4 targeted cities and targeted municipality	Q3 & Q4,Y1	VPO-DoE, PORALG, NEMC, MIT, MoHCDGEC, COSTECH, ARU/UDSM, CPCT, TIRDO, GCLA, TAEC
	Establish specifications for outdoor air quality monitoring stations and air quality testing instruments		Q1 & Q2,Y2	
	Procure, install, test and commission the monitoring stations and testing instruments		Y2-Y4	VPO-DoE, PORALG, MoHCDGEC, MIT, MFP, MWTC, COSTECH, TIRDO, GCLA, TAEC
	Develop template for periodic reporting of air quality trends and forecasts		Q3,Y1-Q2,Y3	VPO-DoE, PORALG, COSTECH, eGA, TMA, MIT, ME, MM, MWTC, ARU/UDSM, TIRDO, GCLA, TAEC
	Publish air quality trends and forecasts in the media outlets		Q2-Q4,Y2-Y4	VPO-DoE, NEMC, (LGAs-Env. Officers) and media outlets, GCLA
Output 3: Air quality baseline report is in place				
Air quality baseline study	Carry out baseline study on air quality in targeted cities and Municipalities	4 targeted cities and targeted municipality	Q1-Q2, Y1	VPO-DoE, MoHCDGEC, MIT, Higher Learning Institutions, CPCT, TIRDO, GCLA, TAEC

Component	Activities	Locations	Timing	Partners
Utilization of air quality data generated from installed facilities	Output 4: Air quality management database developed, tested and operationalised			
	Develop centralized database system at PO-RALG in Dodoma	Dodoma Region	Y2-Y4	PORALG, VPO-DoE, MoHCDGEC, NEMC, MIT, COSTECH, ARU/UDSM, CPCT, Consultant, TIRDO, GCLA, TAEC
	Conduct training for data clerks and system administrators			
	Facilitate approval for air quality management database and launch			
	Analyse and publish air quality data for policy advocacy related to health and environment protection			

Gender mainstreaming

Special attention will be given to gender to respond to SDG5 “Achieve gender equality and empower all women and girls”. Women will be given high priority in the workshop trainings. Moreover, prepared TOR and RFPs for consultants will insist on gender equality during the execution of the project by the consultant. The number of female beneficiaries will be tracked as part of the project’s indicators.



Ian Montgomery from Pixabay

Project financing and indicative budget

Budget line	EUR				
	Total	Year 1	Year 2	Year 3	Year 4
Project staff:					
- National	200,000	50,000	50,000	50,000	50,000
Project consultants:					
- International	250,000	62,500	62,500	62,500	62,500
- National	1,040,000	550,000	150,000	160,000	180,000
Sub-contracts	350,000	75,000	75,000	100,000	100,000
Meetings	60,000	20,000	20,000	10,000	10,000
Awareness creation	720,000	180,000	180,000	180,000	180,000
Training Workshops	180,000	60,000	60,000	60,000	0
Equipment	2,000,000	500,000	500,000	500,000	500,000
Other direct costs	100,000	25,000	25,000	25,000	25,000
Total Project Cost	4,900,000	1,522,500	1,122,500	1,147,500	1,107,500

Sustainability of project results

The project is designed to create an enabling environment for its sustainability by involving all the key partners/stakeholders in the project's implementation, from government and non-governmental institutions. The Vice President's Office - Division of Environment, which is the overall coordinator of all environmental management issues in the country, will oversee the overall implementation of the project. The Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) as well as the Ministry of Works, Transport and Communications (MoWTC) will also be involved. The local government authorities under President's Office - Regional Administrative and Local Government (PORALG) will be key players in implementing all activities concerning awareness creation of the general public. The following aspects of the project's design will support sustainability:

- Awareness creation among the beneficiaries, focused on giving them an understanding of the effects of air pollution on their health and the health of their children as well as of the major sources of air pollution and their role in generating the emissions;

- Creating a spirit of project ownership among the project's stakeholders, especially the local communities, by involving them throughout the project in its implementation;
- Working to have the necessary policies in place to ensure timely financial support from the government (and possibly other donors) for the operation and maintenance of the monitoring stations, the testing equipment, and the air quality management data base. In this regard, it is key to have the President's Office Regional Administration and Local Government (PO-RALG) involved in the project since it is the responsibility of PO-RALG, in collaboration with Vice President's Office and Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), to establish clear financial mechanisms to cover the operational and maintenance costs of the facilities that will be installed and procured by the project;
- Building the capacities of the relevant inspectors, since enforcement of the existing legislation and regulations is of the utmost importance to ensure sustainability of the project results;
- Ensuring that the selection criteria of the monitoring technology and equipment give the proper consideration to the aspects of operational and maintenance costs of the facilities, as well as proper training for the technicians who will be operating and maintaining them.

Risks to project implementation

Project assumptions	Risk of failure	Mitigation action(s)
Commitment of key stakeholders (such as Local and Central Governments) in implementing project activities	Low	Active engagement of key stakeholders

Monitoring, reporting and evaluation

The project will be monitored and evaluated using Results Framework and Monitoring (RFM) that will be prepared at a multi-sectoral retreat followed by a validation workshop. The RFM will comprise project indicators which include:

- Test report and certification;
- Number air quality monitoring stations installed, number of pieces of equipment procured;
- Number of training workshops and awareness seminars conducted, list of participants attended the trainings.

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project donor in an agreed format. The project coordinator will also ensure that progress by component and a technical summary are included in those progress reports.

At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor(s), it could also be subjected to a mid-term evaluation half way through the project.

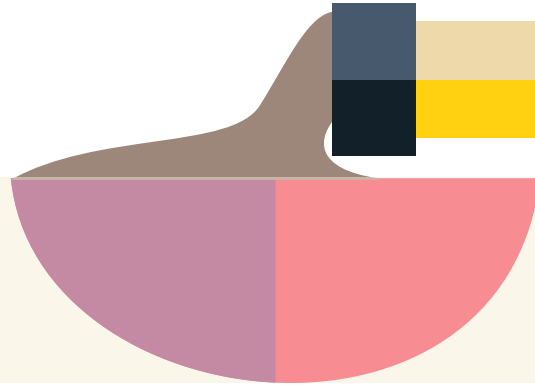
Communication and visibility

Information about the project will be shared through formal meetings especially to the LGAs and the regulators, through public meetings conducted in the local languages, through brochures and leaflets, and through messages in radio and print media. Moreover, biannual stakeholders' meetings will be organized. The aim of these meetings will be to share information about progress of the project.

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partner and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

PROJECT PROPOSALS ON WATER POLLUTION



PROJECT SUMMARY

Water pollution in the Wami-Ruvu river basin is an outcome of rapid population growth and increased human-induced activities. The population in the basin is expected to be more than 7 million by 2020. Over 80% of the industries in Tanzania are located within the basin and most of them lack effective wastewater treatment facilities. The project is aimed at reducing health risks associated with water pollution by improving water quality and promoting sustainability of water resources within the Wami-Ruvu Basin.

Key issues to be addressed in the project include strengthening water pollution control within the basin, raising awareness on proper water resources

Project title:	Wami-Ruvu Basin Water Quality Improvement Project
Location(s):	Wami-Ruvu Basin
Planned start date:	January 2020
Duration:	5 years
Government coordinating agency and Executing agency/cooperating agency:	CPCT, TBS, NEMC, GCLA, MIT, MoW, Wami-Ruvu Basin Water Board, WSSAs, MoHCDGEC.
Budget (in EUR):	5,000,000



THE PROJECT IS AIMED AT REDUCING HEALTH RISKS ASSOCIATED WITH WATER POLLUTION BY IMPROVING WATER QUALITY AND PROMOTING SUSTAINABILITY OF WATER RESOURCES WITHIN THE WAMI-RUVU BASIN.

management among stakeholders, enhancing proper management of industrial and municipal wastewater, and promoting water use efficiency.

It is expected that, after successful implementation of the project a database of water sources and pollution point sources will be established. Water pollution will be minimized hence the quality of water will be improved. Industries and institution will be encouraged to adopt the Resource Efficient and Cleaner Production techniques which promote efficient use of water resources which will finally ensure sustainability of water resources. In addition, the awareness of project beneficiaries will be raised, particularly women and children. Finally, the risks associated with water pollution will be reduced.

RELEVANT BACKGROUND

The Wami-Ruvu River Basin is one of the nine basins located in Tanzania, namely the Rufiji River Basin, Lake Victoria Basin, Pangani River Basin, Lake Tanganyika Basin, Lake Rukwa Basin, Lake Nyasa Basin, Ruvuma River and Southern Coast basin, and Internal Drainage basin. The Wami-Ruvu River Basin is located on the Eastern side of Tanzania, and lies from Longitudes 350 30' 00" to 400 00' 00" E and Latitudes 050 00' 00" to 070 30' 00". The basin covers an area of about 66,820 km². This represents 7.07% of the country's total surface area. The basin includes, in whole or in part, the following six regions: Dar es Salaam, parts of Coast, Morogoro, Dodoma, Tanga and Manyara. It has two major rivers, the Wami and the Ruvu, whose individual basins cover an area of 43,946 and 18,078 km² respectively. The Coastal sub-basin, which consists of Mpigi, Sinza, Mlalakuwa, Msimbazi, Mbezi, Mzinga and Kizinga rivers, covers another 4,796 km².

Some 7.2 million people live in the basin, 4.07 million in rural areas (56%) and 3.21 million in towns and cities (44%). The great majority of the population rely on surface waters from the Wami and Ruvu rivers and their tributaries, or – in the case of the Coastal sub-basin – on the small rivers rising in that sub-basin. Some data on consumption levels are available for the region around Dar es Salaam. Over 3 out of 7 million residents of Dar es Salaam City, and Kibaha and Bagamoyo towns depend on the Ruvu River as a source of water for domestic and industrial use. Over 500 million litres of water are consumed per day in Dar es Salaam alone (National Environmental Statistics Report, 2017⁷). The population of Dar es Salaam is estimated to reach 7 million by the year 2020.

Some people in the basin rely on groundwater as an extra or alternative source of water. For instance, groundwater is one of the most important alternative sources of water for Dar es Salaam City and its peri-urban areas.

Urban areas are supplied with pre-treated piped water from water supply and sanitation authorities such as DAWASA, MORUWASA, CHALIWASA, HANDEN TRUNK MAIN, etc., while peri-urban and rural areas use untreated water, either groundwater from standpipes or boreholes and/or surface water from the rivers and rainwater dams. The fetching of water from different sources is normally done by women and children. Most of the rural population bathe in rivers. Cattle grazing also takes place near the rivers and rainwater dams, which cattle drink directly from.

In addition, water is used in the basin's economic activities such as agriculture (growing of crops and keeping of livestock), mining, and industrial activities. Agriculture in particular is a significant user and polluter of water. Agriculture is the backbone of Tanzania's economy. According to the World Bank, agriculture accounted for 31.1% of GDP in 2016. The agricultural sector employs over 60% of the labour force, with most farmers, including those in the Wami-Ruvu river basin, engaging in small-scale farming. Agricultural activities are heavily dependent on both rain, surface water, and to a lesser extent groundwater. However, agricultural activities (farming and livestock keeping) conducted near water sources (river banks and dams) contribute to the pollution of these water sources.

Increased industrial activities have resulted in significant use of water. Moreover, the government's initiatives to transform the economy are catalysing industrialization in the basin. The country has adopted the Long-Term Perspective Plan, which advocates for

7 National Environment Statistics Report, 2017, https://www.nbs.go.tz/nbs/takwimu/Environment/NESR_2017.pdf

industrialization to drive the country's socio-economic transformation. The government is very much committed to ensuring that the country attains its goal of becoming semi-industrialised and to ensuring that by 2025 the industrial sector contributes 15% of the GDP and provides employment to 40% of the citizens of working age. Currently, over 80% of the industries in Tanzania are located in the Wami-Ruvu Basin, particularly in and around Dar es Salaam. It is expected that the government's focus on industrialization will increase the number of industries in the country and in the basin in particular. However, industrial activities conducted in the basin consume a huge amount of water and hence generate a huge amount of wastewater. Improper management of effluent by industries leads to pollution of both ground and surface water resources. However, not all industries have water discharge permits. For example, in 2016 in Dar es Salaam, 100,078,972m³ of wastewater was produced. Out of this, 83,749,428m³ was discharged to the environment without being treated (National Environment Statistics Report, 2017)

Municipal wastewater and solid wastes, as well as industrial discharges in the area in and around Dar es Salaam, are the main sources of pollution of the basin's water resources, both its surface waters as well as its groundwater. Only a small proportion of the basin's residents and commercial and industrial workplaces are connected to sewer networks (e.g., about 15% of residents in the case of Dar es Salaam). In these cases, wastewater is discharged, untreated, into surface water or onto land from where they percolate into the groundwater. Where sewer systems do exist, they are often not connected to a wastewater treatment plant, so again the wastewaters are discharged untreated. Where wastewater treatment plants do exist, their design is simple, often just consisting of stabilization ponds. Most of these are inefficient due to poor design and inadequate maintenance. The result, once again, is the discharge of untreated or minimally treated wastewater.

Mining, particularly gold mining, can be a significant source of water pollution. Although all the gold mining in the Wami-Ruvu Basin is small-scale, mercury is used for the concentration process and is most often drained off into the surroundings. Use of ammonium nitrate as explosive agent in the mining and rock crushing operations also contributes to pollution of both surface and underground water sources (case study at Chalinze rock crushing plants)

Water pollution is also caused by the improper management of solid waste at dump sites. The existing dump sites are not designed as sanitary landfills, hence leachate from these sites pollutes both underground and surface water sources. A large proportion of solid waste generated is not even sent to dump sites. This waste is left by the sides of the roads or in other open areas and is washed away by rain, contributing to the pollution of surface water sources. It is estimated that over 4,000 tons of solid waste are generated per day in Dar es Salaam, of which only 1,500 tons are collected and deposited at the city's dump sites.

The impacts of unsafe water on human health are increasing. The large proportion of waterborne diseases such as cholera, diarrhoea, typhoid and dysentery in the country is the outcome of water pollution. As of 2016, a total of 11,065 of cholera cases with 172 deaths were reported, while in 2017, 4,928 cases and 95 deaths and in 2018, about 4,421 cases with 83 deaths were reported nationwide.

Rivers in Tanzania including the Wami-Ruvu Basin are not classified. The Classification of rivers aims to categorize rivers based on the quality of their water. Normally, rivers are graded from least polluted (natural levels of contamination) to most polluted. The classification of rivers helps to set programmes to upgrade rivers based on the quality of their water. Grading helps relevant authorities set up the necessary mitigation measure to reduce the burden of

pollution in the river caused by pollution point and non-point sources. It also suggests the allocation of appropriate uses for the river based on its water quality. Hence, the rivers in Tanzania need to be classified.

Climate change is projected to have negative consequences for Tanzania's water resources (OECD, 2003)⁸. The effects of climate change and variability such as rising temperature and changes in rainfall are undeniably clear, with impacts already affecting ecosystems, biodiversity, and people. The recent floods which occurred in Dar es Salaam and other parts of the basin led to water pollution, which then resulted in an outbreak of waterborne diseases.

Generally, most water consumers, from simple citizens to industries and other institutions (i.e., hospitals, schools, etc.), use water inefficiently. Hence, they generate unnecessarily large amount of wastewater and increase water demand. The existing inefficiency in water use is caused by a lack of awareness among water consumers. The inadequate wastewater treatment facilities, especially for industrial and municipal wastewater, as well as a lack of infrastructure to manage municipal solid waste, all contribute to water pollution. Where water and waste infrastructures exist, they are often inefficient in their operation. Lack of awareness on water management among the communities is compounding the problems here.

PROJECT DESCRIPTION

Project beneficiaries

The main beneficiaries of this project will be residents of the Wami-Ruvu River basin whose number it is estimated will be over 7 million by 2020. In particular, the following groups will benefit most from the project:

- i. Those people who fall sick because of using or coming into contact with unsafe water;
- ii. Investors (industries and agriculture sector) whose operations depend on water;
- iii. Institutions such as hospitals and schools which depend on water;
- iv. Local farmers and livestock keepers; and
- v. Technical personnel participating in the project.

Overall project objective

The objective of the project is to improve the health of residents in the Wami-Ruvu river basin by controlling the pollution of the basin's water sources and by promoting sustainability of water resources in the river basin.

