



UNITED REPUBLIC OF TANZANIA  
MINISTRY OF HEALTH

# INTEGRATED VECTOR MANAGEMENT GUIDELINES AND STANDARD OPERATING PROCEDURES

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## Definition of terms

**Anthropophagy:** Preference of mosquitoes to feed on human

**Budget:** A budget describes the money that an organization plans to raise and spend for a set purpose over a given period of time

**Effectiveness: In context of indoor residual spraying is the** extent to which the intervention achieves the specific objectives.

**Efficiency:** If input into the work is appropriate in terms of the output i.e., resources are used rationally

**Elimination:** Reduction to zero of the incidences of infection caused by a specific pathogen in a defined geographical area, with minimal risk of reintroduction, as a result of deliberate efforts; continued action to prevent re-establishment of transmission may be required.

**Epidemic:** Occurrence of a number of cases in excess of what is expected in a given place and time. The increase is usually above what is normally expected in the population in a specific geographical area.

**Eradication:** Complete and permanent reduction to zero of the worldwide incidences of a specific pathogen, as a result of deliberate efforts, with no risk of reintroduction.

**Evaluation:** Is the episodic assessment of the change in targeted results that can be attributed to the program or project intervention. Evaluation attempts to link a particular output or outcome directly to an intervention after a period of time has passed.

**Impact:** Tells whether or not what you did make a difference to the problem situation you were trying to address.

**Indicator:** A pre-defined variable, specific, observable and measurable characteristic which helps to identify differences in quality and/or quantity within a defined period of time.

**Infection:** The process of bacteria or viruses invading the body or making someone ill or diseased.

**Infectious:** Refers to a condition that is likely to spread in a rapid manner, such as a contagious disease that spreads easily from person to person.

**Inputs:** Refers to the resources invested in a programme and includes financial, technological resources and manpower.

**Monitoring:** Is the regular observation and recording of activities taking place in a project or program (usually inputs and outputs) through record-keeping, regular reporting, and surveillance systems.

**One Health:** A collaborative, multisectoral and interdisciplinary approach, working at the local, regional, national and global levels with the goal of achieving optimal health outcomes by recognizing the interconnection between people, animals, plants and their shared environment.

**Outcomes:** These are indicators of intermediate results of project implementation. For IRS the main

outcome indicator that determines the success (or lack of success) of IRS is spray coverage.

**Outputs:** These are immediate results produced through project activities. For IRS intervention, Output indicators monitor spray operations, including quality management of spraying, compliance of operators with IRS best practices, houses visited, houses sprayed, people residing in the sprayed houses and information on the use of LLINs as well as the perception of IRS in communities

**Parasite:** An organism that lives in or on an organism of another species (its host) and benefits by deriving nutrients at the other's expense.

**Process:** Refers to activities carried out to achieve the programme's objectives: They show what is done and how well it is done.

**Relevance:** Any meaningful effect with respect to the problem. Are activities worth continuing with? Social and behavior change: Factors that affect behaviors of individuals, households, communities or societal and the barriers or facilitators to change. The cause of behavior change can be due to communication or non-communication issues such as environmental factors or other factors.

**Surveillance:** Monitoring of activities, behavior or information for the purpose of information gathering, influencing, managing or directing.

**Sustainability:** Continuation of project activities or support of the project without its collapse.

**Zoophagy:** Preferences of mosquitoes to feed on other vertebrate host (animals).

## Abbreviations

AAT	Animal African Trypanosomiasis
ANC	Antenatal Care
AT	African Trypanosomiasis
AW-IPM	Area Wide Integrated Pest Management
Bs	Bacillus sphaericus
Bti	Bacillus thuringiensis var. israelensis
CCHP	Comprehensive Council Health Plans
CFA	Circulating Filarial Antigens
CHMT	Council Health Management Team
CORPs	Community Owned Resource Persons
CW	Community Worker
DAO	District Academic Officer
DCDO	District Community Development Officer
DDT	Dichlorodiphenyltrichloroethane
DED	District Executive Director
DHIS-2	District Health Information System 2
DHO	District Health Officer
DITT	District Indoor Residual Spraying Technical Team
DMFP	District malaria Focal Person
DMFP	District Malaria Focal Person
DMO	District Medical Officer
DNA	Deoxyribonucleic Acid
EDTA	Ethylenediaminetetraacetic acid
EIA	Environmental Impact Assessment
EIR	Entomological Inoculation Rate
EPI	Expanded Program on Immunization
EWT	Esperanza Window Trap
FAO	Food and Agriculture Association
GPELF	Global Programme for Elimination of Lymphatic Filariasis
GPS	Global Positioning System
GR	Geographical Reconnaissance
HAT	Human African Trypanosomiasis
HBI	Human Blood Index
HLC	Human Landing Catch
HMIS	Health Management Information System
IAEA	International Atomic Energy Agency
IRS	Indoor Residual Spraying
ITC	Insecticide Treated Cattle
ITT	Insecticide Treated Targets
IVM	Integrated Vector Management
LBRF	Lice-Borne Relapsing Fever
LF	Lymphatic Filariasis
LLINs	Long Lasting Insecticide Treated Nets

LSM	Larval Source Management
M&E	Monitoring and Evaluation
MDA	Mass Drug Administration
MoH	Ministry of Health
mRDT	Malaria Rapid Diagnostic Test
MSDS	Material safety Data Sheet
NGOs	Non-Governmental Organizations
NMCP	National Malaria Control Programme
NMSP	National Malaria Strategic Plan
NTD	Neglected Tropical Diseases
PA	Public Address
PBO	Piperonyl-butoxide
PCR	Polymerase Chain Reaction
PHC	Primary Health Care
pHI	Proportionate Hole Index
PO-RALG	President's Office-Regional Administration and Local Government
PPCT	Permanent Plaque Control Team
PPE	Personal Protective Equipment
PPRA	Public Procurement Regulatory Authority
R&D	Research and Development
RF	Relapsing Fever
RHMT	Regional Health Management Team
RMFP	Regional Malaria and Focal Person
RVF	Rift Valley Fever
S.S	Sensu stricto
SBCC	Social Behavior Changes Communication
SIM	Site Information Education and Communication Manager
SIT	Sterile Insect Technique
SOPs	Standard Operating Procedures
SOW	Scope of Work
TANAPA	Tanzania National Parks Authority
TAS	Transmission Assessment Surveys
TBRF	Tick-Borne Relapsing Fever
ToTs	Training of Trainers
TPHPA	Tanzania Plant Health and Pesticides Authority
VPP	Voluntary Pooled Procurement
WDC	Ward Development Committee
WEC	Ward Education Coordinator
WHO	World Health Organization

## Foreword

Vector-borne diseases impose a heavy burden on human population worldwide. The diseases particularly affect developing countries in tropical and subtropical zones including Tanzania. Vector-borne diseases disproportionately affect the poor and under served populations. The World Health Organization estimates more than 80% of the global population living in areas at risk of at least one major vector-borne disease. Globally, it is estimated that vector-borne diseases account for more than 17% of all infectious diseases, causing over a million deaths annually. Malaria is a leading vector-borne disease causing more than 400,000 deaths annually, most of the deaths occurring in children under 5 years of age. It has been estimated that 2.5 billion people in over 100 countries are at risk of contracting dengue fever, while hundreds of millions are affected by lymphatic filariasis (LF), human African trypanosomiasis (HAT), plague, onchocerciasis, tick-borne relapsing fever (TBRF) and schistosomiasis.

Tanzania is endemic to several vector-borne diseases, including malaria, dengue fever, chikungunya, lymphatic filariasis, rift valley fever, human African trypanosomiasis, tick and louse-borne relapsing fever, plague, onchocerciasis and schistosomiasis. Besides the direct human suffering, vector-borne diseases pose a significant obstacle to socio-economic development in affected communities. Vector control is an important component in the prevention and control of vector-borne diseases and in some diseases, the vector is the only feasible target for control. When well-planned and targeted, vector control interventions can interrupt the transmission of disease-causing organisms, reduce illness and save lives. Integrated Vector Management (IVM) entails a decision-making process to optimize and rationalize the use of limited resources and tools for effective control of vectors. The concept of the IVM approach is more appropriate because a single intervention may be applied to address multiple diseases transmission.

The developed IVM guidelines are building on the National Strategy for Vector Control that was developed in 2019. The strategy stresses on holistic approach to effectively tackle multiple vector-borne diseases. The IVM guidelines aim at enlightening the policymakers, planners, and implementers of vectorborne disease control in the country on the concept of IVM, its strategies, available options for diseases vector control and its operationalization at various levels of implementation in the country. This includes regional and local government authorities, development partners, implementing organization, academic/ research institutions, private sector, and the community at large.

The Ministry of Health realizes the value of a strong and well-coordinated partnership to achieve the goals and objectives under the IVM approach. It is our sincere hope that partners will join hands in the fight against vectors of different diseases and therefore effectively utilize these guidelines to reach the country's vector control targets.



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**Ministry of Health**

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## Vector control overview

Vectorborne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors. A vector is any organism (vertebrate or invertebrate) that functions as a carrier of an infectious agent between organisms of a different species. This includes organisms that release parasites in close proximity to vertebrate hosts (snails releasing cercariae in water) those playing a purely mechanical role in transmission, and the blood sucking insects, which ingest disease-producing microorganisms during a blood meal from an infected host (human or animal) and later transmit it into a new host. Very often, once vectors become infectious, they are capable of transmitting the pathogen for the rest of their life during each subsequent bite/blood meal.

Globally, vector-borne diseases account for more than 17% of all infectious diseases, causing more than 700 000 deaths annually. These deaths are due to malaria, dengue, schistosomiasis, human African trypanosomiasis, leishmaniasis, Chagas disease, yellow fever, Japanese encephalitis and onchocerciasis. Of the total death, mosquito-borne diseases contribute the biggest share. The burden of these diseases is highest in tropical, and subtropical areas, and they disproportionately affect the poorest populations. Since 2014, major outbreaks of dengue, malaria, chikungunya, yellow fever and Zika have afflicted populations, claimed lives, and overwhelmed health systems in many countries including Tanzania. Other diseases such as Chikungunya, onchocerciasis, leishmaniasis and lymphatic filariasis cause chronic suffering, life-long morbidity, disability and occasional stigmatizations.

Rapid unplanned urbanization, changing land use patterns and increased international travel and trade, bring humans into more frequent contact with vectors, while climate and other environmental changes fuel their spread worldwide. For example, dengue viral disease, which is spread by *Aedes* mosquito, with its origin in Asia-Pacific, is now reported in 111 countries across Asia, Africa, America and Europe. It is the most prevalent viral infection transmitted by *Aedes* mosquitoes. Approximately more than 3.9 billion people are at risk globally with an estimated 40,000 deaths annually. Other mosquito-borne viral diseases include chikungunya fever, rift valley fever, Zika virus fever (all already reported to occur in Tanzania), yellow fever, West Nile fever and Japanese encephalitis. Malaria is another typical vector-borne parasitic disease, which is widespread globally, causing about 400,000 deaths annually. This disease is spread by female mosquitoes of the genus *Anopheles*. *Anopheles gambiae complex* and *Anopheles funestus* being the major malaria vectors in Tanzania, and across sub-Saharan Africa. It is estimated that approximately 70% of the World's malaria burden is concentrated in just 11 countries, of which 10 are in sub-Saharan Africa, with Tanzania being one of them. The remaining vector-borne diseases such as lymphatic filariasis, onchocerciasis, schistosomiasis, human African trypanosomiasis, tick-borne relapsing fever, plague, and chikungunya, rift valley fever, tick-borne relapsing fever and louse-borne relapsing fever persist in Tanzania, with some only localized to particular settings. These diseases cause catastrophic household and country expenditures, thus limiting societal and economic development.

Effective control of vector-borne diseases is critical for the realization of several global sustainable development goals with a direct impact on Sustainable Development Goals (SDG) 1, 2 and 3. It is widely recognized and witnessed that effective implementation of vector control contributes significantly to the reduction in disease burden. For example, recently, it has been shown that of all the interventions used against malaria (use of insecticide treated nets (ITNs), indoor residual spraying (IRS) and case management by artemisinin-based combination therapy (ACT)), vector control contributed to the greatest share in the reduction of the disease. Interruption of onchocerciasis transmission which is spread by the blackflies was also demonstrated successful in West Africa in the 1970s, through the application of aerial larviciding with *Bacillus thuringiensis israelensis* (Bti) over rivers and streams, the breeding sites of blackflies.

However, for any vector control program implementation to be successful, the following should be incorporated during the design: 1) Capacity-building 2) Social and resource mobilization 3) Strong political support 4) Structures with clear mapping of roles and responsibility 5) Vector surveillance, monitoring and evaluation. Infrastructures (e.g., laboratory, test kits, office and sundry supplies), financial and trained human resources are needed. Capacity-building is highly needed for entomology cadre to upgrade and maintain the knowledge and skills.

The involvement and engagement of communities have been demonstrated as an integral part to make vector control not only more effective but also sustainable. Communities should be made aware of the risk of vector-borne diseases and act in the use of recommended vector control measures. Resources, both financial and human needs to be mobilized from multiple sources including central government, local government, and private sectors and not leaving out the development partners. Vector-borne disease control is everyone's business, as it is a cross-cutting issue. Political support from the central government should ideally promote intra and intersectoral collaboration (also embracing the One Health concept) and streamline decision-making and resource allocations.

Clear mapping of resources and costing should be conducted at national level based on the strategic plan. To coordinate efforts, a well-defined organization and operational structures (with roles and responsibilities defined), across all levels from the national level all the way to the village level is essential. Clear mapping of who does what at each level is critical for the success of the disease-control program. At national level, a committee composed of members from the Ministry of Health, coordinators of disease control programmes (e.g., Malaria, NTDs), representatives from other ministries (e.g., livestock, agriculture), local government, medical research institutions, non-governmental organizations (NGOs), civil society groups to be established and oversee program needs and implementation. Specific roles and responsibilities are as outlined in respective section(s) of each specific disease.

Surveillance is an essential component of vector control to provide information on distribution of vector species over space and time, vector dynamics and behaviour that affect both disease transmission and effectiveness of vector control interventions.

Surveillance data are important for designing effective vector control strategies. Where there are ongoing vector control interventions such as ITNs, IRS and/or larviciding, vector surveillance serves to monitor and evaluate the effect of interventions based on density, species composition, infectivity,

resistance and behavioural avoidance. Essential indicators for entomological surveillance may vary depending on the vector species. For example, key indicators for immature *Aedes* vectors are the house index, the container and the Breteau index. Adult density may also be used as an indicator when using adult sampling methods. Other entomological indicators including vector density (number of black fly vectors per trap per unit time), infection rate (proportion of vectors infected with parasites) and parous rate (proportion of vectors that have laid eggs at least once) may apply to black fly and adult malaria vectors while snails' indicators including the positivity of water bodies, the density of snails per unit area or the proportion of snails containing cercariae when dissected.

In recognition of the power of vector control, the WHO and its partners came up with a Global Vector Control Response (GVCR) 2017 – 2030. This response aims at reducing the burden and threat of vector-borne diseases through effective locally adapted and sustainable vector control. It anticipates that countries will set their own national or subnational targets towards establishing resilient and sustainable vector control systems. Furthermore, it calls for improved public health entomology (and malacology) capacity, a well-defined national research agenda, better coordination within and between sectors, community involvement in vector control, strengthened surveillance, monitoring and evaluation systems and novel interventions with proven effectiveness.

In an effort to align with GVCR and enhance vector control impact, Tanzania has developed a number of national documents including the National Vector Control Strategy, National Insecticide Resistance Management plan, and Integrated Malaria Vectors Control Guidelines. The documents however focus on a single disease vector, "*The Malaria Vector*". The present guidelines bridge the gaps in controlling disease vectors in silos (which are often not cost-effective). The vectors could be controlled in an integrated manner, thus maximizing the impact of different vector control approaches. Situation analysis of each disease vector, potential vector control interventions, essential surveillance and monitoring indicators, standard operation procedures with roles and responsibilities across all levels have been included in this document.



## 1.0. | Mosquito borne diseases

### 1.1. Malaria vector control in Tanzania

Malaria remains an important mosquito-borne parasitic disease, which results in human suffering and adversely affects socio-economic development in endemic countries. In 2019, an estimated 229 million cases of malaria occurred worldwide, resulting in 409,000 deaths, of which 95% were in the sub-Saharan Africa (1). In Tanzania, about 86.2% (of 58 million people) are at risk of malaria, with children less than five years and pregnant women being at the highest risk (2).

#### 1.1.1. Malaria burden

The average malaria prevalence in Tanzania is 7.5%, but with wide geographical variation ranging from less than 1% to over 24% (2). In Tanzania, regions such as Songwe, Njombe, Arusha, Manyara and Kili-manjaro have malaria prevalence of less than 1% whereas the southern and north-western regions of the country have malaria prevalence above 20%. In response to this variation, the National Malaria Control Program has stratified the country into 4 malaria epidemiological strata (very low, low, moderate and high) including a separate operational stratum namely urban (3).

#### 1.1.2. Malaria vectors

In Tanzania, *Anopheles gambiae* sensu stricto (s.s), *An. arabiensis* and *An. funestus* s.s are considered the most important and widely distributed malaria vectors (4). *An. gambiae* s.s and *An. arabiensis* vary in their geographical distribution but sympatric occurrence of the two sibling species is not uncommon. *An. gambiae* s.s predominates in humid savannah areas while *An. arabiensis* colonizes the arid savannah and there are marked seasonal shifts in the species dominance in areas of sympatry (4). On the other hand, *An. funestus* s.s is the predominant, both in numbers and geographical distribution, and also the most important malaria vector in the *An. funestus* group.

##### 1.1.2.1 Malaria vector ecology and behaviour

Malaria vectors *An. gambiae* s.s. and *An. arabiensis* prefer to breed in clear, temporary water bodies ex-posed to direct sunlight. The two vectors differ in their degree of host preference, with the first being strongly anthropophilic, while the latter is more liberal and exhibits zoophilic tendencies especially when alternative mammalian hosts are available. These differences in behaviour are important in the planning, designing, and implementation of malaria vector control interventions. More recently in Tanzania, a substantial shift in malaria vector species composition from predominantly *An. gambiae* s.s. to *An. arabiensis* has been reported in different ecological settings (5,6).

On the other hand, the *An. funestus* group prefer breeding in semi-permanent to permanent water bodies with some degree of shading and emergent vegetations. *An. funestus* is highly anthropophilic than any other malaria vector, and the great bulk of blood-feeding takes place inside the houses (7). Due to its tendency to breed in relatively permanent habitats, it has been considered to be responsible for maintaining the endemicity of malaria. More recently, studies have indicated re-emergence of *An. funestus* as an important malaria vector in Tanzania (8,9).

### 1.1.3. Situational analysis of malaria vector control

The efforts to fight malaria in Tanzania have been implemented since colonial time by targeting malaria vectors by indoor residual spraying, delivering insecticide treated nets (ITNs) and larval source reduction. Over the past two decades, the National Malaria Control Program (NMCP) has implemented different malaria control strategic plans since 1997. However, malaria transmission across different geographic regions remains a public health problem in the country (3).

In the current national strategic plan for malaria (3), the burden of malaria transmission in Tanzania has been stratified to indicate areas with very low, low, moderate and high burden. This stratification enables allocation of vector control interventions in response to the local context to rationalize resource allocation and maximize the impact of vector control interventions. However, the core control interventions deployed for malaria vector control (i.e., long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS) all rely on the use of insecticides which have led to selection for insecticide re-sistance in all major malaria vectors. This threatens the current and future efforts to control and eliminate malaria in Tanzania. For example, both target site mutations (kdr-East and kdr-West) and metabolic resistance mechanisms were reported around the Lake Zone and southern regions of Tanzania. The widespread insecticide resistance in major malaria vectors across the country necessitates the deployment of second generation LLINs where appropriate and rotation of insecticide formulations for IRS. In this regard, the deployment of appropriate interventions to control malaria vector need to be guided to mitigate the effect of insecticide resistance.

### 1.1.4. Rationale of malaria vector control

Despite the success recorded in malaria control over the past two decades, partly from the deployment of LLINs and IRS, malaria transmission continued with large variations in human infection across the country. Emergence and wide spread insecticide resistance have been recorded over the country, with diverse resistance mechanisms. In addition, outdoor malaria transmission which cannot be interrupted with existing frontline vector control tools is on the increase. The two factors above pose a major threat that may compromise progress towards malaria elimination if not well monitored and effectively managed. Rational choices, design and delivery of vector control interventions based on local evidence are thus critical. This document is intended to provide guidance to decision makers, partners and implementers on overcoming the impending challenges towards the realization of malaria elimination.

### 1.1.5. Goal of malaria vector control guidelines

The primary goal of malaria vector control guidelines is to provide guidance on the implementation of priority, high impact vector control interventions to contribute to the reduction of malaria prevalence by 50% for children under five years by 2025.

### 1.1.6. Specific objectives

Specific objectives of the malaria vector control guidelines include;

- a) Provision of evidence-based recommendations on appropriate choices of vector control options for malaria prevention and control.
- b) To inform and guide technical decisions on the effective implementation of each of the vector control options currently available for malaria prevention and control.
- c) To provide guidance and coordinate operational and implementation research responsive to the current needs in the area of malaria vector control to inform policy and decisions.

## 1.1.7. Malaria vector control guidelines

### 1.1.7.1. Purpose of the guidelines

The purpose of malaria vector control guidelines is to guide implementers, partners and other stakeholders in planning and implementing interventions; capacity building; vector surveillance as well as monitoring and evaluation of integrated malaria vector control activities. The guidelines aim at enlightening policy makers, planners, partners and implementers of malaria vector control activities in the Country on how to implement malaria vector control intervention options available and its operationalization at various levels of implementation in the country.

### 1.1.7.2. Guidelines for malaria vector control

The National Malaria Strategic Plan (NMSP) 2021-2025 (3) recommends universal coverage with LLINs and IRS as core malaria vector control interventions, with Larval Source Management (LSM) as a priority supplementary intervention. The plan prioritizes IRS, LLINs and LSM interventions that will be deployed using different channels based on stratification and by considering epidemiology and ecology of the local vector and overlapping diseases to maximize benefit. For LLINs products, pyrethroids including next generation LLINs under development will be used for malaria vector control. IRS will be conducted with insecticides pre-qualified by the World Health Organization (WHO) and the insecticides will be appropriately rotated to manage insecticide resistance based on insects resistance management report. Meanwhile, pyrethroid insecticides will not be used for IRS.

On the other hand, community LSM interventions will be conducted to reduce larval abundance. Where appropriate, targeted larviciding using *Bacillus thuringiensis* var *israelensis* and/or *Bacillus sphaericus* will be deployed for control of mosquito larvae. For effective malaria vector control interventions, multi sectoral collaboration with the involvement of community members will be adopted and advocated. Emphasis should be directed towards conducting monitoring of vector dynamics, their susceptibility to insecticides, supportive supervision during implementations, compliance inspections, recruitment and training of field technicians for successful implementation of vector control interventions. Moreover, novel tools that address the emerging threat of insecticide resistance and preserve the effectiveness of recommended malaria vector control interventions will be adopted as they become available.

Due to varied malaria endemicity across the country, the choice of vector control interventions to be implemented should also be aligned with the requirements of the National Malaria Strategic Plan (2021-2025) and any changes in programmatic vector control interventions should be evidence-based to sustain impact. All activities related to malaria vector control in Tanzania will be coordinated by the Vector Control Unit of the Ministry of Health (MOH) in liaison with the National Malaria control Program (NMCP). Information on malaria vector species, priority interventions and their associated performance indicators is summarized in Table 1. Deployment of the approved malaria vector control interventions will be guided by standard operating procedures (SOPs) presented in section 1.4.

**Table 1. Malaria vector species, priority control interventions and their associated performance indicators**

S/ No.	Vector species	Diseases	Geographical Distribution of the vectors	Recommended Interventions	Performance Indicator
1.	<i>Anopheles funestus sensu stricto (s.s), An. gambiae s.s &amp; An. arabiensis</i>	Malaria	Countrywide	<ol style="list-style-type: none"> <li>1. Long lasting insecticide treated nets (LLINs)</li> <li>2. Indoor Residual Spraying (IRS) based on strata</li> <li>3. Application of targeted biolarvicides based on malaria transmission strata.</li> <li>4. Larval Source reduction (environmental management)</li> <li>5. Improvement of housing</li> <li>6. Community engagement</li> </ol>	<ol style="list-style-type: none"> <li>1. LLIN coverage, utilization, durability &amp; bio-efficacy and other indicators such as vector species composition, vector survival, annual entomological inoculation rate (EIR), changes in vector behaviour and insecticide susceptibility status</li> <li>2. Community acceptability, Households sprayed, Population protected, insecticide decay rate and other indicators listed in LLINs.</li> <li>3. Mosquito abundances, Larval habitats covered, Reduction of larvae, pupa, adult density</li> <li>4. Number of larval habitats covered by modification or manipulation.</li> <li>5. Number of mosquito-proof households</li> <li>6. Level of community participation in control interventions</li> </ol>



### **1.1.8. Capacity building in various elements of malaria vector control**

Capacity building for malaria vector control is essential across all levels covering staffing and infrastructure to achieve effective delivery and implementation of control interventions. The training should ideally be adaptive and needs-driven. Capacity building will enable malaria stakeholders at different levels (National, Regional, Council and ward/community) to plan, implement, monitor, and evaluate malaria vector control activities across the country. This process will involve a broad partnership of players from local government, civil society, development partners and the private sector. Formal training will be provided to malaria vector control officers, malaria vector surveillance officers, researchers and health care workers to manage day-to-day operations of the proposed interventions. These trainings will provide practical knowledge and skills required in managing malaria vector control interventions in accordance with outcomes of the training needs assessment.

### **1.1.9. Resource mobilization**

To ensure sufficient and timely availability of personnel and funds to implement malaria vector control interventions, the NMCP will develop costed National Malaria Strategic Plan (NMSP) every five years. This costed plan will be used to mobilize resources from the Government of Tanzania, development partners, and the private sectors to enable implementation of effective and appropriate malaria vector control interventions.

### **1.1.10. Malaria vector surveillance**

Vector surveillance is a prerequisite activity in any vector control intervention. Malaria vector surveillance will be adaptive and reflective of the diverse ecological settings, representative of temporal and spatial resolution to guide and monitor impact of deployed malaria vector control interventions. Entomological indicators including vector species composition, distribution, abundance, behaviour (resting and host preference and feeding location), infectivity status (sporozoite rates especially in high malaria transmission settings), and insecticide susceptibility status should ideally be integrated into the surveillance system. Well-designed informatics which allow easy entry, access, processing and visualization of entomological data will be developed and used for data storage and access. The system needs to provide useful relational data tables with key linkages to allow integration of entomological and epidemiological data. Malaria vector surveillance activity will be coordinated by the NMCP in collaboration with President's Office, Regional Administration and Local Government (PO-RALG) and other stakeholders. Entomological samples collected during surveillance activities will be sent to the reference laboratory for processing and the entomological data generated will be integrated into an appropriate user-friendly electronic database available.

### **1.1.11. Monitoring and evaluation of malaria vector control intervention**

From time to time, and using selected indicators, monitoring and evaluation (M&E) will be implemented for all vector control interventions conducted in the country. The M&E framework will be developed based on specific intervention needs, standard operating procedures (SOPs) and timing of the monitoring strictly observed. The malaria control M&E data will be triangulated with other relevant data to provide real time information on the impact of the deployed intervention on vectors and disease outcomes. The implementation of M&E will be coordinated by the NMCP in collaboration with other stakeholders. Based on the capacity available at district level to collect and analyze the data, the minimum essential

indicators will be monitored. In addition to essential indicators, supplementary indicators are recommended if capacity to measure them exists. The listed indicators have been identified as useful to inform routine programmatic decision-making on vector control and are summarized in table 2 (list of minimum essential indicators), table 3 (supplementary indicators) and table 4 (indicators for monitoring performance of intervention).

**Table 2. M&E minimum essential indicator**

Indicator	Outcome	Usefulness
Occurrence	Adult female vectors present or absent	Knowledge whether your site is receptive to malaria transmission and detect invasive species
Density	Number of adult female vectors collected, usually sampling method and time	Monitor the impact of vector control interventions on vector populations,
Vector species	Change in relative vector species over time, obtained by <i>Anopheles</i> vector species / Total <i>Anopheles</i> collected / unit time	Determine transmission potential and optimization of interventions due to variability in host preference and/or resting location
Biting time	Number of adult female vectors that attempt to feed per person per unit time	Identify a gap in personal protection measures by associating it with human behaviour, also inform targeting of intervention
Biting location	Proportion of adult female vectors biting indoors or outdoor	Identify gap and inform target complementary intervention
Indoor resting density	Proportion of adult female vectors collected resting indoors in structures sampled	Inform the choice of intervention, evaluate whether IRS might be effective.
Insecticide's resistance status	Classification of adult female vector populations as confirmed resistant, possibly resistant, or susceptible	Inform optimization on the choice of insecticides and impact of insecticides-based intervention. Using a discriminating concentration of insecticide in a standard bioassay. <90%=confirmed resistance, 90-97%=possible resistance, ≥98%=susceptible
Larvae habitat availability	Number of aquatic habitats present by area, habitat type, and season	Inform planning for larval surveys and LSM interventions
Larval habitat occupancy and seasons	Number habitats with larvae/pupae / Total habitats inspected / unit time or season	Inform LSM targeting and timing and monitor receptivity in combination with adult vector occurrence and rainfall data

**Table 3. M&E supplementary indicators**

<b>Indicators</b>	<b>Outcome</b>	<b>Usefulness</b>
Sporozoite rate	Proportion of adult female vectors with sporozoites in their salivary glands among total vectors examined.	Identify <i>Anopheles</i> species capable of transmitting <i>Plasmodium</i> and estimate the proportion of <i>Anopheles</i> vectors present that are considered infectious. This indicator is difficult to measure in low transmission settings and thus not recommended in these settings.
Entomological inoculation rate (EIR)	Number of infectious bites by adult female vectors per person per unit time, usually per year. The EIR is calculated by multiplying the HBR by the sporozoite rate.	Estimate level of transmission and evaluate the impact of interventions. Similarly, to sporozoite rate, this indicator is difficult to measure in low transmission settings.
Human blood index (HBI)	Proportion of blood-fed adult female vectors that feed on humans out of total fed.	Determine anthropophagy and zoophagy of vectors and inform target vector control interventions.
Host preference	Proportion of adult female vectors collected feeding on humans or animals, of total vectors collected through human and animal baited sampling methods.	Determine anthropophagy and zoophagy of vectors and target vector control interventions.
Resistance intensity	Classification of adult female vector populations as having high, moderate, or low resistance.	Determine the level of insecticide resistance and inform decisions on insecticide-based vector control interventions. Requires sufficient mosquito numbers for testing and based on exposure to 5 x and 10 x intensity.
Resistance mechanism (synergist bioassay)	Difference between the proportion of dead or incapacitated adult vectors after exposure to insecticide + synergist and those exposed to insecticide alone.	Useful for an initial characterization of metabolic resistance. This indicator is especially relevant to inform procurement decisions about PBO LLINs
Resistance mechanism(s) (molecular or biochemical tests)	Mechanism detected or not detected in adult female vectors	Useful to 1) further characterize metabolic resistance and 2) monitor vector control interventions, including PBO LLINs

**Table 4. M&E indicators for measuring the performance of vector control intervention**

Indicators	Outcome	Usefulness
LLINs access	Proportion of households with at least one LLINs for every two people.	Monitor access to LLINs and indicate whether there are gaps in protection as a result of lack of access to /LLINs.
LLIN usage	Proportion of people who slept under an LLINs the previous night.	identify gaps in protection
LLIN use: access Ratio	The proportion of the population using LLINs, among those who have access to LLINs within their household (divide use by access).	This indicator clarifies whether a gap in net use is related to behaviour or lack of access to nets.
LLIN durability	Survivorship (i.e., attrition) =total LLINs present in the household at the time of survey of total LLINs at distribution, over time. Fabric integrity=proportionate holes index (pHI) per net based on number and size of holes. Bio-efficacy=proportion of susceptible mosquitoes alive 24 hours post-exposure by species.	Monitor the effectiveness of nets and identify gaps in protection if nets lose physical integrity and chemical efficacy.
IRS residual efficacy	Proportion of susceptible vectors knocked down within 30 minutes while exposed to a sprayed wall or proportion of susceptible vectors dead within 24 hours (or 7 days for neonicotinoids) after being exposed to a sprayed wall (measured over the expected period of insecticide efficacy) by species and wall type.	Monitor effectiveness of IRS and identify gaps in protection. If IRS efficacy does not extend through the malaria season(s) requiring an additional spray round or shift of the IRS campaign.
LSM effectiveness	Reduction in adult vector density after implementation of interventions.	Adult density is a better indicator of the impact of LSM on vector populations.
Intervention coverage	Proportion of unit (people, house structure, larvae Habitat) with an intervention of total units.	Monitor delivery of vector control interventions.

## 1.2. Lymphatic filariasis vector control

### 1.2.1. Lymphatic filariasis (LF) burden

LF is a disabling and disfiguring parasitic disease caused by infection with nematodes *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori*. LF is the most prevalent of the neglected tropical disease (NTD) and the leading cause of long-term disability in the world (10). In Tanzania, LF is caused by *W. bancrofti* and transmitted by mosquito vectors.

### 1.2.2. Situation analysis of LF burden in Tanzania

Mapping for LF conducted in the country from 1999-2004 indicated that all the districts across the country had >1% circulating filaria antigen (CFA) prevalence, a proxy for adult worm infestation. The endemicity varied from highly endemic zones along the coast of the Indian Ocean (with antigenemia levels of 45–60%), to low endemicity in the areas of Western Tanzania (with endemicity of 2–4%), and varying endemicity levels in the remaining regions (central Tanzania, the southern highlands and north and north-western). The LF mapping data in Tanzania mainland showed that 34 million people were at risk of infection and it was estimated that 6 million people had debilitating manifestations of the disease (11). The main intervention for LF control in Tanzania is Mass Drug Administration (MDA) with a combination of ivermectin and albendazole in endemic areas. Mass drug administration (MDA) intervention was initiated by the Tanzanian National Lymphatic Filariasis Elimination Programme in Mafia

Island in 2000. Since then, the intervention has expanded to cover all endemic areas in the country. LF mapping conducted in 2015 established 14 councils (along the coast of Indian Ocean) that were still endemic for LF. In these 14 Councils, approximately 8.2 million people are still at risk of infection and the prevalence of Circulating Filarial Antigen (CFA) among standard 1 and 2 pupils were well above the WHO threshold of 2%. Of recent, (2020), a total of 120 districts have conducted transmission assessment survey (TAS) and 96 of the districts no longer require MDA (12).

### 1.2.3. Lymphatic filariasis vectors in Tanzania

Selected research work in Tanzania has documented the principal vectors of *W. bancrofti* in order of decreasing importance to be *An. funestus sensu stricto (s.s)*, *An. gambiae s.s*, *An. arabiensis* and *Culex. quinquefasciatus* (13,14). A recent report in coastal areas of north eastern Tanzania has shown a significant shift in *W. bancrofti* vectors from *Anopheles* to mostly *Cx. quinquefasciatus* in a coastal village near Tanga (15).

#### 1.2.3.1. Lymphatic Filariasis Vector ecology and behaviour in Tanzania

The *An. funestus s.s*, *An. gambiae s.s* and *An. arabiensis* briefly described in malaria section 1.1.3 also transmit LF in rural areas of Tanzania. In addition, *Cx. quinquefasciatus* is an important urban vector of *W. bancrofti* in many parts of the country. However, urbanization of rural areas and other climate factors has brought this mosquito to rural areas, a vector that is considered to be more efficient in transmitting LF at low infection prevalence (16). This mosquito species prefers to breed in polluted water in sanitary structures (septic tanks, cesspits, pit latrine and soakage pits), clogged drainage canals and on some occasions, they breed in open water bodies and hence co-exist with *Anopheles mosquitoes*. *Cx. quinquefasciatus* is the most important nuisance mosquito and readily bites humans and other domestic animals.

#### 1.2.4. Situational analysis of LF vector control in Tanzania

Vector control interventions for LF started as operational research in the 1970s with the use of chemical larvicides such as organophosphorus, chlofenvinphos, temephos and chlorpyrifos. In 1990, polystyrene beads were used in Zanzibar (17) and Dar es Salaam (18,19) for *Cx. quinquefasciatus* larval control. Moreover, insecticide impregnated bed nets were also introduced in the 90s, however, studies have shown that the insecticide impregnated nets had limited effect on *Cx. quinquefasciatus* (20).

#### 1.2.5. Rationale of LF vector control in Tanzania

The principal goal of the Global Programme for Elimination of Lymphatic Filariasis (GPELF) is the interruption of LF transmission. The main measure recommended by the GPELF for achieving this goal is regular MDA to the entire endemic population. Despite ongoing LF control intervention based on MDA strategy, studies have recommended the inclusion of vector control as an additional tool to achieve the goal of LF elimination (21). In the current 14 endemic councils in Tanzania, more than 10 rounds of MDA have been implemented without reaching the elimination threshold set by WHO. This calls for inclusion of vector control to supplement the ongoing MDA intervention.

#### 1.2.6. Goal of the guidelines for LF vector control

The goal of LF vector control guidelines is to guide implementation of priority high impact vector control interventions to contribute to the elimination of LF by 2030.

### 1.2.7. Specific objectives for the guidelines for LF vector control

The specific objective of the LF vector control guidelines is to integrate vector control initiatives in the package of LF control measures that will enable the country to reach the goal of LF elimination by 2030.

### 1.2.8. LF vector control guidelines

#### 1.2.8.1. Purpose of the guidelines for LF vector control

The purpose of these guidelines is to provide guidance to the implementers, partners and other stakeholders in planning and implementing interventions; capacity building; vector surveillance as well as monitoring and evaluation of LF vector control activities. The guidelines aim at enlightening policy makers, planners, partners and implementers on how to implement LF vector control to supplement MDA intervention in the country by recommending appropriate intervention options and their operationalization at various levels of implementation.

#### 1.2.8.2. Guidelines for LF vector control

Since LF share the same vector with malaria, some of the guidelines applicable for malaria vector control (section 1.1.7) will also apply to the control of LF vectors. The same will also apply in capacity building, resource mobilization, vector surveillance, and monitoring and evaluation (M&E) of the interventions as detailed in malaria vector control guidelines in sections 1.1.8, 1.1.9, 1.1.10, and 1.1.11 respectively. Entomological indicators for LF vectors such as vector abundance, parity, infection and infectivity will be used during vector surveillance. However, specific areas of *Cx. quinquefasciatus* need more emphasis, especially environmental management and control in sanitary structures, which will need close collaboration with human settlement sectors (engineering) such as repair of broken sanitary structures and drainage channels, as well as larviciding of closed breeding habitats such as pit latrines, cesspits and septic tanks. Proper education on settlement planning is essential for preventing mosquito breeding .

## 1.3. Mosquito-borne arbovirus vectors control

### 1.3.1. Mosquito-borne arboviral disease burden in Tanzania

Arthropod-borne viruses (arboviruses) are an important cause of human diseases worldwide, infecting millions of individuals and causing great social and economic burden. Dengue, yellow fever and chikungunya are emerging health problems and regular outbreaks have been reported throughout most of the tropical and sub-tropical regions of the world (22-24). Dengue is an increasingly serious public health problem in more than 100 countries worldwide with some 2.5 billion people at risk. On the other hand, there has been an increase in the number of reported yellow fever cases in Africa during the last 5 to 10 years. Outbreaks of Chikungunya have occurred in countries in Africa, Asia, Europe, Indian and Pacific Oceans. Zika virus infections have been reported in Africa, Asia and America. On the other hand, Rift Valley fever (RVF) is endemic in most parts of sub-Saharan Africa and epidemics are not uncommon in other parts of Africa such as Tanzania, Egypt, Madagascar and Comoros.

### 1.3.2. Situation analysis of mosquito-borne arboviral burden in Tanzania

In recent years Tanzania has experienced several dengue fever epidemics with the most recent reported in 2014 (25). Chikungunya virus was first reported in Tanzania in 1952 and since then the virus has

been circulating in different areas of Tanzania (26,27). On the other hand, Rift Valley Fever (RVF) was first reported in Tanzania in 1930s and ever since six outbreaks have been reported. Of the reported outbreaks, the 2007 outbreak was the most severe and widespread, affecting livestock and humans. In this outbreak, a total of 511 human cases were reported out of which 186 were laboratory confirmed and 144 (28.2%) died (28,29). A study published recently has indicated the circulation of Zika virus in different parts of the country (27). Yellow fever occurs most often in Africa and South America, but the disease has not been reported in Tanzania.

### **1.3.3. Mosquito-borne arbovirus vectors ecology and behavior**

In Tanzania, dengue, chikungunya, Zika and RVF are commonly transmitted by female *Aedes aegypti* mosquitoes (25,30,31). On the other hand, RVF can also be transmitted by *Culex* and *Anopheles* mosquito species. *Aedes aegypti* is a widely distributed mosquito in Tanzania. They prefer to breed in man-made containers and hence thrive close to human habitations. Adult females are strongly anthropophilic and most of their bites occur during the day and rarely enter human dwellings. This behavior makes them evade LLINs and IRS which are the core indoor insecticide-based mosquito control intervention currently used in the country.

### **1.3.4. Situational analysis of mosquito-arboviral vector control in Tanzania**

In Tanzania, over the past years, no specific intervention has been deployed to control *Aedes aegypti* mosquitoes. Due to their behaviour, insecticide-based interventions deployed for malaria and lymphatic filariasis vector control had a limited impact on this mosquito species. Recently, larval source management has been advocated as a supplementary strategy to control mosquito-borne diseases in the country.

### **1.3.5. Rationale for mosquito-borne arboviral vector control in Tanzania**

Emerging and re-emerging mosquito-borne arbovirus is a global concern due to their rapid geographical expansion, threatening health and socio-economic development in affected countries. Despite morbidities and mortalities caused by mosquito borne arboviruses, some of the diseases for examples yellow fever have travel restrictions. Rift valley fever (RVF) is a zoonotic disease, which causes morbidity and mortalities in domestic animals, loss of productivity and presents an occupational hazard to animal handlers. The method recommended for the control of *Aedes aegypti*, a vector of most mosquito-borne arboviruses is larval source management (32). This section is intended to provide guidance to decision makers, partners and implementers of mosquito control on appropriate choice and implementation of proven interventions to overcome the impending challenges of mosquito-borne arboviruses and prevent outbreaks and epidemics.

### **1.3.6. Goal of mosquito-borne arboviral vector control guidelines**

This section provides technical guidelines for the implementation of high impact vector control interventions to prevent occurrence of mosquito-borne arboviral infections in Tanzania.

### **1.3.7. Specific objectives for the mosquito-borne arboviral vector control**

Specific objectives of the mosquito-borne arboviral mosquito vector control guidelines include:

- a) Provision of evidence-based recommendations on appropriate vector control options for mosquito borne arboviral diseases control and prevention.

- b) To guide technical decisions on effective implementation of each of the vector control strategies currently available for *Aedes aegypti* control.
- c) To forecast an impending outbreak of mosquito-borne arboviruses by timely monitoring vector indices for timely prevention of outbreaks.

### **1.3.8. Mosquito borne arboviral vector control guidelines**

#### **1.3.8.1. Purpose of mosquito-borne arboviral vector control guidelines**

The purpose of this guideline is to guide implementers, partners and other stakeholders in planning and implementing interventions; capacity building; vector surveillance as well as monitoring and evaluation of arboviral vector control activities. The guidelines aim at enlightening policy makers, planners, partners and implementers of mosquito-borne arboviral vector control activities in the country on how to implement control, intervention options available and its operationalization at various levels of implementation in the country.

#### **1.3.8.2. Guidelines for mosquito-borne arbovirus vector control**

Since all important mosquito-borne arboviral diseases in Tanzania are transmitted by mosquitoes, where appropriate, the guidelines applicable for malaria mosquito vector control (section 1.1.7) will also apply to the control of *Aedes aegypti* mosquito vector. This will also apply to other components of mosquito control interventions such as capacity building, resources mobilization, vector surveillance and monitoring and evaluation (M&E) of the interventions as presented in malaria vector control guidelines in sections 1.1.8, 1.1.9, 1.1.10 and 1.1.11. The fact that mosquito borne arbovirus responds readily to mosquito larval control, larval sources management (LSM) will be the primary measure for mosquito borne arboviral disease control in the country. For vector surveillance and M&E of arbovirus vector control interventions, key indicators for immature *Aedes* vectors are the house index (percentage of houses with larvae and/or pupae), the container index (percentage of water-holding containers with larvae or pupae) and the Breteau index (number of positive containers per 100 houses inspected) will be used. Adult density may also be used as an indicator when using adult sampling methods.

## **1.4. Standard operating procedures (SOPs) for mosquito vector control interventions**

### **1.4.1. SOP for advocacy, community mobilization and engagement in mosquito vector control interventions**

#### **Scope and purpose**

The purpose of these SOP is to guide the delivery of effective advocacy, community mobilization and engagement activities in support of mosquito vector control interventions. These SOP is intended to be used by stakeholders at national, regional, council, ward, village and hamlet levels. For successful mosquito vector control interventions, communities ought to have the right knowledge to be influenced to accept the program and support its implementation. Community support requires effective and correct information flow to promote acceptance of interventions among community members. This is usually enhanced by having a clear understanding of roles and responsibilities across the different actors.



## Roles and Responsibilities

### National Level

- Plan and mobilize resources from internal sources and Development Partners for advocacy, community engagement and mobilization activities for mosquito vector control interventions.
- Prepare social and behaviour change (SBC) guidelines for mosquito vector control interventions.
- Develop, print and disseminate SBC materials for mosquito vector control interventions.
- Create awareness on mosquito vector control interventions among policy makers and other important stakeholders.
- Create awareness of mosquito vector control interventions to Regional Primary Health Care (PHC) Committee.
- Train Regional Health Management Teams (RHMTs) and Council Health Management Teams (CHMTs) on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on advocacy, community mobilization and engagement activities in the regions and councils.

### Regional level

- Solicit resources for community mobilization in mosquito vector control interventions activities
- Conduct advocacy meetings at the council level.
- Plan and train CHMTs on advocacy, community engagement and mobilization
- Distribute SBC materials and guidelines to Councils.
- Conduct supportive supervision of SBC and advocacy activities in the councils.
- Reinforce the implementation of the 2004 environmental management act and the 2009 public health act.
- Prepare implementation reports and submit to them NMCP/PO-RALG.

### Council level

- Incorporate SBC and advocacy activities for mosquito vector control interventions in their Council Comprehensive Health Plans (CCHPs).
- Plan and implement awareness creation activities of mosquito vector control interventions in the community through different approaches.
- Sensitize and educate community members on the benefit of mosquito vector control interventions in preventing mosquito-borne disease transmission in wards and villages.
- Train wards and village teams on advocacy, community mobilization and engagement.
- Disseminate and distribute SBC materials and guidelines to wards and villages.
- Conduct supportive supervision on advocacy, community engagement and mobilization activities at the ward and village levels.
- Reinforce the implementation of 2004 environmental management act and 2009 public health act.
- Prepare implementation reports and submit to the regional level.

### Ward level

- Prepare council community mobilization and engagement plan.
- Raise awareness on mosquito vector control interventions at village and hamlet levels.
- Support CORPs on acquisition of all requirements for conducting community mobilization activities for mosquito vector control interventions.