Specific objectives

- i. To strengthen water pollution prevention measures within the basin;
- ii. To enhance proper management of wastewater effluents;
- iii. To promote water use efficiency in the Wami-Ruvu River Basin; and
- iv. To strengthen water quality monitoring within the basin.

Intervention strategy

In order to be able to achieve the objectives, the project will intervene at five levels.

It will ensure that there is a greater understanding among the stakeholders about where the major sources of water in the river-basin are located, so that they can be properly protected from contamination. It will also ensure that there is a greater understanding of where the major pollution sources are located, so that all stakeholders are in a better position to decide where efforts must be focused as a priority to reduce the pollution loads entering the basin's river systems.

It will work with policy makers to ensure that the relevant laws and regulations pertaining to water pollution are enforced properly, and to ensure that they are fit for purpose. In parallel, it will work with the government to ensure that its systems for monitoring water quality and water pollution – primarily its water laboratories – are upgraded and strengthened so that they can feed back to government meaningful data on the state of the nation's water. Priority will be given to strengthening the monitoring networks in the Wami-Ruvu river basin, but the objective would be to do this as part of an overall strengthening of these networks at the national level.

Recognizing the key role that properly functioning centralized sewerage and waste stabilization ponds make in minimizing the pollution of waterways and that the responsibility for building and operating such plants rests with water supply and sanitation authorities, the project will support a survey of the wastewater treatment plants already in place in the basin. The project will develop standard designs for wastewater treatment plants that can be used by the authorities when developing their own.

Noting that industrial wastewater discharges share the responsibility for polluting waterways, especially in the region of Dar es Salaam where most of the country's industries are concentrated, the project will have a special focus on these discharges. It will deploy the Resource Efficient and Cleaner Production approaches and methodologies, giving these a specific focus on reducing the quantity and hazard of industrial wastewater discharges.

Finally, since much of the water which households in the basin use for cleaning, cooking, and washing is first stored for some period of time in the house prior to use, and recognizing that improper storage can lead to contamination of initially clean water, the project will have a special focus on creating awareness in households about how to ensure that this storage is undertaken in a manner which protects the water from contamination.

Implementation partnership(s)

The project will be implemented through the partnership of the following stakeholders:

- i. Ministry of Water:** The main function of the Ministry of Water is to ensure that water resources are developed/conserved, protected and managed sustainably in collaboration with all stakeholders. This will be the leading ministry in the implementation of the project.
- ii. Ministry of Health, Community Development, Gender, Elderly and Children:** The MoHCDGEC is responsible for monitoring quality of water sources designed for public consumption and promoting water safety and hygiene at source and household.

- iii. Wami-Ruvu Basin Water Board:** The WRBWB is mandated by the Water Resources Management Act No. 11 of 2009 to coordinate all water resources management and development programs, and to monitor and enforce water use, discharge permits, and pollution prevention measures and other interventions undertaken in the Basin. This will be the leading institution in the implementation of the project.
- iv. National Environment Management Council (NEMC):** The role the NEMC is to work in line with other stakeholders to implement activities that protect water resources against massive pollution and degradation.
- v. Cleaner Production Centre of Tanzania:** Its mandate is to promote RECP practices in enterprises to improve competitiveness and environmental excellence through material, water and energy efficiency as well as waste minimization.
- vi. Water Supply and Sanitation Authorities (the Dar es Salaam Water and Sewerage Authority - DAWASA, the Morogoro Urban Water Supply and Sanitation Authority - MORUWASA, the Chalinze Water Supply and Sanitation Authority - CHALIWASA):** These are key stakeholders and potential supporters in the implementation of the project activities.
- vii. Government Chemist Laboratory Authority (GCLA):** This is a government referral laboratory which has the mandate to undertake laboratory testing of water quality in Tanzania. It will collaborate with other stakeholders in the implementation of some of the project's activities.
- viii. Local Government Authorities (LGAs):** These are key stakeholders, with the mandate to support implementation of the project at local level.
- ix. Water Users Associations (WUAs):** These are designed to be localised actors implementing the overall responsibility of the Basin Water Board. Their roles are to conserve and manage water catchments sustainably; increase the usage of water for economic and social improvements and develop sustainable and responsive institutions; resolve conflicts on water use; and lastly, monitor water availability and use.

Project results/outputs

The outputs of the project are as follows:

- i. Water sources within the Wami-Ruvu basin are identified, mapped and demarcated;
- ii. Major pollution point sources within the basin are identified and mapped;
- iii. The water quality monitoring network is strengthened;
- iv. Effluent treatment plants are surveyed and standard designs developed;
- v. Resource Efficient and Cleaner Product (RECP) is promoted in industries and other stakeholders, with a special focus on the most industrialized areas i.e. Dar es Salaam; and,
- vi. Awareness is created on the safe storage of water in households, proper water use and hygiene practices.

Key project activities

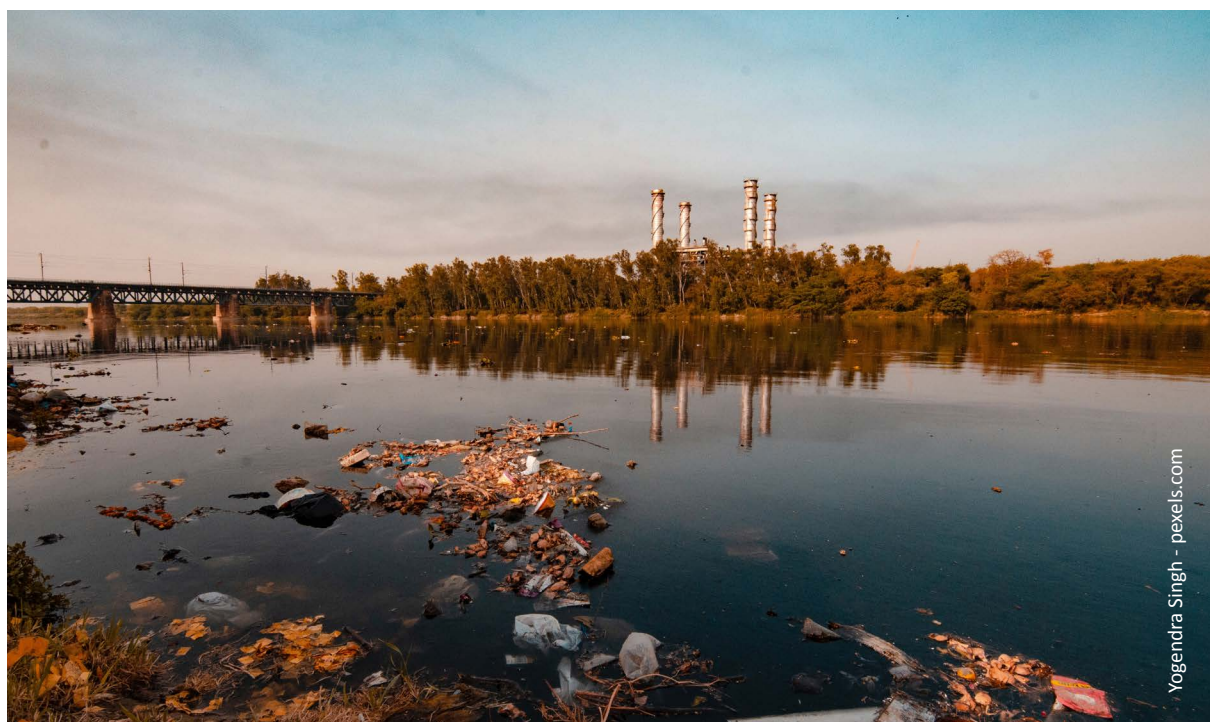
Activities	Locations	Timing	Partners
Output 1: Water sources within the Wami-Ruvu basin are identified, mapped and demarcated			
Conduct mapping of all major water sources within the Wami-Ruvu River Basin	Wami-Ruvu basin	Years 1-2	WRBWB, LGAs, NEMC, CPCT, GCLA
Undertake classification of water sources within Wami-Ruvu River Basin	Wami-Ruvu basin	Years 1-3	WRBWB, LGAs, NEMC
Output 2: Pollution point sources within the basin are identified and mapped			
Conduct mapping of major point sources of pollution within the Wami-Ruvu River basin	Wami-Ruvu basin	Years 1-5	WRBWB, LGAs, WUAs, CPCT, GCLA, NEMC
2.2 Sample and analyse industrial effluents	Wami-Ruvu basin	Years 1-5	WRBWB, LGAs, GCLA, NEMC
Output 3: Water quality monitoring network strengthened			
Monitor water quality of major water sources quarterly	Wami-Ruvu basin	Years 1-5	MoW, WRBWB, NEMC, MoHCDGEC, GCLA,
Develop a database monitoring system for increasing accuracy of data	Wami-Ruvu basin	Years 1-5	MoW, WRBWB, NEMC, MoHCDGEC, GCLA
Equip water laboratories in the Basin with real time water quality monitoring facilities	Wami-Ruvu basin	Years 2-5	MoW, WRBWB, NEMC, MoHCDGEC, GCLA,
Build capacity of basin laboratory human resources	Wami-Ruvu basin	Years 2-5	MoW, WRBWB, MoHGE, GCLA, CPCT,
Establish surveillance on biodiversity balance of water basin's species	Wami-Ruvu basin	Years 2-5	MoW, WRBWB, NEMC
Review national wastewater effluent standards and update if required	Wami-Ruvu basin	Years 2-5	MoW, MoHCDGEC, TBS, NEMC, WSSAs, LGAs
Output 4: Effluent treatment plants surveyed and standard designs developed			
Facilitate and support surveys of the current wastewater treatment plants in the Wami-Ruvu River basin	Wami-Ruvu basin	Years 1-2	MoW, WRBWB, WSSAs, LGAs
Develop appropriate designs for wastewater treatment plants in the Wami-Ruvu River basin	Wami-Ruvu basin	Years 2-4	MoW, WRBWB, WSSAs, LGAs
Output 5: Resource Efficient and Cleaner Production is promoted in industries and other stakeholders, with a special focus on the most industrialized areas			
Undertake trainings on RECP for industries, SMEs, hotels, institutions, hospitals and regulatory authorities	Wami-Ruvu basin	Years 1-5	CPCT, MoW, WRBWB, LGAs
Undertake in-plant RECP assessments for industries, SMEs and other institutions	Wami-Ruvu basin	Years 1-5	CPCT, MoW, WRBWB, LGAs
Monitor RECP implementation	Wami-Ruvu basin	Years 2-5	CPCT, MoW, WRBWB, LGAs

Activities	Locations	Timing	Partners
Output 6: Awareness on the safe storage of water in households, proper water use and hygiene practices is created			
Create awareness through appropriate media on proper hygiene practices for drinking water storage in households	Wami-Ruvu basin	Year 1-5	MoW, MoHCDGEC, LGAs
Create awareness among small-scale miners on management of wastewater effluents	Wami-Ruvu basin	Years 3-5	MoW, WRBWB, GCLA, LGAs, NEMC
Create awareness among farmers on the proper management of agricultural chemicals	Wami-Ruvu basin	Years 3-5	MoW, WRBWB, GCLA, LGAs, NEMC

Gender mainstreaming

In many societies in Tanzania, the problems of water pollution normally affect mostly women and children. Based on this fact, the project will focus on gender equality. The project will be designed to give women special consideration throughout the project implementation, thus an adequate number of women will participate in most of the project activities.

In line with SDG 5 (Gender Equality), all gender issues will be given due consideration. A gender equality inclusion strategy will be drawn up whereby stakeholders will agree on how the programme will promote gender equality. Sex and age disaggregated data will be collected to ensure best possible impact for women and children. An analysis of the effect of the project on reducing gender inequality will be included in the annual reports.



Project financing and indicative budget

Budget line	EUR					
	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Project staff:						
- International	450,000	90,000	90,000	90,000	90,000	90,000
- National	400,000	80,000	80,000	80,000	80,000	80,000
Project consultants:						
- International	450,000	90,000	90,000	90,000	90,000	90,000
- National	300,000	60,000	60,000	60,000	60,000	60,000
Sub-contracts	200,000	40,000	40,000	40,000	40,000	40,000
Meetings	100,000	20,000	20,000	20,000	20,000	20,000
Project activities:						
Training workshops	400,000	80,000	80,000	80,000	80,000	80,000
Awareness seminars	300,000	60,000	60,000	60,000	60,000	60,000
Local travel	200,000	40,000	40,000	40,000	40,000	40,000
Laboratory analysis	200,000	40,000	40,000	40,000	40,000	40,000
Equipment	1,400,000	-	500,000	500,000	300,000	100,000
Vehicles	300,000	150,000	150,000	-	-	-
Other direct costs:	300,000	60,000	60,000	60,000	60,000	60,000
TOTAL	5,000,000	810,000	1,310,000	1,160,000	960,000	760,000

Sustainability of project results

The mutual advantages that beneficiaries will get as an outcome of implementing this project will catalyse the need for sustainability of the project. Based on this, the project is designed to create an enabling environment for its sustainability. The following aspects will be included in the project:

- Building up a spirit of project ownership among the stakeholders and beneficiaries by involving them throughout the project;
- Involving Water supply and sanitation authorities and government authorities as partners (DAWASA, MORWASA, CHALIWASA, Ministry of Water, and the Wami-Ruvu River Basin Authority) in the project will encourage them to use existing legislation to ensure the sustainability of the financed facilities and programs;
- Prompting financial support from the government and other donors (e.g. World Bank) for construction of the project facilities as well as sustainability of the programs;
- Reviewing the existing relevant legislations (i.e. the water resource management act 2009, water quality standards regulations, 2007 and EMA, 2004) to incorporate cost

sharing aspects by which the polluters (i.e. industries and institutions whose effluents do not meet standards) will be obliged to adopt and support RECP programs;

- Designing facilities that put into consideration the aspects of operation costs of the facilities including training, upgradability and easy maintenance during designing of facilities;
- Participation of women and children as means of fostering the resource efficient habits in the minds of future generations.

Risks to project implementation

A summary of the main risks and mitigation measures is given in the table below:

Project assumptions	Risk of failure	Mitigation action(s)
Involvement of women and girls in the project	Low	Ensure that women are given priority in the project activities such as training.
Government or other projects implement interventions that are in line with the plans laid out in the Wami-Ruvu	Medium	Actively engage government and other stakeholders to align planning
Sustainability of project outcome	Medium	The government through medium term expenditure (MTF) are streaming into annual budget for continuity of the project
No conflict among the beneficiaries that may disrupt the project or cause regression in the situation of beneficiaries.	Low	The project's benefits will lessen chances of conflict. The development of a participatory action plan and undertaking a social and technical survey of the impacts of the project's interventions will lessen chances that interventions exacerbate conflict.
Wastewater treatment facilities constructed/ rehabilitated. Facilities dependent on surface water will not be susceptible to degradation.	Medium	To the extent possible, design minimal-operation, minimal-maintenance infrastructure within the realistic ability of communities (and government) to maintain. Build capacity of communities to maintain their infrastructure.
Work on facilities provided by communities will not involve any child labour.	Low	The difference between small amounts of help provided by children (e.g. light chores after school) and child labour will be explained in sensitization. It will be a condition of agreements with communities that child labour is not permitted and strict sanctions will be in place if child labour is detected.

Project assumptions	Risk of failure	Mitigation action(s)
Approaches of different NGOs in the partnership will be compatible.	Low	Planning has already set the ground-work for some joint approaches and other areas where partners will work in different ways (for various reasons). Working groups will work out the details of joint approaches. There will be partnership cross-learning sessions and capacity building of local NGOs and other stakeholders to transform learning into tangible outputs.
Acceptance of sanitation interventions by communities.	Low	Awareness raising. Use of local partners with in-depth understanding of community issues. Utilization of different communication methods – e.g. through religious and community leaders.

Monitoring, reporting and evaluation

The achievements of the project will be reported in regular progress reports. These will be developed and submitted to the project coordinators and the donors. A framework for monitoring the project indicators will be developed by Monitoring and Evaluation experts. The monitoring system will look at:

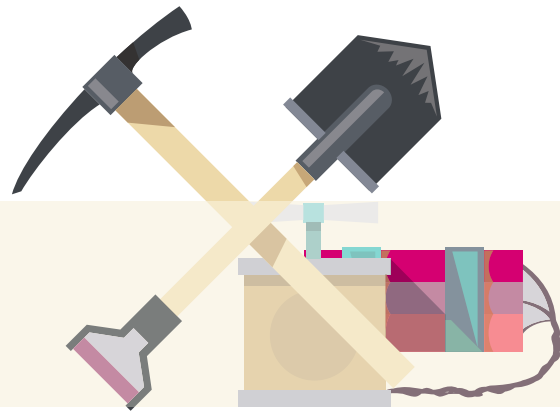
- i. Progress in implementing the activities (through a set of key indicators that will be measured for different activities);
- ii. Progress against output, outcome and impact targets;
- iii. Developments regarding the assumptions and risks identified in the log frame;
- iv. Qualitative assessment of any quantitative monitoring data; and
- v. Effects on gender and conflict.