- Coordinate dissemination and distribution of SBC materials in targeted groups and places in the community.
- Reinforce the implementation of 2004 environmental management act and 2009 public health act.
- Receive, review, summarize and file reports on community mobilization collected by Community Owned Resource Persons (CORPs) from the field and submit to the council level.
- Supervise all CORPs implementing community mobilization activities for mosquito vector control interventions.

### **Village level**

- Select CORPs in their respective villages according to the established selection criteria based on the National Operational Guidelines for Community-Based Health Services
- Prepare community mobilization plan in collaboration with CORPs.
- Conduct community sensitization meetings.
- Support CORPs to conduct community mobilization for mosquito vector control interventions.
- Disseminate and distribute SBC materials in targeted group and places in the community.
- Reinforce the implementation of 2004 environmental management act and 2009 public health act.
- Maintain proper storage of SBC materials, forms/documents and other supplies.
- Submit implementation report on community mobilization to ward level.

### **Community Owned Resource Persons (CORPs)**

- Sensitize and educate community members on mosquito vector control interventions through: village/community meetings, house-to-house visits and group discussions.
- Distribution and placement of information and educational materials (posters, fliers).
- Reinforce the implementation of 2004 environmental management act and 2009 public health act.
- Prepare community mobilization plan in collaboration with the village leaders (village level).
- Fill in the community mobilization reporting tools and submit them to the village level.

### **Community members**

- Provide support to CORPs during community mosquito vector control interventions mobilization activities.
- Actively participate in community sensitization meetings for mosquito vector control.
- Take appropriate actions in conformity with all mosquito vector control messages and instructions provided during sensitization meetings.
- Allow the implementing teams to access domestic and peri-domestic areas, private properties etc. during surveillance and implementation of mosquito vector control activities.

### **Procedure**

#### **National Level - NMCP/PO-RALG**

- Solicit funding from domestic sources and identify development partners who are interested in mosquito vector control interventions.
- Develop and print mosquito vector control interventions social behavioural change communication (SBC) materials and tools for CORPs.
- Disseminate and distribute SBC materials and tools for CORPs to the identified regions.
- Provide mosquito vector control interventions guiding messages for radio advertisements and public address (PA) to the regions for lower-level community mobilization activities.

- Prepare a national plan for advocacy and community mobilization activities.
- Conduct national level advocacy meetings on mosquito vector control targeting policy makers and other important stakeholders.
- Conduct regional level advocacy meetings on mosquito vector control interventions to Regional
- Conduct preparatory meetings for advocacy and community mobilization activities in the country.
- Conduct training to Regional Health Management Teams (RHMTs) and Council Health Management Teams (CHMTs) on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on community mobilization activities at all levels.

### **Regional Level**

- Solicit funding for mosquito vector control interventions from different stakeholders within and outside the region.
- Identify all councils implementing mosquito vector control interventions activities and their timeline and conduct training for CHMTs on advocacy, community engagement and mobilization.
- Conduct preparation meetings for advocacy and community mobilization activities in the respective region.
- Review council's community mobilization and engagement implementation plan.
- Assist councils to plan and budget for community mobilization and engagement activities.
- Distribute mosquito vector control interventions information and educational materials to the councils.
- Supervise council's community mobilization and engagement activities.

### **Council Level**

- Prepare budget for community mobilization and engagement activities and incorporate to Comprehensive Council Health Plan (CCHP).
- Prepare council community mobilization and engagement plan.
- Conduct preparation meetings for advocacy and community mobilization activities in the respective councils.
- Identify approaches / channels (e.g., print, electronic & social media), target audience, key messages and timeline.
- Receive SBC materials and guidelines from the regional level and distribute them to wards and villages.
- Use National message guide to prepare cultural, specific and relevant mosquito vector control intervention messages for radio interviews and PAs.
- Conduct sensitization meetings with the ward development committee.
- Conduct sensitization meetings with community leaders and other influential people in the community.
- Identify local/community radio for airing mosquito vector control intervention messages.
- Select key council staff for radio interviews / talk shows.
- Participate in radio interviews / talk shows.
- Organize and arrange vehicles for PA messages and deploy according to route plan.
- Conduct training to CORPs to effectively implement community mobilization activities and provide

scope of work (SOW).

- Conduct supportive supervision on community mobilization activities.
- Prepare community mobilization report and submit to the regional level.

### **Ward level**

- Prepare ward community mobilization and engagement plan.
- Conduct ward level sensitization meetings on mosquito vector control interventions.
- Sensitize and educate community members on the benefit of mosquito vector control interventions in preventing mosquito-borne disease transmission in their areas.
- Disseminate and distribute SBC materials in targeted group and places in the community.
- Receive, review, summarize and file reports on community mobilization collected by CORPs from the field and submit to the council level.
- Prepare community mobilization implementation schedule with COPRs and hamlet leaders.
- Inform community members and hamlet leaders on dissemination of SBC materials and mobilization activities that will be carried out in the village.
- Inform hamlet leaders on the roles and responsibilities of CORPs.
- Conduct meetings to introduce CORPs to hamlet leaders.
- Supervise and oversee the implementation of community mobilization activities.
- Submit community mobilization reports to the ward level.

### **Community Owned Resource Persons (CORPs)**

- Prepare participatory community mobilization/sensitization plan.
- Select approaches and channels (use a combination of these recommended channels; house to house visits, village/community meetings, group discussion, distribution of information and educational materials).
- Implement community mobilization plan.
- Prepare community mobilization report and submit to the village level.

### **House to house visits**

- Prepare topic/messages and all other necessary working tools.
- Consult village leader for planning and receiving advice on households to visit in the respective village.
- Identify households for house visits.
- Inform heads of households of the intention and time for the visit.
- Visit identified households.
- Conduct sensitization talk and deliver mosquito vector control intervention messages.
- Allow household members to interact, ask questions and seek clarifications.
- Provide clarifications and respond to questions accordingly.
- Prepare and submit reports to the village level office (VEO).

### **Small group discussion**

- Prepare topic/messages and all other necessary working tools.
- Consult village leader for planning.
- Identify different groups in target village (e.g., women, youth, men groups, VICOBA, Vijiwe vya

Kahawa, Bao etc.).

- Inform the groups on the intention and time for the visit (each group should have 8-12 participants selected by the respective group leader).
- Visit the groups during the agreed time.
- Conduct group discussions and deliver mosquito vector control interventions messages.
- Allow group members to interact, ask questions and seek clarification.
- Provide clarifications and respond to all questions accordingly.
- Distribute information and education materials (if available).
- Determine total number of people in the group by gender.
- Prepare and submit report to the village level office (VEO).

### **Village/community meetings**

- Prepare topic/messages and all other necessary working tools.
- Liaise with target village leaders to agree on the schedule of village meetings.
- Seek permission from community leaders to include mosquito vector control interventions agenda among the meeting agenda.
- Deliver mosquito vector control interventions messages to the meeting.
- Use effective communication skills to deliver bio larvicide intervention agenda to the community.
- Allow people to ask questions and respond accordingly.
- Seek assistance from other health staff available at the meeting (e.g., Ward Health Officer or Health staff from the village health facility) in answering questions/giving clarifications to the questions / issues that you do not have answers to.
- Determine/estimate total number of people in the respective meeting.
- Prepare and submit report to the village level office (VEO).

### **Distribution of SBC materials (e.g. posters, flyers, brochures)**

- Receive/ask for SBC materials from the Ward/village level.
- Identify the target audience that needs to be distributed with materials (e.g., flyers, brochures).
- Identify important places for placing posters (e.g. village offices, health facilities, schools, public areas) where individuals can see and read clearly and where posters cannot be removed easily or destroyed by rainfall.
- Distribute materials to the targeted audience such as religious leaders, schools etc.
- Place posters to the identified places.

### **Materials and supplies**

**For successful implementation of advocacy, community mobilization and engagement activities for mosquito vector control interventions, the following materials and supplies will be needed at different levels**

- Mosquito vector control interventions messages
- SBC materials e.g., posters, fliers, banners
- Stationeries
- Vehicles for PAs
- Transport for officers/staff during advocacy and community mobilization

## Precautions

**The following points should be observed while conducting community mobilization and engagement activities**

- Do not communicate messages which do not comply with the National Mosquito Vector Control SBC & advocacy guide.
- Do not use communication approaches that can create chaos in the community.
- Make sure you have consent from the head of household before conducting any household dialogue.
- Use effective communication skills based on the community and the type of audience.
- Use mobilizers within the same community.
- Use key/influential persons.

### 1.4.2. SOPs for distribution of Long-lasting Insecticide Treated Nets (LLINs)

#### Introduction

Mosquito nets provide a physical barrier between the individual(s) using the nets and the mosquito, thus preventing disease transmission and annoyance. An insecticide-treated net is one that is impregnated with an insecticide that repels, disables and/or kills mosquitoes encountering insecticide on the netting material. A long-lasting insecticide treated net (LLIN) is a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibres, which remains for at least three years of recommended use under field conditions. They require no retreatment during their expected life span. Large-scale use of LLINs (at least 80% community coverage) is part of an integral approach to malaria control. In order to reach and maintain 80% coverage of LLINs, the Ministry of Health has four key channels to distribute LLINs to households namely, mass distribution of LLINs to all households, distribution of LLINs to school children (for distribution to their households), distribution of LLINs to vulnerable populations (pregnant women and infant) through antenatal care (ANC), expanded program on immunization (EPI) clinics and commercial sector.

#### Scope and purpose of SOPs

To clearly explain the responsibilities of all stakeholders and provide guidance at different levels of implementation (National, regional, district, ward, village and community at large) related to the distribution of LLINs.

These standard operating procedures covers all aspects of the distribution of LLINs to the community, schools, vulnerable groups as well as engaging the private/commercial sector in the marketing of LLINs. These procedures apply to all responsible personnel involved in the implementation, including but not limited to MOH, regional health management teams (RHMTs), council health management teams (CHMTs), Ward development committee (WADC), village health committees, volunteers, implementing partners and LLINs importers/retailers.

#### 1.4.2.1. SOP for mass distribution of LLINs to all households (“catch up”)

##### Scope and purpose

LLINs delivery via mass campaign is the ‘catch-up’ strategy that has proven to be an important opportunity to immediately scale up coverage. The implementation is divided into six main stages namely, planning, pre-implementation, implementation, reporting, promotion of LLINs use, monitoring

and evaluation. Good planning is very important for the success of mass distribution campaign. Detailed and timely planning is important to ensure efficient implementation of campaign. There are two types of planning namely macro and micro planning. Macro planning provides an estimated budget and allows for early identification of any major gaps in funding.

### **Roles and responsibilities**

#### **MoH/NMCP**

- Develop costed proposal. (LLINs quantification, procurement and distribution).
- Mobilize funds.
- Delegate operational aspects of programme implementation to selected partners/contractors where appropriate.
- Validate timelines.
- Conduct micro planning.

Microplan provides more detailed information on training, supervision, household registration, logistics, channels for social mobilization, distribution points, guidelines and templates, clearly defining roles and responsibilities of each partner and community at large in a specified time.

### **Responsibilities of various levels in micro planning**

#### **MoH/NMCP**

#### **Develop operational/action plan including**

- Sub-committees and their terms of reference (communication, training, logistics, M&E etc.). Each sub-committee must have its action plan for implementation of the campaign.
- Personnel required and supportive supplies for the campaign.
- Logistics- transportation, dispatch control tools.
- Waste management.
- Officially inform implementing levels (regional and districts) about the campaign.
- Assist in micro-planning at the district level.

### **Regional Health Management Team and Council Health Management Team**

- Develop micro plans with assistance from National level and implementing partners which include planning for
  - Training
  - Transportation and distribution
  - Supervision
  - Households' registration
  - Logistics, channels for social mobilization
  - Distribution points and issuing
  - Advocate for sufficient resources through Comprehensive Council Health Plans (CCHP)
  - Maintain continuous communication with MoH/NMCP and implementing partners for efficient implementation of the campaign

#### **Roles and responsibilities in communication MoH/NMCP**

- Establish a 'communications sub-committee' for the campaign, including implementing partners, which will
- Develop various messages (IEC materials) about dates for registration, issuing and benefits of

LLINs use to be used in various channels (Posters, leaflets, radio/TV spots, newspapers, drama, public announcements, and road shows) to be used by the community.

- Develop a communication plan in advocacy for national and local authorities.
- Advocate to political leaders, national media and funding agencies to promote the campaign and raise further support (financial) for the planned activities.
- Social mobilization to ensure full community participation during and after the campaign.
- Prepare, produce and disseminate IEC materials informing communities on dates and locations for registration and distribution and what to expect from household visits.
- Behaviour Change Communication part to ensure continuous use (hang-up) and maintenance of LLINs through multiple channels.
- Develop presentation regarding campaign for sensitization at regional, district and ward levels.
- Conduct sensitization meetings at the regional and district levels.
- To inform dates for training, registration of households, distribution of LLINs, issuing and roles of each stakeholder for the success of the implementation of the campaign.

### **Regional Health Management Team and Council Health Management Team**

- Implement awareness creation for the campaign to lower levels (ward, villages, community) through official letters, meetings and other channels that will be coordinated by the district.

### **Ward Executive Officer and Ward Health Officer**

- Raise awareness of the campaign and emphasize LLINs use to the community through multiple channels (public meetings, public announcements, ngomas, poems, dramas etc.) before and during registration and issuing.

### **Village Executive Officer and Village Chairperson**

- Raise awareness of the campaign and emphasize LLINs use to the community through multiple channels (public meetings, public announcements, ngomas, poems, dramas etc.) before and during registration and issuing.

### **Training**

Good quality training is important for the successful implementation of the campaign. Use cascade system to train three levels: National core trainers, regional & district trainers of trainers (ToT) and training of implementers (ToI). Training is important at all levels beginning with the national level- a first level of cascade. Care must be taken to maintain good quality training so as to avoid loss of information and misinterpretation.

### **Procedure**

#### **MoH/NMCP**

- Form a national/core training team.
- Develop, print and distribute training materials such as manuals, coupons, and issuing and reporting forms.
- Conduct training of trainers at the regional level, which will include regional and district supervisors.
- Supervise training of implementers.



**Regional Health Management Team (RHMTs) and Council Health Management Teams (CHMTs)**

- Form district training team (supervisors).
- Attend training of trainers.
- Conduct training of implementers (Wards & Villages).
- Distribute campaign implementation tools (forms/coupons, stickers, pens, clear bags).

**Ward Executive Officer (WEO), Ward Health Officer (WHO), Village Executive Officer (VEO) and Village Chairperson**

- Form team of implementers to be trained.
- Attend training of implementers
- Select needed personnel for registration and issuing exercises (volunteers)
- Orient volunteers on the registration exercise, use of tools/forms/booklets/coupons and how to write reports/fill report forms

**Volunteers/ Community Resource Owned Person (CORPs)**

- Attend and receive orientation on registration.
- Conduct registration exercise.

**Registration of households and institutions**

The information collected during the household registration is critical to the LLINs distribution, as its typically used for the distribution of LLINs. Registration of household members and/or institutions must be done immediately after training, prior to distribution for the purpose of:

- Getting correct approximation of quantity of LLINs required in the specific area.
- Identifying LLINs beneficiaries during issuing.
- Identifying different ways that can be used for registration such as:
  - a) Using household registration forms- where all members of the household/institution are registered in registration/issuing forms with identification number and location (village, ward, school).
  - b) Using vouchers/coupons- these have two parts; one part is given to beneficiary and the counterfoil/tub remaining in the booklet with beneficiaries' information. After registration, a list of beneficiaries is prepared (from the information in counterfoil/tub) at district level.

Vouches can be of two types: Vouchers of same colour representing one LLIN per voucher and Vouchers of different colours representing several LLINs depending on the colour of voucher.

**Note:** During issuing, the beneficiary must come with the provided coupon and will be identified using the prepared list

**Roles and responsibilities of various levels in registration MoH/NMCP**

- Design and print coupon/registration forms (ID number, age, sex, village, ward, district).
- Distribute coupon/registration forms to the implementers.
- Supervise registration exercise.
- Continue sensitization for registration through mass media where possible.

## RHMTs and CHMTs

- Supervise registration process at a lower level.
- Collect and compile district and regional data and send to national level.
- Sensitize lower levels on registration.

## WEO and WHO

- Supervise registration process at village level.
- Remind/sensitize the community on registration.
- Put poster targeted for registration on notice board.
- Collect and compile data from the village and send them to the district team.

## VEO and Village Chairperson

- Supervise volunteers during the registration of household members.
- Remind/sensitize the community for registration.
- Put poster targeted for registration on notice board.
- Collect all campaign registration tubs/forms from volunteers and submit them to ward level.

## Volunteers/CORPS

- Conduct registration of households including all institutions in the village (army camps, boarding schools, missionaries etc). As a volunteer enters the house, she/he must:
- Introduce him/herself.
- Explain the purpose of visit.
- Record beneficiaries' information (in coupon/registration forms) as trained.
- Tear out the coupon from the tub and give it to the person.
- Respond to questions.
- Disseminate key messages on dates and procedures for LLIN issuing.
- Thank the person for their time and move on to the next household.
- If there is no one at home during the visit, place a "Not at Home sticker" at the door or visible place which instructs the household to visit the VEO office for campaign registration.
- Send the filled coupons/registers to village leaders.

**Note:** Ensure that the hard-to-reach areas are reached and registration is done in all areas of the village during the days of registration. Registration activities should begin immediately after the volunteer's orientation

## Procurement and distribution

### Introduction

Procurement is a massive task that must be carefully planned. In Tanzania, Public Procurement Regulatory Agency (PPRA) tender procedures must be followed to obtain the qualified manufacturer/distributors. In cases where donor is involved in procurement, Voluntary Pooled Procurement (VPP) for international tender must be followed. After procurement, it is the responsibility of National level (or its contactors) to deliver the LLINs to the village level through district.

## Roles and responsibilities

### National level (MoH/NMCP)

- Follow PPRA procedures for national tender process and VPP for international tenders.
- Conduct quality assurance for LLINs.
- Deliver LLINs using the awarded contractor to the village level through districts.
- Deliver other supplies to the villages through selected contractor.

### Regional Health Management Team, Council Health Management Team, Regional and District Security Officers

- Ensure security of LLINs during distribution in their respective areas.
- Ensure availability of safe warehouses at the district level.

### Ward Executive Officer and Ward Health Officer

- Ensure availability of safe warehouse and security of LLINs at the village level.

## Implementation/Issuing Phase

### Introduction

LLINs issuing is done through fixed site at the village/mtaa level during universal coverage campaigns. The organization of the site is a critical component for the success of the activity and safety of the site personnel. It is important to ensure that urban sites have appropriate staff and that security measures for both commodities and site personnel are planned and budgeted. The number of beneficiaries that can realistically be served per day should be defined during planning so that a sufficient number of sites are organized, which will help minimize overload problems during the LLINs distribution. Communication activities are important for ensuring full participation in the LLINs distribution.

**Note:** Reminding beneficiaries of the process for receiving nets (e.g., bringing voucher who should come to the site etc. Disseminate messages about the start and end dates as well as the hours that the LLINs distribution site will open.

### Roles and responsibilities MoH/NMCP

- Supervision of the issuing exercise at the lower levels.
- Continue with awareness creation on proper use of LLINs at the national /zonal level.

### Regional Health Management Team and Council Health Management Team

- Supervision of the issuing exercise at the community level.
- Verify and compile issuing data and send them to the national level.

### Ward Executive Officer and Ward Health Officer

- Supervise issuing exercise at village level.
- Assist in crowd control.

**Note:** All the remaining nets from the villages should be delivered to the district level through the CHMT teams. There should be no nets remaining at the Ward level.

## Village Executive Officer

- i) Approximately two days before the issuing activity, VEO should call all the volunteers together for preparations and go through the following areas;
  - Set-up issuing points and crowd control procedures.
  - The process of accepting and verifying coupons and distribution of nets.
  - Fraud control and security measures (thumbprint and barcode procedures).
  - How do deal with unregistered individuals and lost coupons.
  - Emphasize proper net usage and LLINs facts.
- ii) Determine which volunteers will be working at which issuing points; ensure that they know the location, the campaign dates and the working hours.
  - Allocate LLINs and required supplies to the issuing points accordingly.
  - Ensure adequate number of trained volunteers according to the number of issuing points.
  - If there will be dropouts of volunteers after registration exercise, replace and orient new volunteers.
  - Write issuing report accordingly and submit to the Ward level
  - Put up posters at the issuing points before the issuing days.
  - Sensitize the community on the issuing dates.

## Volunteers/CORPs

- Issue LLINs to all beneficiaries.
- If a person comes for a net claiming that they were not registered, let them know that they must see the VEO at the VEO's Office on the last day of issuing to be registered and receive any remaining nets.
- If there are any extra nets remaining after the three issuing days, they should be used for those people who missed the registration and are still awaiting nets.
- Each person attending the issuing point should be collecting only the nets registered for their household.
- Collect and bundle the redeemed coupons from the issuing point using an empty LLIN bale and string and submit them to VEO.
- Alert the VEO if there are any suspicions of possible fraud or misuse of the registration coupons.
- Insist on proper and constant net usage, care and repair.
- Demonstrate how to hang the nets.
- Explain to the beneficiary that the strings in the upper part of the net should be tied up in the roof or loose rope above the sleeping place.
- The net should be tucked appropriately in the sleeping place to avoid mosquitoes from entering and biting.

DO's	DON'Ts
<ul style="list-style-type: none"> <li>• Only government offices/institutions should be chosen as issuing points.</li> <li>• Basel Convention guidelines should be used to burn LLIN bags.</li> </ul>	<ul style="list-style-type: none"> <li>• Never choose the political party office or religious institution as issuing point.</li> <li>• If there is a possibility of uniform provision (e.g., T-shirts) to campaign implementers, the colour should not reflect any political party.</li> <li>• Do NOT burn LLINs bags in the open air.</li> <li>• Do NOT incinerate LLIN bags unless proper incineration conditions are available.</li> <li>• Do NOT re-use LLIN bags for any other purpose.</li> </ul>

## **Reporting, promotion of LLINs use, monitoring and evaluation**

### **Data collection and compilation of reports**

Report on large-scale mass LLINs distribution campaigns that highlight successes, challenges and lessons learned are essential. A post-campaign report provides the MOH, contributing partners and donors with information that can be used to advocate for continued support and perhaps more importantly provide lessons learned that could help guide future campaigns. Data collection and compilation of reports at each level are essential in all phases of the campaign. Various forms should be developed at the national level, appropriately filled by the implementers and timely submitted.

### **Responsibilities for various levels of implementation**

#### **MoH/NMCP**

- Collect and compile registration and issuing reports from all regions.
- Generate campaign report after issuing LLINs.

#### **Regional Health Management Team and Council Health Management Team**

- Verify and compile Ward, village reports/data.
- Generate district and regional reports.
- Timely submit registration and issuing reports to the national level.

#### **Ward Executive Officer and Ward Health Officer**

- Collect registration and issuing reports from villages, compile them and send ward reports to the district level.

#### **Village Executive Officer and Village Chairperson**

- Fill in designed forms for registration and issuing (as per the given manual).
- Timely submit forms to the ward level.

## **Promotion of LLIN utilization**

### **Introduction**

Behaviour Change Communication (BCC) aims to foster positive behaviour change (consistent and correct use of LLINs) through increasing knowledge, encouraging dialogue and promoting services. BCC is especially important in the case of LLINs because once nets are distributed; impact will be low unless community leaders exercise proper behaviours concerning net usage for everyone. This includes hanging and sleeping under LLINs every night, and caring for and repairing nets. Behaviour BCC also helps to achieve the goal of 80 per cent use of nets by the target groups, which dramatically reduces malaria cases. It is important to ensure that community leaders are actively involved right

from the planning stages through to the implementation of the campaign. The MoH has to work with BCC partners to ensure messaging about the campaign and nets in general reaches as many people as possible, using different mechanisms.

**Note:** BCC Messages should be communicated at all opportunities to communities by all people involved in the campaign.

### **Roles and responsibilities of different stakeholders MoH/NMCP**

- Implement (BCC programme to increase proper LLINs use by using different channels e.g. mass media, mid-media, community mobilization etc.

### **Regional Health Management Team and Council Health Management Team**

- Supervise/implement specific BCC activities in their respective areas.

### **Ward Executive Officer, Ward Health Officer, Village Executive Officer and Village Chairperson:**

- Implement specific BCC activities in their respective areas.
- Set Posters BCC material on office walls, public meetings etc.

### **Monitoring and evaluation of the campaign**

#### **Introduction**

Monitoring and evaluation are done in order to determine the optimal use of resources during the campaign and to provide lessons for future distribution. During the initial stage of planning for implementation of mass LLINs distribution campaign, it is important to have a ‘monitoring and evaluation sub-committee’ with its ‘plan of action’ for the campaign. Terms of reference must be clearly stated.

#### **Campaign monitoring**

Monitoring of the campaign should be taking place alongside supervision during each phase of activities for all levels (from national level to village level). Monitoring data are important to direct changes in the campaign implementation to improve quality and coverage. The following are important issues to take note during various phases of monitoring:

#### **In pre-implementation phase**

- Visit planned distribution sites.
- Meet local health staff and community officials.
- Observe and assess trainings.
- Visit few households to assess community awareness about the campaign
- Monitor registration field activities.
- Review registration forms/list of beneficiaries for accuracy and follow-up actions.
- Conduct rapid monitoring to identify areas missed by registration teams etc.

#### **In issuing phase**

- Conduct supervisory visits to some issuing points to detect any problem.
- Conduct exit interviews and visit some households to assess community awareness of the campaign.
- Meet supervisors and some officials to refine strategies immediately based on feedback.

**After issuing (post-campaign)**

- Calculate administrative coverage.
- Verify regular tabulations.
- Conduct rapid monitoring to identify areas for mop-up.

**Procedural and implementation challenges**

- Whether surpluses and/or shortfalls on LLINs exist in different households.
- Whether excess free LLINs end up in the commercial market.
- The impact on usage and coverage amongst beneficiaries.
- Financial feasibility of establishing and maintaining this model on a national scale over a sustained period of time.

**Responsibility of MoH/NMCP through National Bureau of Statistics (NBS)**

- Conduct surveys to focus on measuring LLINs ownership, use and communication on the intervention through the Malaria Indicator Survey.
- Conduct evaluation meetings at all levels.

### 1.4.2.2. SOP for distribution of LLINs to school children

#### Scope and purpose

Tanzania is one of the first countries in sub-Saharan Africa to have achieved universal coverage with LLINs for every two people, with LLINs use rate of over 80% in many regions. To sustain these gains, the MoH initiated a wide scale consultative process (guided by international and national consultants) to define future continuous or “Keep-Up” distribution system to cover new sleeping spaces and replace lost or worn-out nets etc. School Net Programme is among the keep-up distribution strategies opted by MoH. This part highlights the SOP for the distribution of LLINs through schools. Major activities include; registration, distribution, issuing and reporting.

#### Registration

The school registration process will take place before the distribution exercise to ensure there is a list of all eligible pupils/students in each selected class. This is important so that we know how many nets each Region, District and School should be given. The exercise will involve pupils/students in Standards 1, 3, 5, 7 and Forms 2 and 4. This will allow every child to get a school net for his/her family once every two years. Registration is a key component of the whole distribution process; it will need good supervision and good preparation to ensure the data collected is accurate.

#### Responsibilities of the head teachers

- Call a meeting with all class teachers and explain the registration process.
- Call for a morning school assembly together with the health teacher to announce the expected school net registration and issuing event.
- Explain when the event will take place (month and week) and who are the eligible pupils/students to get the net and the criteria used for selection.
- Inform pupils/students on the benefits of using the selected classes approach – i.e., to ensure that every child gets a net to take home once every two years.
- Clarify that the net will be given to the pupils/students for their families’ use.
- Explain that all the teachers should cooperate during the issuing date.
- Appoint one focal person per grade if there is more than 1 stream/ class.
- Instruct teachers to fill in the registration forms.
- Supervise filling of the registration form according to the instruction given.
- Instruct teacher to submit complete registration forms to the head teacher within one day.
- Verify the data for each class against the School Register/ Admission Book and counter-sign.
- Complete the school summary registration form and sign.
- Make all forms available to Ward Education Coordinators (WECs) for verification and counter signing.
- Keep copies of registration forms at school and store in a safe place until issuing.
- Inform parents of the pupils/ students about the School Net LLINs distribution mechanism and the rationale for the Keep Up Strategy during village meetings.



### **Responsibilities of the School Health Teachers**

- Explain to the pupils/ student (e.g., during general assembly or other opportunities) about the school net LLINs distribution mechanism and the rationale for not giving all pupils a net.
- Emphasize the importance of sleeping under a net.
- Provide support to the Head Teacher in managing the registration process.
- Give each class teacher registration forms for the registration exercise.
- Organize the registration process in the respective classrooms.
- Fill in the name of the pupil in the registration form according to the school register.
- Collect and keep all the filled registration forms.
- Summarize the information from the registration form to the school summary form.
- Submit school summary form to the head teacher.

### **Responsibilities of the WECs**

- Confirm the total number and names of primary and secondary schools in your ward, and inform the Regional Training Coordinator during the ToT.
- Verify the school summary forms against the class registration form, filled in by the schools in your respective ward.
- Counter-sign the school summary form.
- After visiting all the schools in your ward, submit all school summary registration forms to the School Health Coordinator – Education (SHC-E) at the district headquarters.
- Keep copy of registration form at the Ward level.
- Responsibilities of the District school health coordinators (Education and Health):
- Keep copy of the summary registration forms from the WECs for district records.
- Confirm that all primary and secondary schools in your district have submitted the school summary forms.
- Compile summary of district data in collaboration with contractor representative and malaria focal persons (MFPs) within 3 days of receiving the copies.
- Give copies of the Summary Registration Forms to the contractor representative.
- Submit the district summary data and remaining copies (one for NMCP and one for the district) to the DED via the DMO.

### **Responsibilities of the District Medical Officer and the District Executive Director**

- Officially inform the MoH of a number of eligible students in the district per school together with the copies of school summary forms.

### **Responsibilities of the MoH/ NMCP**

- Verify district summary data against school data and compile comprehensive list for all districts.
- Submit comprehensive summary data of all districts to logistics contractor for packaging of LLINs to schools.

## **Distribution**

### **Responsibility of logistics contractor in collaboration with NMCP**

- Receive the original copies of the school summary registration forms of each school from the respective District.
- Crosscheck the data with the summary sheets as submitted to NMCP via email by the respective Districts. Provide final data with total nets required by each school to transporter/NMCP and agree on a date to start the distribution process.
- Inform the Regional Administrative Secretary of the date of the repackaging at Zonal warehouse.
- Supervise the offloading of the LLINs consignment at the zonal warehouse.
- Supervise the repackaging of nets into bundles for the individual schools based on data provided.
- Sign the issue voucher after repackaging has been successfully completed.
- Hand over the consignments of repackaged bundles as outlined in a distribution manifest to the respective regional representatives with co-signed person from the contracted transportation company.
- Inform the Head teacher via telephone or text message when nets have been dispatched and the expected date of delivery.

### **Representatives from Regions**

- Supervise the repackaging of nets into bundles for the individual schools.
- Sign the Distribution Manifest /delivery note.
- Inform the respective DEDs by telephone that the consignments have been dispatched. If there is any deviation from the original distribution plan, the DEDs will be informed beforehand by the logistic firm.

### **Responsibilities of the head teachers**

- Receive the consignment from the transportation company, verify the numbers delivered and sign the delivery note.
- Attach a copy of the delivery note to the school summary issuing form for submission to WEC.
- Ensure that the nets are appropriately safely stored at the school until the day of issuing.
- Check with the school in your ward whether consignments have been delivered and whether storage facilities are satisfactory.
- In case of problems, inform the CHMT immediately.

### **Issuing of LLINs at Schools Responsibilities of the Head Teachers**

- Inform class teachers on official dates of issuing after receiving messages from District School Health Coordinators.
- Distribute the class registration/ issuing forms to the respective class teachers on the day of issuing.
- Release the LLINs from the storage to the respective class teachers and allocate an appropriate number of nets according to the school summary registration form.
- Supervise the issuing exercise in the respective classes.
- Collect all class registration and issuing forms as well as the lists of any unregistered pupils from the respective class teachers and record them in separate forms within 1 day after issuing.

**Responsibilities of the Class Teachers**

- Receive the nets from the head teacher and take them to the respective class
- Call the registered pupils one by one as recorded in the registration forms.
- Give one net to the pupil and ask him/her to sign for receipt and insist on net use, care and repair.
- Return to the store nets of those registered pupils that are not present on the day of issuing.
- Record details (names, sub-village, sex, and grade of the pupil) of any pupils that are not on the original registration list on a separate piece of paper and submit them to the head teacher.

**Responsibilities of the Ward Education Coordinators**

Visit each school in your respective ward within 2 days after issuing, and

- Verify the school summary registration and issuing form of each school.
- Keep the school copy of the school summary forms as well as the copies of each class registration/issuing forms.
- Submit copies to the District School Health Coordinator – Education in the District HQ.

**Responsibilities of the District School Health Coordinators**

- Receive the copies of registration/issuing forms from the WECs.
- Confirm that all primary and secondary schools in your district have submitted their forms.
- Keep the copy from the School Summary form and all of the class registration/issuing forms for district records.
- Compile Summary of district data in collaboration with contractor representative and MFPs within 3 days of receiving the copies.
- Submit the summary data as well as all district and NMCP copies to the DMO.

**Responsibilities of the District Medical Officer and District Executive Director**

- Assign LLINs from district buffer stock to those schools with unregistered children.
- Submit all summary data of number of LLINs issued per school and copies to the region.
- Officially submit the summary data to the MoH- NMCP.

**Responsibility of MoH /NMCP**

- Verify data and draft comprehensive summary data and report for internal use and donor.

**1.4.2.3. SOP for distribution of LLINs to vulnerable populations (keep up)****Scope and purpose**

Based on the evidence available, the combination of continuous distribution approaches is considered to be the most cost-effective and appropriate means to keep coverage high after a mass replacement campaign. These approaches provide access to all population sub-groups and geographical areas while avoiding unnecessary overlap of LLINs availability. This part highlights the SOP for the targeted distribution to vulnerable groups namely infants and pregnant women. The guiding principle: is to “provide the right number of nets, to the right people, at the right time, at the lowest possible price”.

## **Roles and responsibilities**

### **MoH/NMCP**

MoH/NMCP with support from donors, implementing partners, national regulatory agencies, central tendering agencies should:

- Provide strategic leadership, normative and technical guidance.
- Cost proposals, and action/work plans.
- Coordinate all actors involved in the programme/project.
- Advocate the distribution mechanism.
- Develop strategic, implementation programme and operational plans.
- Assess needs and develop gap analysis.
- Quantify needs.
- Delegate operational aspects of programme implementation to selected partners and sub-contractors where appropriate (e.g., LLINs procurement, warehousing, supply chain management, training, communication).
- Procure LLINs.
- Train the trainers.
- Manage and supervise the programme implementation.
- Write the report; monitor and evaluate the program progress.

### **Development Partner**

- Review needs assessments, gap analysis, and proposals.

### **Implementing partners**

- Participate in program design and development.
- Participate in preparing strategic and operational plans, needs assessments, and gap analysis.
- Conduct advocacy and communication activities.
- Implement the project according to national plans under NMCP guidance and supervision.
- Write the report to NMCP and donors.
- Monitor and evaluate the activities implemented.

### **CHMT, Community Based Organizations (CBOs), Communities**

- Conduct sensitization meeting and social mobilization to increase awareness and appreciation of participation in the program.
- Participate in needs assessments and program action; design and develop implementation plan to ensure community needs are taken into consideration.
- Promote use and care of LLINs.

### **Procedures for LLINs distribution to the vulnerable groups**

- Procurement of LLINs will be done by the MoH or partners
- The NMCP will coordinate transportation of the LLINs to the Medical Store Department (MSD) zonal warehouse.
- MSD will distribute the LLINs from the zonal warehouse to the health facilities (private and public).
- The health facility workers will issue the LLINs to the pregnant women on the first ANC visit, to the infants receiving measles and rubella vaccines, people living with HIV/AIDS and children under 5

years admitted with severe malaria.

- Elderly and orphans will receive LLINs through outreach but must be registered in the health facilities.

#### 1.4.2.4. SOP for Commercial market for LLIN

##### Scope and purpose

To ensure access to LLINs for all segments of the population on a sustainable basis, the participation of the private commercial sector is critical. NMCP encourages manufacturers and commercial sector in promoting and selling LLINs to those who can afford to pay, thus enabling the limited resources available in the public sector to be used to subsidize LLINs for those who truly cannot afford to pay. The commercial sector provision of LLINs is designed to complement the public sector (i.e., campaign and routine distribution of LLINs) in order to maintain and increase coverage of LLINs. Aims of including commercial distribution as part of 'keep-up' strategy are:

- a) LLINs to continue being available in local markets so that vulnerable people should continue to be covered (those who were not covered by the LLINs mass distribution).
- b) Replace the worn-out LLINs.
- c) Offer variety of LLINs to meet the preferences of consumers.
- d) Complement the public sector effort to increase LLINs access.

**MOH recommends use of the LLINs only even in commercial sector. LLINs importer/seller must know that currently, only three types of LLINs are available, depending on the polymer fibre from which they are manufactured**

- a) Polyester LLINs are typically made from 75 or 100 denier multifilament polyester fibres which are factory treated with an insecticide and binding agent after the net fabric has been knitted and, in some cases, sewn into nets. 75 denier polyester nets have a typical life span of about 2-3 years.
- b) Polyethylene LLINs are made from monofilament high density polyethylene (HDPE) fibre with linear densities between 100 and 180 deniers. The insecticide is incorporated into the polyethylene before the fibre is extruded. HDPE nets are more durable than polyester ones and have a typical lifespan of 3 years or even longer.
- c) Polypropylene LLINs are made from multifilament polypropylene fibres, 100 deniers with insecticide incorporated into the fibres. Lifespan is estimated at 5 years under favorable conditions e.g., avoiding extreme temperature and soot deposit.

##### Responsibility of MOH/NMCP in LLINs commercial market

- Check for quality assurance of LLINs in commercial market.
- Register or develop an inventory of all private businesses (importers/sellers) of LLINs.
- Monitor all private businesses (importers/sellers) of LLINs.

#### 1.4.2.5 SOP for LLINs in private businessmen (importer/seller)

- Liaise with MOH/NMCP to familiarize with the current list of accredited manufacturers of LLINs.
- Import/sell nets that meet the LLINs specifications as explained above.
- Manufacturers of LLINs should have a copy of accredited certificate from country insecticide regulatory body, Pre-qualification unit of the WHO for full registration of LLINs.

- Importers/sellers should have a copy of certificate from the country insecticide regulatory body.
- Have a proper warehouse/storage that ensures the LLINs are not subjected to direct sunlight.
- Being a chemical product, LLINs should not be mixed with food items in warehouse/store, during transportation or at selling point/shop.

### 1.4.3. SOPs for Indoor Residual Spraying (IRS)

#### 1.4.3.1. SOP for Environmental compliance and human safety

##### Introduction

This SOP is important to ensure that insecticide used in IRS does not contaminate the environment which includes food, air, water, soil and vehicles and also does not harm the health of spray operators as well as the household members.

##### Scope and purpose

Environmental Impact Assessment (EIA) is required for any public or private program with potential environmental and human health impacts including IRS activity.

The SOP establish requirements for the following activities:

- Preparation of EIA in fulfilment of national environmental requirements.
- Training in environmental compliance.
- Conduct pre, mid, and post-spray environmental compliance inspections.

##### Procedure

##### Conduct pre-spray inspection

- Use a standardized pre-spray inspection checklist and toolkit to ascertain mitigation measures proposed for EIA.
- Write inspection reports and communicate to relevant authorities.
- Conduct mid-spray inspection.
- Use a checklist and guide on key items to look out for environmental compliance.
- Prepare a report that scores the IRS program as unsatisfactory, satisfactory, or excellent.
- Recommend for improvement.
- Share the report with relevant environmental compliance authority.

##### Conduct end-of-spray-round environmental compliance reports

- Write environmental compliance successes.
- Write environmental compliance failures (if any).
- Point out areas requiring further improvement.
- Write steps that will be put in place to ensure compliance before the next spray round.
- Share the reports with relevant environmental compliance authority.

##### Roles and Responsibilities

##### Roles and Responsibilities of Environmental Compliance officer

- Provide training sessions on environmental compliance as part of pre-spray training programs.
- Conduct pre/ mid / post-spray environmental compliance inspection, prepare a report of findings and also provide advice and on-site consultation to support pre-spray preparations required for environmental compliance.

- Provide technical advice on issues related to environmental compliance.
- Coordinate scheduling of environmental compliance training and pre-spray and mid-spray inspections and provide results of compliance inspections.
- Monitor the status of follow-up actions to address issues identified in compliance inspection reports.
- Prepare EIAs and other documents as required by the EIA and Audit Regulation of 2005.
- Develop training curriculum, trainers guide and module for training spray team on environmental compliance.
- Conduct Training of Trainers (TOTs) and spray team on Environmental compliance.

### **Roles and Responsibilities of Environmental Assessors**

- Conduct EAI pre/ mid / post-spray environmental compliance.
- Provide technical advice on issues related to environmental compliance.
- Prepare EIAs and other documents as required by the EIA and Audit Regulation of 2005.

### **Roles and responsibilities of vector control officers**

- Develop training curriculum, trainers guide and module for training spray team on environmental compliance.
- Conduct Training of Trainers (TOTs) and spray team on Environmental compliance.

## **1.4.3.2. SOP for advocacy and community mobilization for IRS**

### **Introduction**

The public needs to be well informed to ensure full support and cooperation with any IRS activities. IRS programs should always have an effective advocacy and public health promotion component to ensure widespread acceptance and support at household and community levels. This requires an ongoing dialogue between those coordinating IRS programs and community and local government leaders, together with other sectors such as agriculture, and education. Professional guidance should ideally be sought from health educators, health promoters and social scientists to develop information, education and communication (IEC) strategies and to conduct IEC campaigns before the start of each spray round. Focus group discussion sessions should be held to define how IRS is justified to the public, anticipate areas of concern, and to develop key messages.

IEC campaigns use simple messages that are consistently reinforced through different media. Educational materials such as pamphlets, posters and cartoons need to be produced and widely distributed. Where possible, these should be supported by radio and TV spots. Meetings organized by community leaders to explain the procedures and benefits of IRS programmes should be one of the tools used in health education and should include: how insecticide application impacts on malaria, including the duration of activity on the sprayed surfaces; the fact that spraying does not harm walls, ceilings and furniture; the fact that spray operators are responsible people who will take care of people's property; the need for the participation of householders in preparing their houses for spraying and complying with instructions; the fact that insecticides used are not hazardous to humans, dogs, chickens, cats or other domestic animals especially if the precautions outlined by the spray operator are followed; instructions to house owners not to re-plaster or wash sprayed walls for a few months after spraying and until the peak malaria season is over.

## Areas of focus

- IEC in Indoor Residual Spray.
- Implementation of advocacy and communication activities for IRS.
- Roles and Responsibilities.

## Scope and purpose

The SOP provide guidance to health educators and promoters at National, Regional and District levels on effective deliverance of advocacy and community mobilization. For the IRS operation to be successful, communities need to accept the program and support its implementation. This community support requires effective information, education, and communication (IEC) interventions.

This SOP is intended to be used by health educators and promoters at National, Regional and District levels for effective deliverance of advocacy and community mobilization.

- **IEC is particularly important for:** Increase levels of knowledge about malaria and IRS.
- Build approval of IRS as an effective intervention.
- Develop positive attitudes toward IRS.
- Develop skills and calls for action with regard to what residents should do before and after a structure is sprayed.

## Roles and responsibilities National level

- Plan and budget for IEC activities.
- Mobilize resources.
- Procure and distribute IEC materials.
- Prepare and distribute IEC guidelines and protocols.
- Conduct advocacy meetings at national level targeting Politicians, NGOs and other stakeholders.
- Train regional IEC facilitators.
- Conduct supportive supervision of IEC activities in the regions and districts.

## Regional level

- Plan and budget for IEC trainings.
- Prepare and distribute IEC training schedules to districts.
- Develop skills and calls for action with regard to what residents should do before and after a structure is sprayed.
- Notify target audience on training venue according to the schedule.
- Distribute IEC materials to Districts.
- Distribute IEC guidelines and training tools to districts.
- Train District IEC facilitators.
- Conduct supportive supervision on IEC activities in the districts.
- Prepare training and implementation reports.



## **Composition of Region IRS Technical Team (RIRST)**

- i. Regional Medical Officer.
- ii. Regional Health Officer.
- iii. Regional Malaria Focal Person
- iv. Regional Vector Control Officer.
- v. Regional IEC Officer.
- vi. Regional HMIS Coordinator.
- vii. Regional storekeeper.

### **Responsibilities of each of the RIRST members Regional Medical Officer**

- The RMO is the Manager of IRS activities in the Region.
- Is responsible for overall monitoring and evaluation of IRS activities in all Districts
- RMO will ensure safety of the equipment and insecticide by providing several storage facilities at regional level
- Chair RIRST meetings.

### **Regional Vector Control Officer/Malaria Focal Person**

- Coordinate all IRS activities in the Region.
- Conduct supportive supervision to all Districts.
- Advise RMO on recruitment of IRS staff, selection of IRS vehicles, selection of IRS sites.
- Verify delivery of Insecticide and other IRS equipment and update list of all items delivered in the district.
- Review daily IRS report/data and give feedback to the District Malaria Focal Persons (DMFPs).
- Assist in stores management.
- Supervise the closure of IRS sites and make sure remaining insecticides and other equipment are neatly arranged in regional warehouse.
- In collaboration with Regional IEC Officer, verify payments of contracted partners for IEC and other district officials

### **Regional IEC Officer**

- Prepare a work plan.
- Work with other partners in the district who are engaged in sensitization and advocacy.
- Meet with village and ward leaders for planning the sensitization and advocacy meetings.
- Review pamphlets and other health education materials and give comments.
- Distribute Health education materials
- Monitor the implementation of advocacy and sensitization activities.
- Prepare a system for monitoring health education, sensitization and advocacy.
- Prepare implementation report and present to District IRS Technical Committee (DITC), and IRS support team.

### **District Level**

- Identify and provide scope of work (SOW) to district IEC facilitators and supervisors.
- Identify and provide SOW to site information , education and communication managers (SIMs).

- Distribute IEC materials to IRS sites.
- Distribute IEC guidelines and training tools to IRS sites.
- Train SIMs.
- Conduct advocacy meetings for DITC.
- Conduct supportive supervision on IEC activities in the districts.
- Prepare training and implementation reports.

### **District Data manager**

- With the assistance of IRS information system support team, learn and be able to use data templates.
- Feed data to the computer from all IRS reporting forms received from IRS sites.
- Give daily reports of compiled data to DMO.
- Interpret compiled data for technical committee.
- Arrange storage of IRS reporting forms.

### **District Logistic Officer**

- With the assistance of IRS management support team, prepare the inventory of all IRS equipment used in the previous spray round.
- In collaboration with the same team, obtain the list of equipment allocated to the district.
- Assist District IRS Coordinator to identify sites for establishment of IRS camps.
- Monitor fuel consumption.

### **District Health Officer**

- To assist DMO with environmental compliance activities.

### **District Vector Officer**

- To assist in conducting entomological surveys

### **IRS site level**

- Distribute IEC materials to spray operators for deliverance to heads of households.
- Conduct advocacy meetings with village health committees.
- Distribute IRS IEC materials to drivers of operators' vehicles.
- Place IEC posters on strategic points within catchment areas of IRS sites.
- Disseminate IRS schedule to hamlet leaders two days before IRS.
- Notify village communities using megaphone on spray operation one day before operation.
- Prepare implementation report and submit to district IEC coordinator copies to site manager.

### **Advocacy Committee at different levels**

#### **Regional Advocacy Committee**

##### **Composition**

Regional Commissioner, Regional Police Officer, Regional administrative secretary, Regional Procurement Officer, Regional Medical Officer, Regional Education Officer, Regional Health Officer, Regional Community Development Officer, Regional Malaria Focal Person and Regional Religious Leaders.

### **Responsibilities of Regional Advocacy Committee**

- Provide Political support to IEC activities in the region.
- Translate and disseminate Policy regarding Malaria control.
- Conduct supervision on IEC activities.
- Provide support on legal matters regarding IRS e.g., refusals, Vehicle inspections etc.
- Sensitize the community to be involved and Regional Advocacy Committee.
- Provide Political support to IEC activities in the region.
- Translate and disseminate Policy regarding Malaria control.
- Conduct supervision on IEC activities.
- Sensitize the community to be involved and participate fully in IRS activities.

### **District advocacy committee**

#### **Composition**

DMFP, District Commissioner, District Administrative Secretary, District Education Officer, District Medical Officer, District Health Officer, District Community Development Officer, District Religious Leaders and Council Chairperson.

### **Responsibilities of District Advocacy Committee**

- Provide political support to IEC activities in the district.
- Translate and disseminate policy regarding malaria control.
- Conduct supervision on IEC activities.
- Provide support on legal matters regarding IRS e.g., refusals, vehicle inspections etc.
- Sensitize the community to be involved and fully participate.

### **Ward advocacy committee**

#### **Composition**

Ward executive Officers, Village Executive Officers, Village Chairpersons, Ward Education Coordinators, In charge of Health Centre in the ward and SIM.

### **Responsibilities of village advocacy committee**

- Reconcile number of targeted households from registration with village leaders.
- Train village leaders.
- Conduct advocacy public meetings in villages.
- Inform all village leaders on the spray schedule.
- Supervise deliverance of IEC messages by village leaders and spray operators.
- Find all refusals and provide facts about IRS and if still no compliance, take legal action.
- Prepare implementation report and submit to appropriate leader.

### **Village Advocacy committee**

#### **Composition of Village Advocacy Committee Members**

Village executive Officers, In charge of the dispensary in the village, Village Chairpersons, Hamlet Leaders and School teachers.

## Responsibilities of Village Advocacy Committee

- Conduct and update household registration.
- Reconcile number of targeted households from registration with hamlet leaders.
- Train Hamlet leaders.
- Conduct Advocacy public meetings in villages.
- Inform all hamlet leaders on the spray schedule.
- Supervise deliverance of IEC messages by hamlet leaders and spray operators.
- List houses which are not sprayed and make follow up for catch up.
- Find all refusals and provide facts about IRS and if still no compliance, take legal action.
- Prepare implementation report and submit to SIM

## Procedure

Select the strategic approach among three options currently used for conducting advocacy and community mobilization for IRS operations in Tanzania. The three strategies can be implemented in option-al scenarios that can either be in a mix or separately depending on the circumstances on the ground (social perspectives), timing of the exercise, and level of funding.

### Approach 1: The Partnership

This is partnering with the civil societies (NGOs) as change agents.

#### At National Level

- Identify partner using rapid organizational capacity assessment (R-OCA) which have two stages.

#### Preparatory Stage

- Develop terms of reference for potential partner organizations.
- Develop/adapt an organizational partner assessment tool.
- Develop organization selection criteria.
- Develop a field visit plan.
- Publish an expression of interest (in a newspaper of wide circulation) i.e., a formal call for application to partner with the implementing agency so as for interested potential partners to make formal applications.
- Analysing the submitted bids (whenever need arise, the assessment team may request for further information or clarification from the applicants).
- Shortlisting based on established selection criteria.

#### Terms of Reference for Partner Organization

The selected partner NGO will be responsible for the following roles and responsibilities, among others

- To conduct cascade trainings at ward and lower administrative levels.
- To facilitate ward level IRS sensitization meetings.
- To oversee and ensure the holding of village level IRS sensitization meetings.
- To ensure the deliverance of adequate, relevant and quality information and education on IRS to all people up to household level in a timely manner.
- To ensure the relevance of messages passed during all mobilization/sensitization meetings in all levels.

- To ensure high quality flow of information within a respective catchment area.
- To oversee and ensure the distribution of IEC materials up to hamlet levels (i.e., Brochures are distributed at households, schools and worship places; Poster are posted on public places – health facilities, schools/colleges, shops, etc.).
- To undertake random spot-checking to ensure hamlet leaders are visiting households and conducting hamlet level meetings.
- To follow up with community leaders in their respective catchment areas ahead of spraying teams to ensure and maintain community acceptance and readiness for IRS exercise.
- To produce a comprehensive performance report about the whole exercise comprising, but are not limited to the following.
  - Number of IEC materials categorically distributed (posters, brochures, fact sheets and banners, etc.).
  - Number of participants in community meetings (segregated by sex/gender).
  - Number of meetings (categorically) conducted at ward/village/hamlet level.
  - Number of hamlets visited/reached.
  - Number of households visited/reached.
  - Challenges encountered and recommendations (on how to overcome).
  - Lesson learnt (that could be adopted as best practice or success stories).
  - Produce a comprehensive financial report cumulatively and breakdown of each item.

### **Agreement Stage**

- Receive the nominations of the recommended organizations (at least 2 per district) in order of preference as per score sheets.
- Defend the selection of the organization at a plenary session of the assessment and selection team.
- Review the selection based on a checklist and selection criteria on issues of cohesiveness, integrity and mutual interest of the implementing agency and potential partner.
- Invite implementing agency for partnership formalization.
- Conduct community mapping in collaboration with implementing agency, district authorities and the selected partner organizations.
- Effect agreement with the recruited partner organizations whereby a scope of work (SOW) and memorandum of understanding (MOU) will be signed between the two parties to guide the mode of operations.

### **Approach 2: The Community-Based Site Information Education and Communication Manager (SIMs)**

Another recommended strategy in advocacy and community mobilization for IRS operations is drawing individuals from the communities to be recruited as change agents.

#### **Regional level**

- Prepare qualifications for recruitment of SIMs
- Prepare terms of reference for SIMs – (Refer to IRS Training Module A – Training community Mobilization Strategy).

**District level**

- Advertise the vacancy using local media
- Conduct Interview sessions in collaboration with regional officials
- Select qualified SIMs according to the number of sites (1 per site)
- Train selected SIMs.

**Approach 3: The Combined Approach**

This is a combination of Partnership and Community-Based SIMs approaches.

**Six Months before IRS****National level**

- Plan and budget for Advocacy and sensitization.
- Procure and distribute IEC materials to regions.
- Prepare and distribute IEC guidelines and protocols to regions.
- Prepare and distribute Household register books.

**Two Months before IRS****National Level**

- Train National team of facilitators (Figure 1).

**Regional level**

- Training the selected partner's institutions and organizations.
- Provide SOWs and TORs to selected partners.
- Conduct Regional IEC master TOT training.
- Develop Regional implementing partners' plan.
- Distribute IEC materials, guidelines, and protocols to districts.
- Select partners, institutions and organizations to implement IEC activities (Refer to IRS Training Module A – Training community mobilization strategy).

**District Level**

- Select SIMs.
- Train SIMs.

**One Month before IRS National level**

- Supervise IEC training in regions.
- Check and reconcile received IEC materials.

**Regional Level**

- Conduct training to IEC district trainers.
- Provide SOW to IEC district trainers.
- Supervise trainings at district level.

**District Level**

- Conduct training to SIMs.
- Provide SOW to SIMS.
- Supervise trainings at Ward level.

## **SIMs activities**

### **One month before IRS**

- Receive IEC training.
- Signing of temporary contracts with implementing partners and filling personal particular forms.

### **Three weeks before IRS**

- Compose IEC timetable.
- Preparation of ward and village IRS advocacy meetings.
- Sending invitations for ward and village IRS advocacy meetings.

### **Two weeks before IRS**

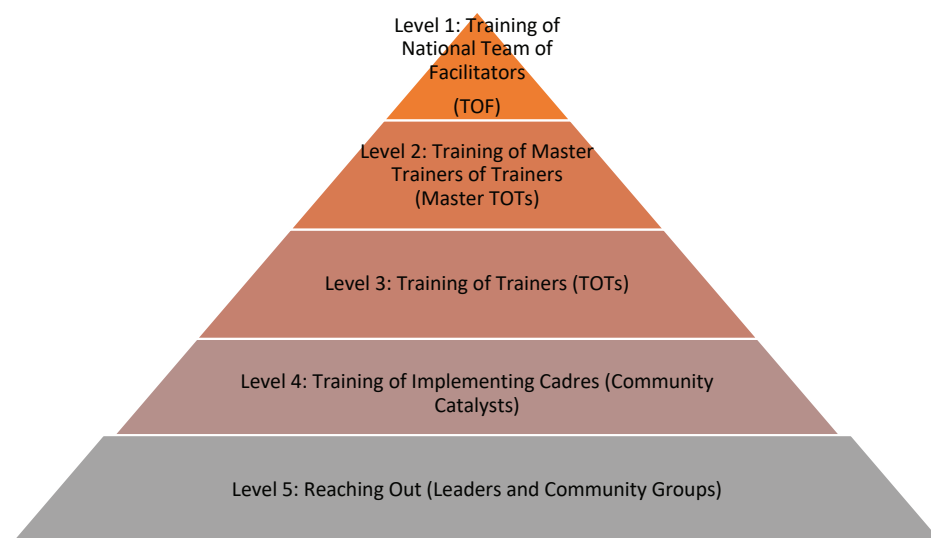
- Facilitation of IRS ward level advocacy meetings.
- Facilitation of IRS village level sensitization meetings.
- Conduct hamlet leaders' training on IRS.
- Distribute IEC materials and develop plan for house-to-house communication.
- Monitoring and supervision of hamlet leaders work i.e., house-to-house IRS mobilization.
- Deliver correct information to the Ward and village advocacy meetings as may be required.
- Verify if posters for IRS are in community centres.
- Verify with VEOs on the correctness of household data and timetable.
- Distribute the spraying schedules to the hamlet leaders and revise with them when there are changes.

### **Two days before IRS**

- Report to the site manager.
- Revisit the villages in which IRS will start and do the followings.
- Discuss with VEO to ensure escort for spray operators has been arranged.
- Sample some households to confirm the right message has been given and people are ready for IRS.
- Investigate for refusal and if any discuss it with local authority to intervene.
- Confirm the targets with VEO and the best approaches to distribute operators.
- Report to site manager daily and IEC coordinators weekly.
- Communicate contingency plans if needed.
- Conduct community mobilization using megaphones, especially announcing the spraying dates to the areas that are about to be sprayed the following day.
- Work with hamlet leaders making sure all households listed are sprayed and for those that are not sprayed collect the names of head of households and submit to the site manager on the same day.

### **Post IRS**

- Produce a comprehensive report about the whole IRS exercise in the areas (standard report template will be provided).
- Identify rumours, myths and misconceptions about IRS.
- Form strategies or networks with community leaders to clear the rumours, myths and misconception about IRS.



**Figure 1:** Conceptual Framework the numbers of people trained increase at each level in a descending order.

## Target audiences for the IRS

### Primary audience

Household members and community members.

**Secondary audience:** Leaders and politicians. These are community, religious, and government leaders who are in a position to influence our primary audience through various channels (mass media, public meetings, etc.)

## Communication Tools and Channels

### House-to-house visits

Done by District IEC coordinator and SIMs.

- Prepare meeting agenda and conduct meetings.
- Develop an FGD guide and conduct FGD.

### Radio

#### National/Regional/District

- Organized by Regional and District IEC Coordinator

### Design Radio Spots

- Use drama to communicate steps the households need to take before, during, and after spraying.
- Communicate benefits of IRS and broadcast to reach people who may have missed their household IEC visit.

### Arrange for Radio talk shows

- Allow listeners to ask their questions on air and to get more specific information.
- Allow community members and/or community leaders to appear on radio shows to share their experiences with IRS.
- Explain relevancy of IEC materials.



## National/Regional/District Design and Print Leaflets

- Incorporate detailed information about IRS.
- Print leaflets.
- Distribute to lower level.
- Design and print Posters.
- Develop one specific key message about IRS.
- Provide a blank space to write the date for IRS for that particular village to inform the spray date.
- Display in popular places such as markets, schools, places of worship, and offices.
- Design and print FAQ fliers - are provided as a tool or job aid to spray operators and hamlet leaders, who can refer to them to respond to questions from households and community members.

*Note:* IRS IEC messages have to be applicable based on cultural setting of specific areas

## Sensitization by hamlet leaders

### Roles and responsibilities of hamlet leader

- Record all households in the permanent household register.
- Distribute fliers and conduct house-to-house visits to spread the information;
- Plan with household members on ways the spraying operators should reach the household.
- Report to supervisors any household or area that refuses IRS.
- Direct and lead the spray operator into hard-to-reach areas, with the support of household members.
- Cooperate fully with IRS supervisors.
- Provide a progress report to the VEO about IRS operations in their hamlet; and
- Prepare and share a list of all households that have been sprayed and those that have not been reached.
- Identify unsprayed households.

### 1.4.3.3. SOP for IRS effluent waste disposal

#### Scope and purpose

In the implementation of IRS activities, wastewater (IRS effluent) is generated on a daily basis during the triple rinse of the spray pumps, when the spray operators clean themselves, and in washing of used personal protective equipment (PPE) such as overalls and gloves.

This SOP includes factors to consider in locating the IRS effluent disposal facilities, standard designs for the disposal facilities (soak pits and evaporation tanks), construction materials, recommended personal health and safety while in the facilities, and how to decommission the facilities once operations are terminated.

## Responsible person

- a) District Medical Officer
- b) District Environmental Compliance Officer
- c) Vector Control Officer

## Procedures

- Provide technical assistance to the district team in locating the proper site for the soak pits or evaporation tanks.
- Communicate with the DMOs and the RMO to ensure that the correct number of evaporation tanks and soak pits are constructed before the start of the spray round.
- Provide technical support during the construction of the soak pits and evaporation tanks.
- The environmental management officers are expected to familiarize themselves with the design and construction of evaporation tanks and soak pits.
- Oversee the construction of evaporation tanks and soak pits.

## Construction of Soak Pit

- Find a suitable place for construction of Soak Pit e.g., far away from water bodies, dwelling houses etc.).
- Construct large pit, usually an area of 2m by 1m by 1m.
- Pack 1.5 to 2 bags of charcoal at the bottom of the pit followed by 1.0-to 1.5 bags of saw dust, then stone aggregates comprising of boulders, coarse gravel and then fine gravel upon reaching the ground level.
- Fence the entire area and fit a door with a lock to keep domestic animals and children out.
- Put a warning sign to warn intruders not to enter to the area.

## Construction of evaporation tank

- Find a suitable place for construction of evaporation tank e.g., far away from water bodies, dwelling houses etc.).
- Dig a pit of 5m (16.4 ft.) long by 3m (9.8 ft) wide by 0.8m (2.6 ft.) deep.
- Make pit lining using cement blocks, plaster it and smooth finishing using cement mortars.
- Raise the edges of the tanks above the ground to prevent the wastewater from flowing out to the environment.
- Provide a covering sheet to cover the tank whenever it rains to prevent rainwater from flooding the tank and causing overflow and contamination.
- Discharge wastewater in the evaporation tank.
- Cover the evaporation tank by a lockable wire mesh panel to allows the insecticide to settle and the water to evaporate.
- Leave the wastewater to settle and the water to evaporate.
- Collect dried DDT powder from the evaporation tank and then disposed of together with the other solid DDT waste.
- Fence the area including a lockable door to restrict unauthorized access.
- Put warning signs for further caution to the public.
- Evaporation tank is only recommended when spraying using DDT.

**Note:** DDT is not currently used for IRS in Tanzania.

### Construction of Washing Bay

- Construct a cemented washing bay adjacent to the tank measuring 6m by 3.5m with the edges raised 20cm above the ground.
- Erect a hanging line over the washing area to dry the overalls.

**Note:** Construction of soak pits and evaporation tanks must be done at least two to three weeks before spray date.



**Figure 2:** Washing slab connected to effluent Soak Pit.

### Health and Safety

Wear complete PPE (overall, masks, gloves and gum boots) when rinsing or washing insecticide contaminated PPE. This includes spray operators, washers, supervisors, and storekeepers.

### Decommissioning

- Dismantle the DDT effluent disposal facilities in case IRS activities are closed completely, by restoring back to its natural state as much as possible. This includes backfilling the pits and planting grass, trees, or other appropriate local vegetation.
- Level the Soak pits without removing the stones, charcoal, and sawdust, but instead level and restore appropriate local vegetation.

### 1.4.3.4. SOP for IRS warehousing/store

#### Scope and purpose

This SOPs intends to give direction on how to locate IRS warehouse/store, constructions, and storing of IRS equipment.

#### Procedure

##### Location of IRS warehouse/IRS store

- Locate the warehouse away from schools, animal feed depots, water sources and residential houses (generally 100 meters away).
- Locate (minimum of 50 meter) away from health clinics, and generally away from pedestrian routes.
- Locate out of potential flood zones, water zones, wells and other supplies of water for domestic or animal use.
- Locate away from areas where ground water is close to the surface.
- Locate at the area accessible by transport and easy exit by large size trucks and in case of an emergency rescue people and their facilities.

##### Design and structure of building

- Design the structure of a warehouse with strong walls and roof, built in a surveyed area to rule out dispute issues.
- Provide adequate ventilation both artificial and natural so that pesticide vapours as well as temperatures, don't reach dangerously high levels.
- Construct impermeable floors (e.g., concrete surface) to minimize absorption in case of spills and facilitate clean-up.
- Construct a store building large enough to allow for proper accommodation of pesticides as well as storing empty containers and pesticide waste.
- Provide light using transparent roofing sheets or provide reliable electricity light.

##### Pesticide shelving

- Keep pesticides on wooden pallets and not directly on the floor to prevent them from getting wet.
- Stack Pesticide at reasonably height (not exceed a height of 2 m) to avoid risks of tipping, risk of perforation of boxes.
- Store liquid materials in shelves below the dry materials and not vice versa in order to avoid spillage.

##### Pump storage

- Store Knapsack sprayer pumps upside down in shelves.



**Figure 3: Pumps shelving**

### **Security precautions**

- Provide strong doors and windows and where needed grilled windows and doors in the ware-house/store.
- Employ security guard for both day and night.
- Use strong locks with double system of operation whereby one is operated by the storekeeper and the other by the assistant.
- Provide security light during the night.

### **Safety precautions**

- Label IRS warehouse/store and provide safety (Danger) sign. The label should be in common language of the people surrounding the warehouse/store.
- Arrange containers in good order so as to avoid mechanical damage giving rise to leaks.
- Floor spaces in the store should permit easy inspection and allow free airflow. This also enables immediate clean up in the event of any leakage or spills.
- Arrange store in such a way to create zone of insecticide and other supplies, zone of clean and contaminated commodities.

### **Essential equipment within a pesticide store**

- Wooden pallets.
- Ramps at entrance to contain leakage.
- Spill response kit.
- Container of absorbent sand, sawdust or dry soil.
- Shovel.
- Long-handled brush with stiff bristles.
- Short-handled brush and pan.

- Water supply, or container of water, with soap.
- Detergent solution.

**Fire and accident preparedness**

- Provide fire-fighting equipment: fire extinguisher and fireproof blanket.
- Provide extra PPE in case of visitors.
- Provide containers for empty pesticide sachets/containers (preferably salvage drums that can contain a whole 200-litre).
- Provide empty bags to repack heavily damaged or leaking containers.
- Provide self-adhesive warning labels for marking containers.
- Provide first aid kit.

**Temperature control in the storage of insecticide Procedures**

- Provide the mercury thermometer in every insecticide store.
- Provide daily temperature monitoring chart every insecticide warehouse/ store.
- Assign someone to record the temperature on daily basis (Morning 8.00 – 9.00 am), Noon 12.00 – 14.00 and afternoon (16.00 – 17.00).

**NOTE: If the temperature is above the range, then do the following to cool the store**

- Open windows and doors to increase air movement.
- Install cooling fans or air conditioner for large stores located in areas prone to high temperatures.
- Selection or construction of site stores should consider of having windows or vents that can assist in cooling of the store.
- Use the following temperatures chart recommended by WHO for various insecticides used in IRS.

**Table 5:** Temperatures recommended by WHO for various insecticides used in IRS

C/N	Insecticide compound and formulations	Storage temperature
1	DDT WP	20 -30 °C
2	Malathion WP	<49 °C
3	Fenitrothion WP	<34°C
4	Pirimiphos-methyl WP, EC	<34°C
5	Bendiocarb WP	< 40 °C
6	Propoxur WP	< 40 °C
7	Alpha-cypermethrin WP, SC	< 40 °C
8	Bifenthrin WP	< 40 °C
9	Cyfluthrin WP	38
10	Deltamethrin WP, WG	< 40 °C
11	Etofenprox WP	< 40 °C
12	Lambda-cyhalothrin WP, CS	< 40 °C.

### 1.4.3.5. SOP for IRS solid waste disposal

#### Scope and purpose

In the implementation of IRS activities, toxic solid wastes are generated in the form of empty insecticide sachets/ containers, used gloves, used respiratory masks, material covering sheets, used rinse barrels, and contaminated materials (e.g., sawdust, soil, or sand from accidental spills). The objective of this section is to present acceptable standard procedure for disposal recommended by WHO and FAO. This section details the standard requirements for storage of IRS solid waste before eventual disposal; selection of an in-country incinerating facility, including selection criteria; steps to take when no in-country incinerating facility is available; personal health and safety during disposal; responsibilities of different actors; and proof of destruction.

#### Responsible persons

##### Procedure

- Undertake an inventory of all IRS solid wastes by category (gloves, empty insecticide sachets, used masks, covering sheets, contaminated clean-up materials).
- Get a letter of proof from incinerating facility attesting that the incinerator is licensed by the government to dispose toxic wastes.
- Transport solid waste in appropriate vehicles to the identified licensed incinerating facility.
- Supply the following PPEs to the incinerator operators if it is not already supplied: Broad rimmed helmet, Face shield or goggles, Dust masks (vented version preferable), A pair of overalls, Nitrile, rubber, neoprene, PVC, or butyl rubber gloves long enough to cover the forearms; and Rubber boots.
- Verify that actual incineration has occurred by being present at the time of incineration or obtain certificate of destruction in case physical presence is not required during incineration.

#### Storekeeper

- Keep accurate inventory and records of all IRS solid wastes as stipulated in the IRS storekeeping manual.
- Prepare a weekly summary report on IRS waste status for the logistics manager.
- Participate in selection of waste disposal facility which is accredited and licensed by the governments to dispose of toxic waste.

#### Method of solid waste disposal

- Dispose empty insecticide sachets/containers, damaged insecticide sachets/containers, face masks, polythene covering sheets, broken thermometers and broken plastic containers (basins/buckets and jerricans) through incineration or other method approved by National Environmental Management Council (NEMC).
- Follow government procedures to dispose torn gloves, damaged rubber boots, damaged and helmets.
- Incinerate (in local hospital incinerator/municipal dump) all uncontaminated empty boxes/containers and worn-out overalls.

### 1.4.3.6. SOP for insecticide tracking during IRS

#### Scope and purpose

These instructions are important for improving supervision of full insecticide sachets and empty insecticide sachets or containers so that no insecticide is lost during IRS activities. This SOP outlines the essential requirements for insecticides tracking during IRS operations.

#### Roles and Responsibilities

District environmental management officers, in collaboration with malaria focal person /vector control Officer in the respective districts, will supervise insecticide use.

#### Procedure

- Provide register and stock in all stores or sub-stores at the beginning of IRS.
- Provide unique ID numbers to all sachets/containers for easy tracing from the spray operator to the IRS site in question when being issued (e.g., an ID consisting of the spray operator number, name of the site, sachet serial number, and date).
- Issue and receive in writings all full and empty sachets/containers to managers/supervisors and spray operators after physical counting and verification.

#### At the end of each day of spraying

- Empty sachets/containers are signed back in by each spray operator and full sachets/containers are signed back in by each spray operator.
- The numbers of both empty and full sachets are checked against what was originally signed for by both the storekeeper and the supervisor.

#### On each IRS site

- Monitor full sachets received from the district store or other source against the number actually used and again compared with the number of empty sachets/containers in the store.
- Submit on weekly basis Insecticide stock balances to supervisor.
- Store all empty sachets/containers until their disposal.
- Check sign to attest that the household members witnessed the full sachets/container being opened at the sprayed house. This document will ensure the intended use of the insecticide and the quality of spraying.

**Note:** Any environmental compliance inspector may inspect at random to check whether a particular empty sachet/container exists.

#### Material Management

- Provide double lock system.
- Complete store ledger and bin cards and other forms on daily basis.
- Ensure ledgers, bin cards are all filled and stored on their respective location.
- Use issue vouchers to issue material.
- Report loss or damage of any property and deal with the situation accordingly.
- Pay attention to the amount of insecticide use (Perform daily checks on the amount used per household sprayed). This should be done by team leader and detected gaps dealt with accordingly).



### 1.4.3.7. SOP for IRS workers' health and safety

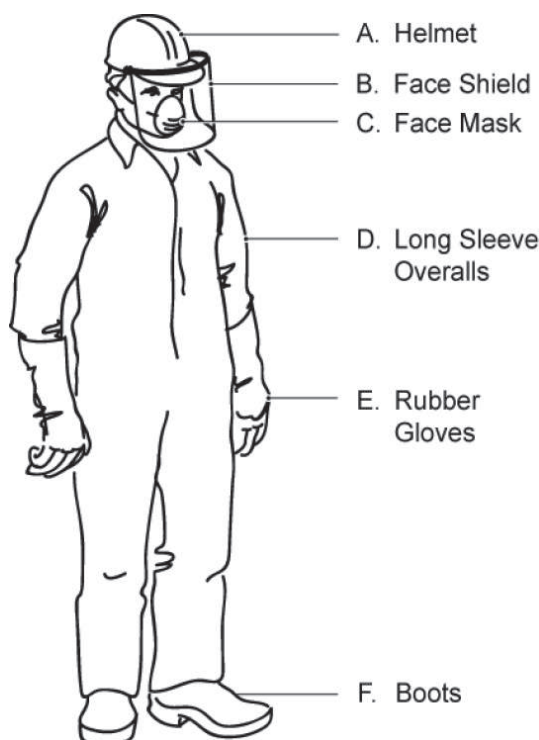
#### Scope and purpose

To provide acceptable, standard safety procedures (compliant with international and national standards) for handling, storage, transportation, and use of the various classes of insecticides used in IRS accordance with country safety regulations and the regulations put forward by the WHO and FAO.

This SOP guides all workers during handling and transportation of insecticides, safety precautions during storage of the insecticides, and general safety of all spray operators and emergency preparedness during the spray campaign, including responsibilities of different actors at the country level.

#### Procedures

- All persons working on IRS must wear appropriate PPE in accordance with the safety instructions on the product label or MSDS based on WHO and FAO specifications.
- Wear broad-rimmed hat/helmet with extended cloth flap or towel to cover the nape of the neck to protect head, face, and neck from spray droplets.
- Wear face shield or goggles (face shield preferable) to protect face and eyes against spray fallout.
- Wear particulate mask or filtered mask (see MSDS for specifics, N95).
- Wear cotton long-sleeved overalls per spray operator (overalls must be worn out-side of boots) and provide 2 or 3 overall per spray operator.
- Wear Nitrile rubber, neoprene, PVC, or butyl rubber gloves, without an inside lining and long enough to cover the forearm.
- Wear rubber boots.



**Figure 4:** Proper wearing of personal protective equipment (PPE) for spray operators

#### Personal protective equipment for storekeepers

- Wear Overalls (two pair).
- Wear Nitrile rubber, neoprene, PVC, or butyl rubber gloves long enough to cover the forearm and without an inside lining (The lining can retain insecticide and increase dermal exposure for staff

routinely exposed to insecticide-contaminated water.).

- Wear Rubber boots.
- Wear Broad-rimmed helmet.
- Wear Goggles, and
- Wear Dust mask (vented).

### **Personal protective equipment for washers**

- Wear apron.
- Wear nitrile rubber, neoprene, PVC or butyl rubber gloves long enough to cover forearm, very flexible to use in washing, and without an inside lining.
- Wear rubber boots.
- Wear goggles; and
- Wear dust mask.

### **Supplies for washing**

- Provide plastic barrels (50-60 liters) for progressive rinsing, sufficiently wide and deep to submerge the entire spray can (A minimum of seven barrels are generally required as a set for one wash line. The number can be doubled or tripled based on the size of the team).
- Provide plastic basins for washing overalls.
- Provide standard quality household detergent preferably in powdered form, for washing overalls.
- Provide rope/ clotheslines at the top of washing bay to hang overalls after washing.

### **Medical and first aid supplies**

- Provide pregnancy test kits sufficient for the number of female spray operator to be tested before and after the spray campaign and once each month during the campaign.
- Provide an eyewash set.
- Provide medical/first aid kit suitable for particular type of pesticides used e.g., contain activated charcoal and vaseline with vitamin E.
- Provide treatment medications for dermal exposure or pesticide poisoning.

**Note:** In the event of accidents or injuries, the exposed or injured person should be transported immediately to the nearest health facility.

### **Worker safety practices for spraying**

During operations, pay attention to personal hygiene, including washing and changing clothes.

### **Procedures**

- Enforce that eating, drinking, or smoking during work is strictly forbidden.
- Wash hands and face with soap and water before eating, smoking, or drinking.
- Change clothes immediately in case clothes become contaminated with insecticides.
- Discourage nursing mothers from applying the job of spray operator.

Involve the nearby in charge of health facility to conduct pregnancy tests to all female spray operators to identify pregnant women as health effects of the pesticides to the foetus is unknown.

**Note:** For spray campaigns lasting longer than 30 days, pregnancy tests should be repeated on a monthly basis throughout the campaign.

### **Washing facilities**

- Provide washing facilities with sufficient water and soap at the IRS site.
- Enforce at the end of the day that the spray operators to take bath using soap and water and then apply vaseline with vitamin E.
- Wash overalls at a central location in tubs used exclusively for overall washing.
- Wash working clothes (overalls) on daily basis.

### **Safety of households and beneficiaries**

- Advice household members to clear homes of mats or rugs, furniture, cooking utensils, and food items prior to spraying.
- Move the furniture at the center of the room and cover them if furniture cannot be moved out of the house.
- Advice household members to stay outside the home during spraying and for at least two hours after spraying.
- Advice household members to keep all animals outside the house during spraying and for at least two hours after spraying.
- Advice household members to sweep floors free of residual insecticide and insects and drop them in pit latrine or bury the material.
- Advice household members to wash their skin with soap and water in case of itching after re-entrance into the home and for eye irritation.
- Advice household members to flush eyes with water in case of eye itching.
- Advice household members to leave the home for fresh air in case of respiratory irritation.

**Note:** The only way to ensure safety of households is to ensure that every household gets the right messages through information, education, and communication (IEC)

### **Transportation of spray operators**

- Provide pickup trucks “Fuso” “or Canter” to transport spray operators from the site to village. Ideally, in the case of pickup truck transport, where spray operators sit in the bed of the vehicle, it is recommended to retrofit this compartment with handrails on the sides of the truck bed and to install benches with a plastic cover along the middle and the sides of the bed.
- Provide minibuses to transport spray operators from the site to village. The seat must be covered by plastic sheet to prevent spillage. Ideally two teams of 16 spray operators and two team leaders can share one mini bus.
- Advice spray operators to place pumps between their legs to minimize the risk of spillage
- Tighten the pump at the back seat in upright position in case of bicycle transportation. This will minimize spillage of pesticides.
- Provide life jackets in marine transportation to spray operators and other IRS staff and the vessels should be lined with plastic sheets to prevent spills in the vessel itself or into the water body.

### 1.4.3.8. SOP for IRS insecticides transportation

#### Scope and purpose

In the implementation of IRS activities, insecticides are usually transported from the port of entry to IRS regions (i.e., regional warehouse, district stores, and sub-stores) according to the needs of each operational site. Insecticides are harmful to human health and the environment, and for this reason they are categorized as toxic and hazardous.

This SOP include factors to consider when transporting insecticide from the port of entry to stor-age sites and, ultimately, to IRS sites, including safety precautions and vehicle speed limits.

#### Roles and responsibilities

**National Malaria Control Program (NMCP) Manager, RMO, DMO, DMFP, Store-keeper/Logisticians, Environmental compliance Officer**

#### Procedure

- Identify qualified supplier to transport IRS insecticide from the source to a utility point.
- Provide technical assistance in proper packaging, labelling loading and unloading of insecticides.
- Communicate with the DMOs to ensure that insecticides are handled safely and properly in transport from the source to the utility point.
- These steps should be followed each time IRS insecticides need to be transported, either via land or via water bodies.

#### Logistician/Storekeeper

- Pack sachets/containers in watertight barrels and mark with the exact number of sachets/containers therein when insecticide is transported over water.
- Keep in normal packaging boxes when insecticides are transported over land in an enclosed vehicle.
- Provide shipping papers containing detail the quantity and type of insecticide, and the material safety data sheets (MSDS) must be onboard accompanying the IRS insecticide to the final destination. Also prepare transportation documents (i.e., issue vouchers, delivery notes) specifying the quantity and type of insecticides.
- Provide emergency response telephone numbers (for both point of departure and destination) and make them available to the driver in case of an emergency.
- Check if the driver has a valid driving license, is trained on hazardous material regulatory requirement and possess certificate of the vehicle's road worthiness.
- Escort the vehicle carrying the IRS insecticides and other materials from the source to the point of use.

#### Selection of vehicles to be used for transportation

- Select a vehicle which has permission from relevant authorities to carry people.
- Select vehicle with valid insurance coverage for carrying passengers.
- Select vehicles which posses inspection certificate as proof of certification.

## Health and Safety

### Guidelines to minimize exposure during transportation

- Affix a warning placard to any vehicle transporting a bulk container of insecticide; common signage includes the hazard class of the waste, an emergency police number, the fire brigade number, and a speed limit of 80 km (50 miles) per hour.
- Check availability of first aid box kit and an insecticide spill kit that includes an absorbent material (e.g., sand, soil, or sawdust) a shovel, and an extra empty drum for storing contaminated materials.
- Check if the driver has all the necessary PPE (i.e., face mask, goggles, gloves, and rubber boots) and must wear them whenever controlling or decontaminating a spill.
- Train the driver on toxicity of the insecticide, Security issues, and implications of the insecticide being accessed by unauthorized persons, handling an accident or emergency, combustibility and combustion by-products of insecticide, and handling vehicle contamination.
- Allow only trained personnel to accompany the vehicle to load and offload the insecticides.

### Vehicle decontamination

- Clean and decontaminate the interior of the vehicle and exterior at the end of the spray day.
- Provide gloves for driver to wear during cleaning the vehicle.
- Wash all cloths used in wiping down the interior and bed of the vehicle along with the spray operator overalls.
- Prevent pesticide runoff from vehicle washing, by wiping the vehicle bed with a damp cloth prior to washing the interior of the vehicle.

#### 1.4.3.9. SOP for IRS solid waste transportation

##### Scope and purpose

In the implementation of IRS activities, solid wastes are generated on a daily basis during the spraying round, when the spray operators use pesticides and other materials; when these materials are no longer fit for use, they become solid waste. IRS solid wastes contaminated with pesticides are harmful to human health and the environment and are therefore regarded and categorized as toxic and hazardous.

This SOP include factors (e.g., safety precautions, vehicle speed limit) to consider when transporting insecticide or insecticide-contaminated waste from the generation point to storage sites and, ultimately, to disposal sites.

##### Roles and responsibilities

**DMO/DMFP/Storekeeper and Contractor Representative, vector control Officer, Environmental Compliance Officer**

##### Procedure

##### Environmental Officer

- Identify contractor to transport IRS waste from the generation point to disposal facility.
- Provide site managers and district storekeepers with technical assistance in proper packaging, labelling, and loading of solid waste, particularly insecticide-contaminated IRS waste
- Communicate with the DMOs and ensure the safe and proper handling of waste from the generation point to disposal facility.

- Fulfil this role each time insecticide-contaminated IRS waste and other solid wastes are transported via land or water bodies.

### Logisticians/Storekeepers

- Prepare transportation documents specifying quantity and type of waste (e.g., issue vouchers, delivery note).
- Familiarize with procedure for transportation of IRS solid waste each time when required to escort the vehicle carrying the IRS waste (both insecticide-contaminated and non-contaminated) from the generation point to disposal facility.
- Communicate with the DMOs/DMFP, before transportation of wastes, on properly packaging the waste as follows;

### Pack and transport IRS contaminated waste

- Pack used face masks, torn gloves, damaged covering sheets, worn out overalls and all other waste in plastic bags that have been labelled the quantity and type of waste material.
- Pack empty sachets/container in 210 L (55 gallon) barrels labelled with the number of sachets/containers contained therein.
- Provide shipping papers showing quantity, type of waste, and MSDS.
- Provide the driver with emergency response telephone numbers for fire, police, red cross, (for both point of departure and destination) to the driver in case of an emergency.
- Check if the driver possess valid driver's license, trained on hazardous material regulatory requirements and possess a certificate of vehicle's road licence.



**Figure 5:** Labeled 210 L barrels for packing used face masks, torn gloves, damaged covering sheets, worn out overalls and all in plastic bags and empty sachets s

### Health and Safety

- Affix a warning placard to any vehicle transporting a bulk container of insecticide; common sign includes the hazard class of the waste, an emergency police number, the fire brigade number, and a speed limit of 80 km (50 miles) per hour.
- Provide first aid box kit and an insecticide spill kit that includes an absorbent material (e.g., sand, soil, or sawdust), a shovel, and an extra empty drum for storing contaminated materials.
- Provide PPE to the driver (i.e., face mask, goggles, gloves, and rubber boots) and must wear them whenever controlling or decontaminating a spill.

- Restrict only trained personnel to accompany the vehicle to the disposal facility to load and offload the vehicle.

### **Decontamination of the vehicle**

- Wash the interior of the vehicle with water and soap or detergent, and the effluent waste must be disposed off in an IRS effluent disposal soak pit or evaporation tank.

## **1.4.3.10. SOP for logistics management in IRS**

### **Scope and purpose**

The purpose of this SOP is to help IRS managers and logistics staff to appreciate the importance of appropriate and timely management of logistics related to IRS commodities during a spray round.

The SOP is for zonal and regional IRS managers, logisticians and warehouse managers. It covers the following areas: procurement, management of property including inventory, transportation and storage and financial management.

### **Logistic definition**

The total management of the key operational functions in the supply chain – procurement, production and distribution. Procurement includes purchasing and product developments. The production function includes manufacturing and assembling, while the distribution function involves warehousing, inventory, transport and delivery. The process of managing both the movement and storage of goods and materials from the source to the point of ultimate consumption and the associated information flow.

### **Levels and functions of logistics management**

#### **National level**

- Procure items and services.
- Clear and forward items sourced from abroad.
- Transport insecticide, pumps and other items to regional warehouses.
- Oversee Regional and District levels for procurement and logistics management.

#### **Regional level**

- Oversee the design and location of warehouses.
- Manage IRS items including sensitive items such as insecticide, pumps and contaminated waste.
- Transport IRS material to district temporary storage facilities including sensitive items such as insecticide, pumps and contaminated waste.
- Prepare monthly inventory and motor vehicle movement for IRS activities.

#### **District level**

- Oversee the design and location of temporary storage facilities at district and operational site level.
- Manage IRS items including sensitive items such as insecticide, pumps and contaminated waste.
- Transport IRS material including sensitive items such as insecticide, pumps and contaminated waste to and from IRS site.

#### **Site Level**

- Transport IRS material to district temporary storage facilities including sensitive items such as insecticide, pumps and contaminated waste.

- Oversee transportation back to district temporary storage facilities including sensitive items such as leftover insecticide, sprayers and contaminated waste.

## **Procedure**

### **Pesticide shelving**

- Keep pesticides on wooden pallets and not directly on the floor to prevent them from getting wet.
- Stack pesticide at reasonably height (not exceed a height of 2 m) to avoid risk of tipping or perforation of boxes.
- Store liquid materials in shelves below the dry materials and not vice versa in order to avoid spillage.

### **Knapsack sprayer pumps storage**

- Store pumps upside down in shelves

### **Security precautions**

- Provide strong door and windows and where needed grilled windows and doors should be provided in the warehouse/store.
- Employ security guard for both day and night.
- Use strong locks with double system of operation whereby one is operated by the storekeeper and the other by the assistant.
- Provide security light during the night.
- Provide strong fence around the warehouse/store to prevent easy access of unauthorized people.

### **Safety precautions**

- Label IRS warehouse/store and provide safety (danger) sign. The label should be in common language of the people surrounding the warehouse/store.
- Arrange containers in good order so as to avoid mechanical damage giving rise to leaks.
- Floor spaces should permit easy inspection and allow free airflow. This also enables immediate clean up in the event of any leakage or spills.
- Arrange store in such a way to create zone of insecticide and other supplies, zone of clean and contaminated commodities.

### **Essential equipment within a pesticide store**

- Wooden pallets.
- Ramps at entrance to contain leakage.
- Spill response kit.
- Container of absorbent sand, sawdust or dry soil.
- Shovel.
- Long-handled brush with stiff bristles, and
- Short-handled brush and pan.
- Water supply, or container of water, with soap.
- Detergent solution.

### **Fire and other accident preparedness**

- Provide fire-fighting equipment (fire extinguisher and fireproof blanket).
- Provide extra PPE.
- Provide empty pesticide containers (preferably a whole 200-litre drum).



- Provide empty bags to repack damaged or leaking containers.
- Provide self-adhesive warning labels for marking containers.
- Provide first aid kit.

### **Temperature control in the storage of insecticides**

#### **Procedures**

- Provide the mercury thermometer in every insecticide store.
- Provide daily temperature monitoring chart.
- Assign someone to record the temperature on daily basis (morning 8.00 – 9.00 am), noon 12.00 –14.00 and afternoon (16.00 – 17.00).

#### **If the temperature is above the range, then do the following to cool the store**

- Open windows and doors to increase air movement.
- Install cooling fans or air conditioner for large stores located in areas prone to high temperatures.
- Construction of site stores should consider of having windows or vents that can assist in cooling of the store.
- Use WHO recommended temperatures chart in insecticides stores.

#### **Procedure for washing PPEs at IRS warehouse/store**

- Wear PPE when washing overalls.
- Use washing bay to wash overalls.
- Wash overalls daily for spray operators spraying carbamates, pyrethroids, or organophosphates; every two days for spray operators spraying DDT (to minimize effluent waste).
- Contaminated protective clothing should be thoroughly washed using industrial grade detergent followed by several rinsing (more than two).
- Hang washed clothes to dry in the soak pit or evaporation tank wash area.

#### **Best practices in pesticide stores management**

- Careful planning of pesticides requirements is essential to avoid the accumulation of stocks.
- Stock control begins with ensuring that the correct pesticide has been procured and delivered and therefore all products should be appropriately and correctly labelled.
- Material Safety Data Sheets (MSDS) should be readily available for dispatch with pesticide stocks leaving the central storage facilities.
- Pesticide stock should be verified at each point of delivery. At all storage facilities the manager/storekeeper should be present when pesticides are being delivered and record receipt of boxes. Boxes are then randomly sampled for both quality and quantity controls. If, during the visual inspection, they are damaged, the supplier should be notified and the pesticide should not be accepted.
- Incoming stock should be carefully recorded on inventory stock cards.
- Boxes should be numbered to track the distribution. In the event of inventory loss, misplacement, or quality concerns, the boxes can be tracked back.
- Pesticide inventory should be distributed on a “first-expire/first-out” (FEFO) basis to avoid the risk of stocks becoming obsolete (past their useable life dates).
- Stock delivery records require dual signatures, of those dispatching or delivering the pesticide stocks and of those receiving them so that there is no confusion about the amounts utilized within the program.

- At the secondary level, a storekeeper must record and sign quantity of pesticide received and distributed. In order to minimize theft, a double lock system should be utilized such that both the storekeeper and guard are needed to open the warehouse, and each will keep one key only.
- For daily transactions, the team leader requests and signs for sachets from the storekeeper. Normally, 5-6 sachets are distributed daily to each spray operator. The team leader therefore requests 40-48 sachets of pesticide each day for his/her team of 8 spray operators. The store manager should track the name of the team leader and number of sachets with a pen. The team leader does the same, writes down the number of sachets given to each spray operators. Marking each of the sachets makes it easy to identify which team and eventually whether the spray operator had custody of any given sachet. Both the spray operators and the team leaders have their separate sachet inventory cards.
- It is highly recommended that a dedicated logistician periodically visits and verify the inventory stock and storage at the storage facilities. He/she may also spot check the spray operators' record sheets to ensure that their daily stock forms are in order and being properly used, thus reiterating the principles of supervision and accountability.
- Routine stock verification (sampled physical counting of existing inventory in the storage place) is required at each operational site at least once every fortnight. This will be done by the storekeepers.

#### **Insecticide transportation from port to Regional/District store/IRS site**

- Contract qualified transporters while in need of transporting bulky insecticide for long distances, 100 km or else crossing risky environment like water bodies and game reserves.
- Select the vehicle which complying with all standards of traffic requirement plus the ability to shield the insecticides and other goods from rains and sun. Also, should be able to avoid accidental drop out of cargo and maximum security while transporting.
- Observe packaging requirements for that specific insecticide. Where no directives given by the manufacturer or supplier; consider avoiding contamination of environment while transporting and compromising the potency of the insecticide.
- Placard your vehicle if transporting a bulk container of insecticide; common sign are like hazard class of the insecticide, emergence policy number, fire brigade number, and a speed limit of 80 km /h.
- Enforce to transporter to have first aid box kit and insecticide spill kit composed of absorbent material and shovel and an extra empty drum for putting contaminated materials.
- Check if the driver possesses a valid driving license and a certificate of vehicle road worthiness (Road license) or SUMATRA license also trained on hazardous material regulatory requirement.
- Enforce the driver/sailor to have all the necessary protective gears i.e., face mask, goggles, gloves, and gum boots and whenever spill control need to be done or decontamination then he/she must be on PPE.
- Provide the driver with proper documentation, shipping papers with details in quantity and type of insecticides and material safety data sheets (MSDS) must be on board accompanying the IRS insecticide to the final destination, also emergence response phone numbers.
- Communicate prior to transportation of the insecticide, to destination warehouse on the preparedness to accommodate the insecticide is highly recommended.
- Allow only trained personnel to accompany the vehicle/vessel while transporting insecticides purposely for loading and offloading the vehicle.