Communication and visibility

The progress and achievements of the project will be communicated by means of dissemination seminars and workshops, a project website, social media, and radio and TV programs. Efforts will be made to ensure that publications, training programmes, seminars financed by donors and all press releases or other information materials issued with respect to the donated fund clearly indicate that the activities in question have received funding from various donors.

A common logo that includes the flags or logos of all donors to the project will be developed and used on all project publications. In addition to the use of a logo, appropriate measures will be taken to ensure that financed activities are well-covered by local print press and electronic media, and that all related publicity material, official notices, reports and publications explicitly acknowledge the facilities and their donors.

PROJECT PROPOSALS ON HEAVY METALS FROM MINING ACTIVITIES



PROJECT SUMMARY

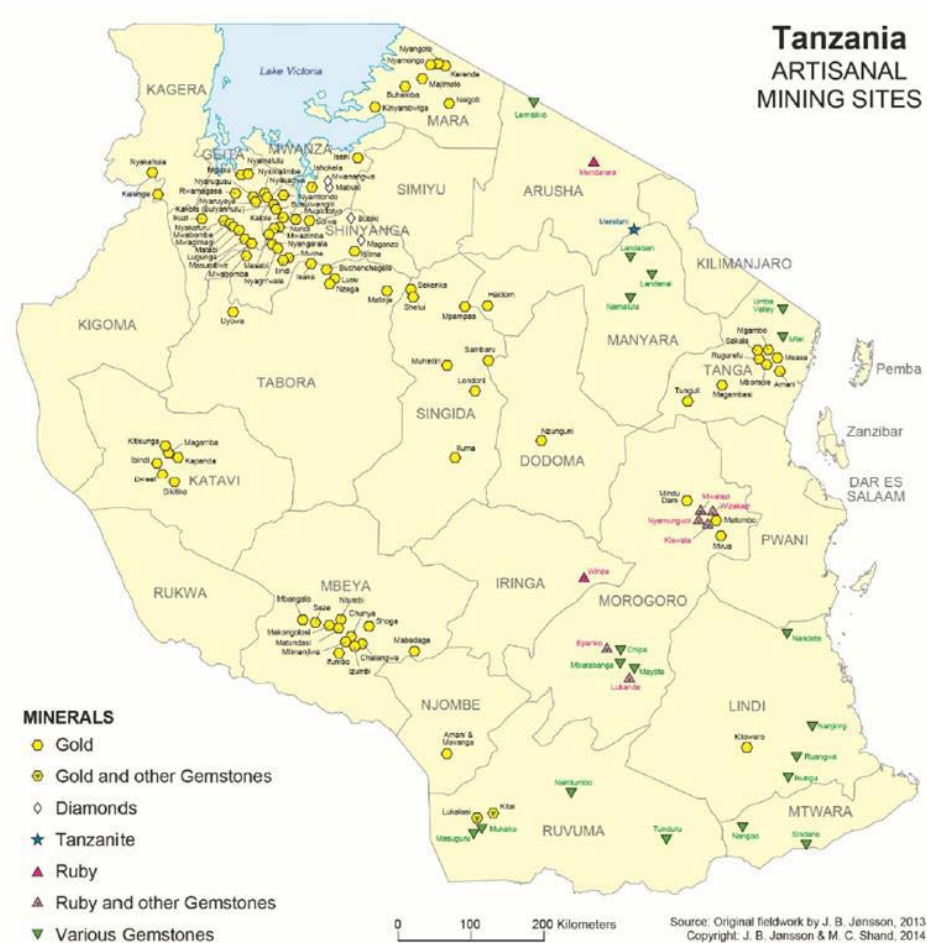
The project intends to establish the baseline information on exposure of miners and their communities in artisanal and small-scale mining areas to heavy metals as well as to other toxic chemicals and substances. It also intends to establish the capacities of the existing health facilities to conduct health monitoring before undertaking the interventions. Interventions will be through capacity building on alternatives, Best Available Technologies (BATs) and Best Environmental Practices (BEPs). The awareness of the miners and general public on the health effects of the toxics they are exposed to will also be enhanced. Finally, the capacities of the existing health facilities will be strengthened to ensure continuous monitoring of the affected individuals.

Project title:	Exposure to Heavy Metals and other Toxics in Small Scale Mining
Location(s):	Geita, Shinyanga and Mbeya
Planned start date:	January 2020
Duration:	5 years
Government coordinating agency and Executing agency/ cooperating agency:	Ministry of Minerals & Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC)
Budget (in EUR):	4,945,000

THE PROJECT INTENDS TO ESTABLISH THE BASELINE INFORMATION ON EXPOSURE OF MINERS AND THEIR COMMUNITIES IN ARTISANAL AND SMALL-SCALE MINING AREAS TO HEAVY METALS AS WELL AS TO OTHER TOXIC CHEMICALS AND SUBSTANCES.

RELEVANT BACKGROUND

Artisanal and Small-scale Gold Mining (ASGM) has been practiced for long time in Tanzania and continues to grow, with significant contribution to income, employment, the local and national economies. It directly employs more than 1.2 million people (about 3% of the total national population), constituting 40-60% of the mining labour force in the country, and supports indirectly about 7.2 million people. The ASGM sub-sector is estimated to produce more than 3 tonnes of gold per year (about 7-10% of the national annual gold production) worth about TZS 240 billion (USD 105 Million).

Figure 7.1. Tanzania Map showing areas where ASGM is practiced

Source: *Mercury Trade and Use for Artisanal and Small-Scale Gold Mining in Sub-Saharan Africa, 2016*

Once the ore has been extracted, ASGM consists of several steps. The first is ore size reduction, through crushing and milling. This is followed by concentration, through sluicing. Finally, there is gold recovery from the ore concentrate through amalgamation with mercury and latter, evaporation.

Probably the biggest health impacts from ASGM are linked to the use of mercury. For every ton of gold produced in ASGM, about 1.7 tons of mercury are emitted. For many years now, mercury has been used worldwide as a means of extracting gold from its ore due to its ability to easily form amalgams with gold and thus enable the separation from the ore, and its equally easy separation from the gold by evaporating from the amalgam. Although other methods of gold extraction are available, mercury is favoured by ASG miners due to its affordability, accessibility, ease of use, and ability to be used in many locations. However, most ASG miners in Tanzania have low awareness of the adverse health effects of mercury, both on themselves as well as on the mining communities. Mercury is known to cause an array of effects, notably impairment of nervous and respiratory systems, cardiovascular

disorders, kidney malfunctions, immune system changes and digestion impairment. Due to the adverse effects of mercury on public health and the environment, the Minamata Convention on Mercury was adopted in 2013 and entered into force in 2017. Its objective is to protect human health and the environment from anthropogenic mercury emissions and releases. The United Republic of Tanzania participated in the negotiation process, adoption and signing of the Minamata Convention. The country is now in the final stages of ratifying the Convention.

The large amounts of dust generated by mining activities (drilling, blasting, ore loading, haulage, crushing and grinding) can also impact on human health. Long exposure to silica in dust may lead to diseases such as silicosis.

These same mining activities generate noise and vibrations. These can impair miners' hearing ability. In addition, they disturb communities living around mining areas, and sometimes damage their buildings.

Other health impacts for ASG miners and their communities come from exposure to other heavy metals present in the ores being processed. These ores will often contain Arsenic, Cadmium, Chromium, Nickel, Lead, and Zinc. All of these heavy metals can have health impacts, sometimes severe. The main health effects that can be caused by heavy metals include permanent brain damage, central nervous system disorders (neurotoxicant), memory loss, heart disease, kidney failure, liver damage, loss of vision, loss of sensation and tremors. Heavy metals can also damage the reproductive and hormonal development and growth of fetuses and infants. They are also linked to neurological diseases, such as Alzheimer's and Parkinson's. In some cases, other toxic chemicals are present; for instance, cyanide, a highly toxic chemical, which can also be used for the extraction of gold.

A characteristic of ASGM is that the mining activities are undertaken in intimate contact with the mining communities. The extraction of gold, especially with mercury, is often done at the miners' homes with their wives and children close by, if not involved in the operation itself. Thus, not only the miners but also all the members of the mining communities can have their health impacted by the mining operations. With respect to mercury, the most affected people are often children and pregnant women who are directly exposed to mercury fumes.

In addition, ASGM causes many environmental impacts. Water bodies can be polluted by the sluicing operations, which wash heavy metals, silt and sediment into rivers and streams. In addition, due to the fact that many ASGM sites are located near water bodies, these can be polluted by the mercury being used and by the poor sanitation of the mining camps. Furthermore, some of the tailings left behind can be washed down into water bodies, especially during the rainy seasons, thus contaminating the waters with heavy metals, silt and sediment, as well as with mercury if this has been used in the vicinity. All of these pollutants can affect aquatic species and the quality of water. This pollution can also have a secondary health impact, through downstream users being exposed to mercury and other pollutants by eating fish that have themselves been contaminated. Additionally, there are potential occupational health and safety risks. Exposure to high noise levels has already been mentioned. There are also risks of falling into mining pits, the collapse of these pits, etc.

ASGM also causes considerable land degradation since most of the gold mining activities are carried out through pit mining. The excavated pits and piles of waste rock left behind after mining ceases cause severe, but localized, land degradation. However, the fact that miners frequently shift from one site to another results in a multitude of abandoned pits across the country.

ASGM also leads to deforestation. There is significant use of timber in ASGM sites for supporting pit structures, construction of shelters and domestic use, all leading to significant levels of deforestation. Also, the establishment of new ASGM sites often involves massive inflow of people which in turn leads to clearance of large areas for the mining and the settlements, hence deforestation. Also, a high reliance on wood as a source of energy by ASG mining communities contributes to deforestation.

The hazards posed by mercury to ASGM miners and their communities are already well understood, and – through the Minamata Convention and the corresponding support from the GEF – funding will be available to Tanzania to deal with this heavy metal. Hence, the project intends to contribute to minimizing exposure of miners and their communities to the other heavy metals and other toxics found in ASGM operations.

PROJECT DESCRIPTION

Project beneficiaries

One of the main project beneficiaries will be the miners, who are heavily exposed to mercury and other toxics through the mining operations (drilling, blasting, ore loading, haulage, dry crushing and grinding as well as gold extraction). This will include miners' families who are often involved in the mining operations, especially the gold extraction step.

Another main beneficiary will be the communities living in ASGM sites. Along with the miners' families, these can be service providers of one sort or another. Because the mining operations are often located close to or even in the communities, these persons will often also be heavily exposed.

Other beneficiaries include inhabitants living around the mining centres, although not necessarily in the mining camps themselves, or living downstream of the mining sites. These persons suffer from some lower level of exposure.

Finally, implementing partners will also benefit by gaining experiences and training on issues related to pollution from heavy metals.

Overall project objective

The overall objective of the project is to minimize exposure of ASG miners and their communities in the targeted locations to heavy metals and to other toxic chemicals and substances.

Intervention strategy

In order to reach this objective, the project will use an intervention strategy based on four pillars:

Seeing this project as very much a pilot for further upscaled activities in the future, the project will focus its efforts on 10 ASGM sites in three different locations around the country. At these chosen sites, the project will start by establishing baseline levels of the heavy metals in the mining communities themselves (body burdens) as well as the surrounding environment. A baseline will also be established of the capacities of the local health centres to monitor body burdens. Regular monitoring of the health and environmental parameters during the

rest of the project will indicate if the other activities of the project are leading to a reduction in human and environmental exposure in the ten chosen mining sites.

Once the baselines have been set, the project will start an awareness and information dissemination campaign to the mining communities in the chosen mining sites on the risks to their health, especially those of their children, posed by the toxic chemicals and substances to which they are exposed. Similar information is disseminated to the wider general public around mining sites.

This will be followed up with training focused specifically on the miners and those in the communities most closely involved in the mining activities, on the best available technology and practices for the extraction, processing, recovery, and refining of gold-bearing minerals.

Finally, the lessons learned from these on-site activities will be turned into policy recommendations, which the relevant policy-makers can use to either adopt new laws, regulations, and guidance documents, or adapt the existing ones, with a view to upscaling the project's activities to the whole country.

Implementation partnership(s)

The following table lists the main implementing partners and their role/responsibilities in the project:

Implementing Partner	Role/Responsibilities	Collaborators
The Mining Commission (MC) under Ministry of Minerals (MM)	Identify 10 ASGM sites for assessment in the three targeted locations	
	Assess the awareness needs (a) for miners and their communities (b) for the wider communities around mining sites	STAMICO, NEMC, CPCT, AGENDA
	Decide on the most appropriate awareness-raising processes and tools to use for each population	
	Prepare the necessary awareness-raising materials	NEMC
	Conduct the awareness-raising campaigns	CPCT
	Disseminate the awareness materials	
State Mining Cooperation (STAMICO) under Ministry of Minerals (MM)	Prepare a report on the awareness-raising activities	
	Assess the training needs (a) of the miners and (b) of their communities	MC, NEMC, OSHA, CPCT
	Prepare the training materials	
	Conduct the trainings	
Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDEC)	Prepare a report on the training activities	
	Assess ability of the existing health centres for monitoring heavy metals health effects (body burden)	GCLA

Implementing Partner	Role/Responsibilities	Collaborators
Government Chemist Laboratory Authority (GCLA)	Prepare the checklists and testing protocols (a) Environmental (b) Biological	(a): GST; (b): MoHCDEC
	Prepare and train the field teams	MoHCDEC
	Collect the samples used to establish body burdens.	GST
	Collect the environmental samples used to establish environmental concentrations	(a): GST; (b): MoHCDEC
	Undertake the laboratory analysis of collected (a) environmental (b) biological samples in accredited laboratories (locally)	MoHCDEC
	Compile the individual field reports. Prepare a summary report with the baseline information.	
	Prepare sampling protocols	
	Prepare measuring equipment for environmental parameters	
	Collect samples for body burdens and environmental concentrations	
	Analyse samples for body burdens and environmental concentrations	
Vice President's Office Division of Environment (VPO-DoE)	Compile the individual field reports. Prepare a summary report showing changes with respect to the baseline information	
	Participating staff to scale up their technical capacity on baseline establishment Capacity building in equipment for carrying out project activities	MoHCDEC, GST, STAMICO, OSHA, NEMC, CPCT, AGENDA

Project results/outputs

Expected outputs are as follows:

- Baseline information has been established on the level of heavy metals as well as of other toxic chemicals and substances found in the three targeted small-scale mining areas and in the miners and members of their community (body burden).
- Awareness has been raised and information disseminated to miners and their communities in the three targeted locations on the risks to their health and those of their children posed by the toxic chemicals and substances to which they are exposed. Similar information is disseminated to the wider communities around mining sites.
- Training has been conducted for ASG miners and their communities in the three targeted locations on ways to more safely extract, process, recover, and refine gold-bearing minerals.
- Monitoring of body burdens has been conducted in the three targeted locations to assess if exposure levels are decreasing.
- Lessons learned from the project have been translated into policy recommendations on how to upscale the project activities to the national level

Key project activities

Activities	Locations	Timing	Partners
Output 1: Baseline information has been established on the level of heavy metals as well as of other toxic chemicals and substances found in the three targeted small-scale mining areas and in the miners and members of their community (body burden)			
1.1 Identify 10 ASGM sites for assessment in the three targeted locations	Dodoma	Q1-Q2 Y1	MC
1.2 Prepare the checklists and testing protocols		Q2-Q4 Y1	GCLA, GST, MoHCDEC
1.3 Prepare and train the field teams		Q2-Q4 Y1	
1.4 Collect the samples used to establish body burdens.	10 selected ASGM sites	Q3-Q4 Y1, Q1-Q2 Y2, Q2-Q3 Y3, Q1-Q3 Y4.	GCLA, MoHCDEC
1.5 Collect the environmental samples used to establish environmental concentrations		Q3-Q4 Y1, Q1-Q2 Y2, Q2-Q3 Y3, Q1-Q3 Y4.	GCLA, GST
1.6 Undertake the laboratory analysis of collected samples in accredited laboratories (locally)	Dar es Salaam and Dodoma	Q4 Y1, Q1-Q4 Y2, Q3-Q4 Y3, Q1-Q4 Y4.	GCLA, GST, MoHCDEC
1.7 Compile the individual field reports. Prepare a summary report with the baseline information.		Q4 Y1 - Q3Y2, Q1 Y3 - Q4 Y4	
Output 2: Awareness has been raised and information disseminated to miners and their communities in the three targeted locations on the risks to their health and those of their children posed by the toxic chemicals and substances to which they are exposed. Similar information is disseminated to the wider communities around mining sites			
2.1 Assess the awareness needs (a) for miners and their communities and (b) for the wider communities around mining sites	Dar es Salaam and Dodoma	Q3 Y1 - Q4 Y2	MC, STAMICO, NEMC, CPCT, AGENDA
2.2 Decide on the most appropriate awareness-raising processes and tools to use for each population	Dar es Salaam and Dodoma	Q4 Y1 - Q2 Y2	