**a) Pesticide Loading and Containmentment**

- Check if only IRS materials are in the truck during transportation.
- Check for open or leaking containers and make sure they are never be transported.
- Compartmentalize if co-transport is necessary.
- Arrange pesticide containers in such a way that they will not be damaged during transport, that their labels will not be rubbed off and that they will not shift and fall off the truck on rough road surfaces (the load must be securely fixed).
- Check the containers at intervals during transportation for any leakage, spills or other contamination and clean up immediately.
- If a leakage is noticed in transit, the vehicle should be brought to a halt immediately, the leak stopped and contained, and the spill cleaned up.
- Check the truck, including tarpaulins and other goods for evidence of spills or leaks after the pesticides have been unloaded, and then decontaminate using soap and water.
- Check newly arrive consignments for leaks and loose lids, and repacked immediately if necessary. Replace torn or unreadable labels.

**b) Decontamination of the vehicle and vessel**

- Wash the interior of the vehicle with water and soap or detergent.
- Dispose the effluent waste in IRS effluent disposal soak pit.

**c) Timelines**

- Transport insecticide from port of entry to regional warehouse at least one month before IRS
- Transport insecticide from regional warehouse to district store at least two weeks before IRS
- Transport insecticide from district store to IRS store at least two days before IRS operation.

**1.4.3.11. SOP for management of pesticide poisoning****Scope and purpose**

This SOP define minimum requirements for management of pesticide poisonings associated with IRS programs. This SOP describes basic management techniques applicable to pesticide poisonings related to IRS.

**Roles and responsibilities****NMCP Manager/RMO/DMO/DMFP/Clinicians in IRS sites**

- Train all people with potential direct contact or exposure to insecticides during handling, transportation, storage, use, and cleaning of insecticide-contaminated materials in first aid measures for pesticide poisoning.
- Supply first aid kits in warehouses and at spray centres and include the following: eyewash bottle, clean water, activated charcoal, soap, disposable towels, clean clothes, and atropine (for treating cases of poisoning with organophosphates or carbamates).
- Insist reporting of adverse events per the IRS round.

## Procedures

### Management of Acute Pesticide Poisoning

#### *i). Pyrethroids*

##### **a) Skin decontamination**

###### **Storekeeper, site managers, team leaders, spray operators and suit washer**

Wash skin promptly with soap and water. If irritant effects occur, obtain treatment by a physician. Vitamin E oil preparations (dL-alpha tocopheryl acetate) are uniquely effective in pre-venting and stopping skin reactions. Corn oil is somewhat effective, but possible side effects with continuous use make it less suitable. Vaseline is less effective than corn oil.

##### **b) Eye contamination**

Treat immediately by prolonged flushing with clean water or saline. If irritation persists, obtain professional ophthalmologic care.

##### **c) Gastrointestinal decontamination**

Administer activated charcoal if only small amounts of pyrethroid have been ingested, or, if treatment has been delayed, oral administration of activated charcoal and cathartic probably represents optimal management. Do not give a cathartic if the patient has diarrhoea.

#### *ii). Organochlorines*

##### **Clinicians**

- Provide supportive and symptomatic treatment including anticonvulsive therapy may be life saving. It is essential to establish a clear airway so that tissue oxygenation is maintained. There is no specific antidote against poisoning with organochlorine insecticide.
- Carry out gastric lavage with saline or non-oily purgative. If massive dermal contamination was the cause of poisoning, skin decontamination should be repeated in the hospital.
- Give diazepam 5-10mg intravenously for adults or 0.1mg/kg for children. Otherwise, a quick-acting barbiturate (e.g., barbital 5mg/kg intravenously or intramuscularly or rectally) should be administered. Such medication may have to be repeated at two to four hour intervals to effectively suppress convulsions and may have to be maintained for several days. If drug treatment in this manner is ineffective, intra-tracheal intubation and curarization may be required to stop seizures. Pulmonary ventilation has to be maintained mechanically.

#### *iii). Organophosphates*

##### **Clinicians**

- Give as soon as the diagnosis of organophosphorus compound poisoning a first injection of 2- 4mg of atropine sulphate intramuscularly or intravenously in very severe cases.
- In cases of poisoning with organophosphates or carbamates, atropine may be lifesaving if given in time and sufficient dosage.
- Give further atropine if the patient received atropine in the field as an emergency treatment, and if the symptoms are not promptly relieved or the patient's condition deteriorates at frequent intervals (every 10 to 20 minutes) and continued until the patient is fully atropinized. The amount needed may exceed a total of 100mg of atropine sulphate within 24 hours.
- Administer a cholinesterase (pralidoxime should be administered very slowly and the patient's respiration observed) in any severe or progressive case of poisoning.

**Note:** The decision to administer atropine should be made solely on the basis of clinical diagnosis and history of exposure, not on laboratory tests.

*iv). Carbamates*

**Clinicians**

Give as soon as the diagnosis of carbamates compound poisoning a first injection of 2-4mg of atropine sulphate intramuscularly or intravenously in very severe cases.

**Note:** Oximes (pralidoxime) must not be administered in case of carbamate poisoning.

### 1.4.3.12. SOP for IRS set up and logistics

#### Introduction

Timely and good quality delivery of IRS operations depends on strong program leadership and a well monitored management system. This includes collection of baseline information, detailed proposal development, thorough planning, rigorous implementation, strict supervision, careful monitoring and evaluation, and reporting. The planning and management cycle must consider current epidemiological and entomological conditions. Additionally, it provides systematic way of procurement, management of property including inventory, transportation, storage and financial and human resource management. These should be reviewed annually, and IRS strategy adapted and optimized according to changing conditions. Also, this SOP help IRS managers and logistics staff to timely procure and distribute IRS commodities during a spray round. During set up of IRS operations several activities have to be taken into consideration. The work plan with responsibilities and expected outputs are presented in appendix 1.

#### IRS is appropriate in areas where

- Majority of the vector population feeds and rests inside houses.
- Vectors are susceptible to the insecticide in use.
- People mainly sleep indoors at night; where the malaria transmission pattern is such that the population can be protected by one or two rounds of IRS per year.
- Majority of structures are suitable for spraying.
- Structures are not scattered over a wide area, resulting in high transportation costs.

#### Scope and purpose

The purpose of this SOP is to provide guidance to IRS implementing partners to deliver quality assured IRS. This SOP describes procedures to be followed in setting up IRS and IRS Logistics management system.

#### Roles and responsibilities in IRS setup

##### National level

- Develop policy guidelines and standards operating procedures for IRS.
- Resource mobilization and management.
- Overall IRS quality assurance and quality control.
- Develop IRS implementation annual plans.
- Supervision, monitoring and evaluation of IRS implementation.
- Forecasting annual requirements of IRS commodities.
- Develop capacity for implementation of quality IRS.
- Provide guidance on the selection of appropriate insecticides for IRS.
- Provide technical guidance on the selection of councils legible for IRS and guide the implementation of quality IRS.

##### Regional level

- Overall IRS quality assurance and quality control.
- Develop IRS implementation annual plans.
- Supervision and monitoring and evaluation of IRS implementation.

- Forecasting annual IRS commodities required.
- Participate in the selection and training of IRS sprayer operators and district supervisors.
- Assist the national level in the selection of councils for IRS and on the implementation of quality assured IRS.

### **District level**

- Develop IRS implementation action plan.
- Identify and recruit community members to be trained for IRS implementation.
- Provide space for storage of IRS commodities, supplies and equipment.
- Supervise and monitor implementation of quality IRS.
- Ensure all legible structures in the councils are sprayed.
- Take appropriate actions for those contravene the implementation of IRS.
- Insure sustainability of required rounds of IRS.
- Manage and undertake IRS equipment inventory and repairs.
- Monitor implementation of quality IRS.
- Prepare IRS implementation reports and report to the regional level.

### **Procedure**

#### **Activities to be carried out before IRS begins**

##### **Review population census**

The starting point for the IRS population census at the latest national population census document, inter-census surveys and demographic health surveys (DHS). It is important to update the population data when conducting house-to-house census prior to the spray campaign.

**NOTE:** Compile this information using the latest census data, local government records and health-sector data, as well as data from other major community-based programs such as expanded program on immunization. They should establish an initial estimate of the number of structures or houses that require spraying, the number of spray rounds to be carried out in a year, and the details and location of areas that can be placed under active surveillance with target spraying in response to outbreaks. Conduct a full geographical reconnaissance (GR) during the first round and updated during subsequent rounds (Figure 6).

##### **Liaise with relevant authority to perform environmental assessments**

- Implementation of IRS requires fulfilling the requirements for environmental compliancy in IRS.
- Before IRS implementation, ensure all environmental requirements are met.
- Consult the relevant institution (National Environmental Management Council -NEMC) to approve the Environmental impact assessment (EIA).
- Liaise with partners to identify their specific environmental mitigation requirements.

##### **Perform GR and mapping of structures/households**

- GR is defined as “the operation that provides the basis for the choice of field centers and depots, for detailed schedules and itineraries of spraying and surveillance personnel, for the final deployment of transport, and for the numerical control of the completeness of the work accomplished or reported”. This should be carried-out at least six months before implementing IRS.

## Estimate sprayable surface area

- ‘Sprayable surface is defined as the inside surfaces of all structures or houses that should be sprayed. This includes all internal wall surfaces, eaves not exposed to rain, ceilings, under-floor areas in raised housing, and the inside walls of latrines. Other structures in the village, outside the household compounds and where there are no sleeping areas, such as schools (except boarding school dormitories) and shops, should not be sprayed, as these will have very few malaria vectors resting (appendix 2).
- Obtain the average sprayable surface area of the target houses before insecticide quantification and procurement.
- Use a representative sample of 5–10% of the total houses to obtain the average sprayable surface area.
- Record the building materials used e.g., wood, mud, lime, cement blocks, burnt bricks and metal.
- Measure the surface (i.e., inside walls, ceiling, doors and windows) of all the structures (main houses, animal shelters and other buildings)- measure all dimensions with the tape in centimeters as accurately as possible.
- Multiply by two the sprayable surface area of partition walls, windows and doors (because both sides need to be sprayed).
- Measure all sprayable surfaces within a structure and added to determine the total sprayable surface area per structure in square meter.
- Add measurements of non-metal ceilings, wooden or straw doors and the undersides of immovable furniture.

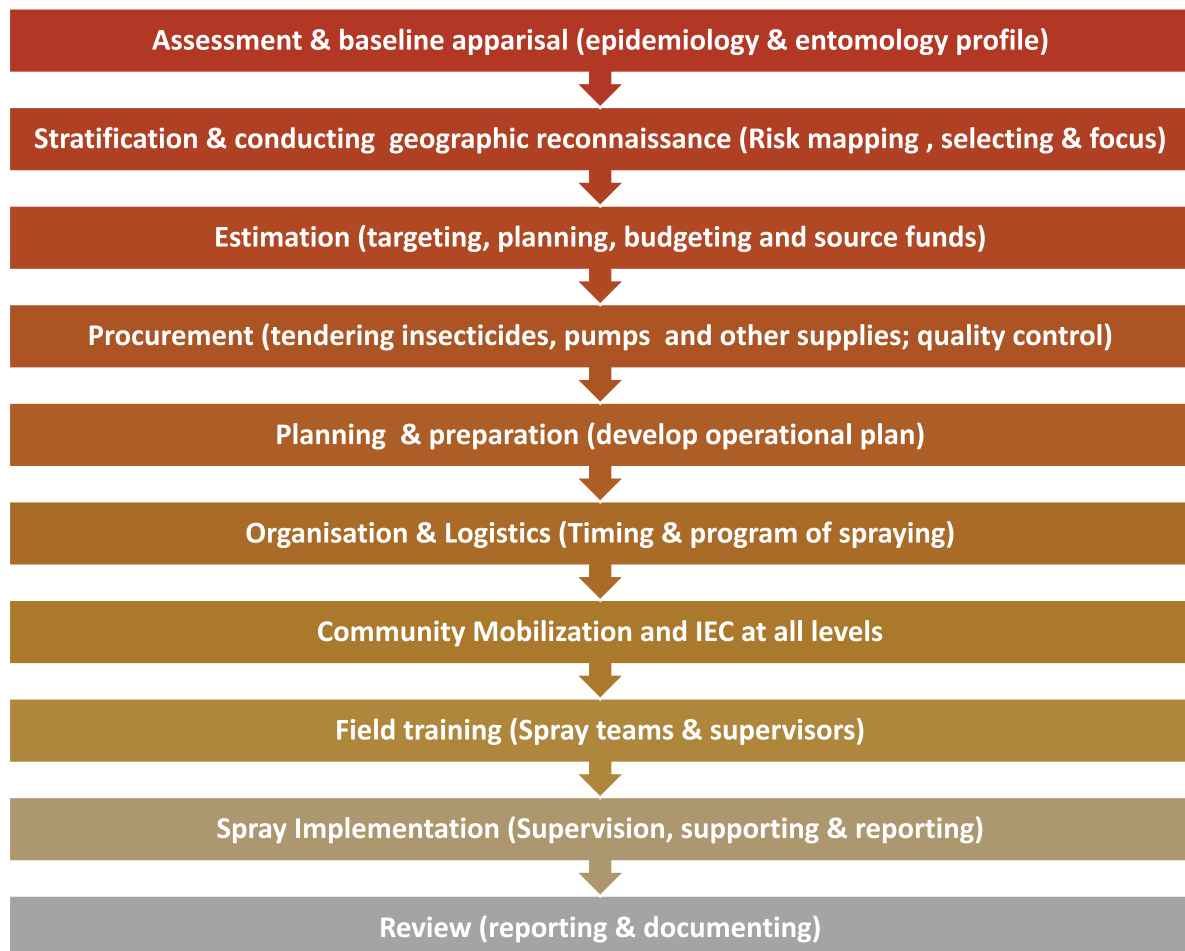
**Note:** Room sizes and sprayable surfaces should be estimated for each structure type. For the total, estimate the average number of rooms, along with the average sprayable area of the sleeping structures, in square meters).

- When all measurements are complete, calculate 10% of the total area, and add it to the total in square meters.
  - Use the following formulae to calculate the sprayable surface of a structure:
  - Rectangular structures: Measure the length and width of the ceiling, walls, and eaves. If a structure has no ceiling, calculate the area of the roof by the formula of the area of two rectangles and obtain the area of the shorter sides by doubling the area of the triangle.
  - Round houses without partitioning walls: Measure the radius of the house and use the formula  $\pi$  multiplied by the radius, multiplied by the height of the wall to the eaves, multiplied by 2 (or  $2\pi rh$ ) b. Then add the area of the roof, which is obtained by the formula of the cone (radius of the house multiplied by  $\pi$ , multiplied by the length of the roof from the eaves to the center, or  $\pi rs$ ); or estimate the area using the area of a circle to represent the ceiling ( $\pi$  multiplied by the radius squared, or  $\pi r^2$ ).
  - Measure a representative random sample of sleeping structures that were identified during reconnaissance, to estimate the total sprayable surface area in a geographic target area (e.g., division, ward, village, hamlets).



## Selection and quantification of insecticides

- Select WHO approved and registered insecticides for IRS guided by: the characteristics of the insecticides; the susceptibility status of the local vectors; the epidemiology of the disease, especially the duration of the transmission season; the environmental situation; and other factors relevant to the effectiveness of the IRS program.
- Quantify insecticides required based on the estimates of the total sprayable surface in the average house (See appendix 3).
- Liaise with insecticide registration authority to get list of registered insecticides.



**Figure 6:** Schematic layout of IRS management and implementation process.

## Financial planning for IRS

- Prepare financial plans or proposals based on estimated needs of insecticides, equipment, human resources, logistics, travel, per diem for coordinators and supervisors, etc.
- Prepare these budget estimates based on the number of spray rounds per year, the number of houses, rooms or structures to be sprayed and the planned duration of the spray campaign.
- Prepare separate budget for each activity. Each of the following activities must be budgeted for:
  - baseline and routine entomological monitoring.
  - mapping and geocoding of target areas.
  - insecticide and equipment, including sprayers and personal protection gear;
  - supplies such as tools, spares and replacement parts.

- transportation (vehicle rental, fuel, insurance, drivers).
- warehousing, camp or staging areas and maintenance repair facilities, including lease and site management costs.
- staff salaries, per diems and benefits.
- partnership collaboration, including advisory committees and entomological monitoring networks.
- managerial costs.

### **Resource mobilization**

- Mobilize resources for IRS based on the budget prepared.

### **Procurement of insecticides and other supplies**

- Consult specialized expertise for rapid, efficient and economical procurement of appropriate high quality insecticide products.
- Use the appropriate government machinery for the procurement process (i.e., use existing national policies and guidelines, with clear and transparent procedures supported by appropriate legal provisions and controls).
- Procure insecticides based on the EIA
- Procure all IRS spray pumps, proactive gears, vehicles and other supplies using appropriate government machinery for the procurement process.
- Determine procurement requirements for the campaign at least several months in advance (depending on procurement requirements) to allow time for tender, bidding, and manufacture and shipment of the insecticide to meet the target start date.

### **Developing plan of action for operations**

IRS is a time-sensitive intervention, and the timing and synchronization of activities are critical. Use the IRS operation countdown checklist for developing an action plan (see appendix 4). The information in the checklist enables all parties to prepare for implementing actions and deliverables on time. Display the countdown checklist at all levels of IRS implementation and insert a tick mark (√) in the corresponding box when an activity has been completed. The NMCP is responsible to decide, in the context of the respective strategic and implementation plans, which district or part of a district needs to implement IRS and decide on appropriate action plans like;

- Decide when to spray and when to end spraying.
- Plan to complete IRS before rains are expected to start.
- Consider the efficacy of insecticides.
- Calculate the quantity of insecticides needed (calculated on the basis of the number, size, and construction materials of sprayable surfaces), spray pumps, spare parts, and PPE according to the number of operators to be deployed per day and the duration of the operation. Include the expected breakdown rates of equipment.
- Estimate transportation needs according to distances to be covered and where the spray teams are based.
- Calculate the financial expenditure for the entire spray operation, including transportation.
- Determine how to recruit and train permanent and temporary spray staff, such as spray operators,

team leaders, supervisors, field officers, logisticians, warehouse managers/storekeepers, washers, guards, and drivers.

- Prepare clear terms of reference for all staff who will be involved in the spraying program.
- Include baseline data collection, M&E, and training for operators, supervisors, drivers, health facility staff, store clerks and washers.
- Prepare reporting system and forms.
- Determine a management plan by preparing supervision programs and supervision checklist.
- Plan for safety. Prepare guidelines for safe handling of insecticides, and depending on the insecticide selected, include either evaporation tanks or soak pits and ablution facilities.
- Include contingency measures for anticipated problems.

### 1.4.3.13. SOP for human resources management

#### Scope and purpose

The purpose of this SOP is to describe procedures during recruitment, training, placement, monitoring and discipline measures when so needed. It also includes management of staff health and payments. District IRS Technical Committee (DITC) is responsible in recruitment, training, placement of IRS staff.

#### Procedure

- Determine the type and quantity of staff required per each category.
- Set criteria for selection of staff.
- Form an IRS staff recruitment committee.
- Recruit various staff to serve in the IRS operation.
- Train recruited staff to acquire the needed knowledge and skills to execute their specific roles e.g., operators, site attendants, drivers, clinicians, supervisors.
- Allocate staff to sites and among the teams.
- Document the personal particulars of all staff e.g., consent form, medical examination form, bank account details and medical card.
- Provide each staff with an identification (ID) card.

### 1.4.3.14. SOP for IRS training delivery

#### Scope and purpose

The purpose of this SOP is to deliver standardized training to staff involved in IRS operations from the national to site level. After human resource recruitment, training follows and the DITC will organize all training of staff to be involved in IRS site operation.

#### Procedure

IRS training is delivered in cascade mode whereby the DITC will train the site managers and team leaders and who in turn trains operators and site attendants. Three types of training are recommended in IRS: pre, in between IRS and on job training.

#### Things to consider while planning for the IRS training

- Decide on the type of training and the target group e.g., site managers, team leaders, spray operators.
- Identify the required training packages from the training manual.

- Prepare training presentations e.g., power point presentation, flip charts, booklets
- Prepare a training time table.
- Identify an ideal training venue. The training venue must be clean, spacious with power supply, good light and ventilation.
- Prepare sites and equipment for practical training e.g., IEC materials for sensitization, insecticides, pumps, PPE, water supply in the field area.
- Possibly conduct the practical training near the IRS site. In case the distance between the venue and place for practical is long ensure transportation arrangements are in place.
- Send invitations for training specifying date, time and venue of training and other details like accommodation arrangements.

**Note:** IRS requires practical training to take place in real situation and therefore, if possible, conduct the practical training near the IRS site.

### 1.4.3.15. SOP for reporting incidents & accidents in IRS

#### Scope and purpose

The purpose of this SOP is to provide guidance in how to report incidents & accidents in during IRS. The SOP outline procedures to be taken by RMO, RMFP, DMO, DMFP and contractor in case of incidents during IRS operation.

#### Procedure

All accidents and security incidents must be reported to IRS project management and contractor corporate management.

Below are the required steps for each and every occurrence

#### The person involved in the incident or accident (or anyone close to him/her should)

- Report verbally on the event to the immediate supervisor in the field as soon as possible.

#### The immediate supervisor (if she/he is not the Contractor representative) should

- Inform a contractor representative as soon as possible.

#### Contractor representative should

- Send out a first alert e-mail report of the incident.
- Compile an incident report (supervisor and the Contractor representative) and forward to Ministry of Health as soon as possible but no later than 7 days after incident.

#### The report must address the following

- Brief description of event.
- Date, time and exact known location of the event.
- Name(s) of person(s) involved (both IRS personnel and any third parties).
- Nature of contractor's relationship with any involved persons (specify 3rd party, Contractor employee, contractor consultant, subcontractor employee or a seconded person and include the direct employer of any seconded personnel).
- Involvement of police or any military authority.
- Existence of a police report if applicable (which should be scanned and attached).
- Extent of damage or personal injury to IRS personnel, including whether or not any of those person-

nel are able to report to work.

- Extent of damage or injury to a third party.

#### **Other required information**

- Any complaints or reports filed with the authorities.
- Any payments already made to provide emergency medical care.
- Any press or newspaper report.

### **1.4.3.16. SOP for Store Management at district level**

#### **Scope and purpose**

As part of IRS logistic management, good stores management increases the efficiency of IRS and contributes to cost effectiveness by proper use, avoid loss and malicious damages to supplies. The DITC is tasked with store management for the insecticide and other IRS supplies.

#### **Procedure**

##### **Preparation of District IRS store**

- Allocate the building that will accommodate the insecticide and other IRS supplies.
- Allocate and modify site stores for IRS.

##### **Selection of the District IRS storekeeper**

- Select and train an IRS storekeeper
- Acquire (from NMCP) and provide tools for stores management to the storekeeper.
- These tools include stores books and forms for IRS stores management (i.e., stores ledger, bin card, daily insecticide reconciliation form, weekly insecticide stock management form).

##### **Prepare and train Site Managers for site stores management**

- Train the site managers and team leaders on site stores management.

#### **Other requirements**

- Prepare IRS supplies distribution list.
- Distribute the insecticide and other supplies as per distribution list.
- Supervise the site IRS stores to ensure compliance and to provide supplementary supply for stock out items.

**Note:** At the end of IRS, close of site stores, recover insecticides, other supplies and wastes back to the district store.

### **1.4.3.17. SOP for IRS data entry**

#### **Scope and purpose**

This SOP define the data entry requirements at District Level. The SOP addresses entry requirements for a District Data Clerk and M&E Officer. At district level, hard copy entries of team leader form and site manager booklet are translated to electronic entries, whereby information is entered in specially designed Excel templates- one each for team leader and site manager entries.

Monitoring and evaluation personnel and data clerk personnel are responsible for collection of data

from the spray team, entering, analysing and sharing of the report with relevant authority.

## Procedure

### District Data Clerk

- Translate all hard copy team leader forms onto IRS team leader electronic template.
- Enter the information found in the hard copy team leader forms onto the defined IRS electronic team leader Excel template.
- Enter the information on a daily basis for the period in which the forms are being received during IRS.

### Monitoring and Evaluation Officer

- Translate all hard copy of site manager sheets onto IRS Site manager electronic template.
- Enter the information found in the hard copy site manager booklet onto the defined IRS electronic site manager Excel template.
- Enter the information on a daily basis for the period in which the forms are being received during IRS.

The main parameters found in the spray forms, that are exactly translated into electronic format by entering the hard copy information in the site manager and team leader forms onto the electronic IRS templates are:

- **House Information**  
Targeted; visited; sprayed; not sprayed; not reached; reasons for unsprayed houses.
- **Insecticide**  
Stock; Usage; count of empty sachets; count of unused sachets;
- **Demographics**
  - Number of under-fives; pregnant women; over fives recorded in houses visited.
- **Net Usage**
  - Count of under-fives; pregnant women; over fives who slept under a bed in houses visited.
- **Perception**
  - Perceived advantages and disadvantages of IRS in communities.
- **Information**
  - Number of males and females who received information on IRS
- Main source of information.
- Spray coverage.
- Population Protected.
- Spray operator performances.
- Site performances.
- District performances.
- Average sachet uses per house.

### 1.4.3.18. SOP for IRS data consistency checks at district level

#### Scope and purpose

The purpose of this SOP is to help District M&E officer and data entry clerk to perform data consistency check on data collected by the Site Manager, Team Leader and Spray Operators. This SOP defines the data consistency requirements for district M&E officer and data entry clerk.

#### Procedure

## **M&E Officer**

- Countercheck main parameters defined on the filled sheets in booklet # 4 before transferring them electronically to site manager template.
- Counter check the filled hard copy sheets in booklet (Appendix 5), to ensure no missing fields are present and/or summation errors have not occurred before entering each sheet electronically.
- Assist the data entry clerk conducting consistency check for filled hard copy team leader forms (Appendix 5).
- Serially number hard copy sheets starting from 1 onwards so as to give unique IDs to each of them.
- Review the main fields entered and counter check against the consistency checks put in place on the Excel template. Do this once data have been electronically entered.

### **If variance is noted the following should be done**

- Highlight the field(s) which have the variance.
- Trace back to the particular hard copy form on hand and counter check the numbers. If the information on the electronic template is different to the hard copy entry, then it should be rectified.
- In case the entry is the same, but looks anomalous, then trace back to team leader forms and if need be, up to spray operator forms just to counter check. If the source of error is identified, then change in the form and electronic template accordingly.
- If the information reflects the same in all the hard copy forms but still thought to be anomalous, then communicate with the IRS team to discuss this anomaly and counter check.
- In case of missing fields, follow the same consistency check protocol. If the field is identified, then enter on the template. If the field is missing in all the hard copy forms, then launch an investigation in collaboration with the IRS team to understand its reason.

## **Data entry clerk**

- Before entering each sheet electronically, counter check the filled hard copy of team leader forms, to ensure no missing fields are present and/or summation errors have not occurred.
- Serially number all forms from 1 onwards so as to give unique IDs to each of them. This will also help should it be required to refer to the said forms retrospectively.
- Once data is electronically entered, review the main fields entered, and counter check against the consistency checks put in place on the Excel Template.

### **If variance is noted, the following should be done**

- Highlight the field(s) which have the variance.
- Trace back to the particular hard copy form on hand and counter check the numbers. If the information on the electronic template is different to the hard copy entry, then rectify.
- In case the entry is the same, but looks anomalous, then trace back to the spray operator forms just to counter check. If you identify, change in the form and electronic template accordingly.
- Refer anomalous data to the M&E officer who is responsible for further communication with IRS teams for detailed counter checks as explained above.

**The main consistency checks include Insecticide**

- Difference between the number of empty sachets and number of sachets used should be zero.
- The sum of empty sachets and unused sachets should be equal to the number of sachets initially issued.

**Houses visited**

- The sum of houses visited (defined by total number of house characteristics) should be equal to the sum of houses sprayed and not sprayed.

**Rooms**

- The total number of rooms recorded should be equal to the sum of rooms sprayed and not sprayed in each house it was recorded for.

**Reasons for not spray**

- The sum of reasons for visited houses that refused to spray should be equal to the total number recorded for not sprayed.

**1.4.3.19. SOP for financial management in IRS operation****Scope and purpose**

The purpose of this SOP is to guide financial managers on general rules and regulations needed to handle money for IRS operation. Financial managers and other staff dealing will budgeting and payments before, during and after IRS operation.

**Budget**

The IRS operation budget is determined by 8 main factors:

- a) Human resources utilization.
- b) Logistics including transportation and storage.
- c) Duration of operation.
- d) Needed equipment.
- e) Expected insecticide used ratio.
- f) Consumables.
- g) Capacity building and
- h) Community sensitization.

**Personnel cost is calculated as:** Number of staff by cadre x daily rate by cadre x days

**Transport cost is calculated as:** (Number of teams/2) x daily rate per vehicle hires x operation days

**Equipment budget****Calculation is based on**

Number of spray operators, number of teams, number of sites, shifting operation phases etc.

**Pay roll management**

- Pay roll is prepared using the information from attendance register. Each payroll will have to indicate the name, cadre, contact, and account details/ or any information which will be deemed necessary according to payment method.
- The payroll is used to effect payments.



## Payments to Vendors

- Collect all necessary documents (delivery note, proforma invoice, signed a contract/Agreement, scope of work etc) from the vendors.
- Seek approval from authorized personnel and effect payment.

**Note:** Before effecting any payments to vendor make sure that there is no discrepancy between the Purchase order/Contract, invoice and receiving document.

### 1.4.3.20. SOP for management of IRS at operational site

#### Introduction

An IRS operation site is a workplace designed to accommodate day-to-day IRS operations. There are two types of IRS sites namely standard IRS operation sites (IOS) and Provisional IRS operational sites. Since an IRS site involves a large number of staff (40, on average), proper management system and organization is required for smooth running of routine IRS activities. To achieve this, each IRS site staff has to comply with his/her responsibilities in environmental management, proper record keeping, human safety etc. During IRS operations, maintaining discipline is important to ensure quality IRS. The site manager will ensure that everybody has his or her own scope of work (SOW) and complies with it. The site manager should have all necessary documentation for all staff and submit these documents to the district office.

A good standard IRS operational site should have;

- Storage facilities for insecticides.
- Knapsack Spray pumps.
- Washing bay (concrete slab, drying lines, and water storage tank).
- Sanitary facilities (toilets, a changing room, and washrooms) divided into male and female compartments.
- Washing bay and washrooms should have two separate soak pits.
- Should have a refuse pit for disposal of the site's uncontaminated solid wastes.

The following staff should be included:

- The site manager (SM), who is in charge of the site.
- Team leaders.
- Spray operators.
- Pump technician(s).
- Washers.
- Site attendants for cleaning and fetching water; and
- Site guards.
- IRS site community change agent.

A standard IOS is provided with vehicles for the transportation of spray teams. Minivans are recommended for transport of spray teams, where these are not available, pick-up trucks with improvements for passenger safety are recommended. For the IRS operation to be successful, communities need to accept the program and support its implementation. This community support requires effective information, education, and communication (IEC) interventions.

## Scope and purpose

To provide guidance for smooth running of day-to-day IRS operations with optimal success.

This SOPs are intended to be used by Regional and Councils Health Management Team to guide in the management of IRS operation sites.

## IRS Team Leader

- Should assess four spray operators in his/her respective team per day while the IRS site manager will assess four spray operators per each of his/her teams per week as indicated below:



**Figure 7:** Site IRS management

## Functions of Team Leaders

### On daily basis he/ she should do the following

- Assess each operator every alternate day.
- Assess four spray operators each day, two while spraying and two post spraying.
- Fill out the quality spraying checklist for each supervised spray operators.
- Fill out the summary form for quality spraying.

### Team leaders should stop IRS activities only when

- It rains, do not allow households to keep their property outside during spraying.
- The operators are not able to walk comfortably between houses.

The organization of catch-up spray days has cost implications such as extra transport and staff payment. Administrative arrangements with the spray team should be made after proper consultation with respective district supervisors.

## Functions of site manager

### On daily basis

- Receive and review daily summary of supervision reports from team leaders and pick areas for emphasis on daily morning or evening sessions.
- Institute immediate disciplinary measures (such as suspension, oral or written warning) as may be suggested from team leaders report.
- On daily basis crosscheck reports with registration forms further verify the sprayed household with chairpersons when they come for their payments.
- Inspect registration booklets on their updates from hamlet leaders and further verify newly registered households during IRS.
- Obtain information from the respective SIM regarding community readiness for spraying at least two days prior to the actual spraying day and take appropriate action if there is a reason to believe that there might be some concerns in regards to acceptance of the program.

### On weekly basis

- Perform surprise supervision of team leaders and spray operators.
- Participate in IRS` weekly management meeting and provide feedback on quality control of spray.

### Every morning before IRS teams leaves for spraying operations

- Present the report on supervision of the previous day include the summary of general findings and specific findings.
- Announce the names of spray operators who had gaps found during the supervision and impose measures to avoid future mistakes.
- Also announce the name of those performed well for the praise.

## District IRS Technical Committee (DITC) meeting

### Functions of DITC

- Should meet in weekly with SMs for feedback of the IRS operation and take prompt action when gap observed.
- Receive the supervision report from each site.
- Deliberate on matters concerning the quality of spray and suggest the ways forward.
- Discuss and eventually ratify the disciplinary measures taken by the IRS site managers and VCOs.
- Conduct weekly meeting to review the sites status (staffing, stores, and transport facilities), sites performance, sites problems and how they were addressed, IEC performance, findings from field supervision, environmental mitigation and safety, and the way forward.
- Organizing daily feedback meetings with Team Leaders, IEC Mobilizers and other staff.
- Conduct a daily feedback meeting to solve unexpected problems encountered during day-to-day operations.
- Involve all levels of staff working at the site on meeting.
- Managing adverse or unforeseen circumstances that hampered the normal implementation of IRS.

Excessive rain prevents the launch of IRS operations. Therefore,

- The SM or team leader should wait at the site with the teams to see whether the rain eventually stops.

- If the weather improves before 11:00 a.m., the team will proceed with IRS in the targeted village.
- Postpone the day operation if excessive rain persists after 11.00am.
- Determine alternative date for the operation through consultation with the responsible person at the district level (the malaria focal person).
- The SIM should inform the village leaders that IRS has been postponed for their village and inform them the alternative date.
- If rains start while IRS is ongoing in the village, the spray operators will interrupt spraying until weather conditions allow them to spray again.
- If the rains stop before 3:00 pm, the teams will continue with IRS.
- If it persists after 3:00 pm, the team leaders should send the teams back to the site.
- In case of transport breakdown:
  - If a vehicle breaks down close to the targeted village spray operator should be encouraged to walk the rest of the distance and continue with IRS.
  - If happens far from the targeted village, the team leader should inform the SM. The SM will arrange a nearby spray team's vehicle to assist and rescue the stranded teams.
  - If the damaged vehicle cannot be repaired in a range of one day, the SM will inform the district supervisor to seek an alternative.

### **Motor vehicle accidents**

#### **When confronted with such circumstances**

- The SM and team leaders should ensure that the injured persons receive first aid and are rushed to the nearby-qualified medical facility.
- SM and team leaders should ensure proper custody of the IRS properties.
- Notify the district supervisor immediately of the nature of the accident, the number of people involved, and mitigation measures taken following the accident.
- If the event necessitates the postponement of IRS in the targeted village, the SIM should promptly communicate the postponement to the targeted communities.

#### **Work stoppage by IRS teams**

- Management should take the appropriate action to resolve the situation.
- Allow those spray operators who are to continue with spray operation
- SM should convene a meeting with the concerned individuals to listen to their claims, and seek a resolution.
- If consensus is reached, continue with spray operations as planned.
- If the claims are beyond the SM's decisional capacity, SM should report to district supervisors.
- If the event involves the entire site staff, a meeting should be convened immediately.
- In case of materials or equipment missing or broken
  - Prevent by proper control of the stock and timely requests to replace depleted stocks.
- If occur during a day of spray operations, SM should immediately communicate with the district supervisor for an emergency replenishment of the stock.
- If lost or broken equipment or materials record it by filling the standard Lost Damaged Form (two copies).

- The immediate supervisor should initiate investigations to find out what happened and report to DITT.
- Take necessary disciplinary and judiciary measures where appropriate.

### **Community refusal**

Refusal of IRS can happen in a few households or in the majority of the village. This event is usually an outcome of poor community involvement in the IRS planning stages or poor leadership. If encountered among a few households in a hamlet, the team should do the following:

- Continue with IRS in other hamlets while sorting out the few refusals for further IEC or law enforcement
- If the majority of households refuse IRS, SM should postpone the operation,
- Consult the village leaders, and investigate the cause of the refusal.
- Inform the district supervisor immediately.
- SM and SIM should arrange for a meeting with the village leaders and eventually for a mass community assembly.
- If consensus reached, then the district supervisor should be informed for further intervention.

### **1.4.3.21. SOP for the IRS operations at site level**

#### **Site opening**

#### **Scope and purpose**

This SOP apply when the IOS is ready to safely host staff, materials, and equipment for IRS operation.

#### **Roles and responsibilities**

#### **DITT (District IRS Technical Team) and contractor**

- Dispatch equipment and materials two days before the operation.
- Provide a timetable for the IRS operation.

#### **Site Manager**

- Provide minor site repairs.
- Ensure the premises and surroundings are clean.
- Receive materials and equipment for the site store.
- Receive staff.
- Arrange the site store and site office.

#### **Procedure Details**

- Site repairs and cleanliness (four days before spraying starts)
- If the site is operating for the first time, the SM should
  - Inspect the site for completeness of effluent waste disposal facilities and the storage facility,
  - Ensure soak pits are in place and complete (one pit for the washing slab and the other for washrooms),

- Ensure the washing slab is in place and complete and the drying lines are posted in the right place, and
- Ensure the toilet and washrooms are in place.

**If the site is operating for the second time or more, then the SM should**

- Instruct site attendants to provide for site cleaning and general cleanliness and
- Arrange for minor repairs as may be required.

**After the above arrangements the SM should**

- Ensure the water supply is in place or else arrangements for securing water are in place and
- Ensure the store is provided with security provisions (barred windows and doors, a double lock system, and a fire extinguisher and bucket of sand).

**Receiving materials and equipment (two days before spraying starts)**

**At this time, the SM should**

- Ensure that the site guards report before the arrival of any IRS supplies.
- Ensure the store has adequate space to receiving staff (one day before spraying starts)
- Accommodate insecticide, pumps, and other consumables.
- Receive goods and their related distribution list.
- Arrange goods in the store, with assistance from team leaders.
- Receive and arrange M&E forms and store management forms and books.
- Receive and revise the timetable with SIM and team leaders; and
- Report any discrepancies immediately to the DMFP.

**One day before commencing IRS, all staff should arrive at the IRS site for a number of preparations**

- Opening a personnel file for each staff member at the site, including the SM (The file will contain the medical card, personal information forms, and consent forms).
- Orienting the staff on the site, including the assembly grounds, stores, toilets, and washrooms.
- Building cohesion among workers.
- Allocation of vehicles among the teams.

**Team arrangements**

**Teams' arrangements (one day before spraying start)**

The site should be opened one day before the first day of IRS. This day will involve the early arrival of team leaders to assist the SM in finalization of IRS implementation plan

**Preparations at the site level**

- The SM will receive vehicles and verify that there are enough for the site.
- Goods will be arranged in such a way that they are easy to distribute to team leaders.
- The SM will arrange a site meeting with team leaders and SIM and sort out arrangements for starting IRS the next day.
- Designate an area for the spray teams to assemble.
- Ensure proper warning signs are displayed outside the effluent waste disposal and outside the

insecticide storage facilities.

- Ensure proper labeling of the site premises and properties (toilets and washrooms, equipment for the washing slab, for suit washing, and buckets for the washrooms and toilets).
- The timetable will be displayed, along with a staff list showing the spray teams; site targets; mobile phone numbers of SMs, team leaders, and guards; and the daily performance monitoring chart.
- Timeframe.

**Staff should report to the site at the times indicated below:**

- Four days before spraying: SM and site attendants.
- Two days before spraying: team leaders and SIM.
- One day before spraying: spray operators.

### 1.4.3.22. SOP for day-to-day site management

**Scope and purpose**

- To ensure smooth opening of the site by avoiding issues such as supply shortages, late IRS launch, and inadequate community preparedness.
- To ensure smooth running of day-to-day IRS operations with optimal success.
- To properly manage the IRS staff and stock.
- To manage IRS monitoring and supervision.

**Roles and responsibilities**

**Site Manager will do the following**

- Provide overall site oversight.
- Plan daily activities.
- Assure proper use of premises and properties.

**Team Leaders will do the following**

- Assist SM in his/her functions.
- Provide overall spray team's oversight.

**Procedure**

**At the start of each operation day**

- Ensure that you open the site very early in the morning (6:00 a.m. to 6:30 a.m.).
- Get the report from the site guard for the previous night.
- Distribute goods to team leaders.
- When everybody is in full PPE and ready to leave for the spray operation, speak to the workers (addressing important items such as spray targets and discipline issues).
- Dispatch the teams and attend those with problems such as sickness.
- Issue supplies for washers, pump technicians, and site attendants for them to start working.
- When everything is in order at the site, he or she can leave the site for field supervision.

## After Operation Day

- Have all teams convene at the meeting place to embark the truck. Team leaders will ensure that all team members are present and none have been left behind.
- Receive the remaining insecticide, empty sachets, and other goods from the spray teams and arrange them in the store. Remember to use the store control forms.
- Complete the daily performance monitoring chart.
- Meet with the team leaders and SIM to discuss the supervision report and arrange the next day's work.

## Human resource management

- Post a list of all site workers and their titles over the site notice board.
- Ensure that all staff has their respective SOP and comply with it.
- Have all necessary staff documentation including personnel information forms, consent forms, bank account details, and medical examination forms or else submit them to DITC.
- Keep records of everyone's daily work.
- Ensure everyone knows the day-to-day IRS timetable by displaying the timetable and daily targeted households and coverage on the site notice board.
- Ensure everybody arrives on time at the site and signs in the registration book.
- Speak to IRS staff for at least five minutes daily to inform them of the daily target and other issues.
- Allocate a portion of the site for spray teams to assemble.
- Choose problems and solve them quickly.
- Meet with team leaders to sort out gaps and discuss how to address them.
- All staff at the site should concentrate on their own activity according to the provided scope of work.

The SM should maintain discipline and working performance, meet with those staff who do not perform satisfactorily, and discussing their problem. Any emergency measures can be taken for staff substitutions or replacement.

## Material management

The store should be set up, arranged, and maintained according to principles of IRS stores management:

- Ensure a double lock system is in place.
- Ensure the ledger is updated on daily basis.
- Ensure bin cards are filled and on their respective location.
- Ensure that issue vouchers are used.
- Ensure that insecticide control forms are completed and signed each time insecticides are issued.
- Report loss or damage of any property and deal with the situation accordingly.
- Pay attention to the amount of insecticide use. (Perform daily checks on the amount used per household sprayed. This should be done by team leader and SMs and detected gaps dealt with accordingly)
- At the end of every day, ensure any items that should be in the store are not left outside.
- At the end of the operation, ensure the procedure for recovery of all IRS items, as stipulated in the site closure SOP.



## Paperwork Management

### Staff files

All staff necessary records should be available at the site, including the following:

- Staff personal records filled in the day before IRS. These are important information in case management must report on a particular staff member.
- Medical examination forms. These will be completed for the temporary staff and included in their personnel files.
- Medical card. This should be used whenever any staff goes for any medical treatment during IRS operations either related to IRS or not. At the end of the operation, the SM should compile and summarize a report of the history of illness and treatment related to insecticide poisoning.
- Documents such as warning letters or personal testimony. Each staff member must sign the daily attendance book and at the end of the week compile a tabulation of staff work days and their emoluments for the work done.

### Notice Board

The notice board will prominently display information such as the following:

- The IRS timetables.
- A staff list showing spray staff teams and operator numbers and for staff such as site attendants, suit washer, pump technicians, and site guards display their name and title.
- Mobile numbers of the SM, team leaders, and guards; and
- The daily performance monitoring chart (updated daily).

### Stock Management

The stock management ledger and forms should be completed daily when issuing and receiving goods; such forms include:

- The store ledger.
- The stock management form.
- The daily sachet control form, and
- Bin cards for insecticide stock.

**Note: All of these forms should be systematically filed for easy information retrieval when needed.**

### IRS daily performance monitoring

IRS performance monitoring should be done on a daily basis. The SM should plot the daily IRS performance monitoring chart. All staff should be familiar with the chart for site self-evaluation. The chart shows the IRS achievement versus the target number of houses to spray.

### IRS Outcomes

- What is the number of house structures sprayed versus the target?
- What is the average number house structures sprayed per operator versus the set standard?
- What is the number of sachets spent per day versus the set standard?
- What is the average consumption of sachets per house structure versus the set standard?

## IRS Supervision

When the SM is done with morning work and everybody has the required supplies, he or she can leave the site for field supervision.

### Objectives of site supervision

- Ensure quality spraying is maintained at the households (correct spray techniques are applied with correct movement and overlap, pump pressure is correct, all sprayable areas are covered, doors and windows are closed while spraying).
- Provide on-the-job training.
- Avoid insecticide misuse or loss.
- Ensure that any problems are quickly identified and solved.
- Assess the satisfaction of IRS beneficiaries and address their complaints.
- Ensure proper use of PPE during spraying and avoid insecticide poisoning to operators
- Motivate workers and increase their morale.
- Ensure human safety in transportation.
- Ensure proper information is provided to households and other stakeholders.
- Ensure that team leaders are effectively and actively supervising spray teams.

### Use of supervision information to improve work

The SM should compile his or her supervision report with those of the team leaders and choose areas of improvement. The intra-operational training will depend on the chosen issue to be resolved, and could require the whole day or half a day. The third day of operation is recommended for the training to allow time to capture gaps and correct them early.

In organizing the inter-IRS training, consider the following:

- Review supervision reports with team leaders and choose problems in the performance of spray operators and other actors.

### Organize training during the IRS spray round based on the following

- Agree on the training date.
- Agree on topics to be discussed.
- Identify the facilitator and allocate the topics.
- Identify needed facilities, such as venue and printed materials.
- Arrange for practical demonstration.
- Inform the trainees.

## 1.4.3.23. SOP on management of unforeseen and adverse circumstances

### Scope and purpose

In the course of IRS implementation, unexpected events may significantly impact spray operations, both financially and operationally. Events such as funeral within the scheduled spray area, refusal by the entire scheduled area, poor cooperation from community leaders, and a lack of IEC are sometimes unavoidable and have significant negative impacts financially and operationally. Such challenges must

be identified as early as possible, and SOP must be followed to alleviate the impact. The SOP on management of unforeseen and adverse circumstances is important in (a) ensuring the pace of spraying is not adversely affected, (b) avoiding spending money without output, and (c) ensuring proper utilization of funds.

## **Role and responsibilities**

### **Site Manager will do the following**

- Compile timely unforeseen and adverse circumstances report.
- Submit to immediate supervisor.

**District IRS supervisor** will receive report and perform investigations

### **Procedure**

Excessive precipitation prevents spray operations. In IRS implementation, heavy rains can sometimes interrupt spray operations. In these cases, the SM or team leaders should do the following:

#### **When rain starts before spray teams leave for IRS**

- Wait at the site until rain stops. If the rain stops before 11:00 a.m., proceed with IRS. If the rain continues after 12:00 p.m., postpone spraying and do the following;
  - Send the SIM to inform the village of the postponement and the reason and provide them with another date for IRS.
  - Inform the spray operators about the cancellation of IRS for that day and that there will no payment for the lost day (instead they will be paid on the extra day they will work to cover the missed village).