Activities	Locations	Timing	Partners
2.3 Prepare the necessary awareness-raising materials	Dar es Salaam and Dodoma	Q1- Q3 Y2	MC, NEMC
2.4 Conduct the awareness-raising campaigns through appropriate media	10 selected ASGM sites	Q2 Y2- Q4 Y4	MC, CPCT, Media Institutions
2.5 Disseminate the awareness materials	10 selected ASGM sites	Q2 Y2-Q2 Y5	
2.6 Prepare a report on the awareness-raising activities	Dar es Salaam and Dodoma	Q3 Y5	

Output 3: Training conducted for ASGM miners and their communities in the three targeted locations on ways to more safely extract, process, recover, and refine gold-bearing minerals

3.1 Assess the training needs (a) of the miners and (b) of their communities	10 selected ASGM sites	Q3 Y1 - Q2 Y2	STAMICO, MC, NEMC, OSHA, CPCT
3.2 Prepare the training materials	Dar es Salaam	Q4 Y1 - Q3 Y2	
3.3 Conduct the trainings	10 selected ASGM sites	Q1-Q4 Y2	
3.4 Prepare a report on the training activities	Dar es Salaam and Dodoma	Q4 Y2 - Q2Y3	

Output 4: Monitoring of body burdens has been conducted in the three targeted locations to assess if exposure levels are decreasing

4.1 Prepare sampling protocols	Dar es Salaam and Dodoma	Q2 -Q4 Y1	GCLA, MoHCDEC
4.2 Prepare measuring equipment for environmental parameters	Dar es Salaam and Dodoma	Q2-Q4 Y1	
4.3 Assess ability of the existing health centres for monitoring heavy metals health effects (body burden) for purpose of capacity building	three targeted locations	Q3 Y1 - Q2 Y2	MoHCDEC, GCLA
4.4 Collect samples for body burdens and environmental concentrations	10 selected ASGM sites	Q3 Y1 - Q2 Y2, Q2 Y3 - Q2 Y4	GCLA, MoHCDEC
4.5 Analyse samples for body burdens and environmental concentrations	Dar es Salaam and Dodoma	Q4 Y1 - Q2 Y2, Q3,Y3 -Q2 Y4	
4.6 Compile the individual field reports. Prepare a summary report showing changes with respect to the baseline information	Dar es Salaam and Dodoma	Q4 Y1-Q4 Y4	

Activities	Locations	Timing	Partners
Output 5: Lessons learned from the project have been translated into policy recommendations on how to upscale the project activities to the national level			
5.1 Sharing lesson learned with inter-ministerial committee	Dar es Salaam and Dodoma	Q2-Q4 Y5	MoHCDEC, GCLA, MC, STAMICO, NEMC, OSHA
5.2 Sharing lesson learned with the general public	Dar es Salaam and Dodoma	Q2-Q4 Y5	MoHCDEC, GCLA, MC, STAMICO, NEMC, OSHA, CPCT, AGENDA

Output 6: Project Participating Institutions have been strengthened in terms of human resources capacity, equipment and facilities			
6.1 Participating staff scale up their technical capacity on baseline establishment	Dodoma	Q2-Q4 Y1	MoHCDEC, GCLA, MC, STAMICO, NEMC, OSHA, CPCT, AGENDA
6.2 Capacity building in equipment for carrying out project activities	Dar es Salaam, Dodoma, Geita, Shinyanga and Mbeya	Q1 Y1, Q2 Y2 - Q2 Y4	MoHCDEC, GCLA, MC, STAMICO, NEMC, OSHA, CPCT, AGENDA

Gender mainstreaming

In line with SDG5 “Achieve gender equality and empower all women and girls”, all gender issues will be given due consideration.

The project will provide equal opportunities for both genders (male and female) as well as vulnerable community members at all levels. A detailed gender analysis will be undertaken during the design phase of the full project document.



Project financing and indicative budget

Budget line	EUR					
	TOTAL	YEAR 1	YEAR 2	YEAR3	YEAR4	YEAR 5
Project staff						
- International	120,000	24,000	24,000	24,000	24,000	24,000
- National	240,000	48,000	48,000	48,000	48,000	48,000
Project Consultancy						
- International	50,000	10,000	10,000	10,000	10,000	10,000
- National	150,000	30,000	30,000	30,000	30,000	30,000
Sub-Contracts (Sampling & Lab Analysis)	600,000	120,000	120,000	120,000	120,000	120,000
Meetings	750,000	150,000	150,000	150,000	150,000	150,000
Local Travel (Field Work)	2,600,000	600,000	600,000	600,000	600,000	200,000
Other direct Cost	435,000	115,000	80,000	80,000	80,000	80,000
TOTAL	4,945,000	1,097,000	1,062,000	1,062,000	1,062,000	662,000

Sustainability of project results

To ensure that miners will continue using the BAT and BEP they have received training on, STAMICO as the lead agency will maintain the training scheme for miners and their communities in the three targeted locations on ways to more safely extract, process, recover, and refine gold-bearing minerals.

For continuity of the body burden monitoring and extension to other ASGM sites, the strengthened health centres in the three selected regions will be tasked to carry out this activity regularly for all sites. Strengthening of health centres will also be scaled up to other regions.

Risks to project implementation

Project assumptions	Risk of failure	Mitigation action(s)
Full participation of miners in the project activities	Low Low engagement of relevant stakeholders may discourage participation of small-scale miners.	The project will employ a competent and experienced project coordinator who will work closely with FEMATA for the purpose of building good relationship between project implementers and miners
Willingness of the government to support miners to use safer and environmentally friendly mining technologies	Low In a few cases, ill-informed government officials may decline to support the project due to their not being very conversant with the objectives of the project	Government officials from the Ministry of Minerals will be sensitized on available alternative technologies that miners may use, and how to support miners in order to reduce their exposure to heavy metals as well as the exposure pathways to unintended targets.

Monitoring, reporting and evaluation

The project will institute monthly progress reporting, bi-annual monitoring and bi-annual reporting. Furthermore, the project will institute a mid-term evaluation and a final evaluation.

Communication and visibility

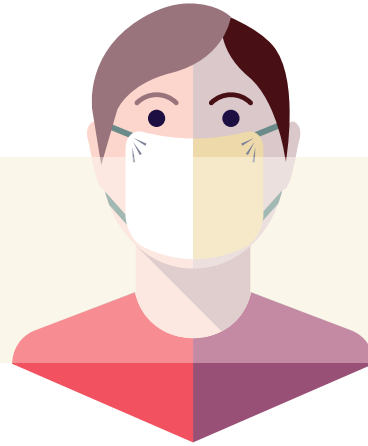
The project will develop a communication and visibility strategy in order to reach out to a much wider group of stakeholders for greater benefits to the general population. The strategy will be developed after conducting a Knowledge, Attitude and Perception (KAP) assessment in the selected ASGM sites.

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partner and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.



PROJECT PROPOSALS ON INDOOR AIR POLLUTION



MD Duran on Unsplash

PROJECT SUMMARY

The main objective of the project is to reduce the burden of respiratory and related morbidities among women and children through reduction of exposure to indoor air pollution. The project will focus on the chief source of this pollution, namely the combustion of solid biomass (firewood and charcoal) for domestic cooking.

The project will initially focus on field work in targeted communities in seven different geographic zones of Tanzania, with the aim of demonstrating how rural households can reduce their indoor air pollution by adopting various affordable, practical, and available approaches. In this regard, the project will take a holistic approach in which the four main factors contributing to elevated levels of indoor air pollutants will be addressed: type of fuels used, cooking technologies, design of cooking spaces to ensure

Project title:	Reduction of Indoor Air Pollution and its impact on Health of Women and Children in Vulnerable Rural and Urban Communities.
Location(s):	Seven geographical zones represented by Shinyanga (Lake Zone), Dar Es Salaam (Coastal), Kigoma (Western), Iringa (Northern Highlands), Lindi (South), Dodoma (Central), and Arusha (North). Project headquarters to be situated in Dar Es Salaam.
Planned start date:	2019
Duration:	5 years
Government coordinating agency and Executing agency/cooperating agency:	MUHAS, VPO-DoE, NIMR, MoHCDGEC, NEMC, TBS, OSHA, CPCT, TPF, LGAs, PORALG, MoHCDEC, MUHAS, UNICEF, TAEC
Budget (in EUR):	€4,652,000



THE MAIN OBJECTIVE OF THE PROJECT IS TO REDUCE THE BURDEN OF RESPIRATORY AND RELATED MORBIDITIES AMONG WOMEN AND CHILDREN THROUGH REDUCTION OF EXPOSURE TO INDOOR AIR POLLUTION.

smoke removal and indoor space ventilation, and behavioural patterns of the members of the household.

Awareness-raising and advocacy at various levels will be undertaken, along with the development of technical and human capacities. Moreover, supply chains will be strengthened to ensure sustainable adoption and usage of cleaner cooking, while levels of indoor toxicants will be further minimized through the adoption of adequate ventilation practices and capacity building on better housing design. Policy briefs will be prepared for policy makers, and policy dialogues will be held with them, with the aim of beginning to build-up necessary legal and regulatory framework to minimize the health effects of indoor air pollution.

Project partners will be supported by clusters of staff from project districts who will support baseline surveys

and community mobilisation. The responsible sectoral Ministries will promote the role of Government on controlling indoor pollution and will guide other partners.

RELEVANT BACKGROUND

The primary problem of interest in this project is the health impacts of indoor air pollution, mainly caused by the use of unprocessed biomass in unimproved stoves for domestic cooking, carried out in badly ventilated indoor environments.

Solid biomass fuels (mostly firewood and charcoal) account for more than 90% of the total energy consumed in Tanzania. The use of solid biomass fuels is dominated by their low cost, easy accessibility and inefficient conventional technologies. Three-stone open fireplaces, which have a thermal efficiency of less than 10%, are being used by more than 85% of rural households and most rural institutions for cooking. In urban areas, about 70% of households use inefficient traditional metal charcoal stoves with a thermal efficiency of 10-15% (TATEDO Annual Report, 2005).⁹

The obvious results of the use of these inefficient technologies, especially in poorly ventilated spaces, are high cost to the users (either in monetary form or in time of firewood collection) and a heavy burden on their health. For instance, studies in rural Tanzania have indicated that in households that use firewood the CO concentrations before cooking exceeded the WHO hourly standard of 30 mg/m³ in 69.4% of the surveyed households, while the concentrations for those households using charcoal and kerosene were zero. During cooking, the overall average CO concentrations in mg/m³ in all households were 325 ± 211 and 148 ± 44 when firewood and charcoal biomass were used, respectively. The study recommends improvement to the ventilation system, including the provision of an adequate number of windows and the installation of chimneys for removal of combustion pollutants from indoor environment (Msafiri J, 2009)¹⁰. Other studies have shown PM₁₀ concentrations in the kitchen ranging from 656 µg/m³ to 2,565 µg/m³, with peak levels reaching 10,048 µg/m³ during cooking (Kilabuko et al. 2007¹¹, Ezzati et al. 2000¹², Ezzati, M & Kammen, D M, 2001¹³).

Indoor air pollution from the burning of biomass is known to give rise to many negative impacts. Women (young and old) are particularly at risk due to their predominant involvement in domestic cooking. Women spend 3 to 7 hours cooking and are exposed to levels of pollution which are 3 to 5 times higher than in the case of boys and men. In Tanzania, females begin to take an active part in cooking from the age of 16 onwards. Children, especially younger children, spend most of their time indoors and near their mothers including in the kitchen. Their respiratory defences are vulnerable and hence they are particularly sensitive to the deleterious effects of exposure to indoor air pollution.

9 TATEDO, 2005, TATEDO 2005 Annual Report, Unpublished work

10 Jackson, M.M., 2009, Cooking as a source of indoor air pollution in rural areas of Tanzania, *Int. J. Biol. Chem. Sci.* 3(5): 934-947.

11 Kilabuko, J.H., Matsuki, H. & Nakai, S., 2007. Air Quality and Acute Respiratory Illness in Biomass Fuel using homes in s in Bagamoyo, Tanzania. *Int. J. Environ. Res. Public Health*, 4(1), 39-44

12 Ezzati, M, Saleh, H. & Kammen, D M, 2000. The contributions of emissions and spatial microenvironments to exposure to indoor air pollution from biomass combustion in Kenya. *Environmental health perspectives*, 108(9), pp.833-9

13 Ezzati, M & Kammen, D M, 2001. Quantifying the effects of exposure to indoor air pollution from biomass combustion on acute respiratory infections in developing countries. *Environmental health perspectives*, 109(5), pp.481-8. Available at: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1240307&tool=pmcentrez&rendertype=abstract>.

Exposure to indoor air pollution is responsible for low birth weights for new-borns and infants¹⁴. It causes excess morbidity and mortalities from Acute Respiratory Infection among children under five years of age. It is a known cause of impaired lung function growth, exacerbating chronic obstructive conditions particularly among individuals with pre-existing asthma (or atopy) and causing excess Chronic Obstructive Pulmonary Disease (COPD) among older women. Consequences of COPD and other forms of obstructive lung diseases are highly damaging to health and may impact the survival of exposed women and children. The Household Air Pollution Intervention Tool (HAPIT) report on Tanzania¹⁵ estimated the burden of disease attributable to household indoor air pollution with respect to five diseases: Lung Cancer; Ischemic Heart Disease (IHD); Stroke; Acute Lower Respiratory Infection (ALRI) in those aged 0-4; and Chronic Obstructive Pulmonary Disease (COPD). The findings show that women and young children living in households where they are exposed to solid biomass fuel have a 2 to 3 times greater risk of developing ALRI compared with those living in households using cleaner fuels or suffering less exposure to smoke.

The priority given to air pollution, whether indoor or outdoor, in the health sector is very low. In the context of environmental considerations for health, the National Health Policy (2007) of Tanzania identifies air pollution as being among the priority policy issues. However, no actions to control air pollution were described under the Health Sector Strategic Plan IV (2015-2020), which is currently in operation, hence limiting the practical execution of this important policy priority. Somewhat more attention is given to air pollution in the environmental sector. There, air pollution has been identified in the National Environment Policy as being among the areas where environmental monitoring needs to be conducted. Further provisions on air pollution are specified in the Environmental Management Act 2004, which promotes “suitable technologies for the minimization of air pollution” among other things. Air pollution and its effects was also a key priority in the National Environmental Research Agenda for Tanzania (2008-2013).

The gap in scientific data describing the relationship between human health and domestic energy choices is critical for developing policy and actions to improve energy options for vulnerable populations both in rural and urban settings of Tanzania.

PROJECT DESCRIPTION

Project beneficiaries

The main beneficiaries of the project will be adult women and children in the populations living in the urban, peri-urban and rural areas of selected districts in seven zones of Tanzania.

Other beneficiaries will be stove technicians, energy product entrepreneurs, staff from project districts, and policy/decision makers. The table below shows the numbers of each beneficiary that the project will reach out to, as well as the role of each beneficiary.

14 Bruce, Nigel et al., 2004. Impact of improved stoves, house construction and child location on levels of indoor air pollution exposure in young Guatemalan children. *Journal of exposure analysis and environmental epidemiology*, 14 Suppl 1, pp.S26–33. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/15118742> [Accessed May 22, 2013].

15 HAPIT 3.1.1: Available at: <https://householdenergy.shinyapps.io/hapit3/>

Beneficiary	Quantity	Roles
Women and children	5,250	Ultimate recipients of the project's impacts. They will benefit from clean indoor air environments and reduced incidences of respiratory diseases.
Stove technicians	105	Producers and suppliers of improved cook-stoves. Capacity will be built through trainings to groups of technicians in each project regions on the production, repair and maintenance of improved cook-stoves.
Energy entrepreneurs	7	Suppliers of raw materials and clean energy products to the project communities and stove technicians.
District staff	21	These are staff who will form clusters in each project district to address issues of indoor air pollutions at the district level.
Communities affected by air pollution problems (in rural and urban areas)	At least 3,000,000	Members of the communities living in selected intervention areas and their neighbours directly through interventions or indirectly via learnings and awareness creation.
Policy/decision makers	50	Recipients of lessons, knowledge and experiences gained from the project in relation to indoor air pollution and health issues.

Overall project objective

The main objective of the project is to reduce the burden of respiratory and related morbidities and mortalities among women and their young children through reduction of their exposure to indoor air pollution (chiefly from biomass combustion through domestic cooking), in 7 zones of mainland Tanzania.

The specific objectives are as follows:

- Conduct baseline and end-line assessments of cooking fuels, cooking technologies and practices as well as of the respiratory and related health effects caused by indoor air pollution in the target communities;
- Raise awareness and develop capacities in households and relevant institutions on indoor air quality improvement and the available options for doing this;
- Increase access to cleaner (low emissions) cooking technologies and fuels for rural and urban households;
- Upgrade housing standards with increased ventilation to reduce exposure to indoor smoke in vulnerable communities; and
- Support the development of a policy, legal, and regulatory framework on indoor pollution control for public health and development purposes.

Intervention strategy

Households in high socio-economic strata, whether in urban or rural areas, may have choices available to them on the domestic energy sources and cooking technologies to use, but for the majority of rural and urban poor indoor air pollution currently remains unavoidable, owing to their limited access to alternative energy sources and cooking technologies, as well as their living in poorly designed housing. Yet, the need for a change towards cleaner indoor air is essential to improve the health of these populations.

To reach durable results, the project will take a holistic approach in which not only the sources of indoor pollution (defined by type of fuels and cooking technologies used) will be addressed but also the human behavioural traits which worsen indoor air pollution as well as the design of the built environment in which fuels and cooking technologies are being used (i.e., the building characteristics which influence smoke removal and indoor space ventilation).

Advocacy at various levels will be carried out, to raise the population's awareness of the risks from indoor air pollution. This will be particularly targeted at women and their young children, because they are most at risk. Not only households but also other entities such as school kitchens will be targeted. Technical and human capacities will also be developed, and supply chains will be strengthened. These are to ensure, on one hand, that a sustainable adoption and usage of cleaner cooking methods are achieved and, on the other one, that the presence of indoor toxicants is minimized through adequate ventilation. In parallel, since the problems of indoor air pollution are not well recognized at the government level, the dissemination of project results will be aimed at initiating dialogues on the supportive policies needed to increase access to cleaner fuel and cooking technologies among poor rural and urban households, and to modify housing designs to increase ventilation.

The project will be implemented in 7 different geographical zones on mainland Tanzania, to be able to address diversity in cooking and heating energy needs, cooking practices, socio-cultural expectations, and household economy levels, all of which can impact indoor pollution sources, periods and levels of exposure, and therefore the related disease burden. Detailed literature reviews and on-the-ground baseline assessments will inform the development of common interventions, energy and cooking stove options, while development of appropriate housing and building designs will be developed as informed by the specific community needs.

The Government will facilitate trans-disciplinary and interdisciplinary collaborations between government partners and stakeholders to address the gaps in access to affordable clean fuel sources and appropriate cooking technologies for households of various socio-economic and geographical backgrounds, to equip households and women in particular with the necessary tools and resources to take on the clean cooking challenge. The collaborations will also address gaps in the understanding of the effect of building design on ventilation and clean indoor air.

In particular, the project will be designed around the implementation of a series of interlinked interdisciplinary approaches:

a. Baseline and End-line Surveys to gather reference indoor air information and situation in the project areas before and after project implementation.

Baseline assessments will be conducted in the chosen communities to gather information on fuel usage, types of cooking technologies used and available, and types of building designs generally adopted, to measure normal indoor air pollutant levels and levels during cooking and heating times, to assess lung function and to identify potential and actual current respiratory health problems related to pollution and other causes, to identify the socio-economic determinants of cooking practices and building designs, to evaluate the levels of community awareness and knowledge on the risks from indoor air pollution, cook-stoves, and clean fuels.

Methods to be used will include interviews, Focus Group Discussions (FGD), in-depth surveys, respiratory health assessments, and documents reviews.

End-line assessments will be composed of elements that will measure progress in clean cooking practices and conditions, including quantitative assessments of exposure to indoor air pollutants and health endpoints.

b. Participatory community mobilizations to enable participatory planning with LGAs and communities and ownership of the project.

Community mobilization will capture a variety of players at both local and national levels. Activities at inception will include: participatory identification of opportunities and potentials for improvement in terms of energy options, stove technologies, building designs, etc.; identification of key players including stove and energy innovators, suppliers, and promoters, as well as house builders; development of community level clusters (teams) for sustainable indoor air pollution mitigation and development of collective plans for indoor air quality improvement.

c. Awareness-raising and capacity development and advocacy on indoor air quality improvement options.

Awareness creation activities will begin from the point of project inception. This component will be implemented in collaboration with socio-education groups, energy and health experts, building design experts, media stakeholders, and partners, using multiple communication tools at various levels. The main messages to be delivered in the targeted communities during awareness raising include polluted indoor air is a major health hazard, responsible for many ailments particularly among women and children.

Capacity-building will involve technical trainings of technicians and entrepreneurs in the project areas in order to: make available clean fuels; produce clean cook-stoves and continue with their maintenance and repair in the future; and build homes with good ventilation.

d. Increasing access to cleaner (low emissions) cooking technologies and fuels for rural and urban households

These measures will be one of the core components of this project, where the aim is to increase access in the targeted communities to cleaner energy options and cleaner cooking technologies, and to demonstrate and advocate for housing improvements that are geared at minimizing exposure to harmful indoor pollutants. The main approaches employed include supporting innovations on cleaner energy, facilitating enhanced production of selected cooking fuel options, strengthening supply chains, and advocating for their use at community level in order to scale up clean home energy in a sustainable way. The project will also increase access to cleaner energy sources by performing the following functions:

- Conducting cost benefit analyses and producing documentation on affordable clean cooking options in different locations/zones;
- Advocating/creating awareness on the cost and health benefits of cleaner fuels;
- Promoting local (in-country) production of solar cooking technologies including solar cooking appliances and batteries;
- Creating/strengthening supply chains for affordable solar systems for cooking purposes in off-grid communities; and

- Scaling up affordable/efficient electric cooking technologies in on-grid communities.

e. Upgrading housing standards with increasing ventilation and reducing exposure to indoor air pollutants in communities

This is the second core component of the project, and addresses measures to reduce exposure to indoor air pollution by promoting better ventilated housing and changing human behaviour. Areas of intervention will be:

- Developing recommendations and providing demonstration units for housing construction with provisions for cooking space and ventilation, for various climatic conditions;
- Composing a team of experts (technical advisors and Trainers-of-Trainers) for training and technical backstopping on healthy housing, with a focus on indoor pollution controls;
- Supporting the development of policy and regulatory tools concerning infrastructure designs and housing amenities, recommending housing materials and methods for avoiding indoor air pollution. At the end, the project will pilot the types of housing improvements required in different geographic zones.

f. Supporting policy, legal, and regulatory framework on indoor pollution control for public health and development purposes

The knowledge which will be gained from the project areas will be used to start a dialogue with government to improve policies, strategies and programmes in the health and energy sectors. Advocacy will be undertaken with government to facilitate the adoption of good practices and lessons learned from this and other projects to develop effective policy instruments on public health protection through the mitigation and control of indoor air pollution.

The project will make recommendations and support the development of specific national guidelines, standards and regulations regarding the domestic cooking energy and housing designs/stands for mitigation of indoor pollution exposures particularly developing regulations for implementation of the Public Health Act 2009 and the Environmental Management Act 2004.

Implementation partnership(s)

The proposed project will be implemented by staff from the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), Ministry of Energy (MoE), Muhimbili University of Health and Allied Sciences (MUHAS), Tanzania Traditional Energy Development Organization (TaTEDO), Tanzania Atomic Energy Commission (TAEC), National Institute of Medical Research (NIMR), and President's Office Regional Administration and Local Governments (PO-RALG).

Specific roles and responsibilities are as follows:

Roles and responsibilities of key stakeholders

Partner	Role	Responsibility
VPO		<p>Overall project overseer</p> <p>Provides overall policy oversight on environmental management policy</p> <p>Coordinates cross sectoral activities and programs</p> <p>Lead entity on the development of legal framework</p>
MoHCDGEC	Overseer of health interventions, policies and regulation in the country	<p>Sectoral coordination and immediate project supervision</p> <p>Coordinates health interventions at ministerial levels</p> <p>Project coordination and management functions</p> <p>Lead entity on the development of legal framework for health, particularly operationalization of the Public Health Act (PHA) 2009</p>
MoE	Overseer of energy interventions, policies and regulations	<p>Supports intervention on reducing biomass energy related indoor air pollution</p> <p>Lead entity in energy sector policy and regulations</p> <p>Coordination of energy sector stakeholders</p>
MUHAS	Training and research and consultancies for health and behavioural related aspects	<p>Coordination of epidemiological and Public Health Assessments</p> <p>Capacity development for health endpoint measurements through laboratory and other technical measurements</p> <p>Establishes behavioural and socio economic context for the uptake of cleaner energy</p> <p>Establishes Centre of Excellence for Indoor air pollution for the country</p>
NIMR	Health research and development organization	<p>Coordination of knowledge management and training</p> <p>Capacity development for environmental measurements and characterization</p> <p>Development of IT platforms for air pollution data management</p> <p>Coordination of technical designs and innovations for health</p>
ARU	Academic and training institutions	<p>Conducts efficiency testing cooking facilities</p> <p>Leads in improved housing designing and provision</p> <p>Leads in efficient cooking technologies</p>

Partner	Role	Responsibility
TaTEDO	Designer and developer of improved cook-stoves Supplier of clean electric cooking appliances Capacity building for service providers in rural and urban areas.	Capacity building of improved cook-stove production Facilitates marketing and supply of improved cook stoves and efficient cooking appliances. Community mobilisation
TAEC	Provide radiation protection services and advise on safe ways to reduce exposure	Provide guidance on how to reduce the effects of indoor air pollutants including of a radioactive nature such as radon particularly through housing

Project partners will be supported by clusters of staff from project districts who will support baseline surveys and community mobilisation. The responsible sectoral Ministry will support the role of Government on indoor pollution, including through the provision of data for health on women and children, and guide other partners.

Project outputs

The following will be the project's outputs and sub-outputs:

1. As a result of reduced indoor air pollution, there are measurable improvements in the health of women and children in the target communities who are suffering from lung and respiratory problems.
 - a. Awareness has been increased in the targeted communities on the affordable, practical, and available means to minimize indoor pollution through the use of cleaner fuels, cleaner cooking appliances, improved ventilation in housing, and protective behavioural patterns.
 - b. High quality evidence has been generated and documented on the state of air pollutants and community health indicators at the beginning and end of the project as a result of completion of both baseline and end-line assessments.
 - c. Indoor air pollutants have been reduced in dwelling houses as a result of increased adoption of improved (emission efficient) cook stoves, and better ventilated houses through infrastructure modification and use of extractor mechanisms like smoke hoods.
4. National capacity has been created for the sustainable design, production, distribution, and testing (regulating) of cleaner cook-stoves and cleaner energy equipment for on-grid and off-grid communities.
5. A national catalogue of housing designs (for indoor pollution mitigation) has been created, taking into consideration different economic classes, location and spaces for cooking areas (including chimneys and extractor mechanisms) and key steps for their construction; and groups of housing providers have been oriented on the healthy housing designs.
6. National plans have been created, indoor pollution mitigation activities have been included in council operational plans, and officials at all government levels have been

designated with coordination roles for indoor and other pollution control activities, as a result of increased prioritization and implementation of actions against indoor air pollution at national and local government levels.

Key project activities

Activities	Location(s)	Timing	Partners
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Output 1: As a result of reduced indoor air pollution, there are measurable improvements in the health of women and children in the target communities who are suffering from lung and respiratory problems

Sub-Output 1a: Awareness has been increased in the targeted communities on the affordable, practical, and available means to minimize indoor pollution through the use of cleaner fuels, cleaner cooking appliances, improved ventilation in housing, and protective behavioural patterns

1.1. Select the intervention districts in each of the seven geographical zones	7 intervention districts	Year 1	All Partners
1.2. Determine the energy choices, cooking technologies, and ventilation techniques in the sample districts		Year 1	All Partners
1.3. Hold meetings and provide educational materials in the sample districts on the following issues : <ul style="list-style-type: none"> •The health effects of indoor air pollution; •The reasons why houses can have high levels of indoor air pollution; •The affordable, practical, and available alternative fuels, cooking technologies, ventilation techniques, and behavioural patterns which can be adopted to reduce indoor air pollution; •The aims of the project; and •The roles of the targeted communities in the project; 		Year 1	MoH, NIMR, MUHAS, VPO
1.4. Through focus group discussions, understand the reasons for the community's energy choices, cooking technologies, and ventilation techniques		Year 1	All Partners
1.5 Conduct gender specific activities including mobilization of women groups for education and advocacy for men's involvement in pollution mitigation actions		Year 1 and 2	All Partners

Sub-Output 1b: High quality evidence has been generated and documented on the state of air pollutants and community health indicators at the beginning and end of the project as a result of completion of both baseline and end-line assessments.

Activities	Location(s)	Timing	Partners
1.6. Identify the households in the target communities which will make up the sample households for the project	7 intervention districts	Year 1	All Partners
1.7. Conduct a baseline situation analysis in the sample households covering domestic fuel usage, cooking practices, ventilation practices	Sample households	Year 1	All Partners
1.8. Conduct baseline measurements of air pollution levels in the sample households and of the respiratory health of the household members		Year 1	All Partners
1.9. Compile a baseline report for each target community and develop operational intervention plans	7 intervention districts	Year 1	All Partners
1.10. Repeat the health analyses in the same households periodically. Conduct end-line progress analyses covering domestic fuel usage, cooking practices, pollution levels, and health endpoint measurements.	Sample households	Year 4	All Partners
Sub-Output 1c: Indoor air pollutants have been reduced in dwelling houses as a result of increased adoption of improved (emission efficient) cook stoves, and better ventilated houses through infrastructure modification and use of extractor mechanisms like smoke hoods			
1.11. Work with the sample households to have them adopt affordable, practical, and available cleaner energy and/or cleaner cook-stoves and/or better ventilation practices	7 intervention districts	Year 2 - 4	All partners
1.12. Provide the community with information materials about the findings in the sample households.	7 intervention districts	Year 2 - 4	All partners
1.13 Work with the community to identify the most reasonable opportunities and potentials for improvement in their communities, in terms of energy options, stove technologies, ventilation practices, etc.	In study districts	Year 2	All Partners
1.12. Identify key players including stove and energy innovators, suppliers, and promoters, as well as home builders.	In study districts	Year 2	All Partners (TaTEDO)
1.13. Develop community level clusters (teams) for sustainable indoor pollution mitigation	In study districts	Year 2	All Partners
1.14. Develop collective community plans for indoor air quality improvement	In study districts	Year 2	All Partners

Activities	Location(s)	Timing	Partners
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Output 2: National capacity has been created for the sustainable design, production, distribution, and testing (regulating) of cleaner cook-stoves and cleaner energy equipment for on-grid and off-grid communities

2.1. Prepare a training manual for capacity-building for various intervention groups, namely LGAs and community promoters, producers, and distributors, large scale products manufacturers	In study districts	Year 2	All Partners (MOHCDGCE)
2.2. Undertake training on production, maintenance and repair of improved cookstoves for rural and urban poor households, institutions and SMEs	In study districts	Year 2	All Partners (TaTEDO)
2.3. Undertake training on clean cooking using other clean cooking methods (solar, gas and electricity) for urban households, SMEs and Institutions	In study districts	Year 2	All Partners

Output 3: A national catalogue of housing designs (for indoor pollution mitigation) has been created, taking into consideration different economic classes, location and spaces for cooking areas (including chimneys and extractor mechanisms) and key steps for their construction; and groups of housing providers have been oriented on the healthy housing designs

3.1 Prepare draft structural designs for efficiently ventilated dwelling houses with provision for kitchen space and extractor mechanisms using locally available materials	National level	Year 1-2	Research and academic institutions: MUHAS, NIMR, ARU
3.2 Pilot the drafted structural designs in laboratory and fields for work and cooler climatic zones	National level	Year 2	MUHAS, NIMR, ARU
3.3 Upgrade draft housing designs with incorporation of learnings from pilot activities	National level	Year 2	MUHAS, NIMR, ARU
3.4 Compile the acceptable housing designs with considerations for pollution control and other health requirements	National level	Year 2	MOH, VPO, MUHAS, NIMR, ARU
3.5 Conduct orientation sessions for rural and urban housing providers/builders on the new catalogue recommendations for healthy housing	National to LGA levels	Year 2-3	ARU, National Housing Corp.