#### **When rain starts after IRS has begun**

- Stop spraying operations until it stops raining.
- If the rain stops before or at 2:00 p.m., continue with IRS. If the rain stops after or on 3:00 p.m., team leaders should send the teams back to the site.
- Because rains vary in intensity, team leaders should stop the exercise only when rain is too heavy to allow keeping the household's property outside the house and when the operators get wet while walking between houses.

### **Transport Breakdown**

When there is transport breakdown, SMs or team leaders should do the following, depending on the circumstances:

- If the vehicle breaks down close to the village to be sprayed, encourage the spray operators to walk the rest of the distance and continue with IRS.
- If the vehicle breaks down far from the village to be sprayed, the team leader should call the SM for the help. The SM should instruct a nearby spray operator vehicle that has already arrived at its target village to go and assist. The driver should record additional mileage for reconciliation of payments in the future.
- If the vehicle cannot be repaired in one day, instruct the vendor to provide an alternate vehicle or else contact the district supervisor for the alternative.

## Motor vehicle accidents

When confronted with a motor vehicle accident, the SM should do the following:

- First, ensure any injuries receive first aid, and then rush injured persons to the nearby qualified medical centre.
- Ensure proper custody of IRS property and the vehicle.
- Inform the immediate supervisor on the nature of accident, the number of people involved, and the steps taken so far.
- If the event necessitates postponement of IRS operations, have the SIM inform the affected village.

## Serious staff health problems

Wherever staff members suffer serious health problems, provide any possible first aid, including seeking assistance from nearby health professionals. Then send the sick staff to a qualified health facility.

## Staff work strike

SMs should take the following steps in the event of a staff work strike:

- If the strike involves just a few individuals, let the willing operators continue with IRS.
- Convene a meeting with the striking workers, and listen to and evaluate their concerns. Determine whether they will continue work while you address their concerns. If their claims are beyond your reach, inform the immediate supervisor.
- If the strike involves all workers at the site, convene a meeting immediately. First discuss the issue with the team leaders and then later with all of the workers. Again, if the problems are within your reach to resolve, then resolve them accordingly. If you cannot manage them, consult immediate supervisor.

## Materials or equipment missing or broken

This problem can be prevented by properly controlling the stock and making timely requests to replenish depreciating stocks. If on a day of spray operations, you discover a shortage of supplies (e.g., insecticide or PPE such as gloves or damaged spray pumps), ensure that those workers without supplies do not go to work while you immediately communicate with district IRS storekeeper to replenish the stock.

## Communities unaware of operation

Because the SIM will conduct pre-spray visits to the targeted villages two days before IRS, communities should be aware of upcoming spray operations. If the communities are unaware for any reason, do the following:

- If the village is new and has not implemented IRS before, postpone spraying and arrange with the SIM for IEC in the village.
- If it is a subsequent visit, discuss with village leaders the possibility of continuing with quick IEC and implementation of IRS. Instruct the operators to be apologetic to families and tolerate inconveniences associated with delays in preparing the houses for IRS.
- If immediate IRS is not feasible in a village, try to determine an alternate village with the SIM. If attempting to go on with IRS in any village could result in waste, postpone the exercise and continue with other arrangements.

## Community refusing IRS

A few individuals or a majority of a village can refuse IRS. Take the following steps where communities refuse IRS:

- If refusal is encountered among a few families, continue with IRS while sorting out the few refusals for further IEC.
- If the majority of a community refuses IRS, then postpone the operation, discuss the refusal with the village leaders and investigate the cause of the refusal.
- Arrange a village meeting, mobilized through public address system (megaphone), if available, so that the majority of the people turn up.
- Ensure that the SM and SIM attend the meeting to deliberate on IRS issues. When necessary, invite other persons from the district, such as the DVCO/DMFP. If the reasons for refusal require the district authority to intervene, inform the district authority immediately and schedule the meeting.

### 1.4.3.24. SOP for IRS data entry for site manager

#### Scope and purpose

To define the data entry requirements for SMs. The SOP addresses IRS data entry for SMs onto the site Manager Booklet for the defined parameters given therein, which reflect what is defined in spray operator daily spray record and team leader daily spray record forms.

#### At site level:

IRS data entry is captured from the team leaders, up to the SM level. Entry is always in hard copy format.

#### Roles and responsibilities

##### Site Manager

Aggregate the parameters reflected on the team leader forms onto site manager booklets (No. 4).

##### NMCP Manager /RMO/DMO or Contractor

Be thoroughly familiar with the spray forms, and ensure that information for the parameters requested is collected at each defined level appropriately.

##### IRS Program Staff

The SOP defines the data entry responsibilities for SM, and NMCP Manager.

#### Procedure

Data for IRS that reflect IRS outputs and outcomes, as defined by the listed indicators, are normally collected starting at community level by spray operators, during IRS spray campaign.

#### Main parameters

- Information of staff and exercise: Operator/team leader/SM name and code; spray day; date of exercise.
- Location: District; ward; village; hamlet; site
- Insecticide: issue; use; return full and empty sachets.

- Household and house: Name of household head; number of structures and rooms
- Demographics: Under-fives; pregnant women; and over fives living in each house.
- Net information: Number of long-lasting insecticidal treated and untreated nets.
- Net usage: Under-fives, pregnant women, and over fives sleeping under nets the previous night.
- Spraying update: House sprayed or not; reasons for those not sprayed (list of reasons are defined); number of rooms sprayed and not sprayed.
- IRS perception: Perceived advantages and disadvantages of IRS (list of main advantages and disadvantages).
- Sensitization: Source of information received on IRS (list of main sources are defined).
- Consistency checks: Empty and returned insecticide sachets; houses visited; reasons for not spray; total rooms and those sprayed and not sprayed.

### **Data Entry Training**

- To be provided in training sessions specifically designed for SMs just before IRS commences
- During supervision, SM or team leader will observe the filling of spray operator daily spray record form and provide help if needed.
- At the end of each spray day, the SM will enter the information of each filled team leader form in his/her site onto the Site Manager booklet.
- The SM will ensure data is entered using a blue or black ink pen, and is entered clearly and concisely.
- The SM will then carefully aggregate the information in each sheet found in site manager booklet, entering the totals in the summary boxes found at the bottom of the sheet.

### **1.4.3.25. SOP for IRS spray pump**

#### **Introduction**

Before starting a spray operation, the spray equipment should be checked for faults and repaired accordingly. As faulty spray pumps may result in under or over application and/or leaks. Supervisors, team leaders, or dedicated maintenance technician should examine spray pumps visually to ensure that all parts are present, assembled correctly and in good condition. Typical spray pump for IRS consists of pressure system, delivery system and tank system. Currently, the NMCP recommend the Hudson X-Pert sprayer for IRS.

#### **Responsible person**

- i) Storekeepers.
- ii) Pump Technicians.

#### **Scope and purpose**

The purpose of this SOP is to equip storekeepers and pump technician with adequate knowledge to repair IRS pumps.

Storekeepers and pump technician involved in IRS operation will be trained on IRS pump maintenance.

### Pressure System

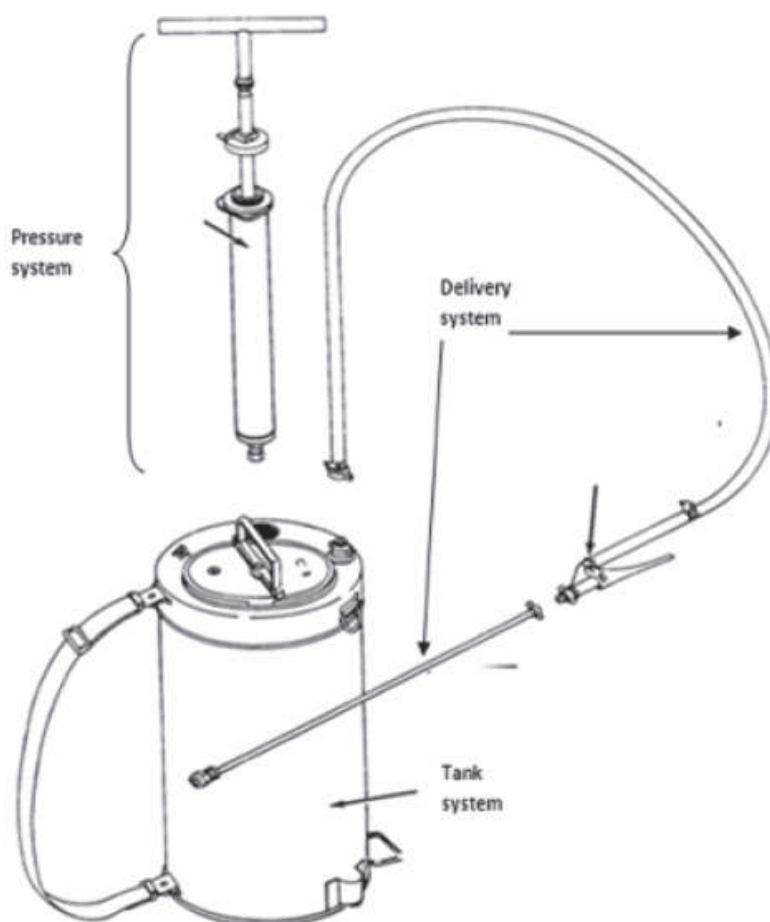
The pressure system consists of pump assembly and pressure gauge assembly. The pump assembly consists of plunger and pump cylinder assembly whereas the pressure gauge consists of the gauge and filter. The main function of pressure system is to generate air pressure and release to a tank system up to a specified level read by pressure gauge.

### Tank System

The tank system consists of the tank itself, cover assembly, supply tube and shoulder strap/belt (Figure 8). The tank is made up of chromium – nickel stainless steel material capable of withstanding pressure beyond 55 psi. The main function of the tank system is to accommodate the desired amount of spray contents (e.g., water + insecticide) according to a specified volume. The tanks system also designed to receive and store the air pressure to a specified level (e.g., 55psi).

### Delivery System

The delivery system consists of shutoff assembly, strainer assembly, hose, extension tube/lance and nozzle assembly (Figure 8). The main function of the delivery system is to receive and control the outlet (spraying contents) from the tank system.



**Figure 8:** Typical Sprayer systems

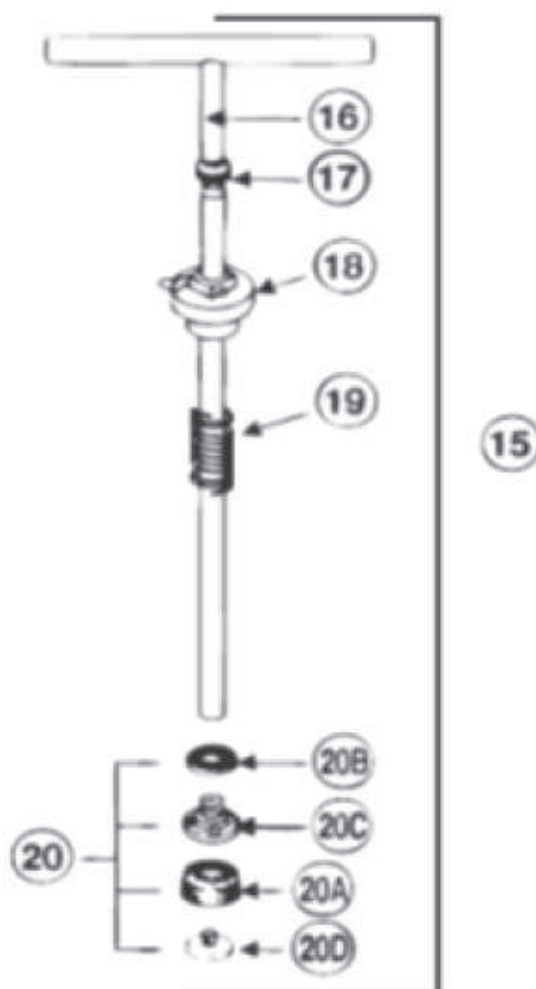
**Table 6: Typical Sprayer system**

Description	Part
Pressure system	- Pump assembly - Pressure gauge assembly
Tank system	- Tank - Cover assembly, - Supply tube and - Shoulder strap/belt
Delivery system	- Shutoff assembly, - Strainer assembly, - Hose, - Extension tube/Lance - Nozzle assembly

**Procedure**

**Pressure system maintenance and repair**

The pressure system consists of three major service parts i.e. plunger assembly, pump cylinder assembly and pressure gauge assembly (Figures 9-11). In total, there are about 14 service parts in the pressure system.

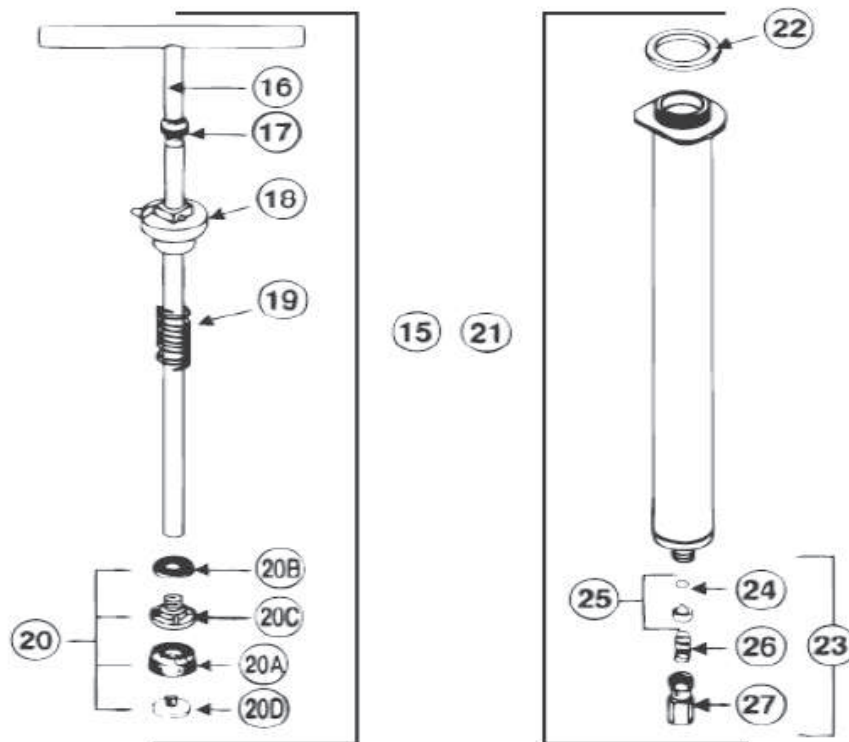


**Figure 9: Plunger assembly**



**Table 7: Plunger service part**

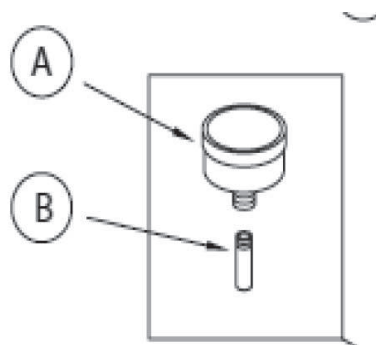
Ref. No.	Part Number	Description
15	147-541	Plunger Assembly, complete
16	147-501	Plunger Tube and Handle, only
17	151-028	Bumper Pad
18	149-100	Pump Cap Assembly, Brass
19	115-842	Bumper spring
20	148-833	Cup replacement kit
20A	154-007	Cup Leather Only
20B	123-908	Washer
20C	153-812	Plunger Adaptor
20D	153-816	Cup Retainer



**Figure 10: Pump Cylinder assembly**

**Table 8: Pump Cylinder service parts**

Ref. No.	Part Number	Description
21	147-202	Pump Cylinder Assembly, complete
22	151-030	Pump Cylinder Gasket
23	140-055	Pump Cylinder Check Valve, Complete
24	805-401	O-Ring, for pump cylinder check valve
25	140-054	Pump Cylinder check valve assembly
26	150-604	Spring, for pump cylinder check valve
27	110-790	Housing, for pump cylinder check valve



**Figure 11:** Pressure Gauge assembly

**Table 9: Pressure Gauge service parts.**

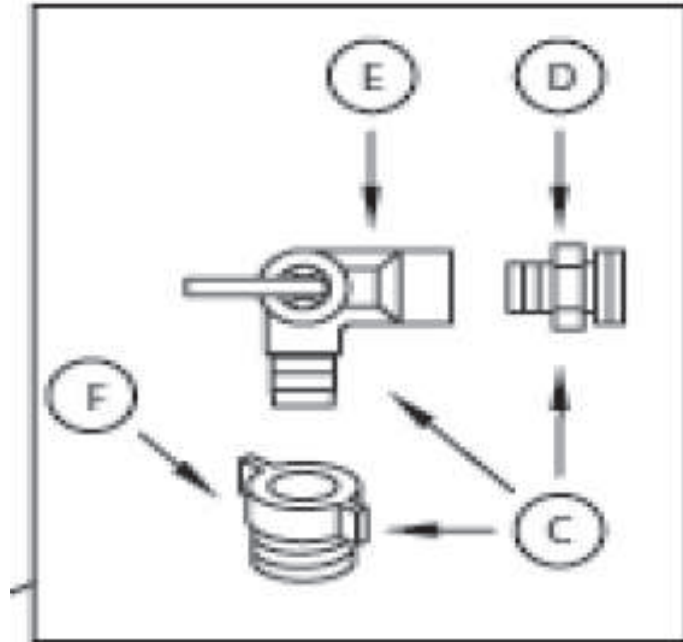
Ref. No.	Part Number	Description
A	803-311	Pressure Gauge, 100-lb
B	146-605	Filter Assembly, for pressure gauge

**Procedure for servicing pressure system:**

1. Unscrew pump cap using pipe range.
2. Pull out the plunger using your arms (one holding the cylinder and the other one plunger).
3. Check the Cup leather (# 20A) if it has worn out. If it has worn out, unscrew the cup retainer (#20D) and replace with the new cup leather.
4. Check other worn-out plunger service parts (Figure 9) and replace them accordingly.
5. Check pump cylinder gasket (#22) if it has worn out and replace with new one.
6. Check the pump cylinder check valve especially the O-ring and the spring for worn out and replace them.
7. Check the pressure gauge's filter if it has worn out and replace with new filter. Check the gauge if it is working correctly (this can be done at the end by applying air pressure through pumping and observe the gauge arrow whether it moves and being rest at "0" reading. Change the gauge if it doesn't work properly.
8. Lubricate the cup leather (#20A) using motor engine oil. Do not use grease to lubricate the cup

**Delivery system maintenance and repair**

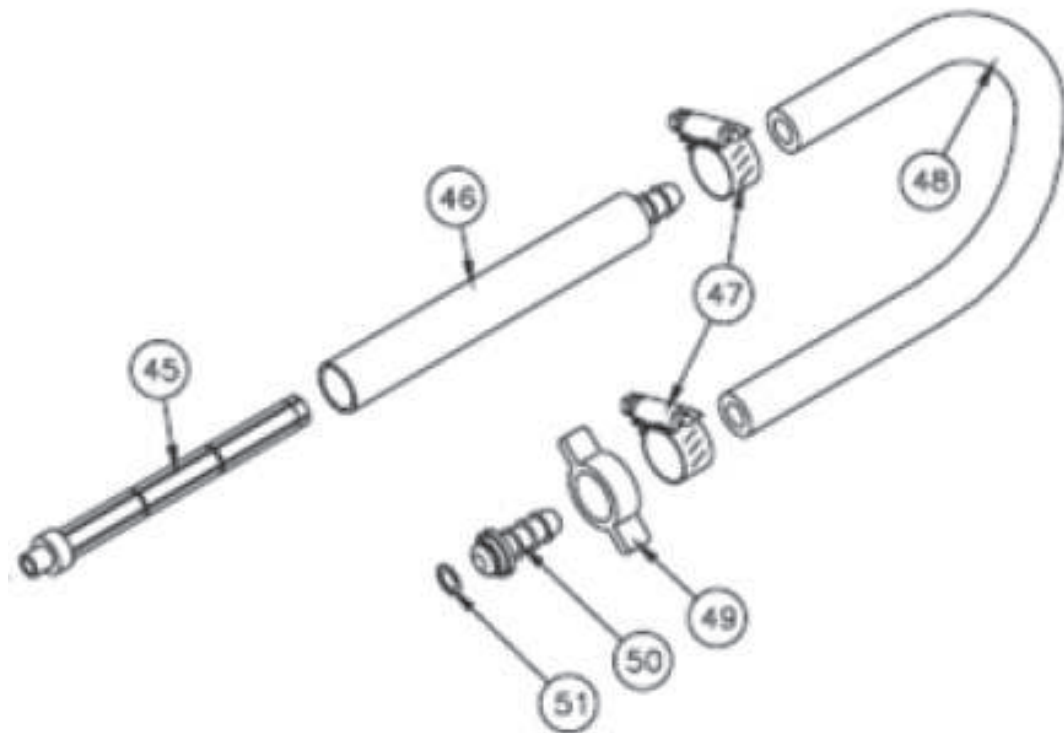
The delivery system consists of four major parts i.e., Tank shutoff/Hose adapter assembly, hose and strainer assembly, trigger shutoff, extension tube/lance and nozzle assembly.



**Figure 12:** Shut off/Hose Adapter assembly.

**Table 10: Shut off/Hose adapter service parts**

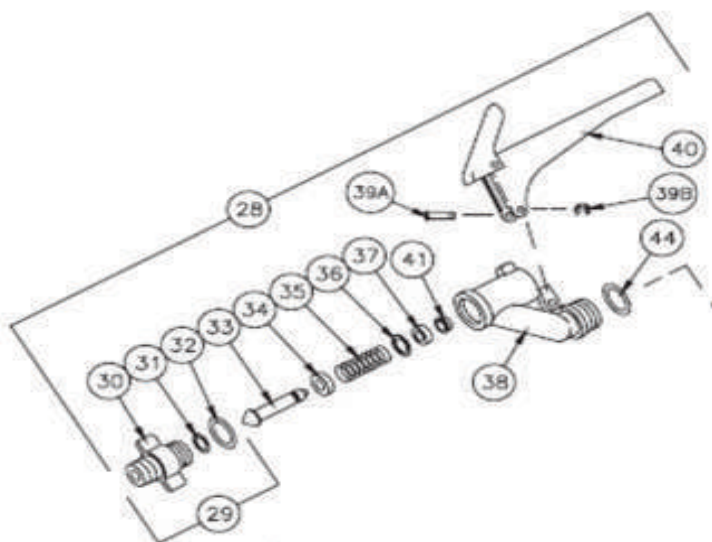
Ref. No.	Part Number	Description
C	148-704	Hose Adaptor Assembly
D	115-960	Hose Adaptor
E	806-428	Shutoff Cock
F	115-968	Supply Tube Adaptor



**Figure 13:** Hose and strainer assembly

**Table 11: Hose and Strainer Service parts.**

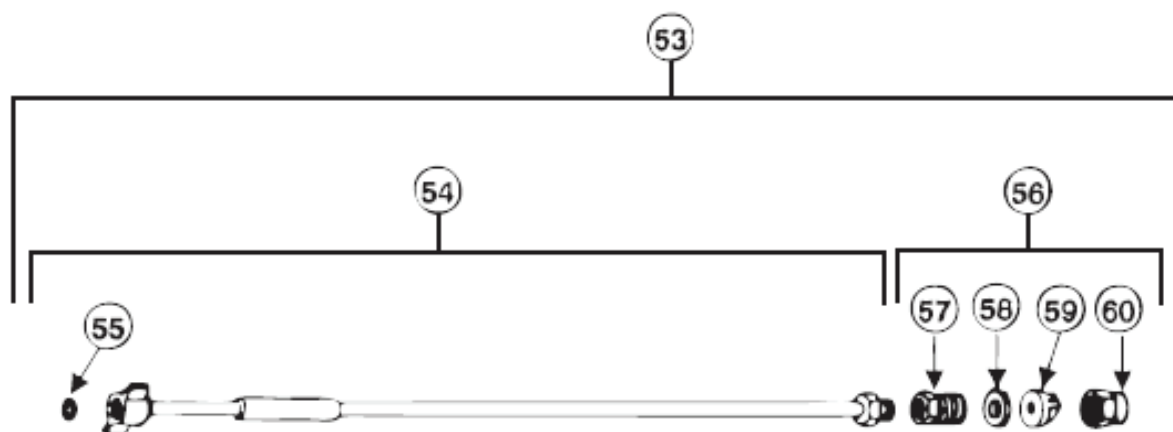
Ref. No.	Part Number	Description
45	152-356	Strainer
46	146-627	Strainer Housing
47	803-623	Hose Clamps
48	115-902	Hose
49	115-970	Nut
50	115-950	Hose connector
51	805-307	O-Ring Gasket for hose connector



**Figure 14: Trigger/shutoff assembly**

**Table 12: Trigger/shutoff service parts**

Ref. No.	Part Number	Description
28	149-706	Shutoff assembly
29	149-702	Valve Body Cap O-Ring gasket
30	115-733	Shutoff Valve body Cap
31	805-335	Valve Body Cap O-Ring for valve pin
32	805-309	Valve body Cap O-Ring
33	115-716	Shutoff Valve Pin
34	110-243	Teflon Valve Pin Spacer
35	150-400	Shutoff valve Pin Spring
36	123-911	Shutoff Valve Pin Washer
37	151-016	Shutoff Valve Pin Packing
38	153-377	Shutoff Valve Body
39	801-423	1/8 x 1/2 Cotter Pin
40	123-899	Shutoff Operating Lever
41	110-234	Teflon Bearing, for Valve Pin



**Figure 15:** Extension tube /Lance and Nozzle Assembly

**Table 13: Extension tube /Lance and Nozzle service parts**

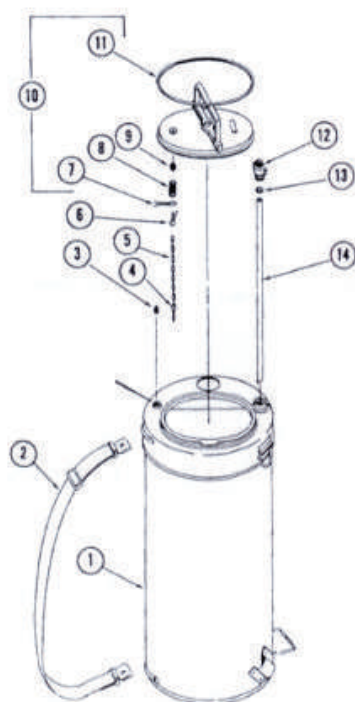
Ref. No.	Part Number	Description
53	141-966	Extension tube and Nozzle assembly
54	141-967	Extension tube
55	805-337	O-Ring Gasket for extension tube
56	803-623	Nozzle assembly (complete)
	115-902	Nozzle body
58	115-970	Polyethylene Nozzle Gasket
59	115-950	Nozzle tip (Hardened stainless steel)
60	805-307	Nozzle body Cap

### Procedure for servicing delivery system

1. Check the shutoff cock whether it allows ON/OFF tank air pressure release. Replace the cock whenever necessary.
2. Check the hose for any damage. If the hose is damaged, unscrew the clamps, cut the damaged part using scissor and then adjust the hose and again screw-up the clamps.
3. Unscrew the strainer housing by hands and check for the strainer whether is damaged or clogged with insecticide remaining and clean it thoroughly. If it is damaged, replace it with new one.
4. Check the trigger's shutoff assembly if it works properly i.e., allows ON/OFF release of spray contents through the extension tube/Nozzle. To service, disassemble all the parts (Figure 14) and if necessary, replace shutoff valve body cap, O-ring, spacer, washer and valve pin pack.
5. Check extension tube/lance for damage. Replace the extension tube/lance with new one or carry out soldering at the joints. Replace O-Ring gasket (#55) for extension tube if it has worn out.
6. Unscrew the nozzle body cap (#60) and disassemble nozzle service parts. Check the polyethylene nozzle gasket (#58) if it has worn out and replace with new one. Check the nozzle tip for clogs; brush it with toothbrush using clean water.

### Tank system maintenance and repair

The tank system consists of the tank itself, cover assembly, supply tube and shoulder strap/belt



**Figure 16:** Tank System assembly

**Table 14:** Tank System service parts

Ref. No.	Part Number	Description
1	142-612	Tank
2	152-829	Shoulder strap/belt
3	114-152	Plug for gauge adaptor
4	801-423	1/8 x 1/2 Cotter pin
5	116-426	Cover chain
6	801-411	3/32 x 1/2 Cotter pin
7	801-419	3/32 x 7/8 Cotter pin
8	150-605	Valve pin Spring
9	143-000	Valve pin Assembly
10	140-205	Cover Assembly
11	151-401	Cover Gasket
12	115-965	Male Fitting
13	805-312	O-Ring for dip tube
14	129-074	Supply tube

### Procedure for servicing tank system

1. Check the tank if is badly damaged such that it can't accommodate a specified volume of spray contents, disassemble other parts and scrap/dispose the tank.
2. Check the shoulder strap/belt if it is badly damaged and then replace it with new one
3. Check the cover gasket if it has worn out and then replace it with new one.

## Calibration

Calibration of the sprayer is normally done when the service is complete. The aim is to make sure the sprayer meets WHO recommended limits of the average volume of spray contents released per minutes ( $757 \pm 15\text{ml}/\text{min}$  for nozzle # 8002).

### Procedure for calibration

1. Pour clean water in the Sprayer, about  $\frac{3}{4}$  of the tank capacity and pressurize to 55psi (3.8bar).
2. Take the graduated jug (1litre) and stopwatch. Discharge the water by pressing the trigger and at same time start the stopwatch and then continue discharging the water into the jug until it is 1litre full per minute.
3. Record the readings from the jug as 1st reading. Empty the jug and proceed with step number (4) below.
4. Repeat step number (2) for 2nd reading and 3rd reading.
5. Calculate the average reading. Compare the average reading with WHO recommended limit ( $757 \pm 15\text{ml}/\text{min}$  for nozzle # 8002). If the sprayer does not meet the limit, check the nozzle again and if possible, replace with new one and repeat the steps above (1), (2), (3), (4) and (5).

### General sprayer troubleshooting Pump doesn't generate air pressure

- Check the cup leather whether is damaged or dried.
- Replace if it is damage or place drops of motor engine oil.

### Sprayer doesn't spray

- Check entire delivery system starting with nozzle tip. Clean nozzle tip using toothbrush; do not use wire!
- Check strainer at the spray control valve, clean any dirty material found by using clean water.

### Sprayer doesn't seal against pressure

- Check tank cover gasket if it is damaged and replace accordingly.
- Check pump cylinder gasket if it is damaged and replace accordingly.

**NOTE:** Check for air leaks by applying a soapy solution

### Sprayer doesn't shut off

- Check shut off assembly.
- Disassemble all the shut off parts, clean and if necessary
- Replace the parts i.e., O-rings, gaskets, etc.

### Inventory management of spare parts

Proper system of inventory management should maintain a daily accounting of records of spare parts received, issued and balanced (appendix 7). It is best practice to arrange spare parts based on part number in its separate container for easily identification and management (Figure 17)



**Figure 17:** Spray pump spare parts arranged in plastic container

### 1.4.3.26. SOP for performance of IRS

#### **Introduction**

Indoor residual spraying (IRS) is the application of long-acting insecticides to the walls, eaves, and ceilings of internal side of the roofs of household structures and domestic animal shelters to kill adult female mosquitoes (malaria vectors). This process involves applying insecticide in liquid form on targeted surfaces. IRS relies on the fact that most mosquitoes carrying malaria parasites enter houses during the night to feed on occupants and rest on the walls or ceilings prior to and/or after feeding. If a wall or ceiling is treated with an effective residual insecticide, the resting mosquitoes pick up lethal doses of insecticide. As a result, IRS reduces the population density of indoor-resting (endophilic) and indoor-feeding (endophagic) mosquitoes, ultimately leading to a reduction in malaria transmission.

#### **Scope and purpose**

This SOP is intended to guide on systematic implementation of IRS.

The SOP are intended to be used by IRS supervisors at regional, district and site level, spray operators and pump technicians.

#### **Conducting Indoor Residual Spraying**

##### **Formation of spray teams**

The Site Manager is responsible for the formation of the IRS spray teams and will do the following:

- The Site Manager is responsible for the formation of the IRS spray teams and will do the following:
- Form spray teams composed of 8–10 spray operators who perform the spraying in the targeted areas.
- Nominate the IRS team leaders, who will supervise and guide the daily performance of spray operators.
- Equip the team leaders with the toolkit for pump maintenance, communication facilities (a phone and airtime), and the supervision checklist.



### **Getting ready before a spray day**

- Personal protective equipment.
- A rucksack or bag that includes insecticide sachets,
- A cup for rationing water for spraying.
- An empty sachet container.
- Plastic sheeting for covering household belongings while spraying,
- A mining torch.
- A pair of scissors.
- A clipboard, a pen, forms for recording IRS performance data
- A list of frequently asked questions to assist him or her in responding to questions posed by the household members.

**Note:** One day prior to the start of spray operation, spray operators must make sure they have completed consent, personal information, and other forms.

### **Respecting people and property**

- Demonstrate respect for the people and property in the homes of IRS target communities.
- Introduce yourself and explain the aim of the visit to establish rapport and to obtain cooperation with household owners as well as the entire community.
- Team leaders to provide direction on houses to be sprayed.
- Spray operators should not enter any house without the permission of homeowners or their representative.

### **Preparing households for IRS**

- Distribute Information, education, and communication (IEC) material and brochures with instructions for household preparation.

### **IEC mobilizers**

- Visit communities at least once before spray operations begin, to explain IRS and build community support.
- Visit communities again during spray operations.

### **Site manager**

- Insist community mobilizers to visit the households to explain what steps to take prior to, during, and after the spraying.

### **Spray staff**

- Make owner conversant with all precautions and IRS “Do’s” and “Don’ts.”

### **During operations Spray operators**

- Inspect to make sure that all people and animals are outside a structure before spraying begins inside the structure, and for the duration of the spraying.
- Tell household members to stay outside for at least two hours after spraying is completed.
- Before the start of spray, all household goods should be removed except those that are immovable. Examples of items to remove include, but are not limited to, the following;

Examples of items to remove include, but are not limited to, the following;

- Items hanging on walls.
- Clothing.
- Agricultural implements.
- Food, food containers, and water jars. o cooking utensils and dishes.

**Note:**

- If someone is unable to remove these items from the households at all, the structure should not be sprayed.
- Heavy furniture or immovable items that cannot be taken outside should be clustered at the Center of the room, turned upside down, and covered with material provided by the IRS program to protect them from the spray.

### **The spray operators should ensure that**

- Household members place household items where they will be safe from breakage and will not receive any insecticide overspray.
- The above actions should be done directly by the household members and the operator should inspect for compliance.
- If elderly disabled people that need help occupy the household, then the IRS operator and hamlet escort can take the responsibility to prepare the house for IRS.
- Before leaving the house, the spray operator should remind household members not to paint or re-plaster inside walls for at least six months after spray.

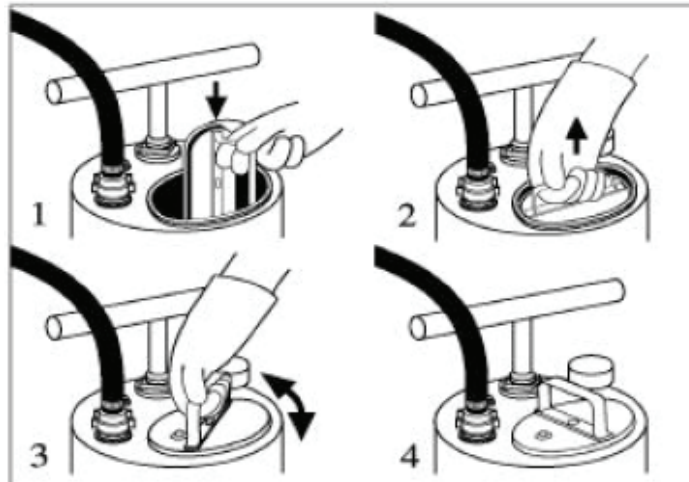
**Note:**The spray operators must use good judgment and keep in mind that their behaviour in the community will affect the success of the IRS operations

### **Handling insecticides safely**

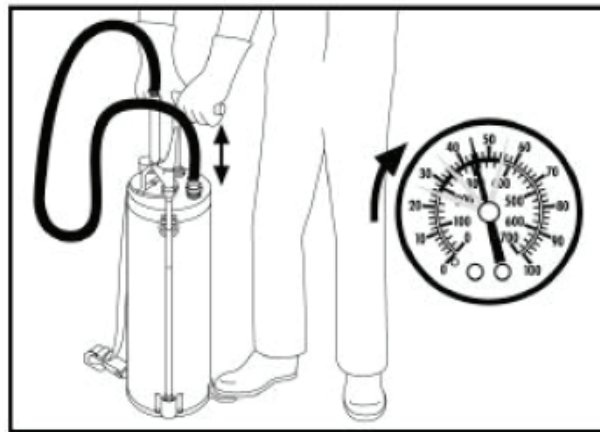
- Add insecticides in pre-mixed sachets to water in the spray can (Figure 18),
- Properly tighten the lid (Figure 19), and
- Pump the can to the correct pressure (Figure 20).
- Spray operators should check the pressure and test the nozzle for leakages or blockages (Figures 21 and 22) while they are outside a structure.
- Clean blocked nozzles with water (Figure 23). An alternative is to blow out an obstruction with compressed air from the pump.
- Nozzles should never be clean with a piece of wire or a pin, because this will widen the nozzle opening and make the nozzle release incorrect amounts of insecticide.
- Test the device at the beginning of the spray day (Figure 24).



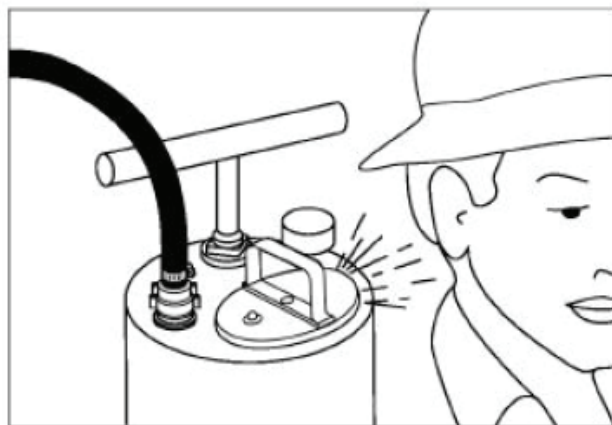
**Figure 18:** Add the right amount of water and insecticide in the spray can



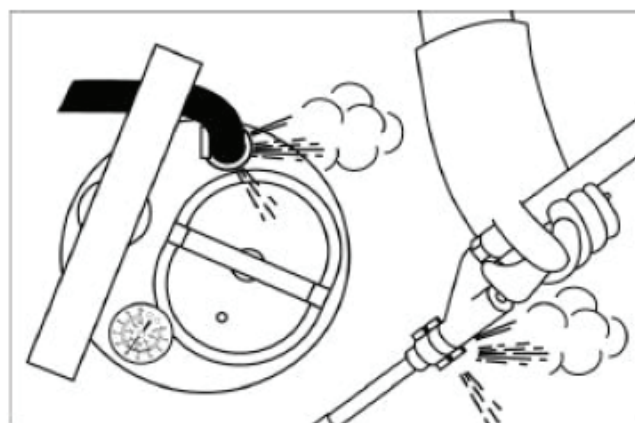
**Figure 19:** Properly tighten the spray can after mixing insecticide and water



**Figure 20:** Pump and make sure the right pressure is reach



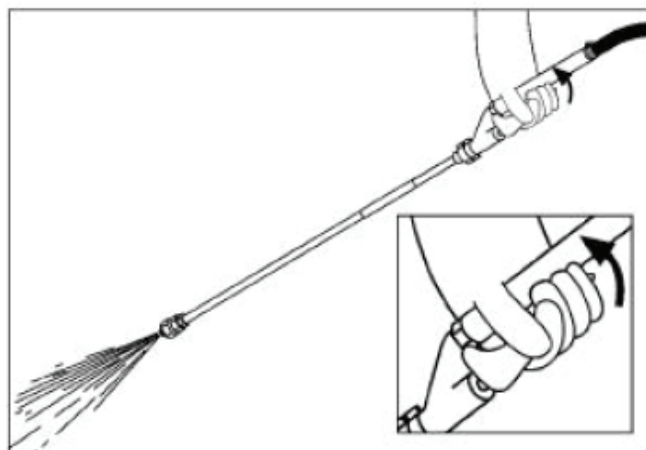
**Figure 21:** Observe from any air leakage from the can



**Figure 22:** Observe any air leakage from the lance or other parts of the spray can



**Figure 23:** Clean the nozzle



**Figure 24:** Test the device at the beginning of the spray day

### **Agitating the spray can to prevent sedimentation**

Insecticide that settles and forms a paste in the bottom of a spray can affect the concentration of a mixture and may cause serious under-dosing when the spray is applied. To keep this from happening, spray operators should agitate the pressurized sprayer before entering a structure and every two to three minutes while spraying, follow these steps:

- Turn off the nozzle.
- Keep your knees straight and bend down briefly so that the can is at a 90-degree angle with the floor.
- This movement ensures that the contents of the pump move up and down, which prevents sedimentation of the insecticide inside the can.

### **Use correct spraying techniques**

#### **Spray operators should follow the following steps to spray each house**

1. Spray the outside of the front door.
2. Enter the house and close the front door.
3. Proceed to the innermost room of the house. Spray the inside of the room door. Spray all of the edges and frame of the door. (This usually requires two swaths.)
4. Next, start spraying at the bottom corner of the wall to the right of the door, if you are right-handed or at the bottom corner of the wall to the left of the door, if you are left-handed. If you are right handed, go to the right. If you are left-handed, go to the left.
5. Start spraying by moving the lance steadily from the ceiling down to the floor. To ensure the correct swath width, keep the spray tip about 45 cm from the wall. Time your spray speed to cover one meter every 2.2 seconds, or 4.5 seconds for a 2-meter-high wall. Timing may be aided by mentally counting “One thousand and one, one thousand and two, one thousand and three...” Use a mental counting procedure appropriate to the local language.
6. Move a step to the right if right-handed, or to the left if left-handed, equal to the width of the spray swath, or 75 cm, and spray from the ceiling to the floor. Lean forward as you spray the top of the wall and move back as you bring the nozzle downward to the middle till the bottom of the wall. Continue this procedure, until you reach the starting point at the front door.
7. If the room is circular, follow the same pattern. If you are left-handed, move to the left. If you are right-handed, move to the right.

8. Agitate the spray pump every two to three minutes.
9. Take care to spray all edges and corners of windows.
10. Spray all niches and cracks.
11. Spray the remaining interior rooms in the same manner.
12. Spray both sides of partition walls.
13. Spray the backs and undersides of immovable furniture. To spray the underside of furniture, place the spray pump on the floor to help you handle the spray lance. Always maintain a distance of 45 cm and speed of 19 square meters per minute.
14. After finishing all interior surfaces, spray the ceiling, unless it is metallic.
15. Adjust the spraying technique according to centimeters the rectangular or conical shape of the structure. You can use an extension lance on high ceilings in both types of structures to help in reaching high places and maintaining the distance of 45 cm.
16. In a rectangular house, use the same spraying motion that is used for walls, up and down, keeping the proper distance and speed, allowing 5 cm overlap with the previously sprayed swath.
17. For a conical house, spray the ceiling either as a continuation of the wall, or spray it separately: up and down, from the top of the wall/eave to the top of the conical ceiling and back to the walls.
18. Spray the underneath part of the eaves from left to right. Usually, this area can be sprayed by holding the lance at a slight angle and making lateral successive swaths.
19. Spray the outer wall of a structure with large eaves where the roof line protects the wall from rain. This area may be a mosquito entry or resting point.
20. When spraying is complete, make a final inspection to see that no unsprayed surfaces remain on which mosquitoes might find a sheltered resting place.

**When the spraying of a structure is completed, the spray operator informs the residents to do the following**

- Stay outside the structure for at least two hours after spraying.
- Keep all animals outside the home for at least two hours after spraying.
- Sweep floors free of residual insecticide and insects killed by the spraying; dig a narrow hole one foot deep and bury the swept material. Pack the loose dirt tightly back into the hole, fill with soil, and place a heavy rock on top. This prevents chickens and livestock from getting to the waste, which usually contains insects that could attract animals.
- Do not re-plaster or paint over the sprayed walls after spraying until after 6-9 months.
- Keep using mosquito nets for protection against malaria.
- For eye irritation, flush the eyes with water. For respiratory irritation, leave the structure immediately for fresh air.
- In case of a reaction from skin contact with insecticide that does not clear up with washing, go to a health facility.

**How to use an extension lance**

- Remove the nozzle assembly from the end of the lance.
- Screw in the lance extension, and re-attach the nozzle to the end of the extended lance.

## Spraying pressure

Spraying pressure is one of the factors that determine how much insecticide is sprayed on a surface. Spray pumps used in IRS normally include a pressure gauge; a recommended pressure is 380 kPa (55 psi). If the gauge is not working, assume that a full stroke of pump will provide 1 psi, so normally use 55 full strokes when pressurizing a tank at three-quarter full (Figure 25). The working pressure must be between 25 psi and 55 psi.

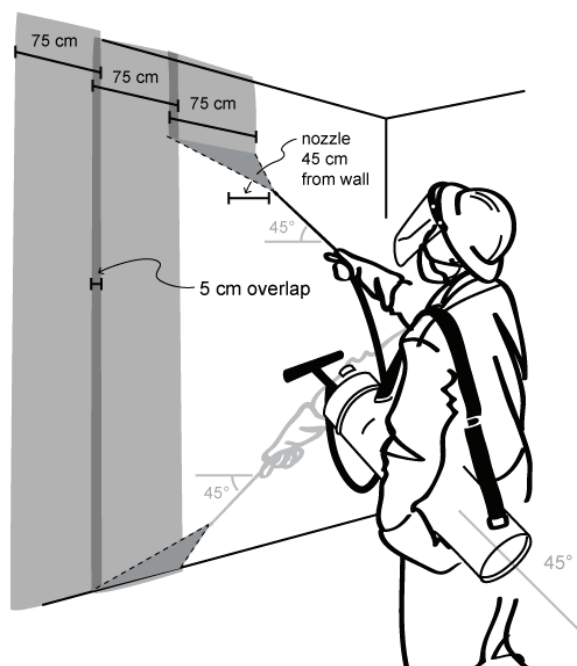


**Figure 25:** Make sure that the spray pump pressure is sufficient

## Tips when spraying

- Water must be poured into the tank using a strainer.
- Especially for wettable powder formulations, shake the tank before spraying.
- Make sure that the working pressure in the tank is between 25 psi and 55 psi.
- Make sure that the sprayer is carried on the left shoulder and held in place with the left hand (and vice versa for left-handed spray operators).
- Stand directly in-front of the wall.
- Maintain the distance from the nozzle tip to the wall at 45 cm<sup>1</sup>.
- Maintain a swath width of 75 cm (Figure 26).
- Make sure you maintain an overlap of 5 cm between swaths.
- Make sure you spray approximately 19 m<sup>2</sup> for one minute according to the recommended speed. Avoid unnecessary contamination of the environment (Figure 27).

<sup>1</sup>During training (when sticks are used to maintain the distance from the nozzles to the wall), extend the right arm and incline the body toward the surface while raising or lowering the right arm so that the end of the stick remains in contact with the surface



**Figure 26:** Spray swath width and overlap



**Figure 27:** Avoid unnecessary contamination of the environment

## **Insecticide wastes**

### **Tracking sachets and ensuring accurate records**

Well-kept records are a sign of a properly run store and are essential to minimize waste of stock or damage caused by accidents. Storekeepers should be trained in the use of the records system and must be responsible for its upkeep.