Output 4: National plans have been created, indoor pollution mitigation activities have been included in council operational plans, and officials at all government levels have been designated with coordination roles for indoor and other pollution control activities as a result of increased prioritization and implementation of actions against indoor air pollution at national and local government levels

4.1. Document the best practices from the targeted communities and use these to provide recommendations to government on the policy, legal, and regulatory actions required to upscale the uptake of fuels, technologies and practices which reduce indoor air pollution	From district to national levels	Year 2	All Partners
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Activities	Location(s)	Timing	Partners
4.2. Develop mechanisms to ensure access for exposed women to healthcare in the local community health services, and develop referral systems for those women with adverse health problems requiring more specialised care	In study districts	Year 4, 5	All Partners
4.3. Train environmental health practitioners in local government to recognise poor household environments, and teach them how to rapidly appraise such high risk households so as to be able to advise them on strategies to implement that reduce their risk of adverse health outcomes	In study districts	Year 2	All Partners
4.4. Support local government officials in the development of the necessary local by-laws	In study districts	Year 3	All Partners
4.5. Develop policy briefs, and organize workshops with national political leaders to address indoor air pollution and to develop mechanisms for policy formulation and implementation	In study districts	Year 4, 5	All Partners
4.6. Support the national task force on health and environment through the Vice President's Office at national level to provide oversight for the project and beyond	National level	Year 1, 2, 3	VPO-DoE, MoHCDGEC, MoE
4.7. Support the functioning of council and ward standing committees on Environment, Health, and Development as provided by the Environmental Management Act of 2004 (As per Section 37-38). Establish coordinators both from health and environment and support their planning and operations	LGAs	Year 1-5	VPO-DoE
4.8. Develop national guidelines on indoor and outdoor air quality for public health protection	National level	Year 3-5	MoHCDGEC, VPO-DoE, MoE
4.9. Develop specific regulations on minimization of indoor air quality in dwelling houses as provided under the Public Health Act 2009 (See section 66-68)	National level	Year 2-4	MoHCDGEC, VPO-DoE, MoE
4.10. Organize capacity-building programs for local stove producers, interpreters, and promoters at grassroot levels including provision of seed funding for small investments in capital like production machineries	District, ward, & community levels	Year 4, 5	MoHCDGEC and all other stakeholders
4.11. Develop an Indoor Air Pollution Centre of Excellence	Selected site	Year 2, 3	All Partners (MUHAS, NIMR, ARU)

Gender mainstreaming

Gender mainstreaming in the project activities will be ensured by imparting gender equity impacts amongst men and women in the project areas. Gender mainstreaming through this project can be looked at from a number of angles. In this case, project management will look at it from technologies, project activities and beneficiaries. There will be inclusive efforts of mixing male and female technicians and operators during implementation project activities. The project will consider equitable health benefit distribution amongst women and men in the households and surrounding communities.

The health benefits from the project will be considered for both men and women before and after project. Women will be involved in all levels from the project management, at district level and at community level. Involvement of women will be ensured through capacity building and use of clean cook-stoves and impacts to the clean indoor environment.

Project financing and indicative budget

Budget line	EUR					
	TOTAL	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Project staff:						
- International	306,000	91,800	61,200	61,200	61,200	30,600
- National	780,000	234,000	156,000	156,000	156,000	78,000
Project consultants:						
- International	80,000	24,000	16,000	16,000	16,000	8,000
- National	145,000	43,500	29,000	29,000	29,000	14,500
Sub-contracts						
District IAP clusters	200,000	60,000	40,000	40,000	40,000	20,000
Grassroot centres	155,000	46,500	31,000	31,000	31,000	15,500
Baseline survey	142,000	42,600	28,400	28,400	28,400	14,200
Community mobilization	163,000	48,900	32,600	32,600	32,600	16,300
Gender mainstreaming	112,000	33,600	22,400	22,400	22,400	11,200
Meetings and workshops						
Management meetings	40,000	12,000	8,000	8,000	8,000	4,000
Capacity building workshops	252,000	75,600	50,400	50,400	50,400	25,200
Other meetings	50,000	15,000	10,000	10,000	10,000	5,000
Other direct costs						
Create access and supply of low emission cooking solutions	650,000	195,000	130,000	130,000	130,000	65,000

Budget line	EUR					
	TOTAL	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Develop Indoor air centre of excellence	915,000	274,500	183,000	183,000	183,000	91,500
Develop marketing networks for low emission cook-stoves	100,000	30,000	20,000	20,000	20,000	10,000
Core support for project management						
Transport and travel	90,000	27,000	18,000	18,000	18,000	9,000
Procurement of 2 project vehicles	70,000	70,000				
Vehicle maintenance and fuel	112,000		32,000	32,000	32,000	16,000
Financial reporting/ auditing	100,000	30,000	20,000	20,000	20,000	10,000
Communication and mass media	90,000	27,000	18,000	18,000	18,000	9,000
Support to indoor air pollution task forces	100,000	30,000	20,000	20,000	20,000	10,000
TOTAL	4,652,000	1,411,000	926,000	926,000	926,000	463,000

All of the participating academic institutions will contribute in-kind to the project. This includes the time of the Principal Investigator and co-Principal Investigator, access to internet and telephonic services, financial management, space, etc. Financial co-support from projects already ongoing in Tanzania includes the Fogarty International Centre.

Sustainability of project results

The proposed project results are expected to continue and be replicated in other areas even after project implementation phase. The project at local level is expected to put in place institutional frameworks for reducing indoor air pollution through district clusters. These clusters will support implementation of the project and continue to support performance of project activities in selected zones. The support of the project will also be in the form of introducing activities for reducing indoor air pollution in district plans and implement them at district levels.

The technical and production capacity developed in different stakeholders in the project areas will enable them to continue with supply and marketing of low emission solutions in the project areas. The indoor air pollution guidelines and task force will also continue to provide recommendations which will be followed by district clusters in areas highly affected by indoor air pollution.

Financial sustainability is expected to come from the budgets of supported district councils and institutions that are going to be developed through this project such as the IAP Centre of Excellence. Sustainability interventions to scale up efforts to reduce indoor air pollution will also be developed and will enable the project activities to be replicated in other parts of the country.

Risks to project implementation

Project assumptions	Risk of failure	Mitigation action(s)
<p>Assumption 1:</p> <p>Country capacity is adequate for design and production of improved stoves of adequate quantities to satisfy requirements for the project phase and beyond.</p>	<p>Low</p> <p>There is existing knowledge, capacity, and already produced cleaner cooking options in the country. The main job of the project is to scale up these capacities and not to create them.</p>	<p>Ensure that potential producers and suppliers are appropriately mapped and critical support is provided including training and sensitization early during the project.</p> <p>Advocate for economic incentives to increase affordability of the technology and so promote their large scale adoption.</p> <p>Explore options for community level production or assembly and technical know-how for repair of energy appliances.</p>
<p>Assumption 2:</p> <p>Policy environment is supportive: the government embraces the knowledge on the subject and policy changes are adopted smoothly.</p>	<p>Low</p> <p>There is a positive policy environment since the program itself is spearheaded by the Vice President's Office. What is missing is the compelling evidence of the impacts and demonstration of viable potentials for making positive change.</p>	<p>Compile best literature into facts sheets, for advocacy and awareness creation.</p> <p>Adopt a strong policy level advocacy from the project beginning.</p> <p>Advocate for policy changes including development of guidelines and regulations.</p>
<p>Assumption 3:</p> <p>Good level of commitment from district, community, and households leading to high adoption of improved stoves and housing improvements.</p>	<p>Medium/Low.</p> <p>LGAs are expected to provide support since the intervention is in line with the national policy and regulations. Community members are more likely to appreciate benefits of improvements and take action once they are well informed of the cost and benefits of the interventions.</p>	<p>Public awareness activities should be well planned and implemented at the beginning of the project.</p> <p>Communities will be engaged effectively from the start to ensure smooth communication and engagement of local champions for change. This could include using experiential marketing technics in our communication strategy.</p>

Monitoring, reporting and evaluation

The achievements of the project will be reported in regular progress reports. These will be developed and submitted to the project coordinators and the donors. A framework for monitoring the project indicators will be developed by Monitoring and Evaluation experts.

The monitoring system will look at:

- Progress in implementing the activities (through a set of key indicators that will be measured for different activities);
- Progress against output, outcome and impact targets;

- Developments regarding the assumptions and risks identified in the log frame; and
- Qualitative assessment of any quantitative monitoring data.

Communication and visibility

Communication and dissemination of the findings of the project will take place at a variety of levels, targeting different audience types.

- Community Groupings:** community workshops will be held on an ongoing basis, to engage with the community, discuss their concerns, address the intervention options, and to inform them of the findings of the project. The findings will be distilled into easy-to-read pamphlets for community members.
- Policy Makers and Non-governmental Organisations:** Representatives of the relevant government departments and of non-governmental organisations with a direct involvement in environmental health or clean energy will be invited to participate in expert/stakeholder workshops to determine the best ways in which to translate the findings for social good. Policy briefs will be prepared by the Steering Committee for dissemination among these relevant stakeholders.
- The Scientific Community:** the findings of the field work in the target communities will be presented at regional and international conferences on energy and health. The findings will additionally be submitted to international peer reviewed journals for a wider dissemination.

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partner and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

PROJECT PROPOSALS ON CHEMICALS FROM AGRONOMY



PROJECT SUMMARY

While the acute health consequences of exposure to pesticides during crop production are relatively well described, the chronic health effects from pesticide exposure are far more difficult to characterize and quantify, and are frequently hidden. Chronic effects result from mild to moderate poisoning, mostly from occupational or accidental exposures and are rarely reported due to inaccessibility of services, treatment costs, competing priorities of the community members, and ignorance or fear of losing employment. The effects have important policy implications because the costs of the adverse effects of pesticides are not taken into account in policy and programme implementation, while they are borne by the government in health care costs or lost productivity. Typically, these costs are externalized, and borne by those

Project title:	Sound management of pesticides in agronomy for protection of human health in Tanzania
Location(s):	United Republic of Tanzania (Five Zones)
Planned start date:	March 2019
Duration:	5 years
Government coordinating agency and Executing agency/ cooperating agency:	(i) Tropical Pesticides Research Institute (TPRI) (ii) Muhimbili University of Health and Allied Sciences (MUHAS) (iii) Ministry of Agriculture (iv) Ministry of Health, Community Development, Gender, Elderly and Children (v) Ministry of Livestock and Fisheries
Budget (in EUR):	4,995,289



THIS PROJECT AIMS TO CO-ORDINATE INTERVENTIONS INTO THE IMPACTS OF PESTICIDES ON HUMAN HEALTH AND ENVIRONMENT AS WELL AS SAFER ALTERNATIVES THAT WILL INCREASE CROP PRODUCTIVITY IN TANZANIA.

with the least resources to cope (poor, marginalized, rural communities).

This project therefore aims to co-ordinate interventions into the impacts of pesticides on human health and environment as well as safer alternatives that will increase crop productivity in Tanzania. It will be based on pilot studies in community self-surveillance of pesticide poisoning and IPM/organic farming. It is expected to provide an excellent basis for mitigating toxic exposures in a sustainable manner since once awareness is created among communities growing crops and safer alternatives are available, it will be shared with other communities.

RELEVANT BACKGROUND

In Tanzania, as in many developing countries, estimations of the risks and benefits of pesticides use often ignore the real costs of that use, leading to their externalisation: onto the farmers who use them, onto their family members and the wider rural communities exposed to them, onto consumers who ingest crop products contaminated with them, onto species in the natural environment which are exposed to them.

On the benefits side, to meet the market demand for quality crops and livestock, farmers in Tanzania use various pesticides to enhance agricultural productivity. Since it is estimated that agriculture provides 80% of the country's employment and contributes to approximately 26% of GDP (Manyilizu et al., 2016)¹⁶, it is the national interest to support enhancements of agricultural productivity. An estimation is that 81% of the pesticides used in Tanzania are applied to control pests and diseases in the agronomy and livestock sectors (Ngowi et al., 2016)¹⁷. Crop production, the focus of this proposal, is a particularly heavy user of pesticides. Horticultural crops, cotton, coffee, and flowers are the major crops using pesticides. There are about five agricultural ecological zones which use pesticides intensively based on crops they cultivate. In the Northern zone, the Arusha region is known to be the leader in Tanzania for pesticides trading and use, with around 28 active ingredients in use, because of the intensification of horticulture (Mrema et al, 2017)¹⁸. Horticulture used to be mainly for subsistence, but is now commercializing rapidly and is mainly dominated by small-scale farms (0.5-5 acres) managed by women.

Health problems arising from exposure to pesticides range from acute poisoning to chronic effects (Maroni and Fait 1993)¹⁹. Exposure to pesticides has been associated with neurological and neuropsychiatric effects in adults who are occupationally exposed to high levels of pesticides (London et al, 2012)²⁰. Moreover, research worldwide is showing a link between "routine" uses in the absence of cases of poisoning that is equivocal on the long-term health effects.

Unfortunately, there is a lack of data in Tanzania on types, amounts and users of pesticides, and on intensities of exposure and pesticide poisoning incidences. Community self-surveillance methods have been piloted in Ngarenanyuki (Meru) and the Lake Eyasi basin (Karatu). Self-reporting of acute pesticides poisoning in the Lake Eyasi Basin has revealed the health symptoms of the farmers which were reported. These ranged from experiencing symptoms of mild irritation to moderate symptoms of organophosphate pesticides poisoning every time they spray. There were also 28 cases of loss of consciousness or seizures during the spraying season, of which the majority were underreported in the health information management system due to misdiagnosis in the healthcare facilities (Ngowi,

16 Manyilizu et al: Association of Long-Term Pesticide Exposure and Biologic Parameters in Female Farm Workers in Tanzania: A Cross Sectional Study. *Toxics* 2016, 4(4), 25: doi:10.3390/toxics4040025

17 Ngowi et al: Pesticide Health and Safety Challenges Facing Informal Sector Workers: A Case of Small Scale Agricultural Workers in Tanzania. *New Solutions: A Journal of Environmental and Occupational Health Policy* 2016 Vol. 26(2) 220–240

18 Mrema et al: Pesticide exposure and health problems among female horticulture workers in Tanzania. *Environmental Health Insights* 2017;22:11

19 Maroni M, Fait A. : Health effects in man from long-term exposure to pesticides. A review of the 1975-1991 literature. *Toxicology*. 1993 Mar;78(1-3):1-180

20 London Leslie et al: Neurobehavioural and neurodevelopmental effects of pesticide exposures. *Neurotoxicology*. 2012 Aug; 33(4): 887–896. Published online 2012 Jan 17. doi: [10.1016/j.neuro.2012.01.004](https://doi.org/10.1016/j.neuro.2012.01.004)

2013²¹, Lekei et al., 2016²²). While the methodology used in these pilot schemes does not aim to associate particular chemical use with symptoms, it did show correlation in time and serve to increase community awareness about routes and effects of pesticide poisoning. In another study, α -, β -, and γ -BHC, Endrin, Dieldrin, Aldrin, α - and β -Endosulfan, Endosulfan ether and Heptachlor have all been detected in human body fluids in Tanzania (Ngowi, unpublished)²³.

Studies have also been carried out in Tanzania to assess the possible impacts of pesticide use on consumers. For instance, an assessment was made of the pesticides health risks from eating tomatoes grown in the Meru District of the Arusha region. Permethrin (mean of 5.3 mg/kg, five times higher than the 1 mg/kg MRL), Chlorpyrifos (mean of 7.5 mg/kg, 14 times higher than the 0.5 mg/kg MRL) and Ridomil (mean of 2.9 mg/kg, 14 times higher than the 0.2 mg/kg MRL) were all detected. The Health Risk Indices, determined as the ratio of estimated daily intake to acceptable daily exposure, for these three pesticides were all greater than one. This implies that lifetime consumption of fresh tomatoes from this region can pose health risks from ingestion of Chlorpyrifos, Permethrin and Ridomil (Kariathi, Kassim, & Kimanya, 2016)²⁴.

Studies have also been carried out in Tanzania to assess the levels of pesticides in the natural environment. For instance, studies done by the Tropical Pesticides Research Institute (TPRI) identified p,p'-DDT, o,p'-DDE, and β -BHC in fish (Kihampa C. et al, 2010²⁵. In other studies, Lindane, Chlorpyrifos, Endosulfan, p,p'-DDE, p,p'-DDD, DDT, and Dieldrin have all been detected in soil samples collected from tomato fields in Tanzania (Kihampa C. et al, 2010)²⁶. Endosulfan sulphate was detected in 100% of the samples analysed, with a mean concentration of 0.2407 mg/kg dw. Chlorpyrifos was detected in 87% of the samples, with a mean concentration of 0.1253 mg/kg dw. p,p'-DDE and p,p'-DDD were detected in 46 and 40% of the samples analysed, with mean concentrations of 0.1482 and 0.154 mg/kg dw, respectively. Lindane was the least detected pesticide, being detected in 5 (33%) of soil samples analysed with mean concentration of 0.2126 mg/kg dw.

In general, the end users of pesticides in Tanzania lack knowledge on the health and environmental impacts of the pesticides they use, relying instead on pesticide dealers or neighbours. The majority of these are primary school leavers with little or no knowledge of pesticides' health and environmental impacts (FAO Final Report (2018)²⁷.

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- 21 Ngowi Aiwerasia et al: Pesticide Health Impacts In Encyclopedia of Environmental Management. Taylor and Francis: New York, Published online: 29 May 2013; 573-577.
 - 22 Lekei Elikana et al: Underreporting of acute pesticide poisoning in Tanzania: modelling results from two cross-sectional studies. Environmental Health 2016, 15:118. Available at <https://doi.org/10.1186/s12940-016-0203-3>
 - 23 Ngowi, Aiwerasia and Rongo Larama (2008). Profile of Chlorinated Pesticides in Human Body Sera from East Africa Farmers in 1991-1994. Poster presentation at The First African.
 - 24 Kariathi Victoria et al: Pesticide exposure from fresh tomatoes and its relationship with pesticide application practices in Meru district. Cogent Food & Agriculture (2016), 2: 1196808. Available at <https://doi.org/10.1080/23311932.2016.1196808>
 - 25 Kihampa, C., Mato, R. R. A. M., & Mohamed, H. (2010): Residues of Organochlorinated Pesticides in Soil from Tomato Fields , Ngarenanyuki ,. Vol. 14 (3) 37 - 40
 - 26 Kihampa, C., Mato, R. R. A. M., & Mohamed, H. (2010). Residues of Organochlorinated Pesticides in Soil from Tomato Fields , Ngarenanyuki ,. Vol. 14 (3) 37 - 40
 - 27 FAO: Final technical report on "project on support for reducing risks of highly hazardous pesticides in the United Republic of Tanzania (URT)", 2018

The impacts of pesticides in Tanzania are worsened by their over-use or their misuse. Studies carried out in some areas of Tanzania have indicated that farmers spray pesticides in mixtures without regard to the active ingredients, mixing three or four pesticides in one mixture which as a consequence is often misused. Users also often overuse pesticides by increasing the frequency of spraying to deal with pesticide resistance or simply with the wrong selection of pesticides (Ngowi et al., 2007)²⁸.

Pesticides use in Tanzania is subjected to regulations. These control imports, distribution, and sales, allowing only those pesticides which are considered less harmful to be registered for use. Most toxic and persistent pesticides are either banned or restricted in use. That being said, unregistered pesticides are smuggled into the country and found on the market. Inadequacies in the regulatory system have led to the sale of pesticides by unlicensed vendors, and the availability of substandard, unregistered, and obsolete products.

A better understanding of the levels of pesticide exposures and their effects is essential to guide the proper interventions and the right levels of resource allocation. Consequently, this project aims to implement interventions in areas of crop production to better understand the impacts of pesticides on the health of Tanzania's population as well as the country's environment. It will also implement interventions to lessen exposure to pesticides by promoting the use of safer alternatives that will maintain if not increase farmers' productivity. It will be based on pilot interventions in different agro-ecological zones, capacity-building, introduction of alternative pest control methods, community self-surveillance of pesticide poisoning, establishment of reporting systems for pesticides poisoning incidents, biological monitoring, assessment of pesticides residues in crops, consolidation of pesticides laws and policies. It is expected to provide an excellent basis for mitigating toxic exposures in a sustainable manner since once awareness is created among crop-growing communities and safer alternatives are available, this knowledge will be shared with other communities.

PROJECT DESCRIPTION

Project beneficiaries

The major beneficiaries will be farmers and farm workers who use pesticides on crops, along with their families who are involved in the handling and storage of pesticides.

Other beneficiaries will be:

- Officers in existing agricultural training organizations
- Extension officers
- Persons involved in the pesticides regulatory process (pesticides registrar, environmental health practitioners, medical officers, pesticide inspectors)
- Persons involved in monitoring compliance with laws and regulations governing the trade in pesticides
- Pesticides dealers
- Researchers and academics

28 Ngowi AVF, Mbise T.J, Ijani A.S.M, London L. and Ajayi, O.C: Pesticide use by smallholder farmers vegetable production in Northern Tanzania. Crop Prot. 2007; 26 (11): 1617-1624

Overall project objective

To reduce the risks to human health and the environment from pesticides exposure in crop production with a view to protecting farmers and the broader community, as well as non-target organisms such as pollinators and natural enemies of pests.

Intervention strategy

The project will work at different levels and with various stakeholders involved in the use of pesticides.

At the national level, recognizing that the current control mechanisms for the use of pesticides in the country are weak, the project will work with the relevant government authorities to promote a review and consolidation of the existing pesticides legal and policy framework. That will facilitate better enforcement of sound management measures for pesticides by highlighting to policy makers the negative impact of fragmentation in the legal texts as well as of lobbying. In addition, the project will support the development of amendments to the existing laws, primarily with the objective of increasing the number of law enforcement officers (inspectors, etc.).

At the field level, the project will work in five different agro-ecological zones, using the principle of pilot interventions which can then be used as the evidential basis for scale-up activities. In the chosen locations, the project will work on six levels.

- a. **Biological monitoring:** As a first step, the project will conduct a programme of testing for cholinesterase levels and pesticides residues in pesticides users in the five site locations, to determine the intensity of exposure in the target communities. These data will be important in the capacity-building programmes that will succeed this step.
- b. **Assessment of pesticides residues in crops:** In parallel, assessments will be made of the pesticides residues in the food crops grown and harvested in the five site locations, to ascertain levels of contamination. These data too will have an important role in the capacity-building programmes. Since the food crops could be traded far beyond the local area, policy briefs will also be prepared, to be shared with the relevant government authorities at the national level.
- c. **Capacity building programmes:** The project will first identify key gaps in knowledge about the sound management of pesticides used on crops through a series of surveys. Programmes of training, demonstrations, and mentoring will then be organized and delivered to farmers, farming communities, and pesticide dealers, with the aim of increasing their knowledge about the impacts on health and safety of pesticides and about the sound management of pesticides. The project will also develop promotional materials to convey the same information. Capacity building programmes will also be designed for the relevant service providers on the sound management of pesticides: pesticides registrar, environmental health practitioners, medical officers, pesticide inspectors.
- d. **Introduction of alternative pest control methods:** A number of alternative pest control methods for different crops already exist in the country. The project will

identify existing alternative methods which are relevant for the different crops grown in the five project site locations and will run demonstration trials on volunteer farms. The project will use these to demonstrate to the local farmers as well as to local agricultural extension officers the efficacy of these alternatives. The latter can then ensure scale-up of their use by the community's farmers and, where relevant, their transfer to other crops.

- e. Establishment of pesticides poisoning incidents reporting systems:** The project will establish mechanisms for obtaining pesticide poisoning data that will involve collection of information on hospital poisoning cases and farmers self-reporting on incidents. The project will work with the Government Chemist Laboratory Authority (GCLA) to facilitate transfer of pesticide poisoning data from TPRI as a Node and from hospitals to a Poison Information Centre database. The project will support the communities in the five chosen locations to adopt self-reporting approaches. In this approach, farmers are trained on filling in a form showing signs and symptoms experienced during and immediately after pesticide handling, and report the number of signs and symptoms and pesticides handled to TPRI through a channel to be established. The project also expects to cultivate motivation among pesticide users to use the pesticides poison reporting mechanism.
- f. Monitoring and evaluation:** Towards the end of the project, the biological monitoring and the assessment of pesticide residues in crops will be monitored again to assess the success of the capacity-building exercises as well as the promotion of alternative pest control methods.

Implementation partnership(s)

The following table shows the main implementation partners and their roles/responsibilities in the project's implementation.

Name	Roles/Responsibilities
Vice-President's Office - Division of Environment (VPO-DoE)	<p>Providing guidance on the implementation of the project activities</p> <p>Coordinating all implementers to ensure project targets and objectives are achieved within the agreed time framework.</p>
Department of Environmental and Occupational Health, Muhimbili University of Health and Allied Health Sciences (MUHAS)	<p>Overseeing the overall project;</p> <p>Specific implementation responsibilities:</p> <ul style="list-style-type: none"> overseeing training of field staff; setting up field infrastructure; securing approvals; ensuring good quality data collection in the field and data capture; (in collaboration with TPRI) establishing the community self-surveillance system in the five project site locations; report writing and dissemination
National Environmental Management Council (NEMC)	<p>Providing guidance and technical support on disposal of pesticide wastes (empty containers and left-overs)</p>

Name	Roles/Responsibilities
Government Chemist Laboratory Authority (GCLA)	<ul style="list-style-type: none"> Coordinating pesticide poisoning reporting system Maintaining pesticide poisoning surveillance database
Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC)	<ul style="list-style-type: none"> Evaluating and amending relevant legal instruments Providing guidance and technical support on the standards and best practices for the sound management of pesticides Facilitating sensitization of reporting system for pesticide poisoning cases in the National Health Data Warehouse (HMIS) Treating individuals identified to be injured by pesticides Linking researchers to various health facilities Participating in training
Ministry of Agriculture (MoA)	<ul style="list-style-type: none"> Evaluating and amending relevant legal instruments Sensitising LGAs on importance of pesticide use reduction and use of alternatives pest control methods Training agricultural stakeholders on various methods to manage pests (Integrated Pest Management (IPM)) Creating awareness on effects of pesticides on the environment Coordinating pesticide poisoning incidents reporting at grassroots level Identifying locally available alternatives to pesticides Establishing demonstration pilots for alternatives to pesticides
Ministry of Livestock and Fisheries (MLF)	<ul style="list-style-type: none"> Evaluating and amending relevant legal instruments
Tropical Pesticides Research Institute (TPRI)	<ul style="list-style-type: none"> Evaluating the existing laws and identifying any gaps, then planning strategies for filling the gaps identified Compiling information on the impacts of pesticide legislation (in collaboration with MUHAS) conducting biological monitoring in human body fluids and residue analysis in food crops samples (in collaboration with MUHAS) conducting trainings and capacity building activities Collecting information on alternative pest control methods and preparing training materials, establishing demonstration sites, organizing training Establishing the pesticide poisoning reporting system that will link with the National Poison Centre (in collaboration with the Ministry of Health) collecting documented pesticide poisoning incidents from selected hospitals
District, ward and village agricultural extension offices (local Government)	<ul style="list-style-type: none"> Contributing towards community consultations Contributing local knowledge Closely following up on implementation at their levels (district, ward, village) Mobilizing community participation and enrolment Supervising self-reported data collection

Name	Roles/Responsibilities
District health officers (local Government)	Participating in trainings on all exposure and outcome assessment tools
Ward executives (local Government)	Hosting students from MUHAS
Management Teams composed of community members living close to the self-reporting farmers	(in collaboration with the local authority) Selecting the self-reporting farmers, Training the self-reporting farmers Gathering the self-reporting forms weekly Analysing the data monthly Conducting the monthly feedback meetings with the self-reporting farmers

Project results/outputs

1. Existing legal framework for pesticides has been consolidated and new pesticides laws and policies have been developed, if required;
2. The intensity of pesticide exposure in the human population in the five site locations has been characterised (baseline);
3. Pesticide residue data for different crops in the five site locations has been collected (baseline);
4. Relevant capacities have been built in the farming communities of the five site locations;
5. Data is being provided on the incidence of cases of mild and moderate pesticide poisoning not normally reported by to the local health care system;
6. Alternative pest control methods have been introduced;
7. Levels of body burdens and pesticide residues have fallen in the five site locations; and
8. Sound management of pesticides has been streamlined at all levels.

Key project activities

Activities	Locations	Timing	Partners
Output 1: Existing legal framework for pesticides has been consolidated and new pesticides laws and policies have been developed, if required			
1.1 Lobby for a review of the national legal and policy framework to consolidate management of pesticides	National level	Q1-Q3Y1	MoA, MLF, MoHCDGEC, TPRI, legal consultant, relevant project stakeholders
1.2 Support the development of a national regulation on sound management of pesticides	National Level	Q1, Y1	MoA, MLF, MoHCDGEC, TPRI, legal consultant, relevant project stakeholders
1.3 Review and develop specific guidelines and protocols for the importation, use and control of pesticides	National Levels	Q1, Y1	Policy makers, stakeholders, relevant project partners

Activities	Locations	Timing	Partners
Output 2: The intensity of pesticide exposure in the human population in the five site locations has been characterised (baseline)			
2.1. Develop and organize training of the laboratory staff that will be analysing samples	TPRI	Q1, Y1	TPRI
2.2. Inform the communities in the five site locations about the purpose of cholinesterase and pesticide residue testing	Five site locations	Q3, Y1	TPRI, MUHAS
2.3. Collect body fluids samples	Five site locations	Q3, Y1	TPRI
2.4. Undertake field cholinesterase testing	Five site locations	Q3, Y1	TPRI, MUHAS
2.5. Conduct dissemination of the results workshops	Five site locations	Q4, Y1	TPRI, MUHAS
Output 3: Pesticide residue data for different crops in the five site locations has been collected (baseline)			
3.1. Survey the types and amount of crops grown in the five site locations and the pesticides used	Five site locations	Q3, Y1	TPRI
3.2. Collect food crops samples	Five site locations	Q4, Y1 Q1-Q2, Y2	TPRI
3.3. Analyse samples for pesticide residues	TPRI Laboratory	Q4, Y1 Q1-Q2, Y2	TPRI
3.4. Conduct workshops to disseminate the results	Five site locations	Q4, Y1 Q1-Q2, Y2	TPRI, MoA, MUHAS
Output 4: Relevant capacities have been built in the farming communities of the five site locations			
4.1. Undertake a snapshot survey of farmer practices and perceptions in the five site locations	Five site locations	Q2, Y1	TPRI, MUHAS, local government
4.2. Review existing training and data collection materials	Five site locations	Q3-Q4, Y1 Q1-Q2, Y2	Project implementers, local government
4.3. Conduct surveys in the five site locations to obtain baseline information on pesticides use and practices	Five site locations	Q3, Y1	Project implementers, any relevant project partners
4.4. Constitute community-based management teams	Five site locations	Q3, Y1	Project implementers, local government
4.5. Establish/empower schools' environment clubs to support community signs and symptoms calculation	Five site locations	Q3, Y1	Project implementers, local government
4.6. Train the management teams as well as the self-reporting farmers	Five site locations	Q4, Y1	Project implementers, local government, any relevant project partners

Activities	Locations	Timing	Partners
4.7. Conduct training, demonstrations, and mentoring of farmers as well as pesticide dealers on health and safety to increase knowledge and understanding on best practices	Five site locations	Q3, Y1 Q1-Q4, Y2-Y5	Project implementers, any relevant project partners
4.8. Develop promotional materials to inform the farming communities on the sound management of pesticides	Five site locations	Q4, Y1 Q1-Q4, Y2-Y5	Project implementers and any relevant project partner
4.9. Conduct tailor-made trainings for service providers on sound management of pesticides: pesticides registrar, environmental health practitioners, medical officers, pesticide inspectors	Five site locations	Q3, Y1	Project implementers and any relevant project partner
4.10. Conduct dissemination workshop involving all the beneficiaries	Five site locations	Q4, Y3	Project implementers and partners as well as beneficiaries