### **Conduct the distribution of insecticide sachets as described below**

- On reception at the district office, count all sachets and stamp them with the district stamp, if appropriate, and register the count in the stock book.
- The storekeeper issues only enough refills for the day's operations to each spray operator.
- The spray operator must sign for these sachets in the log book.
- At the end of each spray day, all spray operators sign the logbook for their empty and full sachets. Both the storekeeper and the supervisor compare the number of sachets returned with the number issued. Stock remaining should equal the stock issued in the morning, minus the number of sachets used during the day. The number of sachets used should be equal to the number of sprays can refills.
- The storekeeper submits insecticide stock balances and sign-in/sign-out logs to the data manager.



- The supervisor submits the number of structures sprayed by each spray operator to the data manager.
- The data manager uses this information to identify spray operators and teams needing additional training and correction and to determine the supervision needed to ensure that theft does not occur.
- The data manager calculates spray operator performance the number of structures sprayed versus insecticide sachets used to see if there are cases of over- or under-application.

### **Handling spray pumps at the end of each day's spray operations**

- Operators should use all of the insecticide in their cans each day.
- If a single spray operator has spray remaining in a can, he or she should spray another structure.
- When wettable powder is used, residue or white powder may gather at the bottom of pumps when teams rinse the equipment. In this case, the spray operator was not sufficiently agitating the pump while in the field.
- A good team leader or a senior operator can easily correct this poor practice by informing the operator that less insecticide is deposited on the wall when the operator does not agitate the sprayer.
- Shake the sprayer during cleaning as demonstrated in figure 28.

By the end of the first week of IRS operations, this practice should be almost completely eradicated. Every effort should be made to minimize the amount of insecticide brought back from the field, because it is not good a practice to have insecticide left over. Even in uncommon situations when the spray operators cannot empty their sprayers, the amount of liquid coming back should be less than a full drum (100 liters).

### **Clean-up facilities**

**Each central meeting area for spray teams (usually storage facilities, either temporary or permanent) should feature the following**

- Temporary or permanent bathing facilities.
- Basins for washing overalls labelled and separated from the basins for face and hand washing.
- Detergent for washing overalls.
- Materials for wash area demarcation (hard coal/charcoal, sawdust, stone aggregates/gravel, fencing and wire mesh), construction/renovation of ablution facility, or construction/renovation of evaporation tank with locked grate and roof, as needed.
- Seven barrels or drums for progressive rinsing (enough to triple rinse), preferably wide enough or deep enough to submerge an entire spray can.
- Three plastic cups to pour water for spray can rinsing.



**Figure 28:** Shake the spray during cleaning

### Recording IRS performance

Recording the performance of spray teams is the backbone of the IRS monitoring and evaluation system:

- During IRS, IRS performance is monitored on a daily basis.
- Monitoring starts with the spray operators, who complete spray operator daily spray record form.
- The form is designed to capture a number of indicators, such as the number of house structures sprayed per day, the type of construction materials (wall), the total number of rooms sprayed and not sprayed, the number of people living in the sprayed household.
- Other recorded information includes possession of mosquito nets and their utilization, IRS refusal cases and reason for refusal, and sources of sensitization information.
- Team leaders compile this information from spray operators using team leader daily spray record form.
- Finally, the site manager compiles the information from team leaders using site manager daily spray record form. These data are sent to the data managers, who process them using a specially designed template.
- From the processing unit, the IRS supervisors and M&E staff utilize data.

After the completion of spraying in a household, the spray operator will compile or update the household card. If the household is being sprayed for the first time, the card is folded and submitted to the head of the household with the indications that he or she should preserve it until the next spray round.

### Spray operator daily spray records

- Before leaving the house, fill the sticker and place it to the front door of the house.
- If the house has not been sprayed, use a red dotted sticker instead.

### Roles and responsibilities for IRS team leaders and spray operators Roles and responsibilities for spray operators

#### One day before IRS start

- Obtain the SOP sheet from team leader for guidance.
- Fill in the personal information form.
- Sign the consent form agreement.
- Complete the bank reconciliation form.

- Ensure that you know your team leader and your teammates by sight and by name.
- Ensure you know your workplace.

### **IRS Working day**

- Report to IRS operational site by 7:00 am.
- Register yourself in the daily attendance register.
- Assemble at your team's assembly ground.
- Ensure that the team leader provides you with PPE (overall, boots, mask, helmet, face shield and gloves).
- Obtain from the team leader working equipment and supplies (bag, pesticide, empty sachet container, plastic sheeting, a mining torch, writing board, household card, spray operator daily spray record form and Hudson spray pump).
- Inspect the provided PPE, equipment, and supplies to ensure they are in good working condition. Add two liters of water to the spray pump, pressurize it, and test that it is in good working condition; this should be done at the washing slab. If the spray pump is working, relieve the pressure, and seal it closed before boarding the vehicle.
- If the pump is not properly working, seek help from the pump technician.
- If all is working, go back to assembly ground and wait for instructions from your team leader.
- When allowed to board the vehicle, ensure you are seated and hold the pump upright between your legs.
- Ensure the proper custody of insecticide, PPE, and other equipment and supplies provided to you.

### **At the household**

- Knock at the door.
- Greet the household members and introduce yourself humbly, requesting permission to enter into the house.
- Explain the purpose of your visit.
- Ask the household if they are informed of the operation and have prepared their house(s).
- Request permission to enter and inspect the house for readiness to be sprayed.
- Give instructions for further preparations of the house if needed.
- Mix the insecticide according to how you were taught and fill the spray pump.
- Instruct the household members to remain outside during spraying.
- Enter the house with all your equipment and close the windows and the doors.
- Spray all inside walls, door, and windows, start from the innermost rooms and proceed to the sitting room.
- When through with spraying, leave the doors and windows closed.
- Fill in and put the sticker on the front door.
- Interview the family spokesperson to fill out spray operator daily spray record form.
- Give post-spray instructions to the family members. (Instruct them to stay out of the sprayed house for at least two hours, then open windows and doors to allow in fresh air, sweep the floor and throw the collected waste in a pit and cover it.)
- Thank them for their cooperation and ask them to lead you to the next house.

### **After spraying the last house**

- Review your daily spray record form to make sure that is properly filled in and do the final compilation.
- Count the empty sachets and remaining sachets to ensure they tally with what you were issued.
- Pack everything in the rucksack, carry your pump, go to agreed meeting place, and wait for instructions from your team leader.

### **At the IRS operational site after spraying**

- When back at the site, go straight to the washing slab and hand the pump to the technician.
- Go to your team's assembly ground to return all equipment that you were issued back to the team leader. Note that any time you receive or you give back the insecticide and equipment you have to sign a special control form.
- Take a bath and apply petroleum gel with vitamin E.
- Now you may go home to rest and eat.

### **Roles and responsibilities for the Team Leaders**

#### **One day before IRS operation**

- Obtain the list of your team from Site Manager know them all physically and by names.
- Ask all Team members and yourself to fill out the appropriate forms, including the personal information form, medical examination form (including pregnancy test for females), consent form, and personal bank account information.
- Liaise with the site manager to ensure the IRS site is well prepared for IRS (effluent waste disposal constructed to standard, store constructed to standard, and sufficient supply of insecticide, PPE, spray pumps, and other supplies and water on hand).
- Attend site manager and team leader meeting to make final arrangements for starting IRS.

#### **IRS working day**

- Report to your site at the site by 6:45 am.
- Register yourself in the daily register book.
- Go to site manager to collect insecticide, PPE, spray pumps, and other supplies for your team.
- Go to your team's assembly ground and ensure every team member has arrived and signed in the site daily register book.
- Issue insecticide, PPE, spray pumps, and other supplies by signing the equipment control forms.
- Talk to your team about the targets of the day and remind them of important items like quality of spraying, proper use of PPE, proper filling of forms, and general discipline at work.
- Lead you team in inspecting proper functioning of the pumps at the washing slab.
- Bring along a buffer stock of insecticide, forms, stickers, and household cards
- Supervise to ensure your team safely boards and is seated in the vehicle.

#### **At the Village Office**

- Report to the village office between 8:00 am and 9:00 am.
- Meet with the village IRS team and confirm the target of the day.
- Distribute the team according to the plan agreed between Village Executive Officer and Site Community Change agent.
- Ensure each spray operator has an escort.

### **During IRS Operation**

- Supervise four sprayers daily to ensure quality spraying and environmental compliancy requirements. Use the supervision checklist to guide you during supervision.
- Correct the errors with diplomacy without humiliating the sprayers, and appreciate all that they have correctly done.
- Pick random sprayed houses and interview the family members to ascertain how well the spraying was conducted.
- In case of any challenge or obstacle beyond your ability, call the site manager for consultation.

### **At the end of each Spray day**

- Go back to agreed meeting place.
- Collect spray operator daily spray record form from your spray operators and inspect the forms to see if they are properly completed.
- Fill team leader daily spray record form.
- Instruct your team to board the vehicle as per the SOP.

### **At IRS Operational Site after Spraying**

- Supervise your team as they go to the washing slab and hand the pumps to the technicians.
- With your team, go back to the assembly ground to receive back the supplies and equipment you issued in the morning. Ensure the numbers of empty sachets and full sachets tally with the number of sachets you issued.
- Inspect PPE and other supplies to ensure they are in good working condition.
- Remind your team to bathe and apply petroleum gel with vitamin E before they go back home.  
**(This is a must)**
- Hand over the insecticide sachets, spray pumps, and other supplies to the site manager.
- Hand over team leader daily spray record form to the site manager.
- Make the summary of the supervision report and brief the site manager.

#### **1.4.3.27. SOP for IRS health and safety worker**

##### **Scope and purpose**

The SOP provides acceptable safety standard procedures (compliant with international and national standards) for handling, storage, transportation, and use of the various classes of the insecticides used in IRS. To provide country IRS programs a reference and direction for worker safety during use of insecticides in accordance with host country safety regulations and the regulations put forward by the World Health Organization (WHO) and the UN Food and Agricultural Organization (FAO). It also explains in details the standard requirements for worker and household safety during transportation, storage, handling, and use of insecticides. This SOP cover all workers during handling and transportation of insecticides, safety precautions during storage of the insecticides, general safety of all spray operators, and emergency preparedness during the spray campaign, including responsibilities of different actors at country level.

##### **Insecticides safety policy guidelines**

Insecticides used for IRS can have adverse impacts on human health and the safety of workers (spray operators, storekeepers, wash persons, and supervision) and beneficiary households if safety precautions

and best practices are not followed. Human exposure may occur when handling the insecticide during opening of the package, during mixing and preparation of the spray solution, or during transportation, storage and spraying. Under IRS, the contractor prepared environmental assessments and Pesticide Evaluation Reports and Safer Use Action Plans (PERSUAPs), which identify potential human and environmental impacts of pesticide use and indicate measures to be followed to mitigate the impacts associated with the use of insecticides, in accordance to environmental assessment measures that ensure worker safety must be monitored during the IRS program.

### **Worker safety**

All persons working on IRS must wear appropriate personal protective equipment (PPE) in accordance with the safety instructions on the product label or material safety data sheet (MSDS) to be adequately protected against potential harm due to exposure to insecticides.

### **Personal protective equipment for spray operators**

#### **Site Manager**

Based on WHO and FAO specifications, provide the following PPEs for each cadre in the site.

For spray operator;

- Broad rimmed hat/helmet with extended cloth flap or towel to cover the nape of the neck (protects head, face, and neck from spray droplets).
- Face shield or goggles (face shield preferable; protects face and eyes against spray fall-out).
- Particulate mask or filtered mask (see MSDS for specifics, N95).
- Two or three cotton long-sleeved overalls per spray operator (worn outside of boots).
- Nitrile rubber, neoprene, PVC, or butyl rubber gloves, without inside lining, long enough to cover the forearm.
- Rubber boots.

**Note:** When ordering overalls and boots, a distribution of sizes that is appropriate for the work forces. Order extra gloves, boots, face shields, and helmets to allow for breakage and loss (usually about 15%). Spray operators should be issued a new dust mask each day and new gloves every two weeks, or immediately if they tear.

#### **For storekeepers**

The following items are required for each storekeeper and store attendant. These staff should wear overalls at all times; gloves and dust mask when distributing insecticide to spray operators; helmet, gloves, and dust mask when moving insecticide stock; and boots, gloves, dust mask, and goggles when cleaning up dry or wet insecticide spills.

- Overalls (two pair).
- Nitrile rubber, neoprene, PVC, or butyl rubber gloves long enough to cover the forearm.
- Rubber boots.
- Broad-rimmed helmet.
- Eye goggles.
- Dust mask (vented).

#### **For suit washers and pump technicians**

The suits washer and pump washers to wash the overall and pumps. The following items are required for each wash person;

- Chemical apron.
- Nitrile rubber, neoprene, PVC, or butyl rubber gloves long enough to cover the forearm and very flexible to use in washings, without inside lining (lining can retain insecticide and increase dermal exposure for staff routinely exposed to insecticide-contaminated water).
- Rubber boots.
- Goggles.
- Dust mask.

### **Supplies for suit washers**

The following are required at each staging location where spray operators gather at the end of the day to wash out the compression sprayers and have their overalls washed.

- Materials for wash area demarcation (fencing, rope, gravel, sign board, etc.)
- Plastic barrels (50–60 litres) for progressive rinsing, sufficiently wide and deep to submerge the entire spray can. A minimum of seven barrels are generally required as a set for one wash line. The number can be doubled or tripled based on the size of the team.
- Adequate washing/cleaning facility with piped water supplies and drainage facilities or in the absence of such facility, basins for face and hand washing.
- Plastic basins for washing overalls.
- Barrels of 50-60 litter for collecting contaminated water, if soak pits or evaporation tanks have not yet been prepared.
- Standard quality household detergent (e.g., OMO, FOMA, AERIAL or Sunlight brands) for washing overalls. Powdered forms are preferred.
- Rope and supports (poles and pegs) for clotheslines to hang overalls after washing.
- Soap for personal washing.
- Wash platform with adequate drainage design leading to evaporation tank or, in the absence of an evaporation tank, strong thick plastic/PVC floor sheeting material to avoid soil contamination.
- Wooden pegs or hangers on which to hang spray pumps for drying.

### **Medical and first-aid supplies**

**District IRS store keeper should provide the following items to each site**

- Pregnancy test kits. Order a sufficient number for every female spray operator to be tested before and after the spray campaign and once each month during the campaign.
- Eyewash set.
- Medical/first-aid kit.
- Treatment medications for dermal exposure or pesticide poisoning.

**Note:** Please note that these kits are provided for use by trained personnel of the Ministry of Health or certified nurses recruited for this specific purpose. In the event of accidents or injuries, the exposed or injured person should be referred immediately to the public health system using the spray team vehicles, after receiving primary help in the field such as thorough washing with soap and water.

## Worker safety practices for spraying

### Best safety practices

#### The Site Manager should enforce the following

- Eating, drinking, or smoking during work is strictly forbidden. After spraying or handling insecticides, personnel must wash hands and face with soap and water before eating, smoking, or drinking.
- In situations where they have to break to eat or have to go to the bathroom in the middle of an operation, the above procedure must also be followed.
- Spray staff should be provided with at least two sets of overalls to allow for daily changing.
- Particular attention should be given to washing gloves, as wearing contaminated gloves can be more dangerous than not wearing gloves at all.
- All staff should change immediately out of clothes that become contaminated with insecticides.
- Spray staff must wash off immediately with soap and water if the skin is contaminated with insecticide. If insecticide gets into the eyes, immediately flush with plenty of water.

### Pregnant and nursing mothers

District Vector Control Officer/ District Malaria Focal Person should ensure the following;

- Arrange for pregnancy tests during recruitment and a normal medical examination to ensure that pregnant women do not join the spray teams.
- Pregnancy testing must be conducted by a professional (health centres qualify to perform the testing).
- For spray campaigns lasting longer than 30 days, pregnancy tests should be repeated on a monthly basis throughout the campaign.
- Discouraged from working as spray operators.
- Pregnancy test reporting should be conducted by qualified health personnel.

### Washing facilities

**District Vector Control Officer/ District Malaria Focal Person should provide the following to each site**

- Washing facilities with sufficient water and soaps.
- Sanitary facilities.
- Plastic aprons for overall washes
- Fencing to wash areas and disposal facilities to prevent unauthorized entry into the premises, especially by children and animals.

### Security of contaminated materials

Empty sachets can easily be picked up by children or domestic animals. It is mandatory to retain empty insecticide containers, including empty sachets, in proper storage until proper disposal is identified. All empty containers and sachets should be collected and returned to the IRS store and treated as store inventory.

### Transportation

Improper handling of insecticides and equipment during transportation may affect product efficacy or cause contamination of the surroundings, accidental poisonings or risk exposure. Ensure to follow the guidelines to minimize risk exposure to insecticides during transportation that are based on FAO's Pesticide Storage and Stock Control Manual.



## **Training of drivers**

Prior to long-distance transport of insecticides from the customs warehouse/central storage facility to the local storage facilities, drivers should be informed about insecticide and how to handle emergency situations (e.g., road accidents). Training for long-distance transport should include:

- For what use the insecticide is intended.
- Toxicity of the insecticide.
- Understanding security issues and implications of the insecticide getting into the public's hands.
- Handling an accident or emergency.
- Combustibility and combustion by products of insecticide.
- Handling vehicle contamination.

## **Selection of vehicles to be used on IRS**

Prior to engaging any vehicle for carrying workers (spray teams), the vehicle should

- Be inspected by the relevant authorities and certified that it is fit to carry passengers. A vehicle inspection certificate is required as proof of certification.
- Have a valid insurance cover for carrying passengers.

## **Transportation best Practices**

Severe cases of poisoning have been caused by the transportation of insecticides with other commodities.

### **Make sure that, during transportation of insecticides**

- Food, animal feed or consumer goods should not be transported in the same truck as insecticides.
- Open or leaking containers of pesticides should never be transported.
- If pesticide containers must be transported with other goods, they must be separated in sealed partitions and securely fixed with straps or rope.
- Pesticide containers should be loaded in such a way that they will not be damaged during transport, that their labels will not be rubbed off and that they will not shift and fall off the truck on rough road surfaces.
- The driver should be trained and given instructions on what action to take in the event of an emergency.
- The insecticide load should be checked at intervals during transportation and any leakage, spills or other contamination should be cleaned up immediately. In the event of leakage while the means of transport is moving, the vehicle should be brought to a halt immediately to stop the leakage and the leaked product should be cleaned up.
- With a major spill, people should be kept away and the spill covered with earth, sand, sawdust, etc.; no attempt should be made to wash away the spill with water or other liquids.
- The truck, including tarpaulins and other goods, should be checked for evidence of spills or leaks after the pesticides have been unloaded and decontaminated of pesticide before it next departs.
- Pesticide containers should be loaded and unloaded carefully; most leaks from containers in storage are caused by damage during transportation and handling.
- For long distance hauling, a containerized vehicle should be used.

**Note:** In case of accident refer to Adverse Event Management SOPs.

### **Vehicle decontamination**

Because vehicles are rented for the program, it is important to ensure that pesticide contamination in the vehicle does not have negative impacts when the vehicle is subsequently used for another purpose (e.g., food transport). Drivers are responsible for cleaning and decontaminating the interior of the vehicle and exterior bed at the end of the spray day. Drivers should be provided with gloves to wear for cleaning the vehicle. All clothes used in wiping down the interior and bed of the vehicle should be washed with spray operator overalls. To prevent pesticide runoff from vehicle washing, drivers will also be responsible for wiping the vehicle bed with a damp cloth prior to washing the exterior of the vehicle.

### **Insecticide storage**

#### **For proper stacking**

- Insecticide containers and boxes should be arranged to minimize handling.
- To avoid the use of ladders, storage shelves should not exceed a height of 2 meters.
- Floor space should be uncluttered, with marked, 1-meter wide, gangways between shelves or stacks that permit easy inspection and allow free air flow.
- Pallets or timber and bricks should be used for stacking so that containers are not placed directly on the floor.

### **Notices and warning signs**

On the outside of the store, a notice should be displayed in the local language(s) with a skull and crossbones sign. The notice should read: “Danger, pesticides. Authorized entry only”. Strategically placed “No smoking” signs, on the inside and outside of pesticide stores, should be visually obvious. The notices should conform to national requirements in terms of color codes, pictorial symbol, and geometric shape. Insecticide containers from suppliers and the MSDS will often have the appropriate labels placed on them.

### **Emergency equipment**

#### **Each store should have the following supplies for dealing with emergencies**

- Bags of sawdust and/or sand to absorb leaked or spilled pesticides.
- Empty containers (preferably 200-liter salvage drums) and empty bags to repack heavily damaged or leaking containers.
- Spade and brush.
- Fire extinguisher.
- Protective gear for staff when dealing with emergencies (nitrile rubber or neoprene gloves, rubber boots, overalls, goggles, vapor masks or half-face respirators with organic vapor cartridges).
- Water supply from a tap or a container of water to wash hands and face if these become contaminated.
- Eyewash set.

### **Emergency preparedness procedures**

All personnel should be trained in recognizing and knowing how to behave in emergency situations such as a vehicle crash, fire, or spillage. Staff should keep an emergency number at all times and know where the nearest source of assistance is located. The primary objective in emergency situation is to

safeguard the life of the affected person(s) and the safety of the public.

### **Training of clinicians**

Health workers within the catchment area should receive training and the necessary equipment and medication to support the spray teams and the nearby population in the treatment and management of insecticide exposure cases.

### **Provision of poison treatment drugs**

- Treatment medication for dermal exposure or pesticide poisoning should be available in all health facilities in IRS areas as recommended by WHO.
- Health personnel of the MoH or certified nurses in the spray area should be trained to deal with insecticide exposure emergencies. In the event of accidents or injuries, the exposed or injured person should be given first aid attention and then should be referred immediately to the public health system.

### **Provision of First Aid Kits**

- First-aid kits should be readily available in case of an emergency in each IRS operational centre, in each warehouse, and in each vehicle transporting spray operators.
- Persons using the first aid kits should be well trained in first aid.
- The contents of the first aid kits should be reviewed and adapted to the spray work environment and should include an eyewash set. Instructions should be in the host-country language.

### **Emergency Plan**

- There should be a written emergency plan that covers possible emergency scenarios. Spray teams, communities, and health centers should be made aware of the plan.
- There should be provisions for referral for emergency cases.

### **Safety of households and beneficiaries**

The only way to ensure safety of households is to ensure that every household gets the right messages through IEC.

### **The following IEC messages should be communicated to target areas before spraying begins**

- Clear homes of mats or rugs, furniture, cooking implements, and foodstuffs prior to spraying.
- If furniture cannot be moved out of the home, move it to the Centre of the room and cover it.
- Stay outside the home during spraying and for at least two hours after spraying.
- Keep all animals outside the home during spraying and for at least two hours after spraying
- Sweep floors free of residual insecticide and insects and drop them in latrine pits or, in absence of a latrine pit, dig a 1-foot hole and bury the material and place a heavy rock over top.
- If skin itches after re-entrance into the home, wash with soap and water; for eye irritation, flush eyes with water; for respiratory irritation, leave the home for fresh air; for ingestion, or if symptoms persist, contact program staff or go to the nearest health facility.
- When spillage has occurred, people should be kept away and the spill covered with earth or sand; no attempt should be made to wash away the spill with water or other substances.

## Managing spills and adverse events

For managing the adverse events, follow the event management SOP.

### Management of spills

Insecticides are biologically active materials and potentially hazardous to human health and the environment.

#### Therefore, attention should be paid to the following

- Spills must be cleaned up immediately.
- Always have two people working when handling severe spills.
- Untreated spills may become trodden in, contaminate store personnel, and produce toxic fumes. If not removed quickly, the spilled chemicals may be absorbed by the floor.
- Floors should be constructed of impermeable (sealed) concrete or other non-absorbent material.
- The spill should not be hosed down, since doing so merely disperses the pesticide over a wider area. A supply of absorbent sawdust, sand, or dry soil should be kept in a container in the store. Nitrile rubber protective gloves and face-mask should be worn.
- Sawdust, sand or dry soil should be scattered over the area of the spill and left for a few minutes to soak up the chemical. The sawdust, sand, or dry soil containing absorbed spilled chemical should be swept or shoveled up and placed in a marked container for disposal.
- Dusts, wettable powders, or granules can create dust when swept up without the use of an absorbent material. A supply of absorbent sawdust, sand, or dry soil should be kept in a container in the store where it can easily be reached for use in an emergency. The material should be dampened and applied with a shovel over the area of the spill. The damp sawdust, sand or soil containing spillage material should be swept or shoveled up carefully and placed in a marked container for disposal.
- After sweeping, more than once, if necessary, a scrubbing brush at the end of a stick should be used to scrub down the area of the spill with water and strong soap or detergent. Excess soapy water should be removed with a rough floor cloth and not hosed down.

### 1.4.3.28. SOP for IRS data management for spray operators and team leaders

#### Scope and purpose

This SOP defines the data entry requirements for spray operators and team leaders. The SOP addresses two entry levels; IRS data entry for spray operators (spray operator daily spray record form) for the defined parameters given therein and IRS data entry for team leaders (team leader daily spray record form) for the same parameters. At the IRS team leader level, data entry is captured from the respondents during the spray campaign, up to the team leader level. Entry is always in hard copy format.

#### Roles and responsibilities

##### Spray Operator

Ensure all parameters defined on the IRS Spray Operator Form (No. 1) are completed for each household interviewed.

##### Team Leader

Aggregate the parameters reflected on the Spray Operator Forms onto the Team Leader Form (No. 2).

##### NMCP Manager /RMO/DMO or Contractor

Be thoroughly familiar with the spray forms and ensure that information for the parameters requested is collected at each defined level appropriately.

##### IRS Program Staff

This SOP define the data entry responsibilities for spray operators, team leaders, and the NMCP Manager.

#### Procedure

Data for IRS that reflect IRS outputs and outcomes as defined by the listed indicators are normally collected starting at the community level by spray operators during the IRS spray campaign.

#### Main parameters

- Staff and IRS information: operator/team leader/ site manager name and code; spray day; Location: district, ward, village, hamlet, site
- Insecticide: issue, use, returned full and empty sachets.
- Household and house: name of household head; number of structures and rooms.
- Demographics: Children under five; pregnant women; and over fives living in each house.
- Net information: Number of insecticide-treated nets and untreated nets.
- Net Usage: Children under five, pregnant women, and children over five sleeping under nets the previous night.
- Spraying update: House sprayed or not; reasons for those not sprayed (list of reasons are defined); number of rooms sprayed and not sprayed.
- IRS Perception: Perceived advantages and disadvantages of IRS (list of main advantages and disadvantages).
- Sensitization: Source of information received on IRS (list of main sources are defined).
- Consistency checks: Empty and returned insecticide sachets; houses visited; reasons for not spray; total rooms and those sprayed and not sprayed.

**Data entry training**

Specifically designed for spray operators and team leaders just before IRS operation commence.

**Procedure****Spray Operator**

- During IRS, the spray operator will be the first person to capture the information from the respondent at the house being sprayed, onto spray operator daily spray record form. The spray operator will record on the form information for each household visited.
- The spray operator will ensure data are entered using a blue or black ink pen and are entered clearly and concisely.
- At the end of each spray day, the spray operator will carefully aggregate the information of each household recorded, and enter the totals in the summary boxes found at the bottom of each form.

**Team Leader**

- At the end of each spray day, the team leader will enter the information of each filled spray operator form in his or her team onto the team leader daily spray record form.
- The team leader will ensure data are entered using a blue or black ink pen and are entered clearly and concisely.
- The team leader will then carefully aggregate the information in the team leader form and enter the totals in the summary boxes found at the bottom of each form.

**1.4.3.29. SOP for IRS data consistency checks for spray operators, team leaders, and site managers****Scope and purpose**

This SOP define the data consistency requirements for spray operators, team leaders, and site managers.

**The SOP addresses three consistency check point levels:**

- IRS data consistency check for spray operators in the spray operator forms.
- IRS data consistency check for team leaders in the team leader forms.
- IRS data consistency check for site managers in the site manager booklet

**Roles and responsibilities****Spray Operator**

Ensures that the main parameters defined on the IRS spray operator form are checked for consistency.

**Team Leader**

Ensures that the main parameters defined on the IRS team leader form are checked for consistency.

**Site Manager**

Ensures that the main parameters defined on the IRS site manager booklet are checked for consistency.

**NMCP Manager/RMO/DMO or Contractor**

Be thoroughly familiar with the spray forms and ensure that information for the parameters requested is collected accurately.

## IRS Program Staff

This SOP defines the data consistency requirements for spray operators, team leaders, site managers, and the NMCP Manager.

### Purpose and scope

Data for IRS that reflect IRS outputs and outcomes, as defined by the listed indicators, are normally collected starting with spray operators at the community level during the IRS spray campaign. It is important to check for consistencies in data entered, especially on the listed consistency checkboxes put in place on the forms as described below.

### Main Consistency Checks

- Insecticide
- Difference between the number of empty sachets and number of sachets used should be zero.
- The sum of empty sachets and unused sachets should be equal to the number of sachets initially issued.
- Houses visited.
- The sum of houses visited (defined by total number of house characteristics) should be equal to the sum of houses sprayed and not sprayed.
- Rooms.
- The total number of rooms recorded should be equal to the sum of rooms sprayed and not sprayed in each house for which this was recorded.
- Reasons for not spraying.
- The sum of reasons for visited houses that refused to spray should be equal to the total number recorded for not sprayed.

### Consistency training

- This training will be provided in training sessions specifically designed for spray operator, team leader, and site manager just before IRS commences.

### Data consistency training check for spray operators will include

- Fill all fields required on the spray operator form are filled for each house visited.
- Sum all required parameters before entering them. If necessary, the spray operator can use a calculator or even ask a second person to counter-check the tallied numbers.
- Perform consistency checks given in the forms, as described above, are duly filled in.
- Ask the team leader If you are not sure what the form is asking for in a particular field.

### Team Leader

- It is the duty of the team leader to answer any queries posed by the spray operator, especially if the spray operator is unsure of the meaning of any requested fields or consistency checks.
- The team leader should double check entries filled by the spray operators in form, before proceeding with translating them to team leader daily spray record form.
- At the end of each spray day, the Team Leader should ensure all fields required on the team leader form are filled in for each spray operator form from his or her team.
- The team leader should also ensure that all totals for the required parameters are carefully totaled

before entering them. If necessary, the team leader can use a calculator or even ask a second person to counter check the tallied numbers.

- The team leader should also ensure the consistency checks given in the forms, as described above, are duly filled in.
- If the team leader is not sure what the form is asking for in a particular field, then it is his or her duty to ask the site manager.

### **Site Manager**

- It is the duty of the site manager to answer any queries posed by the team leaders, especially if the leader is unsure on the meaning of any requested fields or consistency checks.
- The site manager should double check entries completed by the team leaders in team leader daily record form, before proceeding with translating them site manager booklet sheet.
- At the end of each spray day, the site manager should ensure all fields required on the sheets in Site Manager Booklet are completed for each team leader form from his or her site.
- The site manager should also ensure that all totals for the required parameters are carefully tabulated before entering them. If necessary, the manager can use a calculator or even ask a second person to counter-check the tallied numbers.
- The site manager should also ensure the consistency checks given in the booklet, as described above, are duly filled in.
- If the site manager is not sure what the booklet is asking for in a particular field, then it is his or her duty to ask the supervising authorities above him or her.



### 1.4.3.30. SOP for IRS data entry at the District IRS technical team Level

#### Purpose

This SOP defines the data entry requirements at the district level.

#### Scope

**The SOP addresses data entry requirements at two sub-levels within the district level:**

- Team leader entries by the district data clerk.
- Site manager entries by the district M&E officer.

At the District IRS Technical Committee (DITC) level, hard copy versions of team leader daily record form and site manager Booklet sheet are entered in specially designed Excel templates one each for team leader and site manager entries.

#### Roles and responsibilities

##### District Data Clerk

Enter the information found in the hard copy team leader forms onto the defined IRS electronic Team Leader Excel template.

##### Monitoring & Evaluation Officer

Enter the information found in the hard copy Site Manager Booklet onto the defined IRS electronic Site Manager Excel template.

##### NMCP Manager/RMO/DMO or contractor

Be thoroughly familiar with the spray forms, and ensure that information for the parameters requested is collected at each defined level appropriately.

##### IRS Program staff

These SOP define the data entry responsibilities for M&E officers, district data clerks, and NMCP manager.

#### Procedure details

Data for IRS that reflect IRS outputs and outcomes as defined by the listed indicators are normally collected starting at the community level (by spray operators) during the spray campaign and then ascend through the described levels up to the district level.

#### Main parameters

The main parameters found in the spray forms, are exactly translated into electronic format by entering the hard copy information from the site manager booklet and team leader forms into the electronic IRS template.

#### Electronic IRS templates

**This information then yields the required outputs and outcomes, through verifiable indicators.**

#### The main indicators tracked are as follows

- House Information: Houses targeted, visited, sprayed, not sprayed, and not reached and the count of households matching each reason for unsprayed houses.
- Insecticide: Stock, usage, count of empty sachets, and count of unused sachets.

- Demographics: Number of children under five, pregnant women, children over five.
- Net Usage: Count of children under five, pregnant women, and children over five who slept under a LLINs in houses visited.
- Perception: Perceived advantages and disadvantages of IRS in communities.
- Information: Number of males and females who received information on IRS and their main source of information.
- Spray coverage and population protected.
- Spray operator performance.
- Site performance and District performance.
- Average sachet uses per house sprayed.

### **Data Entry Training**

- This training will be provided in training sessions specifically designed for district M&E officers and data clerks just before IRS commences.

### **District M&E officer**

- The M&E officer will translate all hard copy site manager booklet sheets into the electronic Site Manager Excel template.
- The aggregated totals for the listed parameters in each filled sheet will be utilized for entering the data into the electronic templates.
- The M&E officer will enter the information on a daily basis for the period in which the forms are being received during IRS.

### **District data clerk**

- The data entry clerk will translate all hard copy team leader daily record form into the electronic Team Leader Excel template.
- The aggregated totals for the listed parameters in each filled form will be utilized for entering data into the electronic templates.

**Note:** The data entry clerk will enter the information on a daily basis for the period in which the forms are being received during IRS.

## **1.4.3.31. SOP for IRS data Consistency Checks at the DITC level**

### **Scope and purpose**

This SOP define sthe data consistency requirements for district M&E officers and data entry clerks. The consistency checks required for team leader and site manager entries are usually the same, since both electronic templates reflect identical information being entered from the hard copy forms. The only difference is that there will be more team leader entries, thus increasing the chances of data entry errors; therefore, more time should be given to check for these errors in the team leader templates.

### **Roles and responsibilities**

#### **M&E Officer**

Ensure main parameters defined on the filled sheets in site manager booklet are checked for consistency before transferring them electronically to the site manager Excel template.

**Data Clerk**

Ensure main parameters defined on the completed team leader daily record forms are checked for consistency before transferring them electronically to the team leader template.

**NMCP Manager/RMO/DMO or Contractor**

Be thoroughly familiar with the spray forms, and ensure that information for the parameters requested is collected accurately.

**IRS program staff**

This SOP defines the data consistency requirements for M&E officers, data entry clerks, and the NMCP manager.

**Procedure details**

Data for IRS that reflect IRS outputs and outcomes, as defined by the listed indicators, are normally collected by spray operators during IRS spray campaign, starting at the community level. By the time information reaches the district level, information has ascended through all three levels. The district team collects all forms, but mainly focuses on electronic data entry of forms team leader daily record and site manager booklet. The electronic template usually has control features put in place for key indicators to track consistency of data entered. Differences between specified data and actual entries indicate data inconsistencies that should be followed up and corrected.

**Main consistency checks****Insecticide**

- Difference between the number of empty sachets and number of sachets used should be zero.
- The sum of empty sachets and unused sachets should be equal to the number of sachets initially issued.

**Houses visited**

- The sum of houses visited (defined by total number of house characteristics, such as wall type) should be equal to the sum of houses sprayed and not sprayed.

**Rooms**

- The total number of rooms recorded should be equal to the sum of rooms sprayed and not sprayed in each house where this information was recorded.

**Reasons for not spraying**

- The sum of houses listed under each reason for visited houses that refused to spray should be equal to the total number for houses not sprayed.

**Data consistency training**

- This training will be provided in training sessions specifically designed for district M&E officers and data entry clerks just before IRS commences.

**M&E Officer**

- Before entering each sheet electronically, the M&E officer is required to check the completed hard copy sheets in Site Manager booklet, to ensure that no fields are missing data and no summation errors have occurred

- The M&E officer is also required to assist the data entry clerk in doing the same consistency check for filled hard copy team leader daily record form.
- All sheets need to be serially numbered to give them unique identification (IDs). This will also help if the forms need to be referred to retrospectively.
- Once data are electronically entered, the M&E officer should review the main fields entered and check against the consistency checks put in place on the site manager Excel template.

**If variance is noted, then the M&E officer should**

- Highlight the field(s) that has the variance.
- Trace back to the hard copy form on hand and check the data. If the information on the electronic template is different from the hard copy entry, then it should be rectified.
- If the entry is the same but looks anomalous, then the M&E officer should check against the hard copy team leader forms (and down to the spray operator forms if needed). If the source of error is identified, then it should be changed in the form and electronic template accordingly.
- If the information is the same in all hard copy forms but still thought to be anomalous, then it is the duty of the M&E officer to communicate with the IRS team to discuss this anomaly and counter check with original source document.
- In case of missing fields, the M&E officer should follow the same consistency check protocol. If the missing field is identified, then it should be entered in the Excel template. If the field is missing in all hard copy forms, then an investigation should be launched in collaboration with the IRS team to determine why.

**Team Leader**

- Before entering each sheet in electronic format, the data entry clerk, under supervision of the M&E officer, is required to check against the hard copy versions of team leader daily record form to ensure that no fields are missing data and no summation errors have occurred.
- All forms need to be serially numbered to give them unique IDs. This numbering will also help if the forms need to be referred to retrospectively.
- Once data are entered in excel, the team leader, under supervision of M&E officer, should review the main fields entered and check them against the consistency checks put in place in the Excel template.

**If a variance is noted, then the data entry clerk should do the following**

- Highlight the fields with the variance.
- Trace back to the hard copy form on hand and check the numbers. If the information on the electronic template is different from the hard copy entry, then it should be rectified.
- If the entry is the same, but seems anomalous, then the data clerk should trace back to the spray operator form to check against that form.
- If the source of error is identified, then it should be changed in both the hard copy form and electronic template accordingly.
- Anomalous data should be referred for detailed checks as explained above by the M&E officer who is responsible for further communication with IRS teams.

### 1.4.3.32. SOP for IRS data management at operational sites

#### Scope and purpose

This SOP defines the data entry requirements for site managers. IRS data entry for site managers onto the Site Manager Booklet for the defined parameters given therein, which reflect the contents of spray operator daily record and team leader daily record forms. At the site level, IRS data entry is captured from the team leaders, up to the site manager level. Data entry is always in hard copy format.

#### Roles and responsibilities

##### Site Manager

Aggregate the parameters in the team leader daily record forms into the site manager booklets.

##### NMCP Manager/RMO/DMO or Contractor

Be thoroughly familiar with the spray forms, and ensure that information for the parameters requested is collected at each defined level appropriately.

##### IRS Program Staff

This SOP define the data entry responsibilities for site managers and the NMCP manager.

#### Procedure details

Data for IRS that reflect IRS outputs and outcomes, as defined by the listed indicators, are normally collected by spray operators during IRS spray campaign, starting at the community level.

#### Main Parameters

- a) **Information and exercise:** Spray operator/team leader/site manager name and code, spray day, date of exercise
- b) **Location:** District, ward, village, hamlet, site
- c) **Insecticide:** Sachet's issue, used, returned full, and returned empty
- d) **Household and house:** Name of household head, number of structures and room
- e) **Demographics:** Children under five, pregnant women and children over fives living in each house
- f) **Net information:** Number of LLINs and untreated nets
- h) **Net usage:** Children under five, pregnant women, and children over five sleeping under LLINs the previous night
- i) **Spraying update:** House sprayed or not, given reasons for houses not sprayed (from the de-fined list), number of rooms sprayed and not sprayed
- j) **IRS Perception:** Perceived advantages and disadvantages of IRS (from the defined list of main advantages and disadvantages)
- k) **Sensitization:** Source of information received on IRS (from defined list of main sources)
- l) **Consistency checks:** Empty and returned insecticide sachets, houses visited, reasons for houses not sprayed, total rooms and rooms sprayed and not sprayed

#### Data entry training

This training will be provided in training sessions specifically designed for site managers just before IRS commences.

**Procedure**

- During supervision, the site manager or team leader will observe spray operators filling in spray operator daily record form and will provide them help if needed.
- At the end of each spray day, the site manager will enter the information from each completed team leader form at the site into the Site Manager Booklet.
- The site manager will ensure that data are entered using a blue or black ink pen and are entered clearly and concisely.
- The site manager will then carefully aggregate the information in each sheet found in site manager booklet, entering the totals in the summary boxes found at the bottom of the sheet.

### 1.4.3.33. SOP for spray recapture, catch-up, and mop-up

#### Scope and purpose

##### The purpose of this SOP is as follows

- Analyze and confirm whether a site or village needs recapture (i.e., IRS performance is less than 85%).
- Confirm whether the cause of initial refusals has been resolved.
- Sort out the required resources (i.e., manpower, transport, insecticide, mobilization).
- Secure permission in advance from the DITC to perform recapture.

#### Roles and responsibilities

##### The following steps should be taken in recapture spraying

- Determine areas in need of recapture (SM and DVCO/DMFP) and calculate the targets.
- Quantify the resources required.
- Inform the DITC of the decision and request permission to undertake recapture.
- Liaise with the beneficiary community and agree on the recapture date (SM and SIM).
- Ensure the targeted households are informed and are ready for the operation (SIM and the hamlet leaders).
- Inform the teams of which days recapture will be conducted inform the transportation and water supply vendors.
- Agree on the mode of work and payments.
- Implement recapture, compile the data, and send them to the district.

#### Procedure

##### DITC analyze needs for catch-up spraying

- Identify areas of difficulty and problems: leadership, implementation, and community response.
- DITC address implementation problems, including site arrangements, management, staff, transport and supplies.
- Estimate refusals versus unreached, performing, and non-performing sites.
- Temporarily close sites until catch-up will resume (SM to provide inventory, ensure security throughout).
- Hold a meeting with DC/DED to address the problems.
- Provide a letter (DC/DED) to WEO to provide a list of all refusals by hamlet.
- Set a deadline to receive reports from VEO/WEO.
- Receive reports and file appropriately.
- Check consistency and completeness of reports and compile them in the provided template and analyze the data.
- Assign teams to sites according to new set houses target.
- Give priority to the best teams and sites.

- Assign houses to the respective spray teams and operators assign a list of houses, not a number of houses), providing a photocopy of the lists according to the number of spray operators.
- Prepare the catch-up timetable.
- Inform seasonal staff of the timetable.
- For teams coming from outside the site, increase daily pay.
- Send the new timetable to WEOs and VEOs with a cover letter from the DC/DED with relevant instructions
- Plan how to inform targeted communities, including the role of non-governmental organizations if needed
- Receive formal request (sites) from the village authorities (VEOs) that they are committed and ready to accept the catch-up spraying.
- Plan for the transport of teams.
- Instruct SMs and supervisors one day before catch-up.
- Instruct spray operators and team leaders on how to fill the catch-up column in the spray forms.



### 1.4.3.34. SOP for IRS site closing

#### Scope and purpose

This SOP ensures procedural closure of the site to (a) recover insecticides, wastes from used insecticides, spray pumps, and all other supplies without loss; (b) ensure the site is decontaminated and remains environmentally safe; and (c) decommission the site to local and district authority.

#### Roles and responsibilities

##### DITC/ District storekeeper

- Receive back the supplies from the site staff.
- Reconcile the supplies versus the returns and, in cases of loss, follow the disciplinary procedure.
- Clean, repair, and pack the supplies according to the SOP.
- Ensure all staff has been paid or their payments have been processed and sent to the account section.

#### Procedure

##### After the last day of IRS, given that the coverage rate is good, do the following

- Through the team leaders and pump technician, ensure all operators have returned all supplies issued to them. In cases of loss or malicious damage, the name of the responsible person should be communicated to the account section to withhold his or her pay until the lost or damaged property is recovered in full.
- Pump technicians should disassemble each pump and clean and dry each part and assemble and store them on pallets. Pumps should be arranged according to their status (working, not working, and those needing spare parts).
- Instruct the following staff members to report for work the next day: washers for washing, drying, and packing overalls; pump technicians for servicing and packing the spray pump; site attendants for cleaning the site and rendering it uncontaminated and environmentally safe; guards for security reasons; and team leaders to assist you in reconciliation and packing.
- Meet with health facility leaders or the owner of the site structures and hand the structures over to them for safe keeping until the next spray round.

#### Equipment reconciliation

- Physically count the remaining insecticide sachets and the empty sachets and pack them separately.
- Using the material reconciliation form, inspect each item physically and establish a count of the intact, damaged, and missing items. Then pack the items, differentiating the intact and damaged ones.
- Arrange with district IRS storekeeper on the day for delivering the supplies and the reports to the district store.

#### Site decontamination and decommissioning

- Site decontamination will involve packing and transporting to the district store the insecticide, other supplies, and all solid wastes; cleaning and washing of stores, offices, toilets, washrooms, and washing slabs; and ensuring the general area of the site is clean.

- Site decommissioning will involve handing over the site to the local authority and explaining to them the role and importance of keeping the site safe until the next IRS round. The decommissioning form should be used to hand over the site.

### *Timelines*

Decontamination and decommissioning must be done when the operation is over and everything has been transferred from the site to the district store.

**Note: Dispose non-contaminated materials in the pit and fill it with soil when finished. Special arrangement required for large bulk and type of material to be disposed**

### **Evaluation of staff safety after spray operations**

**SMs must summarize all medical records accrued for temporary staff during spray operations and classify them into three categories**

- Attendances at a medical facility due to insecticide adverse reaction.
- Attendances for injuries related to operations.
- Other conditions not related to spray operations.

### **IRS Site end-of-spray report**

**The site manager should compile a comprehensive report on spray operations with the following sections**

- Duration of IRS:
- Human Resource Management
- Training
- Staff Health Issues
- IRS Stock Management
- Stolen/Lost Items
- IRS Performance
- Adverse Event Reported
- Recommendations

### 1.4.3.35. SOP for monitoring and evaluation of IRS

#### **Introduction**

The purposes of the M&E are to monitor, evaluate, and disseminate project related information and lessons on the performance of IRS program. Efficient and accurate reporting is a critical element of any IRS program. It is critical for gauging the effectiveness and efficiency of the program and is vital to its sustainability. Accurate recording during the planning and implementation of an IRS campaign will generate information on effectiveness and performance in terms of coverage and impact.

#### **Scope and purpose**

This SOP is intended to provide guidance on implementation of monitoring and evaluation of IRS project, specifically; analyzing the situation in the community and its project; determining whether the inputs into the project are well utilized; identifying problems facing the community or project and finding solutions; ensuring all activities are carried out properly, by the right people, and on time; applying lessons from one project experience to another; and determining whether project plans are best suited to the problem at hand.

Provides standardized technical sequence to those dealing with data collection, storage, analysis and dissemination in order to effectively monitor and evaluate of IRS operation.

#### **The M & E team for IRS operation should include**

- a) Epidemiologists
- b) Statisticians
- c) RMOs and DMOs
- d) RVCOs/RMFPs
- e) DVCOs/DMFPs
- f) Data entry Clerks
- g) Site Managers
- h) Policy makers
- i) IRS implementing partner

There are six core indicators that determine the process, outputs, and outcomes of IRS (Tables 15 &16).

**Table 15: Indicators of IRS activities**

S/N	Indicator	Definition	Type	Level	Timing	Frequency
1	Number of staff trained to implement IRS	Staff trained for IRS	Output	District/site	Before	Once
2	Number of houses sprayed	Houses sprayed	Output	Village/ward/district	During	Daily, weekly
3	Number of houses visited	Houses visited	Output	Village/ward/district	Before	Once
4	Number of people residing in sprayed houses	Population protected	Output	Village/ward/district	During	Daily, weekly
5	Number of houses reached	Houses reached	Output	Village/ward/district	During	Daily, weekly
6	Percentage of eligible houses in the area that were sprayed	Spray coverage	Outcome	Village/ward/district	After	Once

**Table 16. IRS Indicators and Collection Methods**

1A	Core IRS Indicators	Collection Method/ Tool	Type of Indicator
1.1	IRS coverage	Routine spray forms	Outcome
2.1	Number of residents in sprayed structures	Routine spray forms	Output
3.1	Number of people trained to deliver IRS	Training report	Process
<b>B</b>	<b>Quality IRS Management Indicators</b>		
2.1	Percentage of operators who fully implement best practices	Supervision report	Output
2.2	Supervisory ratio (i.e., the number of team leaders and spray operators reporting to each supervisor)	Supervision forms	Process
2.3	Number sachets of insecticide use per structure sprayed (average)	Routine spray forms	Process
<b>C</b>	<b>Logistics</b>		
3.1	Number of storage facilities from which the Logistics Manager has received a current Storekeeper's Weekly Report.	Electronic routine stock management system	Process
3.2	Number of insecticide sachets in stock	Electronic Routine stock management system	Inputs
3.3	Percentage of insecticide stock available	Electronic Routine stock management system	Inputs
3.4	Quantity of fuel consumption per vehicle	Log book, log sheets	Input
<b>D</b>	<b>Safety</b>		
4.1	Number and percentage of empty sachets returned	Electronic Routine stock management system	Process
4.2	Number and percentage of empty sachets disposed	Electronic Routine stock management system	Process

<b>1A</b>	<b>Core IRS Indicators</b>	<b>Collection Method/ Tool</b>	<b>Type of Indicator</b>
4.3	Proportion of health facilities with adequate stocks of insecticide antidotes and treatment medications in target communities	Supervision forms	Process
4.4	Proportion of health facilities at which health workers have been trained to treat cases of insecticide poisoning and exposure	Training Reports	Process
4.5	Percentage of female spray operators tested for pregnancy during spray operations	IRS site End-of-Spraying Report	Process
4.6	Percentage of spray operators who reported adverse health events attributable to insecticide exposure	IRS site End-of-Spraying Report	Process
<b>E</b>	<b>Information, education, and communication indicators</b>		
5.1	Reasons for spray refusal	Routine spray forms	Process
5.2	Reasons for community satisfaction/dissatisfaction after IRS	Routine spray forms	Process
5.3	Average time the family/family's goods remain outdoors following IRS application	Survey	Process
5.6	Percentage of households in which residents sweep the floor upon re-entry following IRS	Survey	Process
5.7	Percentage of households in which a respondent reports accurate knowledge of IRS messages	Survey	Process
5.8	Number of nets found in the houses (Ownership of LLINs)	Routine spray forms	Output
5.9	People sleeping under a LLINs by age group (Use of LLINs)	Routine Spray forms	Outcome
	1. IRS coverage	Routine spray forms	Outcome
5.11	2. Number of residents in sprayed structures	Routine spray forms	Output
	3. Number of people trained to deliver IRS	Routine spray forms	Process
<b>F</b>	<b>Quality IRS Management Indicators</b>		
6.1	4. Percentage of operators who fully implement best practices	Supervision	Output
6.2	5. Supervisory ratio (i.e., the number of team leaders and spray operators reporting to each supervisor)	Supervision forms	Process
6.3	6. Number sachets of insecticide use per structure sprayed (average)	Routine spray forms	Process
<b>G</b>	<b>Logistics</b>		
7.1	7. Number of storage facilities from which the Logistics Manager has received a current Storekeeper's Weekly Report.	Electronic routine-stock management system	Process
7.2	8. Number of insecticide sachets in stock	Electronic Routine stock management system	Inputs
7.3	9. Percentage of insecticide stock available	Electronic Routine stock management system	Inputs
7.4	10. Quantity of fuel consumption per vehicle	Log book, log sheets	Input

<b>1A</b>	<b>Core IRS Indicators</b>	<b>Collection Method/ Tool</b>	<b>Type of Indicator</b>
<b>H</b>	<b>Safety</b>		
8.1	Number and percentage of empty sachets returned	Electronic Routine stock management system	Process
8.2	Number and percentage of empty sachets disposed	Electronic Routine stock management system	Process
8.3	Proportion of health facilities with adequate stocks of insecticide antidotes and treatment medications in target communities	Supervision forms	Process
8.4	Proportion of health facilities at which health workers have been trained to treat cases of insecticide poisoning and exposure	Training Reports	Process
8.5	Percentage of female spray operators tested for pregnancy during spray operations	IRS site End-of-Spraying Report	Process
8.6	Percentage of spray operators who reported adverse health events attributable to insecticide exposure	IRS site End-of-Spraying Report	Process
<b>I</b>	<b>Information, education, and communication indicators</b>		
9.1	Reasons for spray refusal	Routine spray forms	Process
9.2	Reasons for community satisfaction/dissatisfaction after IRS	Routine spray forms	Process
9.3	Average time the family/family's goods remain outdoors following IRS application	Survey	Process
9.4	Percentage of households in which residents sweep the floor upon re-entry following IRS	Survey	Process
9.5	Percentage of households in which a respondent reports accurate knowledge of IRS messages	Survey	Process
9.6	Number of nets found in the houses (Ownership of LLINs)	Routine spray forms	11. Output
9.7	People sleeping under a LLIN by age group (Use of LLINs)	Routine spray forms	12. Outcome

## 1.4.4. Bio larvicide application

### 1.4.4.1. SOP for participatory mapping, habitat identification and characterization

#### Purpose and scope

Participatory mapping is an activity of engaging community members to identify and map natural and manmade mosquito breeding habitats which are within their surroundings. It is necessary to map all the active and potential mosquito breeding sites within the households/community in order to be able to trace the breeding sites for application of biolarvicides. Mapping should be done at the lowest administrative unit (hamlet) within the community. Additionally, data on habitat characterization should also be collected and updated based on rainfall season (dry and wet seasons) because each region might have different rain season pattern.

#### Participatory mapping and habitat characterization will assist to

- a) Map every square meter of the breeding site in the community and assign the areas as hamlet/block.
- b) Lay foundation of baseline and routine breeding habitats survey.
- c) Recode geographical location and ecological parameters, of all potential breeding habitats in a sketch map.
- d) Characterize the breeding habitats by size, type, and larval composition.
- e) Determine the presence or absence of larva and pupa for each breeding habitat.
- f) Provide baseline quantification data of amount of biolarvicides, equipment and supplies needs.
- g) Prepare a weekly workplan timetable for each CORP in each hamlet/street.

#### Responsible person

Community owned resource person (CORPs) who are familiar and resident of the working area.

#### Supervisors

Hamlet Leaders, Village Executive Officers (VEO), Village Chairpersons, Ward Executive Officers (WEO), Ward Health Officers (WHO), Ward community development officers (WCDO), District Vector Control Officers (DVCO)/District Health Officers (DHO), District Malaria Focal Persons (DMFP), District Medical Officers (DMO), Regional Health Management Teams (RHMT) and NMCP/PORALG.

#### Roles and responsibilities

##### NMCP / PORALG

- Provide guidelines and standard operating procedures for the mapping of the breeding sites and implementation of biolarvicides.
- Provide supervision and technical support on mapping and habitat characterization activities where needed.
- Training region and councils' team on mapping exercise and habitat characterization activities.
- Mobilize resource for implementation of biolarvicides activities.

##### Regional Vector Control Officer (RVCO)

- Translate the guidelines and standard operating procedures
- Provide technical backstop to the councils to guide mapping exercise at councils' level.
- Prepare monthly, quarterly and annual reports that indicates number of breeding sites identified and mapped in the region

**District Medical Officer (DMO)**

- Supervise the implementation of mosquito breeding sites mapping in the council
- Assign a responsible vector control Officer to coordinate and supervise mosquito breeding sites mapping and habitat characterization.
- Provide resources for mosquito breeding sites mapping and habitat characterization.

**District Vector Surveillance Officer (DVSO)**

- Plan, budget and inform all stakeholders for mapping and habitat characterization activities across all levels.
- Coordinate and organize advocacy of mapping and habitat characterization activities across all levels.
- Ensure availability of materials and supplies required for participatory mapping and habitat characterization.
- Facilitate training and mentoring CORPs and supervisors.
- Supervise participatory mapping and habitat characterization activities.
- Resolve any raised concerns from the community during mapping exercise.
- Prepare and submit to the District Medical Officer monthly, quarterly and annually report of the mapping exercise and habitat characterization conducted in the district.

**Ward Executive Officer (WEO) and Ward Community Development Officer (WCDO)**

- Create awareness to the community on the mosquito breeding sites mapping exercise
- Supervise the CORPs during the implementation of mosquito breeding sites mapping and habitat characterization exercise
- In collaboration with VEO, identify CORPs to be responsible for mosquito breeding sites mapping in the village/street.
- Ensure peace and security for smooth implementation of mosquito breeding sites mapping exercise at the ward level.
- Work with Ward Health officer to ensure smooth implementation of mapping activity at the ward level.

**Ward Health Officer (WHO)**

Training the CORPs at ward level on mosquito breeding sites mapping and characterization at the ward level.

- Supervise the CORPs at the ward level during the mosquito breeding sites mapping at the ward level
- Provide technical support to village/hamlet teams on mosquito breeding sites mapping and habitat characterization.
- Support community leaders in community awareness creation for the implementation of mosquito breeding sites mapping exercise at the ward level.
- Provide technical support to the CORPs updating mosquito breeding sites sketch maps to ensure all the necessary information captured
- Compile and submit monthly, quarterly and annually report to District Health Officer.



### **Village Executive Officer (VEO)**

- Create awareness to the community on the mosquito breeding sites mapping exercise
- Supervise the CORPs during the implementation of mosquito breeding sites mapping and habitat characterization exercise
- In collaboration with WEO, Identify COPRs in the village to be responsible for mosquito breeding sites mapping in the village/street.
- Ensure peace and security for smooth implementation mosquito breeding sites mapping exercise at village level.
- Work with Ward Health officer to ensure smooth implementation of mapping activity at the village level.

### **Community Leadership (Village Chairperson and Hamlet leaders)**

- Support implementation of mosquito breeding sites mapping exercise in their area of jurisdiction
- Support recruitment of volunteers (CORPs) to execute mapping and breeding habitat characterization in his areas of jurisdiction
- Provide security to the CORPs during the implementation of mosquito breeding mapping exercise in his area of jurisdiction
- Orient the CORPs to understand the village bounding and provide all the necessary support to access the village boundary

### **CORPs**

- Report to village leaders when visiting the village for mosquito breeding sites mapping exercise and habitat characterization
- Identify all the potential and productive mosquito breeding sites.
- Sketch all the potential and productive mosquito breeding identified in the village.
- To characterize breeding habitats by size, type, and larval species.
- Assess presence or absence of larval and pupa in each breeding habitat.
- Count number of larvae and pupa in each breeding habitat.
- Prepare and submit reports of your work to Ward Health Officer.

### **Community members**

- Provide support to the COPRs during the mosquito breeding sites mapping in the community
- Guide the COPRs to identify the mosquito breeding sites in their area
- Provide space where necessary for storage of materials, equipment and supplies carried by the CORPs.

### **Participatory mapping**

**To achieve precise mosquito larval control using biolarvicide application, it is very important for map-ping team to adhere to the following key considerations during participatory mapping:**

- a) Develop workplan for the implementation of mosquito breeding sites mapping activities.
- b) Collect all required tools, mapping forms and equipment's for mapping activities from VEO's office.
- c) Sub divide area of work into manageable Units, example, hamlet/Blocks.
- d) Divide the hamlet/Blocks into plots according to ownership, occupation or any other land use.
- e) Get the hamlet/community leader accompany mapping team to the respective community for mapping activities.

- f) Fill in date, the council, ward, village, hamlet and the name of the leader in Hamlet Sketch Map Form (Appendix 9).
- g) With the help of the local leaders, make a record of owner, occupier or regular user, define the boundaries, making a rough sketch on a piece of paper.
- h) Draw the sketch map on the space provided in Appendix 9 form capturing hamlet and respective plot boundaries. It is advised to use permanent landmarks for reference while drawing the sketch map
- i) Assign unique identification number for each plot (Plot ID) and the house number
- j) Fill in the hamlet plots ownership form (Appendix 10) and capture the following particulars; date, name of the council, ward, village or street, hamlet, Block number and name of the hamlet leader.
- k) Indicate the owner, the occupier or the regular user of the plot, remember to provide both the official name and other commonly known nickname, if any.
- l) Assign a specified plot ID number for areas covered by common facilities like football pitch, open spaces, church, mosques, schools and infrastructure like roads, rails, drains etc.
- m) Take GPS location (if device available) for household/common facilities and breeding habitat using mobile phone or GPS devices
- n) Describe in details (in the Hamlet plots map form) the location and characteristics of each plot within the hamlet for ease of identification and access, e.g., the plot/compound is in-front of the market
- o) Submit the sketch map and plot ownership form to the immediate supervisor – VEO.
- p) Review the sketch map based on other features like presence of forests, rivers, farms, etc. Regularly take note of any relevant changes, i.e., change in land use.

**Note: Involve other sectors with related interest e.g., Ministry of Agriculture, Ministry of Mining, Ministry of Education, Media and the Ministry of Infrastructure Development.**

### **Identification and characterization of breeding habitats**

In order to collect quality baseline data on habitat characterization for proper planning and implementation of biolarvicides application, the procedures below should be adhered to:

#### **Open habitat identification and characterization**

This includes any water body that is stagnant or slow flowing for more than 7 days, directly exposed to the sun and therefore likely to produce Anopheles malaria vectors. Appendix 11 describes the different types and codes of such open breeding habitats.

#### **Follow the following steps while assessing for open breeding habitats**

- a) Develop a plan for the implementation of the mosquito breeding habitat identification and characterization.
- b) Obtain the open and closed habitats larval survey form – cross-sectional data (Appendix 12) from VEO/WEO.
- c) Carry with you the hamlet sketch maps and their description forms made during the participatory mapping exercise.
- d) Go to the specific hamlet/ previously mapped into plots.
- e) Use larval survey form and fill in the date, names of the council, ward, village or street, hamlet and the name of local leader on top part of the form.
- f) Move from plot to plot as shown on the sketch map; fill in **Plot ID** number as it appears on your

- map. If the plot has a house, fill in the house number.
- g) Search for mosquito breeding habitats systematically for the entire plot.
  - h) Record each located habitat with a unique number (**Habitat ID**), and then fill its type (**Habitat type**) on the form using the habitat codes provided on top part of the open and closed habitats larval survey form –cross-sectional data (Appendix 12). Refer to the notes and pictures on different habitat types if you are not sure of the habitat type (Appendix 11-types of open habitats and Appendix 13-types of closed habitats).
  - i) Write ‘No Habitat’ If you did not find a habitat within a plot
  - j) Describe and locate the habitat on the column labelled ‘Habitat description’
  - k) **Estimate the habitat perimeter by walking around it. Approximately, each step that you walk is one meter**
    - If estimated habitat size is less than 10 m<sup>2</sup>, tick/record the estimate size under “<10 m<sup>2</sup>” column
    - If estimated habitat size is between 10 - 100 m<sup>2</sup> tick/record the estimate size under “10-100 m<sup>2</sup>” column
    - If estimated habitat size is greater than 101 m<sup>2</sup> tick/record the estimate size under “>101 m<sup>2</sup>” column
    - Observe if the habitat contains water or if it is dry and tick (√) the appropriate box.
    - Observe the habitat for the presence or absence of plants/vegetation and tick (√) where appropriate in the data collection form to determine the kind of larvicide to be used and the method of application.
      - i. Distinguish between short vegetation (not higher than your knee) and tall vegetation (much higher than your knee), floating vegetation that can be found on the water surface or no vegetation at all. Multiple ticks are possible.
      - ii. Dip in the habitat using a dipper to assess for presence of mosquito larvae.

### **Closed habitat identification and characterization**

Is any water body that is stagnant or slow flowing for more than 7 days which is not exposed to the sun and therefore unlikely to produce Anopheles malaria vectors but may produce Culicines, notably *Culex quinquefasciatus* (**Appendix 13**). Procedures for larval surveillance and data collection in these types of habitats are almost the same as for open habitats.

### **Note the following additional concerns while assessing closed habitats**

- Drop a small stone in the pit latrine to test for presence of water.
- Dip only habitat found with water.
- Use a long handle dipper with a scoop/cup bent upward, gently dip superficially to sample for larvae/pupae.
- Use open and closed habitat larval survey form – cross-sectional data collection form (Appendix 12) to record findings.
- Give a brief description of the habitat in a way that will assist you to always remember it.

## Dipping techniques

Take care while dipping so that your shadow is casted away from the habitat as larvae are very sensitive and will dive to the bottom once your shadow is casted over the water.

### Procedure

- Lower the dipper twisting it gently towards an angle of  $45^\circ$  just below the surface so that water flows in together with any larvae that might be present (The important point to note here is that we sample by displacement suction and not by scooping). The diagram below (Figure 29) shows how dipping should be done.
- Take care not to spill the water containing the larvae and pupa when lifting the water, hold dipper steadily until larvae and pupae rise to the water surface in the dipper (this can take several minutes, especially for older instars).
- Take care not to disturb the water too much as this will make larvae dive downwards. If the water is disturbed, wait for three minutes before continuing dipping.
- Take 5 dips in habitats with less than or equal to one square meters ( $\leq 1 \text{ m}^2$ ), 10 dips in habitats with more than two but less than fifteen square meters ( $>2 - <15 \text{ m}^2$ ). In case of large habitats with greater than 15 square meters ( $>15 \text{ m}^2$ ) such as mangrove swamps, water channels, long drains etc. walk around/along and take up to 20 dips per habitat to investigate for the presence of mosquito larvae. Take dips in different locations where mosquito larvae can be expected (edges of habitats, around vegetation, shallow areas etc.).
- Empty the contents of all dips in one larval pan.
- Count and record the number of larval (by type) and pupa and record in open and closed habitats larval survey form cross-sectional data (Appendix 12).
- Record by ticking ( $\surd$ ) all the larval stages (Early, Late) that you see.
- Check, count and record the number of mosquito pupae.
- Tick ( $\surd$ ) in the appropriate box for the presence or absence of pupae.
- Note down anything that you think is important in your larval survey exercise on the 'Comments' column of the open and closed habitats larval survey form-cross-sectional data (Appendix 12).
- If there is more than one habitat in a single plot/compound, record the information for each habitat in a separate row.
- Move to the next plot after exhaustive searching and dipping for larvae in all the habitats.
- Move to the next hamlet and repeat the above procedure after you have completed all the plots in a hamlet.



**Figure 29:** How to technically dip for mosquito larval sampling using standard dipper: Lower dipper by gently tilting one side at angle of 45° to cause water and nearby larvae to flow into dipper.

“**Remember** that *Anopheles* mosquito densities are often quite low compared with other genera, and therefore more time and efforts should be dedicated to detect them! Furthermore, sampling pupae is extremely difficult because they are very sensitive and fast. A slightest disturbance in the water they disappear (dive down). Moreover, they are more clustered at one spot than larvae, and therefore require thoroughly searching the habitats for pupae”.

### Equipment and supplies

The following are the equipment and supplies needed during participatory mapping and habitat identification and characterization exercise;

### Guides

- Types of open breeding habitats (Appendix 11).
- Types of closed breeding habitats (Appendix 13).

### Recording forms

- Hamlet Sketch Map Form (Appendix 9).
- Hamlet Plot ownership form (Appendix 10).
- Open and closed habitat larval survey form – cross-sectional data (Appendix 12).
- Stationaries (Pencil, Ruler, rubber, pen, writing board and clear bags).
- Personal protective equipment's (PPE), such as gumboots.
- Standard dipper, larval tray, strainer and pipettes.
- GPS device / Mobile phone with GPS program (if available).
- Aerial picture or/and technical map (if available) for comparison with the sketched hamlet maps.

### Important aspects to observe

Consider the following during participatory mapping activity;

- Do not enter the community without the company of community leader.
- Do not enter the household compound without consent of the household head/owner.
- Introduce yourself and explain the purpose of the activity to each household head

- Do not enter into the water body while assessing/dipping.
- Do not stand on/step on the cover of septic tanks to avoid falling.
- Be vigilant of venomous animals and insects.
- Report any raised concerns from the community to the community leader and immediate supervisors.

### 1.4.4.2. SOP for setup and logistics for biolarviciding

#### Purpose and scope

Setup and logistics include quantification and procurement of biolarvicides, equipment and supplies, inventory management and storage. The process starts after the participatory mapping exercise and baseline data collection when determining the number, type and size of the mosquito breeding habitats. Once this information is obtained actual quantification of biolarvicides, human resources, equipment and supplies requirement in a council can be estimated.

#### Roles and responsibilities

##### NMCP / PO-RALG

- Receive and compile number, type and size of breeding habitats submitted by regional health officer.
- Review annual quantification of the biolarvicides, equipment and supplies.
- Review annual costing of the biolarvicides, equipment and supplies.
- Receive and review costed quantification report from regional vector control officer.
- Mobilize resource for procurement of biolarvicides, equipment and supplies and implementation of the biolarvicides intervention.

##### Regional Vector Control Officer (RVCO)

- Prepare the annual workplan for implementation of biolarvicides intervention in the region
- Determine the annual quantity of biolarvicides required for implementation of biolarvicides intervention in the region
- Submit to the PORALG the number, type and size of breeding habitats submitted by councils.
- Submit to PORALG the amount of biolarvicides and equipment and supplies required for the implementation of biolarvicides activity in the region.
- Provide guidance to the council level on forecasting the quantity of biolarvicides required by each council in the region.
- Assist councils in resource mobilization for the procurement of biolarvicides, equipment and supplies and implementation of the bio larvicide intervention.

##### District Vector Control Officer (DVCO)

- Receive, review and compile type, number and size of breeding habitats submitted by Ward Health Officer.
- Compile the compile and determine the annual quantity of biolarvicides, equipment and supplies required for each ward in the district.
- Submit to the RVCO the annual requirement of biolarvicides, equipment and supplies for the implementation of biolarvicides intervention in the district
- Ensure annual availability of fund for implementation of biolarvicides intervention in the Comprehensive Council Health Plan (CCHP).
- Record and update the biolarvicides inventory as required (Appendix 14, 15, 16 &17).
- Review after every 6 months' the amount of biolarvicides, equipment and human resource and other supplies as necessary.

### Ward Health Officer

- Receive the reports from all CORPs in the wards review and compile to have one report of the wards that indicate types, number and size of breeding habitats
- Provide guidance to the COPRs in determining the amount of biolarvicides, equipment and supplies required for implementation of biolarvicides in the ward
- Receive from the DVCO biolarvicides and issue the bio larvicides, equipment and supplies to the the CORPs.
- Record and file amount of bio larvicide received, used and stock on hand.
- Record and update the biolarvicides inventory as required (Appendix 14, 15, 16 &17).

### Village Executive Officer and Village Health Committee

- Receive biolarvicides, equipment and supplies from the Ward Executive Officer.
- Provide space for the storage of biolarvicides and equipment at the village level.
- Issue biolarvicides, equipment and other necessary supplies to the COPRs for application of biolarvicides intervention at the village level.
- Ensure security for the biolarvicides, equipment and supplies stored at the village level.
- Ensure the availability of biolarvicides and other necessary equipment and supplies requirements based on the estimated size of habitats at the village.
- Manage inventory of biolarvicides, equipment and other supplies at the village level.

### CORPs

- Request bio larvicides, equipment and supplies weekly for implementation of biolarvicides from Village Executive Officer.
- Report weekly amount of biolarvicides used and remaining after every seven days of biolarvicides application in the village/ street
- Provide regularly information to the Ward Health Officer on the numbers and size habitats size to assist in the quantification of biolarvicides required in the village.

### Procedure

To ensure proper estimation and procurement of the required amount of biolarvicides and good stock management, the following procedures should be considered;

#### Quantification of bio larvicides

- Review the data of the number and size of the breeding habitats in the area in each rain season.
  - Estimate the total area of breeding habitats in square meters (Appendix 18)
- Determine the types of biolarvicide requirements based on the nature of the breeding site (clean or polluted water)
  - BACTIVEC (Bti) – is recommended for relatively clean water.
  - GRISELESF (Bs) – is recommended for polluted water.
- Quantify amount of biolarvicide required based of the administrative level locality (village, ward, district. Region)

#### *Note the formulations of available biolarvicide*

BACTIVEC (Bti); 2 - 5 mls per square meter.



GRISELESF (Bs); 5 – 10 mls per square meter.

- For quantification purposes, use maximum dose of 5 mls per square meter for BACTIVEC and 10mls per square meter for GRISELESF.
- Use the following formula to calculate the amount of bio larvicide needed

**Bio larvicide needs per application cycle = total habitat size in square meters X bio larvicide application rate**

**Example:**

- Quantification for BACTIVEC
  - Total number habitat size in square meter = 47,000 m<sup>2</sup>
  - Use maximum dose which is 5 mls per square meter
  - Bio larvicide needs per application cycle = 47,000 m<sup>2</sup> X 5 mls/m<sup>2</sup> = 235,000 mls (→ 235 Liters)
- Quantification of GRISELESF
  - Total number habitat size in square meter = 13,000 m<sup>2</sup>
  - Use maximum dose which is 10 mls per square meter
  - Bio larvicide needs per application cycle = 13,000 m<sup>2</sup> X 10 mls/m<sup>2</sup> = 130,000 mls (→130 litres)

**Note:** Amount of biolarvicide calculated above is for one round / cycle of application. Each round / cycle of bio larvicide is for weekly application. Rotate the two types of biolarvicides to mitigate development of resistance.

- Develop bio larvicide supply plan:
  - Submit biolarvicide needs and supply plan to the appropriate higher level for review using Appendix 18, 19 & 20).

### Quantification of equipment and supplies

- Allocate 1knapsack sprayer with jet type nozzle for each CORP.
- Allocate 1 motorized pump for each village
- Allocate 1 standard mosquito larva dipper for each CORP.
  - Allocate 1 PPE set for each CORP (Gumboots).
- Allocate 1 GPS device for each village (if available).
- Data collection tools and guides.
- Stationaries (Pencil, Ruler, rubber, pen, writing board and clear bags).

### Procurement of Biolarvicide and other supplies

- Use the appropriate government channels for procurement process.
  - (i.e., use existing of national policies and guidelines, with clear and transparent procedures supported by appropriate legal provisions and controls).
- Procure Biolarvicide (BACTIVEC and GRISELESF) per application period from Tanzania Biotech Products Limited (TBPL) in Kibaha.
- Procure other required equipment's and supplies from local vendors.
- The office of the District Medical Officer should arrange for transportation of the biolarvicides from Kibaha plant and other supplies to their respective district.

### **Procurement of Biolarvicide and other supplies**

- Use the appropriate government procedure to procure biolarvicides
- Procure Biolarvicide (BACTIVEC and GRISELESF) per application season.
- The office of the District Medical Officer should arrange for transportation of the biolarvicides and other supplies to their respective district.

### **Inventory Management for Bio larvicides Council level**

- Each council will be ordering bioarvicides per application season.
- Order sufficient amount of biolarvicides based on the the total size oof the breeding habitat identified and mapped in the councils
- Use Report and Requisition form to order the biolarvicides (Appendix 19).

### **Ward level**

- Each ward will be ordering bio larvicides from the DVCO on monthly basis.
- Use Report and Requisition form to order biolarvicides from the DVCO (Appendix 20).

### **1.4.4.3. SOP for Bio larvicide application**

#### **Purpose and scope**

After mapping the hamlets, with their plots, identifying/locating and characterizing all mosquito breeding habitats, start the actual biolarvicide application. Biolarvicide should be re-applied every after every 7 days with the following main objective:

- Reduce mosquito larval density in the productive and potential breeding habitats.
- Reduce the population density of adult mosquito.
- Contribute in reduction of malaria transmission and other mosquito-borne diseases by reducing the emergence of adult mosquito population.

#### **Roles and responsibility of key players on Biolarvicides application**

##### **NMCP/ PO-RALG**

- Resource mobilization
- Development of guidelines and standard operating procedures to guide the implementation of biolarvicides intervention.
- Capacity building for quality application of biolarvicides intervention.
- Supervise and monitor implementation of biolarvicides intervention in the country
- Provide technical support to the region and councils on the quality implementation of biolarvicides intervention.

##### **Region Vector Control Officer (RVCO)**

- Translate policy guidelines and standard operating procedure Quantify and order the amount of biolarvicides required by the region in each application season.
- Provide technical support to the councils for the quality implementation of biolarvicides.
- Submit monthly, quarterly and annually biolarvicide implementation report to PO-RALG and Ministry of Health/NMCP

### **District Vector Control Officer (DVCO)**

- Coordinate the implementation of biolarvicide intervention at the council level.
- Conduct training for biolarvicides implementers (Health Officers, Ward Health Officers and CORPs) at district level.
- Ensure availability of biolarvicides at each application season
- Compile monthly, quarterly and annually implementation report (Appendix 21) and submit to DMO

### **Ward Health Officer**

- Supervise daily implementation of biolarvicide intervention at the wards level.
- Supply biolarvicides, equipment and other supplies to all Village Executive Officers in the ward.
- Prepare weekly report for the implementation of the biolarvicides intervention at the ward level (Appendix 21) and submit to DVCO.
- Supervise all CORPs conducting biolarviciding in the wards.
- Supply to village Executive Officer at the village level biolarvicides equipment and supplies needed for implementation of biolarvicides at the wards level.
- Prepare weekly biolarvicides application report and submit to the DVCO (Appendix 21).
- Record biolarvicide issued to the CORPs on biolarvicide issue form (Appendix 22).

### **Village Chairperson**

- Provide support to the COPRs to access the mosquitos' breeding sites for application of biolarvicides in his area of jurisdiction
- Grantee security to the CORPs when moving around the village for the implementation of mosquito breeding mapping exercise in his area of jurisdiction
- Record daily bio larvicide issued to the CORPs on Larvicide issue form (Appendix 22).

### **Community Owned Resource Persons (CORPs)**

- Educate community on environmental sanitation to reduce mosquito breeding habitats in the village
- Conduct biolarvicides application in all identified and mapped breeding sites in the village
- Regularly update status of mosquito breeding habitats in the village.
  - Record all relevant information on *Larvicide issue form (Appendix 22) and Sprayer's form (Appendix 23)* during the implementation of the biolarvicides intervention.
- Maintain the inventory of all the forms and equipment required and used for the biolarvicides implementation
- Report to the ward supervisor any challenges encountered in the implementation of biolarvicide in the village..

### **Procedure**

#### **Calibration of pumps for application of biolarvicide**

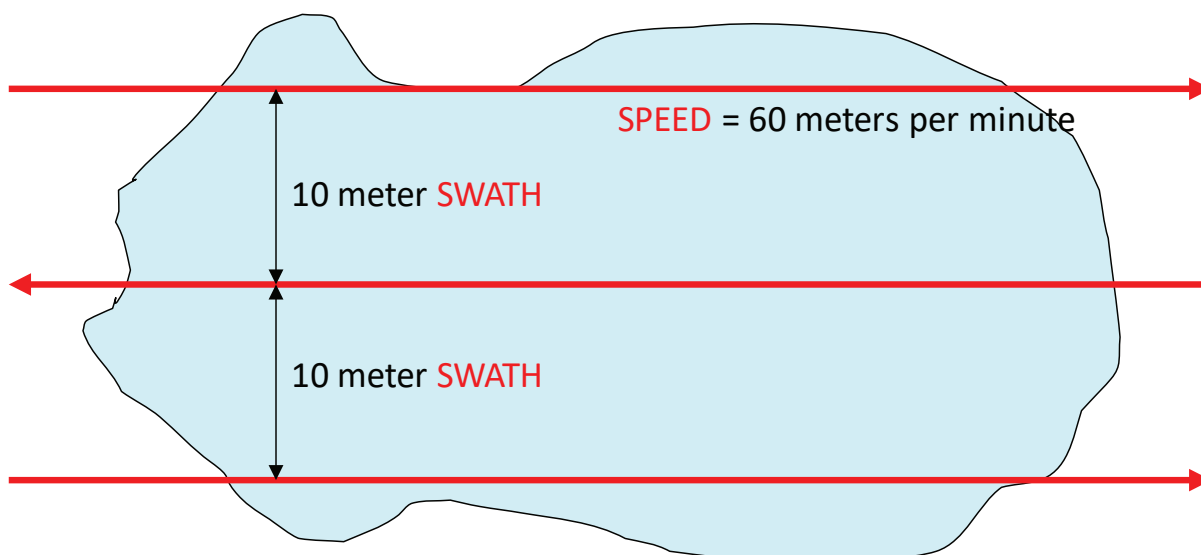
The quality of any bio larvicide intervention is dependent on the application of the desired target dosage. This is achieved by having equipment that discharge larvicides at the right application rate.

#### **The application rate is determined by the following factors including:**

1. **SPEED** of the spray man estimated as the number of meters covered per minute.
2. **FLOW RATE** of the sprayer which refers to the liters (L) or kilograms (kg) of the larvicide product released per minute.

### 3. **SWATH** is the width of the areas covered per stroke (*meters wide*).

The above factors affect the quality of biolarvicides application if the equipment is not well calibrated. Therefore, it is important of the sprayers operators and establish the average speed, the desired flow rate and swath in order to achieve the recommended application rate. In our context owing to the product being used the recommended application rate is 20 Liters per 4,000m<sup>2</sup>, considering average application rate of 5ml per square meter for both *Bti* and *Bs*). To achieve this level of efficiency, the sprayer operators should do several numbers of practice (figure 30).



**Figure 30.** Illustration of factors of calibration

#### **Measuring your working speed: (#Step 1)**

- Measure and mark 50 meters in typical habitat.
- Establish how long it takes to walk 50 meters at a comfortable walking pace while carrying equipment and pretending to spray.
- Repeat the measurement three to four times.
- Make an average of your times to walk the 50 meters (time).
- Calculate the Working Speed by dividing 50 meters with the average time ( $50\text{m}/\text{time}$ ) = meters per minute.

#### **Measuring swath width (#Step 2)**

- Find a flat, clean surface such as a parking lot or a football pitch.
- Decide if – “shoreline” or “full swath”
- “Shoreline” is for applications on one side, sweeping 90 degrees to the direction of travel. This is used when walking only on the edge of a larval habitat.
- “Full swath” will be equal to two times the projection distance using a 180 degree sweep to distribute the material.
- Apply product with appropriate sweep while stationery and measure width covered with the product.
- Subtract 10% for overlap.

### Measuring flow rates for liquid sprays (#Step 3)

- Flow rate of liquids from backpack conventional sprayers can be easily measured with a graduated cylinder or other liquid measuring device.
- The spray pressure is maintained at a standard level (30 – 55 pa), and spray is discharged into the cylinder for one minute.
- The flow rate per minute is determined by the volume of liquid in the cylinder.
- Procedures;
  - Fill the tank with half capacity of water
  - Pump up pressure to the allowable maximum level
  - Spray in a measuring cup for 60 second and write down the result
  - Repeat 3 times
  - Calculate the average yield (mL/min)

### Tips in standardizing calibration

- Calibrate each spray man and sprayer.
- Repeat calibration during each season.
- When sweeping the spray wand, make a full swing.
- Make a fast-enough sweep for even coverage.

### Bio-larvicide application in Open habitat

- Take sketch map of the intervention area, and other stationaries (pen, pencil, data collection forms, waterproof envelope or clear-bag) from the village office.
- Put on Personal Protective Equipment (PPE).
- Take backpack sprayer, fill the amount of Bio-larvicide (Bti/Bs) required
- Pressurize the sprayer on site to the range of operation (refer to the operational manual from the manufacturer).
- Check for any leakage before starting to operate the pump.
- Use sketch map for systematic location of the mosquito breeding habitats
- Apply Bio-larvicide on all potential breeding habitats.
- Record whether bio-larvicide has been applied or not and tick (✓) in appropriate column in the data form known as Sprayer's form (Appendix 23)
- Go around the site, search for more potential breeding habitats, and apply bio-larvicide where is required.
- Apply bio-larvicide continuously by walking along or around large/long habitat and for the small habitat, apply bio larvicide to cover the upper surface area.
- Pump regularly to maintain pressure in the sprayer throughout spraying exercise
- Repeat the procedure until the work of the day is finished.
- Record in liters' quantity of bio larvicide received and remaining after application using Bio larvicide issue form (Appendix 22)
- If there is any amount remaining in sprayer, remove the content and store it.
- Clean the sprayer and dry under the sun before putting into storage at the village store.

### **Bio larvicide application in Closed Habitat**

- Take sketch map of the intervention area, and other stationaries (pen, pencil, data collection forms, waterproof envelope or clear-bag) from the village office.
- Put on Personal Protective Equipment (PPE).
- Take backpack sprayer, fill the amount of Bio larvicide (only Bs) required
- Pressurize the sprayer on site to the range of operation (refer to the operational manual from the manufacturer).
- Check for any leakage before starting to operate the pump.
- Use sketch map to walk around for systematic location of potential mosquito breeding habitats from one house to the other.
- Determine if there is water.
  - In case of pit-latrines, throw a small stone to assess for presence of water.
  - Apply bio larvicide directly by pointing a nozzle to the pit. The dose will depend upon Manufacturer's instructions.
- Record every location, plot number, habitat type, treated habitats and habitat not treated and give reason/s in the comment column (Sprayer's form – Appendix 23).
- Repeat the procedure until the work of the day is finished.
- Record in liters' quantity of bio larvicide received and remaining after application using Biolarvicide issue form (Appendix 22).
- Store any remaining biolarvicide in a separate container.
- Clean the sprayer and dry under the sun before putting into storage at the village store.

### **Bio larvicide application in Closed Habitat**

- Take sketch map of the intervention area, and other stationaries (pen, pencil, data collection forms, waterproof envelope or clear-bag) from the village office.
- Put on Personal Protective Equipment (PPE).
- Take backpack sprayer, fill the amount of Bio larvicide (only Bs) required
- Pressurize the sprayer on site to the range of operation (refer to the operational manual from the manufacturer).
- Check for any leakage before starting to operate the pump.
- Use sketch map to walk around for systematic location of potential mosquito breeding habitats from one house to the other.
- Determine if there is water.
  - In case of pit-latrines, throw a small stone to assess for presence of water.
  - Apply bio larvicide directly by pointing a nozzle to the pit. The dose will depend upon Manufacturer's instructions.
- Record every location, plot number, habitat type, treated habitats and habitat not treated and give reason/s in the comment column (Sprayer's form – Appendix 23).
- Repeat the procedure until the work of the day is finished.
- Record in liters' quantity of bio larvicide received and remaining after application using Biolarvicide issue form (Appendix 22).
- Store any remaining biolarvicide in a separate container.
- Clean the sprayer and dry under the sun before putting into storage at the village store.

**Note:** To avoid heat exhaustion, biolarvicide application should be conducted between 7 am to 1 pm during sunny/hot days.

### **Equipment and supplies**

**To implement biolarvicide application, the following equipment and supplies are needed:**

- Backpack conventional sprayer or motorized sprayer.
- Biolarvicide (BACTIVEC-Bti and GRISELESF-Bs) liquid formulations.
- PPE (Gumboots).
- Data collection forms.
  - Sprayer's form (Appendix 23).
  - Larvicide release form (Appendix 22).
  - Summary – LSM implementation report (Appendix 21).
- Stationeries (pencil/pen, waterproof envelop / clear-bag, writing board).
- Copies of sketch map.

**The good practice biolarvicides operation the following should be observed**

- a) Do not enter any plot or house without permission from the owner or occupants.
- b) Do not misuse the sprayers for any other unintended purposes.
- c) Do not use sprayers for larviciding which are used in spraying insecticides.
- d) Do not apply the biolarvicide in drinking water without owners' consent.
- e) Do not face the pump directly while increasing the pressure

**Note:** Biolarvicide is generally safe for humans, animals and the environment.

#### 1.4.4.4. SOP for monitoring and evaluation of biolarvicide intervention

##### Introduction

The impact of biolarviciding for mosquito larval control is measured by entomological parameters such as reduction in larval density and adult mosquito population obtained through surveys. It is also measured by epidemiological parameters through measuring malaria incidence rate by determining the number of cases obtained from health facilities and reported through DHIS2. Baseline data should be obtained before intervention with biolarvicide application, followed by routine monitoring for comparison.

##### Scope and purpose

**The purpose of conducting M&E following biolarvicide intervention is primarily to**

- a) Assess changes in larval occupancy in the breeding habitats after application of biolarvicides.
- b) Assess changes in larval density.
- c) Assess changes in adult mosquito density (abundance).
- d) Assess changes in the malaria incidence in the area.
- e) Assess the efficacy of the biolarvicides Used and the quality of application.
- f) Determine the impact of the biolarvicides intervention.

##### Roles and responsibilities NMCP / PO-RALG

- Conduct quarterly supportive supervision to all levels.
- Develop monitoring and evaluation framework for biolarviciding and mosquito surveillance.
- Facilitate advanced analysis of mosquito data, including larval and adult mosquito collections.
- Conduct cost-effectiveness analysis of biolarvicide intervention.
- Develop customized models for deployment of biolarvicide intervention.
- Dissemination of the findings in local and international platforms.

##### Regional Vector Control Officer (RVCO)

- Oversee biolarvicide intervention and mosquito surveillance within the region.
- Review monthly summary forms submitted from the DHO/DVSO.
- Conduct quarterly supportive supervision to all levels.
- Report progress of the bio larvicide intervention to the RHMT meetings on a monthly basis.
- Submit monthly reports to the NMCP and PO-RALG.

##### District Vector Control Officer (DVCO)

- Oversee biolarvicide intervention and mosquito surveillance within the council.
- Review weekly summary forms submitted by Ward Health Officer.
- Review the status and availability of biolarvicide, supplies and equipment on monthly basis.
- Compile council monthly report of biolarvicide intervention.
- Conduct regular surveillance spot check visits at ward level.
- Report progress of the biolarvicide intervention to the CHMT meetings.
- Identify challenges and propose timely corrective actions.
- Track and report adult mosquito monitoring on monthly basis.
- Collect specimen samples (adult mosquitoes) from CORPs and submit to designated lab for analysis.
- Submit reports to DMO, and RMO on a monthly basis.
- Train Health Officers, Ward Health Officers and CORPs on biolarviciding and mosquito surveillance.



### Ward Health Officer

- Receive reports from CORPs on status of bio larvicide implementation.
- Receive and review data forms from the field and file them on a weekly basis.
- Compile weekly summary report of the ward and submit to the council office (District Health Officer).
- Conduct spot check supervision to CORPs to assess performance/quality control of biolarviciding and fill the Ward Supervisor M&E form (Appendix 24).
- Oversee adult mosquito surveillance.
- Conduct quarterly meetings with Village Health Committees and the public/community to give feedback on larviciding implementation.

### Community Owned Resource Persons (CORPs)

- Estimate larva presence in habitats by type (anopheline and culicine) and density/abundance and fill the open and closed habitat survey form - routine weekly (Appendix 24).
- Set light traps to collect adult mosquitoes from inside houses.
- Preserve collected specimen within village offices (VEO); adult mosquitoes (paper cups) for 2/3 days before they are collected by DVCO.
- Capture and record data on appropriate forms.
- Monitor and report biolarvicide and equipment usage.
- Submit filled forms to Ward Health Officer.

### Procedure

#### Baseline data

#### Mosquito larvae

Baseline data on mosquito larval should be collected after conducting participatory mapping and habitat characterization. Sample 10% of all breeding habitats for estimation of baseline data. Data should be collected on a weekly basis for the duration of one-month prior to bio larvicide application to obtain four different data points on mosquito larval and pupa density for sampled breeding habitat at baseline. This process should be repeated on the same month in the following years.

#### Open breeding habitats

#### Procedures for mosquito larval surveillance in open habitats are given below

- Sample habitats using a dipper to assess for presence/absence of mosquito larvae and pupa by type.
- Take 5 dips in habitats with less than or equal to one square meters ( $\leq 1 \text{ m}^2$ ), 10 dips in habitats with more than two but less than fifteen square meters ( $>2 - <15 \text{ m}^2$ ).

In case of large habitats with greater than 15 square meters ( $>15 \text{ m}^2$ ) such as mangrove swamps, water channels, long drains etc. walk around/along and take up to 20 dips per habitat to investigate for the presence of mosquito larvae. Take dips in different locations where mosquito larvae can be expected (edges of habitats, around vegetation, shallow areas etc.).

- Empty the contents of the dipper in larval pans.
- Record by ticking (✓) all the larval type (Anopheles, Culex) and by stages (Early, Late) and pupa that you see.
- Count and record the number of larvae by type (Anopheles, Culex) and by stages (Early, Late) and pupa.

- Sum the total number of larvae by type (Anopheles, Culex) and by stages (Early, Late) and pupa and record on larval survey form - routine (Appendix 12).
- Note down anything that you think is important in your larval and pupa survey exercise on the 'Comments' column of the open and closed habitats larval survey form – routine (Appendix 12).
- Move to the next plot after exhaustive searching and dipping for larvae in all the habitats.
- Move to the next hamlet and repeat the above procedure after you have completed all the plots in the hamlet.

### **Cautions during dipping**

- Take care while dipping so that your shadow is casted away from the habitat as larvae are very sensitive and will dive to the bottom once your shadow is casted on the water.
- Lower the dipper gently at an angle of 45° just below the surface so that water flows in together with any larvae that might be present

**Note:** *The important point to note here is that we sample by displacement suction and not by scooping.*

- Take care not to spill the water containing the larvae and pupa when lifting the water, hold dipper steadily until larvae and pupae rise to the water surface in the dipper (this can take several seconds, especially for older instars).
- Take care not to disturb the water too much as this will make larvae dive down-wards. If the water is disturbed, wait for three minutes before continuing dipping.

### **Closed breeding habitats**

Procedures for larval surveillance and data collection in these types of habitats are almost the same as open habitats. **Note the following additional concerns while assessing closed habitats:**

- Drop a small stone in the pit latrine to test for presence of water.
- Sample larvae with dipper only in habitats found to have water.
- Use a long handle dipper with a scoop/cup bent upward, gently dip superficially to sample for larvae/pupae.
- Use open and closed habitat larval survey form – routine (Appendix 12) to record findings.
- Give a brief description of the habitat in a way that will assist you to always remember it.