Output 5: Data is being provided on the incidence of cases of mild and moderate pesticide poisoning not normally reported to the local health care system

5.1. Establish mechanisms for reporting community poisoning incidences by linking TPRI with the Poison Centre at GCLA	Dar es Salaam	Q2, Y1	MUHAS, TPRI, GCLA, MoA, local government
5.2. Document data on the incidence of mild and moderate pesticide poisoning not normally reported to the local health care system	Five site locations	Q4, Y1, Q1-Q4, Y2-Y5	MUHAS, TPRI, GCLA, WEO, WAEO, self-reporting farmers
5.3. Revise existing tool for capturing severely hazardous pesticides poisoning incidences and use in reporting mechanism/system	Five site locations	Q1, Y2	MUHAS, TPRI, GCLA and MoHCDGEC, any relevant project partners
5.4. Train data collectors at hospitals and community levels	Five site locations	Q3, Y1	MUHAS, TPRI, GCLA
5.4. Gather data collected weekly through self-reporting and monthly in health care facilities and prepare reports	Five site locations and Dar-es-Salaam	Q4, Y1, Q1-Q4, Y2-Y5	MUHAS, TPRI, GCLA, WEO, WAEO, management teams
5.5. Conduct dissemination workshops and meetings to stakeholders	Five site locations and Dodoma	Q4, Y1-Y5	MUHAS, TPRI
5.6. Develop policy brief and conduct policy dialogue for up-scaling outcomes of results nationwide	Dar es salaam and Dodoma	Q3, Y3 and Y5	VPO, MoHCDGEC, MoA

Output 6: Alternative pest control methods have been introduced

6.1. Conduct an inventory of alternative pest control methods	Five site locations	Q4, Y1-Q4, Y3	MoA, local government, management teams
6.2. Establish selected pest control methods in one zone in selected areas	Five site locations	Q4, Y2-Q4, Y5	MoA, local government, management teams

Activities	Locations	Timing	Partners
6.3. Monitor the effectiveness of the alternative methods in the selected areas	Five site locations	Q4, Y1-Q4, Y3	MoA, local government, management teams
6.4. Advocate for safer methods and practices on both pesticides and alternative pesticide methods to all farmers	Five site locations	Q4, Y2	MoA, Local government

Output 7: Levels of pesticide body burdens and pesticide residues have fallen in the five site locations

7.1. Repeat the testing carried out in output 2 for pesticide body burdens	Five site locations	Q1, Y4	TPRI, MUHAS
7.2. Repeat the testing carried out in output 3 for pesticide residues in food crops	Five site locations	Q2, Y4	TPRI
7.3. Prepare a report showing how the levels of body burdens and pesticide residues have changed from the beginning of the project.	Five site locations	Q1, Q2-Y4	TPRI, MUHAS

Output. 8: Sound management of pesticides has been streamlined at all levels

8.1. Identify strategies and actions needed to be undertake for the sound management of pesticides during their life-cycle	Arusha, Dar es salaam ad Dodoma	Q1-Q4, Y1-Y5	MoA, MoHCDGEC, MIT, PO-RALG, MUHAS, NGOs
8.2 Develop strategic guidelines to mainstream sound management of pesticides into relevant areas and activities	Arusha, Dar es salaam ad Dodoma	Q3 - Q4, Y3	MoHCDGEC, MIT, PO-RALG, MUHAS, NGOs
8.3. Promote implementation of SMP nationwide	Arusha, Dar es salaam and Dodoma	Q1-Q4, Y1-Y5	MoA, MoHCDGEC, MIT, PO-RALG, MUHAS, NGOs

Gender mainstreaming

In line with SDG5 “Achieve gender equality and empower all women and girls”, all gender issues will be given due consideration. This will be particularly important in this project since farming in Tanzania heavily involves women. The project will therefore be designed to give women special consideration throughout the project implementation.

A detailed gender analysis will be undertaken during the design phase of the full project document. A gender mainstreaming strategy will be drawn up whereby the stakeholders will agree on how the project will mainstream gender issues.

The project will involve male and female stakeholders equally. There will be determined efforts to involve equally both men and women farmers in the implementation of project activities. The project will ensure that cases of poisoning of women are equally reported to those of men, and in the self-reporting it will take into account any differential health effects of pesticides on women. High priority will be given to ensuring equal access for women to all awareness-raising, capacity-building, and training activities. Women will be involved in all levels of the project, from ward level to national level.

Women will be equally involved in the project management and implementation. Prepared TORs and RFPs for consultants will insist on equal access by women.

The number of female beneficiaries will be tracked as part of the project's indicators. Gender-disaggregated data will be collected to ensure best possible impact for women. An analysis of the effect of the project on women as well as men will be included in the annual reports.

Project financing and indicative budget

Budget line	EUR					
	TOTAL	YEAR 1	YEAR 2	YEAR3	YEAR4	YEAR 5
Project staff						
- National	322,825	64,565	64,565	64,565	64,565	64,565
Project Consultancy						
- International	13,000	8,000		5,000		
- National	91,500	91,500				
Sub-Contracts (Lab Analysis)	1,160,336	975,656	110,808	36,936	36,936	0
Meetings	1,104,166	473,125	57,708	9,167	9,167	555,000
Equipment (Office, PPEs & AChE Kits)	1,181,952	812,592	369,360			
Publicity Materials	738,720	147,744	147,744	147,744	147,744	147,744
Other direct Cost	382,790	76,558	76,558	76,558	76,558	76,558
TOTAL	4,995,289	2,649,740	826,743	339,970	334,970	843,867

Sustainability of project results

The close collaboration with the Ministry of Agriculture at district level and the introduction of alternatives to pesticides is considered fundamental for the successful establishment of sustainable horticultural farming practices that are less hazardous in the target areas, and which are then expected to reach farmers beyond the initial focus.

Extension officers and health care providers will be part of the project implementing team and will be expected to continue to support farmers.

Risks to project implementation

Project assumptions	Risk of failure	Mitigation action(s)
Assumption. 1. Alternative methods will be appropriate and affordable	Medium Although farmers like quick fixes for their pest problem which might not be provided by the alternative methods such as biological control	Establish continuous support and where possible have demonstration plots in or near the target villages

Monitoring, reporting and evaluation

The project will be monitored and evaluated using Results Framework and Monitoring (RFM) that will be prepared at a multi-sectoral retreat followed by a validation workshop. The RFM will comprise project indicators which include:

- Consolidation of existing legal framework for pesticides;
- Trends of pesticide residuals data in crops and humans;
- Evaluation of training workshops before and after;
- Monitoring of inputs to the pesticide poisoning database;
- Use of alternative pest control methods;
- Number of training workshops and awareness seminars conducted, list of participants attended the trainings.

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project donor in an agreed format. The project coordinator will also ensure that progress by component and a technical summary are included in those progress reports.

At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor, it could also be the subject of a mid-term evaluation half way through the project.

Communication and visibility

The project will develop a communications and visibility strategy in order to reach out to as wide a group of stakeholders as possible, to benefit the general population. The strategy will be developed after conducting a Knowledge, Attitude and Perception (KAP) assessment.

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partner and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

ANNEX 1 LIST OF CONSULTED STAKEHOLDERS AND PARTICIPANTS

No.	Organization	Name & Designation	Email/Telephone
Government Ministries and Agencies			
1	President's Office - Regional Administration and Local Government (PO-RALG)	Rogasian Lukoa, Senior Environmental Officer	rogasianphilip123@gmail.com +255 784 399 844
		Lucy Ssendi, Senior Climate Change Advisor	lucy.ssendi@tamisemi.go.tz +255 656 412 962
2	Vice Presidents Office - Division of Environment (VPO-DoE)	Esther Makwaia, Ag. Director of Environment	esther.makwaia@vpo.go.tz + 255 784 222 298
		Magdalena Mtenga, Assistant Director	magdalena.mtenga@vpo.go.tz + 255 754 467 301
		Julius Enock, Industrial Engineer	julius.moshi@vpo.go.tz
		Joseph Kiruki, Environmental Engineer	joseph.kiruki@vpo.go.tz +255 715 341 600
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		Aloyce Mdenye, Economist	aloyce.mdenye@gmail.com + 255 756 845 475
		Jeniva Olengelle, Environmental Officer	olengeilejeniva@yahoo.com +255 759 020 727
		Magdalena Gerald Ngotolainyo, Environmental Officer	magdalenagerald@gmail.com + 255 784 498 523
3	Ministry of Agriculture (MoA)	Mwangi Jubilant, Principal Agriculture Officer I (IPM Coordinator)	mwangijubi30@hotmail.com +255 756 599 935
		Martin Katua, Ag. Assistant Director, Plant Health Services	martin.katua@kilimo.go.tz + 255 767 314 702
4	Ministry of Energy	Maseke M. Mabiki, Assistant Director	maseke.mabiki@nishati.go.tz
		Joyce Msangi, Environmental Officer	joyce.msangi@nishati.go.tz +255 716 79 547

No.	Organization	Name & Designation	Email/Telephone
5	Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC)	Dr. Khalid M. Massa	Tel: +255 22 234 2071 Fax: + 255 22 213 8080
		Ag. Assistant Director - Environmental Health	
		Theophil Likangaga, Assistant Director	Theolika@gmail.com +255 782 520 231
		Honest Anicetus, National Coordinator-HCWMP	hanicetus@gmail.com +255 754 311 115
		Stephen Kiberiti, Head - WASH	skiberiti@moh.go.tz + 255 719 324 016
6	Ministry of Industry and Trade	Dr. Isaack Legonda, Director of Industry (<i>at that time</i>)	legondaia@gmail.com + 255 784 866 987
		Christopher Mgifi, Economist	christopher.mgiti@mit.go.tz
		Peter Nyang'ombe, Industrial Engineer	Peter.nyangombe@mit.go.tz +255 756 141 179
7	Ministry of Livestock and Fisheries	Agnely Lishela, Fisheries Officer	agnelyadrian@gmail.com + 255 769 815 867
		Longinus Tegulirwa, Principal Fisheries Officer	tegulirwa@yahoo.com + 255 787 226 172
		Anthony Dadu, Principal Fisheries Officer	dadu@justice.com +255 754 385 530
8	Ministry of Minerals	John Bosco Karugamye, Mining Engineer	johnbosco.karungamye@madini.go.tz Mob: +255 745 508 288
		Milka Digha, Statistician	milka.digha@madini.go.tz + 255 744 045 802
		Jackson Biore, Environmental Officer	jackson.biore@madini.go.tz + 255 769 808 505

No.	Organization	Name & Designation	Email/Telephone
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ANNEX 2 ABOUT THE GLOBAL ALLIANCE ON HEALTH AND POLLUTION



The Global Alliance on Health and Pollution (GAHP). GAHP is a global collaborative body that assists low- and middle-income countries to take concrete action to reduce the impacts of pollution on health. GAHP members include more than 40 national ministries of health and environment, development banks, United Nations organizations, other bilateral and multilateral groups, universities, non-governmental organizations, and other actors working on pollution. The current GAHP Secretariat is the New York-based non-profit organization, Pure Earth (also known as the Blacksmith Institute).

More information about GAHP is available at www.gahp.net.

ORIGIN AND DESIGN OF THE HPAP PROGRAM

The global Health and Pollution Action Plan (HPAP) program is an initiative of the GAHP. It emerged from the recommendations of the Lancet Commission on Pollution and Health and from the expertise and guidance of GAHP members. The Commission report makes six core recommendations, including:

“In addition to increased funding, international technical support for pollution control is needed in prioritization and planning of processes to tackle pollution within rapidly industrializing cities and countries; in development of regulatory and enforcement strategies; in building technical capacity; and in direct interventions, in which such actions are urgently needed to save lives or can substantially leverage local action and resources. Financing and technical assistance programmes need to be tracked and measured to assess their cost-effectiveness and to enhance accountability.”

GAHP has received requests from over 20 low- and middle-income country governments to facilitate research, prioritization, planning, project selection and design, and the development of funding strategies to address pollution challenges. Although GAHP is not a funding agency, the expertise and experience of its member organizations can be highly valuable for countries where national institutions face limitations related to funding and technical capacity. In response to these requests for assistance, the GAHP developed the global HPAP program, aimed at low- and middle- income countries.

The goals of the HPAP program are to:

1. Assist governments to identify, evaluate and prioritize existing pollution challenges based on health impacts
2. Establish pollution as a priority for action within national agencies and development plans
3. Define and advance concrete interventions to reduce pollution exposures and related illnesses

The HPAP is a pollution prioritization and planning process. It differs from other planning processes in that it is structured to bring together different agencies and parties that may not frequently work closely together. It is intended to promote collaboration. It is therefore driven by national agencies – Ministries of Environment, Health, Production/Industry, Transport, Energy, Mining, Agriculture and others – with facilitation and support by GAHP. The process can be tailored to the needs of an individual country, and aims to assist governments in identifying, prioritizing and accelerating national interventions to reduce pollution-related illness and death. It is designed to develop and implement well-defined and practical outcomes, with commitments by all the participants, including international partners and donors, to undertake specific short- and medium-term actions to improve environmental health. In countries where a National Environmental Health Action Plan (NEHAP) has already been developed with the support of WHO, the HPAP is intended to support the practical implementation of the key priorities.

Depending on the national context, the scope of the HPAP can include indoor and outdoor air pollution, unsafe water and inadequate sanitation, chemical contamination of soil, and occupational exposures to pollutants.

The HPAP process is flexible and can be tailored to the needs of each country, but generally includes the following steps:

- **PHASE 1.** Collection, compilation and analysis of available information on health impacts from pollution and existing pollution management programs by the Ministries of Health, Environment and Industry/Production, with assistance of the GAHP.
- **PHASE 2.** Inception meeting to prioritize pollution issues, define next steps, including roles and responsibilities of stakeholders through a participatory process.
- **PHASE 3.** Preparation of a draft Health and Pollution Action Plan describing priority pollutants, pollution sources, health impacts, cost-effective interventions to reduce exposures, resources needed and potential sources of funding by a joint National Working Group with participants from the Ministries of Health, Environment, Transportation, Agriculture, Energy, Industry, Mining and with support from the GAHP.
- **PHASE 4.** Circulation of the draft Action Plan to national and international stakeholders, which are invited to provide comments. The National Working Group integrates stakeholder comments and a final Health and Pollution Action Plan is created. Stakeholders reconvene to officially endorse and validate the Action Plan and discuss next steps toward implementing suggested actions.
- **PHASE 5.** Dissemination, promotion, fund raising, implementation, monitoring and review of the HPAP through domestic and international initiatives, in collaboration with the GAHP, under the guidance of a joint coordinating team between the Ministries of Health and Environment.

Agencies such as the World Health Organization (WHO) and the Institute for Health Metrics and Evaluation (IHME) have conducted increasingly sophisticated global burden of disease studies that use data from government agencies, universities and other research groups to reveal the rates of death and disease associated with different risk factors, including exposures to various forms of pollution. These studies show that pollution is now responsible for between nine million and thirteen million deaths annually, and is one of the leading risk factors causing premature death in the world.

ANNEX 3

GLOBAL BURDEN OF DISEASE DATA



DALY

Disability Adjusted Life Year is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death.

$$\text{YLD} + \text{YLL} = \text{DALY}$$

Years lived with Disability + Years of Life Lost



The HPAP analysis relies primarily on data from the IHME Global Burden of Disease (GBD) study. The GBD quantifies health loss from hundreds of diseases, injuries, and risk factors, so that policy-makers can fully understand their country's health challenges – and how those challenges are shifting over time. Data from ministries of health and other research organizations are collected and analysed by a consortium of more than 2,300 researchers in more than 130 countries. The data capture premature death and disability from more than 300 diseases and injuries in 195 countries, by age and sex, from 1990 to the present, allowing comparisons over time, across age groups, and among populations.

The GBD allows decision-makers to compare the effects of different diseases and risk factors, such as malaria versus cancer, or pollution versus malnutrition, and then use that information to make policy in their home country.

DISABILITY ADJUSTED LIFE YEAR (DALY)

The GBD study cites its data in the form of Disability Adjusted Life Years (DALYs). A DALY is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. The DALY is increasingly used in the field of public health. It extends the concept of years of life lost due to premature death, to include equivalent years of healthy life lost due to poor health or disability. In so doing, mortality and morbidity are combined into a single, common metric.



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