#### **CAUTION:**

*Do not use the same dipper used in closed habitat to dip in water storage tanks, water sources like shallow wells, rivers, dams etc. Use the ordinary equipment used by the local community to sample water storage containers and other public water sources for mosquito larvae*

### **Adult mosquitoes**

Baseline data for adult mosquitoes should be collected concurrently with mosquito larval baseline surveillance. Data should be collected on a weekly basis for the duration of one-month prior to biolarvicide application to obtain four different data points on adult mosquitoes at baseline. This exercise should be repeated yearly on the same month in the same selected houses.

## Procedures for baseline adult mosquito surveillance

### CDC Light trap (Inside houses)

- Randomly select 36 sentinel houses for adult mosquito surveillance in four randomly selected villages implementing bio larvicide within one selected ward.
- Recruit a separate team of CORPs (2 per village) that will be responsible for carrying out routine entomological surveillance activities in the working area.
- Do not enter the house until you get permission after appropriate consenting.
- Using CDC-Light traps, collect actively host seeking mosquitoes inside selected houses within the working area (Refer National Entomology Surveillance Guidelines).
- Collection should be conducted once in each household in a month across all 36 houses.
- Set CDC-Light traps in 9 households weekly.

**Note:** First week in the first 9 houses, the next 9 houses in the following week, until all 36 houses are reached.

- Time for setting up traps should be from 6:00pm up to 7:00 pm (depending with when the sun sets), while time for collection of mosquitoes should be between 6:00 am to 7:00 am.
- Place the CDC Light Trap on the foot side of the human sleeping under a treated bed-net to ensure you trap all host seeking mosquitoes attracted by carbon dioxide and skin odour.
- After assembling the CDC Light Trap; make sure that the CDC cup is a meter and a half from the ground.
- Switch on the CDC Light Trap by connecting its red and black wires to the positive and negative terminals respectively.
- Make sure the CDC bulb is glowing and the motor is functioning properly before you leave.
- The end of mosquito collection time is 7:00am the next day (depending on when the sun rises).
- Tap gently to ensure all mosquitoes do not get trapped in the fold while tying the ropes of the CDC cups.
- Disconnect the wires from the terminals to switch off the trap.
- Carry the tied CDC cups to the field surveillance office/laboratory.
- Perform mosquito sorting and identification using morphological keys and fill out the CDC mosquito collection form (Appendix 25).
- Preserve and store the adult mosquitoes collected in eppendorf tube with silica gel.
- The vector control officer should collect adult mosquito samples and review the field entomological data forms and submit to the council level.

**Note:**

- Make sure the battery for the CDC Light Traps is fully charged before every time before starting mosquito trapping.
- It is advised that you should inform the house owner how the CDC Light Trap works in case any problem arises; he or she will inform you through a phone call or any other way possible.

### Monitoring of adult mosquito (outside houses)

- Adult mosquitoes will be collected using Bucket Traps placed outside the selected houses.
- Randomly select 36 sentinel houses for adult mosquito surveillance in each selected village implementing biolarvicide.

- Recruit a separate team of CORPs that will be responsible for carrying out routine entomological surveillance activities in the working area.
- Using Bucket traps, collect actively shelter seeking (resting) mosquitoes outside selected houses within the working area (Refer National Entomology Surveillance Protocol).
- Do not enter the compound/premises until you get permission after appropriate consenting.
- For collecting the outdoor resting vectors, bucket trap will be located at least 5m from the selected/ focal house.
- Collection should be conducted once in each household in a month across all 36 houses
- Set Bucket trap in 9 households weekly.
- First week in the first 9 houses, the next 9 houses in the following week, until all 36 houses are reached.
- Time for setting up traps should be from 6:00pm up to 7:00 pm (depending with when the sun sets), while time for collection of mosquitoes should be between 6:00 am to 7:00 am (depending with when the sun rises).
- Make sure that the bucket trap is set in a bushy area opposite of the main door of the house in order to attract mosquitoes coming from the house to enter the trap
- It is very important to make sure that the wind direction or sunrise will not affect the mosquitoes which will enter in the bucket trap.
- Use a torch if it is dark outside to make sure you have set the bucket trap well.
- Start mosquito collection from bucket traps early morning beginning 6:00am till 7:00am (depending with when the sun rises).
- When the collection time ends, make sure you tighten the black cloth inside the bucket trap with the ropes attached on its side or with the aid of a rubber band and ensure that it will not open for trapped mosquitoes to fly away.
- Carry the tightened black cloth to the office and sort mosquitoes using morphological identification keys and fill out the bucket trap mosquito collection form (Appendix 26).
- Preserve and store the adult mosquitoes collected.
- The ward health officer supervisor should collect adult mosquito samples and review the field entomological data forms and submit to the council level.

## **Routine Surveillance**

### **Mosquito larvae**

The team leader (CORP) should monitor weekly all breeding habitats in area/hamlet 24 hours after biolarvicide application for mosquito larvae and pupa density and fill the data on open and closed larval survey form – routine (Appendix 12) and submit to Ward Health Officer. The Ward Health Officer should visit one village per week and monitor for mosquito larvae and pupa density in 20% of the breeding habitats visited and reported by CORP team leader and fill the Council and ward supervisor M&E form (Appendix 24). The Ward Health Officer should visit different villages in the subsequent weeks until all villages are supervised. Sampling of villages and habitats to be visited by Ward Health Officer will be determined by the Council in collaboration with NMCP. District Vector Surveillance Officer should visit and monitor 10% of the breeding habitats supervised by Ward Health Officer within a space of one month and fill the Council and ward supervisor M&E form (Appendix 24). Procedures

for routine mosquito larval surveillance are the same as those of baseline survey documented in SOP No. 1.4.4.4.

### **Adult Mosquitoes**

Routine adult mosquitoes' surveillance should be conducted for 3 days each month in selected villages (day 7, day 14 and day 21) using the existing malaria entomological surveillance system. Houses select-ed for adult mosquito surveillance must have treated mosquito nets.

### **Equipment and Supplies include**

- a) Larval Trays.
- b) Standard dipper.
- c) CDC light traps (complete with batteries).
- d) Bucket traps.
- e) Hand lens.
- f) Facilities for mosquito sorting, identification and storage.
- g) Stationeries (pencil/pen, waterproof envelop / clear-bag, writing board).
- h) Data collection forms.
  - Open and closed habitat larval survey form routine (Appendix 12)
  - Council and Ward Supervisor M&E form (Appendix 24)
  - CDC mosquito collection form (Appendix 25)
  - Bucket trap mosquito collection form (Appendix 26)

### **Important aspects to observe**

For smooth operation of M&E activities, the following should be observed;

- Do not enter any plot or house without permission from the owner or occupants.
- Obtain signed informed consent forms from head of the mosquito trapping house.
- Make sure to connect the wires of the CDC light trap battery as indicated.

## 1.4.5. SOP for environmental management

### Introduction

Environmental management is the management of human impact on the environment to reduce disease occurrence. In the context of this SOP, environmental management refers to changing and keeping the environment unfavorable for vector breeding. There are two forms of managing human impacts on the environment; namely environmental manipulation and environmental modification. These two techniques can be deployed together or in isolation depending on the situation.

Environmental manipulation is a form of environmental management aimed at producing temporary conditions that are unfavorable to breeding of vectors. With this approach, manipulation of habitats for vector breeding must be repeated to remain effective, and is normally directed at one particular vector species. In agro-ecosystems, environmental manipulation can often be incorporated into conventional agricultural practice. Many environmental manipulation operations require infrastructural development. Some of the methods applicable for habitat manipulation are controlling water levels (including intermittent irrigation), stream flushing, shading, clearing of aquatic vegetation, straightening and steepening of shorelines. Environmental modification is a form of environmental management that creates permanent or long-term changes in vector habitat, either by removing them altogether or rendering them permanently unsuitable for breeding.

Environmental management is a cross cutting issue which requires collaboration of different sectors, stakeholders and private sector. In planning and implementation of environmental management activities sectoral ministries dealing with environment, agriculture, health, mining, water, livestock, infrastructure, urban planning and housing must be involved. The reason for involving multi-sectoral ministries is because development activities carried out in these ministries have a significant potential risk of creating breeding sites for disease vectors.

The targeted users for this SOP include national & regional health stakeholders, council health committees' members, communitybased organizations and community-owned resource persons (CORPs).

Therefore, the following are the key roles to be played at the national level:

- Coordination and collaboration with key sectors, NGOs and private sectors
- Form a multi-sectoral action plan through multisectoral platform meeting.
- Coordinates sectoral ministries at National level to jointly planning and participate in supervision, monitoring and evaluation of development projects that impacts on the environment.
- Coordinate multisectoral meetings to share reports on the implementation of multisectoral action plan.
- Coordinate through multisectoral platform, review of project development proposals and plans to see if environmental management activities are included.
- Mobilize resources for implementation of multisectoral action plan.

## Area of Focus

- Advocacy and resource mobilization.
- Human habitation.
- Public places.
- Storm water drainage.
- Water supply system.
- Agriculture projects.
- Infrastructure development.
- Mining areas.
- Wastewater drainage system and onsite sanitation.
- Community sensitization and engagement.

## Human habitation

Human habitation is an area where people live and interact with the environment. This includes but not limited to household surroundings likes agriculture fields, water bodies, garden, latrine, dwelling house and playing grounds. In human habitation the vector breeding sites are found in rubbish pits, discarded tires, garden utensils, construction material, roof gutters, water storage containers, drinking water tanks, plants, and all water bodies which are temporary and permanent.

## Scope and purpose

The purpose of this SOP is to provide guidance for the control of vectors of public health importance breeding sites in the human habitation environment. This SOP is applied to both public authority and the community (owners or occupier of the households).

### 1.4.5.1. SOP for human habitation

Roles and responsibilities of public authority

#### Regional Level

- Translate policy, guidelines and legislations.
- Disseminate translated policy guidelines and legislation to the council level.
- Conduct onsite supervision at councils' level.
- In collaboration with other sectors, enforce the implementation of laws and legislation relevant to human settlement planning.
- In collaboration with relevant sectors, supervise the implementation of agreed action plan for human settlements.

#### District Level

- Develop plan of action for housing settlements planning.
- Develop master plan for human habitation.
- Develop by- laws related to human settlement.
- Educate community on building of improved housing.
- Educates community on disposal of waste and refuse at household level.

### Procedure for district and regional authorities

- Develop plan of action to implement environmental management activities.
- Use Public Health Act (of 2009) and Environmental Management Act (2004) to enforce construction of sanitary houses and management of vector and vermin.
- Develop land use plans including master plans for cities, towns, townships and other human settlements.
- Plan human settlement away from vectorbreeding sites such as swamps, irrigation schemes, rice fields and water reservoirs.
- Construction of improved houses that includes windows and doors with mosquito gauze.
- Advocacy to policy makers and communities to create awareness on construction of improved housing.
- Allocate and construction of sites for sanitary disposal of wastes.

### Roles and responsibilities of ouseholders

- Cleaning of the environmental around the houses to keep it free from insects and vermin's breeding habitats.
- Provide support in the planning and implementation insect and vermin prevention and control activities at household level.

### Procedures for householders

- Fill all ponds capable of holding water for more than 7 days.
- Conduct regular environmental sanitation activities to remove all identified vector breeding and hiding sites in the community.
- Cut all grasses, prune flowers, trees and other vegetation around the household compound.
- Screen windows, doors, eaves and other openings to prevent vectors from entering houses.
- Change water in flower vessels twice a week to prevent vector breeding.
- Participate in the implementation of the vector control initiatives (e.g., draining stagnant water, larviciding, filing temporary ponds, cleaning of storm water drains) planned by community.
- Adhere to the Public health regulations and by laws.
- Cover all containers used for storage of food and waste to minimize vector breeding sites.
- Improve drainage system and sanitation facilities to remove breeding sites for vectors.
- Report to the authorities any presence of vectors/breeding sites in the community.
- Place unused tires under roof to prevent them from collecting rain water.
- Destroy all unused containers holding water that can potentially support vector breeding.

**Note:** For urban Household: in addition to the above SOP the following should be observed for the control of mosquitoes breeding site

- Clean or contribute to the cleaning of storm water drains around household compound
- Use solid waste holding containers
- Regularly pay for solid waste collection and disposal

#### 1.4.5.2. SOP for maintenance of public places

Public place refers to an area or place that is open and accessible to all citizens. There are several places which are grouped as public areas and these include: markets, trade fairs and recreational areas (play



grounds, sports stadia, beaches, recreational halls, open parks, food establishment and bars), transport stands/stop-over locations e.g., railway stations, bus stands, airports, harbors, fishing camps and fish markets, informal mining camps, cemeteries, depots/warehouses, slaughter houses, yacht clubs and beaches, fuel stations and public toilets. If not well maintained, these places can contribute to the development of breeding sites for different vectors of public health importance.

### **Scope and purpose**

The purpose of this SOP is to provide guidance for the control of vector breeding sites/resting sites on the environment in all public places. The SOP targets public authorities, communities and individuals.

### **Roles and responsibilities of public authorities**

#### **National Level**

- Formulation of policy, guidelines and legislations for vector and vermin prevention and control in the public places.
- Set standards for management of vectors and vermin in the public places.
- Formulation of interventions packages for management of vectors and vermin in the public places.

#### **Regional Level**

- Translate policy, guidelines and legislation for vector and vermin prevention and control in public places.
- Disseminate translated policy, guidelines and legislation to the councils.
- Supervise implementation of policy, guidelines and legislation at council level.
- Monitor and evaluate implementation of policy, guidelines and legislation
- Map and monitor all public places available at the region.
- Liaise with other departments and other stakeholders within the region
- Engage private sector and business community in supporting management of public places to prevent and control vectors and vermin.
- Resource mobilization for the management of vectors and vermin in the public places.

#### **District Level**

- Enforcement of policy, guidelines and legislation governing vector and vermin prevention and control in public places.
- Plan management of public places to prevent vector and vermins.
- Provision of facilities for wastes disposal in public places
- Prevention and control of vectors and vermin in public places.

### **Procedure for regional and district/council authorities**

- Enforce Environmental Management Act 2004: Section, 17 (ii)
- Enforce Public Health Act of 2009-part IV (c), (g), Part V (b), (c), for development and operation of public spaces
- Conduct survey in order to prepare inventory for all public places in use.
- Map all public places and conduct regular supervision to prevent and control vectors and vermin.
- Prepare and implement vector prevention and control plans in the public places
- Assign vector control/ environmental officers to monitor and prevent/control vectors and vermin in public places.

- Supply and maintain adequate safe water in all public places and ensure proper drainage systems for safe disposal of waste water
- Provision of sanitary facilities for storage and collection of solid wastes in all public places.
- Make sure defective pipes and drains around public places are repaired and maintained
- Work in partnership with other stakeholders to maintain and operate public places

### **Role and responsibility of the community**

- Clean regularly all public places to remove vector breeding/refuge sites.
- Report actions and existence of vector breeding sites in public places.

### **Procedure**

- Participate in the community meetings for various vector control initiatives.
- Perform participatory cleaning of the public places.
- Report to the authority any vector breeding site in the public places.
- Use standard sanitary waste bins or containers placed at the public places for disposal of wastes. (Do not; litter any public places, block or damage any sanitary facilities in public places, throw solid waste in water closets or drainage system, damage water pipes in water closets or throw solid wastes in open drains).

### 1.4.5.3. SOP for maintenance of storm water and waste water drainage

Drainage means the natural or artificial removal of surface and sub-surface water from a given area. These drains can either be paved or unpaved.

#### Scope and purpose

The purpose of this SOP is to provide guidance for the control of vector breeding sites in the storm water drains. The SOP is applied to the public authorities and community.

#### SOP for Storm water drainage system

##### Roles and responsibilities

##### National Level

- Formulation of policy, guidelines and legislations for vector and vermin prevention and control in storm water and waste water drainage system.
- Set standards for management of vectors and vermin in storm water and waste water drainage system.
- Formulation of interventions packages for management of vectors and vermin in storm water and waste water drainage system.

##### Regional Level

- Translate policy, guidelines and legislation for vector and vermin prevention and control in storm water and waste water drainage system.
- Disseminate translated policy, guidelines and legislation on storm water and waste water drainage system management at the council's level.
- Supervise implementation of policy, guidelines and legislation on storm water and waste water drainage system management at the council level.
- Monitor and evaluate implementation of policy, guidelines and legislation on storm water and waste water drainage system management at the council level.
- Map and monitor all storm water and waste water drainage system at the council level to prevent blockage.
- Liaise with other departments and stakeholders engaged on storm water and waste water drainage at the region level.
- Engage private sector and business community in supporting and cleaning of storm water and waste water drainage system at region level.
- Resource mobilization for the management of storm water and waste water drainage system at region level.

##### District Level

- Enforcement of policy, guidelines and legislation governing storm water and waste water drainage system at the council level.
- Plan proper system for storm water and waste water drainage system management at the council level.
- Regular inspection of storm water and waste water drainage system to prevent blockage of the drainage system.
- Rehabilitate damaged and blockage drainage system to prevent vectors and vermin breeding places.

### **Procedure for regional and district authorities**

- Conduct community sensitization and engagement meetings on proper management of drains.
- Conduct regular physical inspection to ensure that the drains work as intended in prevention of vector breeding sites.
- Share the inspection report with the RAS, DED and relevant stakeholders for action.
- Develop mitigation action plan for the cleaning, repair and protection of the drains from becoming vector breeding sites.
- Sensitize community and engaged them in management and cleaning of drainage system to prevent vectors and vermin breeding.
- Inspect drainage system to ensure the flow of water from waste pipes and rainfall is maintained to avoid vector breeding.
- Enforce public health Act of 2009-part IV (g) on drainage water management to prevent vector breeding.
- Construct and maintain sanitary drainage system in water logged areas to prevent vector and vermin breeding places.
- Develop plan of action for monitoring implementation of storm water drainage system to ensure sustainability and functionality.

### **Role and responsibility of the community**

- Participate in planning and implementation of storm water and waste water drainage system management activities.
- Cleaning of open storm water and waste water drainage canals.
- Take action and report existence of vector breeding sites in storm water and waste water drainage system.
- Ensure collection and proper disposal of solid wastes around the domiciliary to prevent blockage of drainage system.

### **Procedure for communities**

- Participate in the cleaning and protection of storm water and waste water drains (remove vegetation around the canals).
- Do not dispose solid waste into drains, connect waste water to the drains, block or damage the drains and construct any structure on or close to the storm water drains.
- Report to the authority any blockage or damage, waste disposal, waste water connection and construction on or close to the storm water drain.

#### 1.4.5.4. SOP for water supply systems

All water supply systems and its infrastructure can contribute to the development of breeding sites for vectors of public health importance if are not well managed. Water should be supplied in a way that cannot cause leakage, seepage resulting into standing water.

##### Scope and purpose

The purpose of this SOP is to prevent and manage water leakages from all water supply systems.

##### Application

The SOP is applied to community and the water supply authorities.

##### SOPs for Water supply systems

Public Authority Roles and responsibility.

##### Roles and responsibilities

###### National level

- Formulation of policy, guidelines and legislations for vector prevention and control during the designing of water supply system.
- Set standards for management of vectors in water supply system
- Formulation of interventions packages for management of vectors in designed water supply system.

###### Regional Level

- Translate policy, guidelines and legislation for vector prevention and control during the designing of water supply system.
- Disseminate translated policy, guidelines and legislation on vector prevention and control in water supply system at the council level.
- Supervise implementation of policy, guidelines and legislation on water supply system management at the council level.
- Monitor and evaluate implementation of policy, guidelines and legislations on water supply system management to prevent and control the impacts of vector borne diseases at the council level.
- Map and monitor all water supply system at the council's level to prevent vector breeding.
- Liaise with other departments and stakeholders engaged on water supply system at the region level.
- Engage private sector and business community in supporting provision of safe and wholesome water supply at the community.
- Resource mobilization for installation and management of water supply system at the community level.

###### District level

- Enforcement of policy, guidelines and legislation governing water supply system management at the community level.
- Plan proper location for wells, boreholes and any other form of water supply at the community level.
- Regular supervision and inspection of water supplies points at the community level to identify blockage and prevent vector breeding.
- Rehabilitate damaged and blockage water supply system to prevent vectors breeding.
- Reserve and protect all water sources to prevent animals and illegal entrance.

**Procedure for regional and district authorities**

- Ensure communities are supplied with safe and wholesome piped water systems to reduce human water contact especially in areas where schistosomiasis is endemic.
- Ensure that water supply pipes are buried in a standard depth that cannot be easily damaged.
- Regular inspection of water supply system to identify damage and rectify to prevent accumulation of water due to leakage.
- Educate community to take ownership in the protection and management of water supply system.
- Ensure water reservoir points and distribution tanks are covered in the water supply system.
- Establish community user committees to maintain and protect outlet points, draining the outlet points to prevent vector breeding sites, cleaning around the outlet points and remove all vegetation and repairing any leakages.
- Plan and implement tree planting around water catchment areas to protect water sources.

**Community roles and responsibilities**

- Protect, report damage /or leakage and maintain water supply system.
- Plant and protect trees at the water catchment areas.

**Procedure for the community**

- Participate in water user committees at the community, in order to maintain and protect water outlet points.
- Participate in cleaning water outlet points.
- Report any damage and/or leakage in the water supply system to authorities.
- Participate in covering water tanks and water storage containers to prevent breeding of vectors.
- Protect water supply system to prevent leakage or damage to water supply pipes.

### 1.4.5.5. SOP for managing agricultural projects

Some disease vectors often find breeding site in or near water supply and irrigation systems used for agricultural purposes, that have been poorly constructed, managed and maintained. Vector breeding sites occurs in irrigation channels or/ ditches and irrigated plots.

#### Scope and purpose

The purpose of this SOP is to provide environmental guidelines for proper procedures to be followed when performing agricultural activities. The SOP is to be applied by farmers in irrigation schemes and those practicing rice farming in irri-gated paddies including:

- i. Open water storage facilities including irrigation, reservoirs, ponds and tanks can serve as ideal breeding sites for malaria vectors
- ii. Deforestation and land clearance can lead to changes in the ecosystem that can encourage vector proliferation, including shifts in temperature, sunlight, humidity and vegetation.
- iii. Ecological changes could create conditions that increase vector populations by reducing predator populations.
- iv. The rearing, breeding and harvesting of fish, shellfish and other aquatic organisms has been associated with vector breeding activities especially when the ponds are abandoned.

#### SOP for agricultural project Roles and responsibilities

##### National level

- Formulation standards and guidance for introducing changes to routine agricultural practices that encourage vector breeding.
- Work across sectors to provide standard guidance for the introduction, scale-up and maintenance of practices and production systems that reduce vector breeding while supporting agricultural productivity.
- Develop a monitoring and evaluation framework to assess progress towards improved agricultural practices that discourage vector proliferation while support increasing agricultural productivity.
- Establish frameworks and structures to promote accountability among partners across sectors, and integrate them into existing local and national regulatory frameworks.

##### Regional Level

- Translate standards and guidance for introducing improved agricultural practices.
- Disseminate translated policy and guidance for introducing changes to routine agricultural practices at the council level.
- Work across sectors at region level to provide guidance for the introduction, scale-up and maintenance of practices and production systems that reduce vector proliferation while supporting a productive agricultural productivity.
- To implement monitoring and evaluation framework to assess progress towards improved agricultural practices that discourage vector proliferation while support increasing agricultural productivity

## District Level

- Plan and implement changes to routine agricultural practices at the council level to prevent vector and vector borne diseases.
- Work across sectors at council level to enforce best agricultural practices for the introduction, scale-up and maintenance of practices and production systems that reduce vector breeding while supporting agricultural productivity.
- Create buffer zones between settlements and dams to put as much physical distance as possible between humans and vector breeding sites.
- To impose shoreline management along reservoirs to manage vector breeding sites.
- Design dam reservoirs to minimize their suitability for malaria vectors.
- To implement monitoring and evaluation framework to assess progress towards improved agricultural practices that discourage vector proliferation while support increasing agricultural productivity.

## Procedure

- Involve national and local government authorities, surrounding communities and private sector stakeholders in continuous monitoring of vectors and encourage reporting of vector and vector borne diseases in any agricultural projects and surrounding communities.
- Introduce vector and vector borne risk assessments into standard licensing regulations, requiring health and environmental impact assessments for potential impacts of agricultural operation on vector borne transmission and practices and interventions to prevent and mitigate vector borne diseases are introduced or scaled up at operational sites.
- Introduce vector-smart design and management of agricultural projects that;
  - Removing unused infrastructure that could serve as vector breeding sites.
  - Reducing standing water by installing proper drainage systems.
  - Using chemical or microbial larvicides, where appropriate.
  - Controlling vegetation around roads, camps, storage facilities and reservoirs or other bodies of water, as appropriate.
  - Improved dam design
- Create buffer zones between settlements and dams to put as much physical distance as possible between humans and vector breeding sites.
- Conduct appropriate shoreline management along reservoirs to manage disease vectors breeding sites.
- Design dam reservoirs to minimize their suitability for disease vectors.



### 1.4.5.6. SOP for infrastructural developments

Infrastructure includes roads, railways; dams, drainage and buildings. Construction and renovation of infrastructure involves various activities such as excavating, sand collections, blasting, redirection of water channels etc. These activities if not well planned and managed can create breeding sites for disease vectors of public health importance.

#### Scope and purpose

The purpose of this SOP is to provide guidance for prioritizing infrastructure development and improvement to discourage vector-borne disease transmission.

#### Housing

In Sub-Saharan Africa, up to 90 percent of malaria transmission occurs inside the house at night. In many homes, a combination of open eave spaces, thatched roofs and a lack of ceiling, window and door screens creates an environment in which malaria mosquitoes can easily enter people's homes and bite the occupants. It has been shown that modern housing provides better protection against vector borne diseases than traditional housing.

#### Water and sanitation infrastructure

Water management practices can influence human health in many ways. Access to clean, safe water and improved sanitation facilities can reduce the risk of vector borne diseases. However, such infrastructure can also create habitats for disease vectors. Substantial evidence suggests that different types of water sources have different implications for risk of vector borne diseases.

#### Electricity access and production

There is some evidence that access to electricity in high-burden vector-borne disease settings may be associated with a lower risk of infection and increased access to diagnosis and treatment services. Access to electricity can promote behaviors and economic growth that are typically associated with improved health outcomes. However, it can also lead to behaviors that put people at risk of vector borne diseases, for example, outdoor lighting may promote outdoor public events during peak mosquito biting hours. The purpose of this SOP is to provide guidance for prioritizing infrastructure development and improvement to discourage vector-borne disease transmission.

#### Key actors

National, region and local government ministries related to

#### Urban planning and housing

- Water and sanitation.
- Public utilities.
- Power and energy.
- Infrastructure.
- Local manufacturers and retailers of housing materials.

#### Community associations and civil society organizations

- Architects and landscape designers.
- Structural and civil engineers.
- Municipal planning authorities.

- Builders and contractors.
- Water and sanitation regulatory authorities, including municipal water authorities and irrigation project authorities.
- Private sector stakeholders involved in infrastructural development activities.
- Sanitation service providers, such as wastewater treatment companies, municipal waste collection companies, and industrial waste collection companies.

### **Electrification**

- Public utilities.
- Civil service oversight bodies.
- Regulatory agencies.
- Private-sector power producers.

### **Civil society organizations**

- Related to infrastructure access and governance, including those dedicated to
- Safe housing,
- WASH and electricity.

## **Roles and responsibilities in infrastructural developments**

### **National level**

- Develop guidance across sectors for infrastructural development that reduce vector proliferation while increasing access to improved infrastructures.
- Develop a monitoring and evaluation framework to assess implementation of improved infrastructural development projects.
- Establish frameworks and structures to promote accountability among partners across sectors in infrastructural development projects and integrate them into existing local and national regulatory frameworks.

### **Regional level**

- Translate policy and guidance for infrastructural development projects across sectors to provide standard guidance for practices, interventions and systems that reduce vector while increasing access to improved infrastructure at council level.
- Monitor implementation of for infrastructural development project practices that discourage vector breeding at council level
- Establish frameworks and structures to promote accountability among partners across sectors in infrastructural development projects and integrate them into existing council regulatory frameworks.

### **District level**

- Oversee implementation of infrastructural development projects across sectors to conform to standard guidance and practices to reduce vector while increasing access to improved infrastructure at council level.
- Use established frameworks and structures to promote accountability among partners across sectors in infrastructural development projects.

## **Procedure for infrastructure improvement**

Promoting improved housings such that vector -resistant design features are regularly incorporated into newly built houses or retrofitted into existing ones. These principles are summarized by the DELIVER mnemonic:

- Doors should be screened, self-closing and without surrounding gaps.
- Eaves, the space between the wall and roof, should be closed or screened.
- Houses should be lifted above the ground.
- Insecticide-treated nets should be used when sleeping in houses at night.
- Houses should be ventilated, with at least two large-screened windows to facilitate airflow
- Environmental management should be conducted regularly inside and around the home
- Roofs should be solid, rather than thatched.
- Passing and enforcing legislation to ensure that improved house principles are incorporated into standard practice.
- Integrating good design practices into Environmental Management Plans based on Environmental Impact Assessments (EIA) for new construction projects.
- Engaging land registry authorities to address the security of land tenders and promote building and property improvements.
- Mandating construction sites to have an environmental protection officer to oversee that the activities will not lead vector breeding sites.
- Facilitate access to financial saving and borrowing schemes that support the building of improved housing.
- Facilitate access to mortgages and longer-term financing for developers.

## **Communities Roles and responsibilities**

- Maintain, protect and report any damaged infrastructure that leads to the occurrence of vector breeding sites.

### 1.4.5.7. SOP for mining activities

#### Introduction

Open minework have often been responsible for increased risk of vector-borne diseases transmission, during different project phases from land clearing to operation. The mining activities include; quarries process for stone, gravels, sand, all these are used for infrastructure development. It also includes mining of minerals such as gold, Tanzanite, iron and coal etc. Mineral wealth is often located remote areas, such as forest, where labour may be exposed to more dangerous forest vectors. Alternatively, partial clearing of forest may encourage breeding of vector associated with more open habitats. Mining often requires large quantities of water, dams and canals are created to pump water in and out of the mine working areas. Damping of tailing creates artificial lakes and marshes and when abandoned become flooded which in turn support vector breeding. If not well planned and managed, these activities can create vector breeding sites.

#### Scope and purpose

The purpose of this SOP is to provide guidance for proper procedures in environmental management as applied to mining activities. This SOP will be applied to public or private firms, small or large scale miners involved in mining activities that includes; quarries process for stone, gravels, sand for infrastructure development. It also includes mining for minerals such as gold, Tanzanite, iron, coal etc.

#### SOPs for mining activities

##### Roles and responsibilities

##### National Level

- Map all large and small- scale mining sites in the country and task the National Mining technical Advisory committee to conduct regularly supervision and monitoring of all mining sites to assess adherence to standards and regulations for operating mining industries.
- Develop environmental Impact Assessment regulations and guidelines for management of mining industry sites.
- Develop standards and regulations to minimize landscape disturbances, wastes production, prevention of soil, water and air pollution.
- Develop guidelines for conducting successful mine closures and reclamation activities.
- Establish national technical advisory committee for regularly supervision and monitoring of mining activities.
- Make regulations to prevent and control vectors and vermin in mining sites.

##### Regional level

- Map all the mining sites at the region level and conduct regularly supervision to observe adherence to standard and regulations.
- Translate standards and regulations for management of mining activities at council level to minimize vector-borne diseases to the surrounding communities.
- Conduct supervision a monitor adherence to standards and regulations in mining sites to minimize landscape disturbances and wastes production, prevention of soil, water and air pollution including vector breeding activities.

## District level

- Monitor compliance to environmental impact statement in mining sites.
- Inspect regularly mining sites to assess adherence to regulations related to vector and vermin prevention and control.
- Conduct environmental inspection visit for purpose of environmental impact statement review.
- Enforcement of maintenance of safe and healthy environment at the mining sites.

## Procedure

- Obligation to undertake environmental Impact Assessment before initiation of small- and large scale mining activities.
- Monitor compliance with environmental Impact statement at all mining sites.
- Conduct environmental Audit.
- Inspection visits for purpose of environmental Impact Statement review at mining sites.
- Prohibition to discharge hazardous substances, chemicals, materials, oils etc in mining sites.
- Conducting successful mine closures and reclamation activities.

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## 2.0. | Schistosomiasis burden

### 2.1 Schistosomiasis burden

Schistosomiasis is a Neglected Tropical Disease (NTD) affecting over 200 million people worldwide with an at-risk population of 700 million people (1). Schistosomiasis is a parasitic disease caused by *Schistosoma* trematode. It has a complex, obligate indirect lifecycle involving an intermediate aquatic snail host and transmitted through direct water contact. In Tanzania, *schistosomes* have been described since the early 19th Century (2). *Schistosoma haematobium* is highly endemic along the eastern and south-eastern coasts, Unguja and Pemba islands and the north-western zones of the country (Figure 31) (3). These areas have been identified as potential areas for the intermediate-host snail species responsible for the transmission of *S. haematobium* (3). *S. mansoni* is absent in the coastal region due to absence of its intermediate host snails and thermal exclusion (3,4) but is dominant along the shores and islands of Lake Victoria (5). In the last decade, attempts have been made to estimate the population infected or at risk of contracting schistosomiasis in Tanzania (6). Currently, mass drug administration with praziquantel is the mainstay of programs for the control of schistosomiasis morbidity. In recent years, there is a growing recognition that treatment alone is not optimal for elimination of the disease. Additional measures that affect the water related stages of the schistosome life cycle, by reducing exposure to infectious water, and by moderating availability of the intermediate snail host or by decreasing contamination of water with egg-containing excreta is required to interrupt transmission. However, efforts to control snail intermediate host of *Schistosoma* are limited, unlike parasite control (7).

### 2.2. Schistosomiasis situation in Tanzania

The Lake Victoria basin is one of the most persistent hotspots of schistosomiasis transmission in Mainland Tanzania. Most of the research efforts regarding schistosomiasis in Tanzania have mainly focused on areas around the Lake Zone and coastal regions due to their high prevalence rates. In 2000, it was estimated that, of the 29.6 million people in Tanzania, 15.4 million were infected with both urogenital and intestinal schistosomiasis (8). Both the urogenital and intestinal forms of the disease are endemic in all administrative regions in Tanzania. Despite control efforts, the disease remained endemic in Tanzania and from 2017 to 2020, about 200,682 schistosomiasis cases were reported (9)

### 2.3. Snail behavior and ecology

The distribution of schistosomiasis is focused and determined by competent snail vectors, inadequate sanitation, and infected humans. The specific snail vectors can be difficult to identify and laboratory can only ascertain whether snails are infected with human schistosome species. In Tanzania, snails of the genus *Biomphalaria* and *Bulinus* serve as the intermediate hosts of *S. mansoni* and *S. haematobium*, respectively (10). Both *Biomphalaria* and *Bulinus* species are hermaphrodites, possessing both male and female reproductive organs and capable of self- or cross-fertilization. A snail lays up to 1000 eggs during its life, which may last more than a year. Snail habitats include freshwater bodies ranging from small temporary ponds and streams to large lakes and rivers that retain water for more than three months. In general, the aquatic snail hosts of *schistosomes* occur in shallow water near the shores of lakes, ponds, marshes, streams, and irrigation channels. Snail control interventions are inevitable because they act as intermediate hosts for schistosomiasis.



## 2.4. Rationale for schistosomiasis vector control

Despite of MDA intervention with praziquantel, schistosomiasis is endemic in many areas in Tanzania. Although snail control is not a focus of the current global strategy to control schistosomiasis, growing evidence suggests that it could play a potential role in epidemic control, especially in areas of high transmission (11-13). A recent meta-analysis of observational data indicates that snail control through a chemical-based method is effective in schistosomiasis control, with measured reductions in both prevalence and incidence of schistosomiasis (14).

## 2.5. Goal of for schistosomiasis vector control guidelines

To implement snail vector control intervention in order to prevent and control of human schistosomiasis transmission in Tanzania.

## 2.6. Broad objective

To introduce and implement snail control interventions as part of integrated schistosomiasis control and elimination efforts.

### 2.6.1. Specific objectives

- i. To deploy snail control interventions for prevention and control of human schistosomiasis transmission.
- ii. To build the capacity of health personnel in snail surveillance, and control at different levels.
- iii. To advocate the integration of snail control into the existing chemotherapy-based program for schistosomiasis elimination.

## 2.7. Guidelines for Control of snail intermediate host of human schistosomiasis

The intermediate hosts of *Schistosoma species* are various species of freshwater snails. Eggs are shed from the human host in feces or urine. Under optimal conditions in the environment the eggs hatch and release miracidia, which swim and penetrate specific snail intermediate hosts. Besides treatment of human host of *schistosomes* with praziquantel, eliminating snail hosts and improving sanitation are important methods for sustainable prevention of the disease. Dam and irrigation projects are known to be potential sites for schistosomiasis transmission and outbreaks of the disease. Provision of piped water supply and sanitation and hygiene is the mainstay of schistosomiasis control programs. Control of snail intermediate hosts of schistosomiasis is mainly based on application of molluscicides, environmental management and mechanical removal methods (Table 17).

### 2.7.1. Application of molluscicides

Molluscicides have been the primary method used for controlling *Schistosoma* transmission. According to the Committee of experts on Schistosomiasis Control it is well known that projects based only on the use of molluscicides substances have a clear impact on the incidence and infection of schistosomiasis (15). The commonly used molluscicide for snail control (Niclosamide) was developed specifically for control of freshwater snail's intermediate host for schistosomiasis and other trematodes such as liver flukes. Other molluscicides includes Bayluscide, methiocarb, metaldehyde, niclosamide and Iron EDTA. Niclosamide acts against both snail and their eggs at low concentration, killing them in a few hours. This intervention should be applied under the supervision of trained and skilled health personnel to ensure safety of molluscicides. It is important to ensure that the product (molluscicide) is registered with the national regulatory body before using it. Regulatory authorities should be consulted before implementing snail control programs.

There are two significant considerations for the timing of molluscicide applications; the first relates to the seasonal weather patterns, particularly rainfall and temperature, which influence the size of the snail populations and determine transmission patterns. The second relates to the careful timing of molluscicide applications with ongoing population based chemotherapy programs. In Africa, most transmission occurs after the primary rains in the early and mid to main dry seasons. Regular molluscicide applications are recommended when the transmission seasonal is high. Schistosomiasis control may require several treatment cycles per year. A sampling of snails is necessary to determine the interval between application cycles and should be conducted one month after application (7).

### 2.7.2. Environmental management

Environmental management is among the best ways of preventing schistosomiasis by considering various practices to ensure ecological modification and manipulation. Environmental modification are measures include stream channelization, seepage control, canal lining, canal relocation with the deep burial of snails, proper drainage in irrigation schemes, earth filling of ponds and improved agricultural practices. Environmental manipulation includes measures in irrigation schemes or aquaculture ponds. Intermittent irrigation, removal of aquatic vegetation, routine change of water velocity (e.g., increased current speed in irrigation canals), prolonged drying of canals, if possible, mud removal from ponds, periodic cleaning of water drains, even in non-irrigation areas, is essential to destroy snail habitats. The intermediate hosts of *S. mansoni* and *S. haematobium*, respectively (10). Both *Biomphalaria* and *Bulinus* species are hermaphrodites, possessing both male and female reproductive organs and capable of self- or cross-fertilization. A snail lays up to 1000 eggs during its life, which may last more than a year. Snail habitats include freshwater bodies ranging from small temporary ponds and streams to large lakes and rivers that retain water for more than three months. In general, the aquatic snail hosts of schistosomes occur in shallow water near the shores of lakes, ponds, marshes, streams, and irrigation channels. Snail control interventions are inevitable because they act as intermediate hosts for schistosomiasis.

### 2.7.3. Mechanical removal

Mechanical removal or reduction includes the physical removal of snails from highly infested areas. The traditional method consists of using a branch plant such as a coconut tree husk, which is submerged into water and left overnight; the snails will attach themselves to it. The branch is removed mechanically in the morning, with snails attached to it, and burned.

**Table 17. Snail vector species, priority control interventions and their associated performance indicators.**

S/No.	Vector species	Diseases	Geographical distribution of vectors	Recommended control interventions	Performance indicators
1	<i>Biomphalaria choanomophala</i> , <i>Biomphalaria sudanica</i> , <i>Biomphalaria pfeifferi</i>	Intestinal schistosomiasis	Lake zone regions, Central zone regions, Coastal areas and Kilimanjaro.	Chemicals: Molluscicides (e.g., Bayluscide methiocarb, metaldehyde and Iron EDTA)  Environmental management: Stream channelization, proper drainage of irrigation systems, earth filling, implementing mud removal, and weed removal.	<ol style="list-style-type: none"> <li>1. Cercaria density and abundance</li> <li>2. Snail density and abundance</li> <li>3. Schistosomiasis endemicity stratified</li> <li>4. Interventions applied with respect to the endemicity level</li> <li>5. Coverage of households with improved sanitation facilities</li> <li>6. Level of community awareness on schistosomiasis prevention</li> <li>7. Status of water quality supplied to the community</li> </ol>
2	<i>Bulinus globus</i> , <i>Bulinus truncates</i> , <i>Bulinus africanus</i> , <i>Bulinus nasutus</i> , <i>Bulinus tropicus</i>	Genital urinary Schistosomiasis			

## 2.8. Capacity building

The Vector Control Unit in collaboration with the NTD Control program, should establish a team with expertise in snail control to coordinate capacity building on snail control. Capacity building will be preceded by needs assessment (15). Capacity building will cover biology and life-cycle of disease parasite, the role of snails in transmitting schistosomiasis, risk assessment, application of molluscicide and monitoring and evaluating snail control programs.

## 2.9. Resources mobilization

Snail control intervention should generally be a long-term program therefore resources should be mobilized at all levels for snail control from different sources, including the Government, development partners, and other stakeholders.

## 2.10. Snail surveillance

Surveillance of snails and human infection are the mainstay of monitoring efforts. Surveillance of snail can provide information on transmission dynamics between humans and snail vectors and help to identify human - water contact transmission foci. Due to transmission focality, surveillance, of snail intermediate host of human schistosomiasis should base on targeted sampling of the transmission hotspots to determine snail infection status by using either traditional method of cercarial shedding or any other available techniques. The surveillance team should scoop snail with a sieve (mesh size of ~2 mm) in each sampling location. To determine the infection status, the snails are placed in fresh water and exposed to light to test for cercarial shedding. Cercarial shedding first occurs 28–42 days after exposed. Therefore, snails are maintained and observed daily for up to 6 weeks.

## 2.11. Monitoring of snail population and infection rate

The snail population will be monitored before and after molluscicide application. Snails can be sampled using snail scoops and small hand-held sieves. Snail shells tend to be fragile, so plastic or rounded forceps are best for handling them. Collected snails should be transferred to the laboratory to check for the presence of parasites. In the long term, indicators recommended for evaluation of molluscicide application include:

- Presence or absence of snail.
- Snail infection rates (cercaria shedding).
- Human infection where water contact is certain.

The monitoring and evaluation team should establish sentinel sites for longitudinal monitoring of snail densities and cercaria infection rates. Sites for monitoring surveys should be selected randomly from the areas that have been treated with molluscicides.

The sites should be revisited within 1–4 weeks and re-surveyed before the application. Snail sampling should be conducted at as many sites as possible. The subsequent application will depend on the recovery and reinvasion of the snail population. The area should be re-sprayed if living, intermediate snail hosts identified. The pre-and post- molluscicide population densities can be compared. streams, lakes, and stagnant waters.

### 2.11.1. General considerations

- As a general rule, if intermediate snail hosts are present at the surveyed site, all human contact points around the water body must be treated thoroughly.
- If no snails were identified, but snails were recorded at the time of the last survey, then all contact points should be sprayed.
- If snails have been absent during the past two surveys, there is no need to treat the contact points. However, if snails appear absent and the area is a known transmission site, the snail team can still decide to treat.
- The focality of schistosomiasis transmission is well recognized, as is the occurrence and persistence of “hot spot” areas. Increased molluscicide application may be required in these areas.

## 2.12. Standard operating procedures (SOPs) for snail control

### 2.12.1. SOP for molluscicide application

#### Scope and purpose

To implement the molluscicide to reduce human exposure to infected snails intermediate host of human schistosomiasis snail.

#### Selecting molluscicide and sites for snail control

- The method applied here covers both temporary and permanent snail infested water bodies.
- Ensure that the product is registered with the national regulatory body before using a molluscicide product.
- Determine the best time to carry out snail control by checking the seasonal weather patterns, particularly rainfall and temperature, which influence the size of the snail populations and determine transmission patterns (coordinating with mass chemotherapy and any seasonality of transmission).
- In collaboration with village and community leaders, identify all existing water bodies and human water contact points and plan and develop an activity schedule.
- Observe local conditions and customs, including rights and access to private land, and try to avoid disturbing food crops or to interfere with other agricultural practices.
- Map the area and size of water contact points with a hand-held global positioning system (GPS) device.
- Prepare simple maps of the local transmission sites.
- Consult meteorological data to detect annual trends in rainfall and temperature.
- Inform the authority of the local area about your plan for molluscicide application.

#### Molluscicide application processing

- Make sure all equipment for molluscicide application are in place.
- Take a sketch map of the intervention area
- Put on Personal Protective Equipment (PPE).
- Prepare Molluscicide according to the manufacturer’s recommendations.
- Take an appropriate sprayer e.g., backpack and others and fill with molluscicide to treat flowing streams, lakes, and stagnant waters.
- Pressurize the sprayer on-site to the range of operation (refer to the operational manual from the manufacturer).

- Check for any leakage before starting to operate the pump.
- Use sketch map for systematic location of the intervention site
- Calculate concentrations of Molluscicide in different water bodies.
- The snail control manager must specify the spraying time and duration according to the water level at the potential transmission sites.
- Treat all snail-infested water bodies within a 500 m radius (Radius approach) from the periphery of human settlements where the most frequent contact between humans and snails occurs (swimming, bathing, washing or any nearby habitats harbouring snail populations).
- Collect geo-reference data of the sprayed area and amount of Molluscicide used after application using Molluscicide release and record form (Annex 1)
- Repeat the procedure until the work of the day is done.
- Perform snails sampling one month after application of Molluscicide to determine the interval between application cycles.
- If snails are present, reapplication should be done.
- Permanent water bodies and areas with seasonal transmission may need frequent molluscicide applications.
- Apply molluscicide in seasonal pools with *Bulinus species* shortly after rains and snail re-emergence.
- The timing of molluscicide treatment will vary according to location due to varied ecological conditions region-wise.
- Store molluscicide in the original closed containers in a cool, dry place away from foods and feed safely out of children's reach.
- Clean the sprayer and dry under the sun before putting it into storage.  
Use of knapsack sprayers or compression sprayer to treat flowing streams, lakes and stagnant waters for snail control.
- Compression sprayers must be fitted with control flow valves and preferably ceramic nozzles when in use.
- Use a motor-powered spraying machine to achieve more excellent coverage.
- There are irrigation canals and rivers that use an automatic dispenser fitted with an agitator.
- Use sprayers with the molluscicide dispersing downstream for focal control in canals and flowing water.
- Use boats to transport sprayers and applicators for better application coverage in larger water bodies.
- Prepare molluscicide according to the manufacturer's recommendations.



**Figure 32.** Spray person carrying Knapsack on the back.



**Figure 33:** Motor powered spraying machine.

### 2.12.2. SOP for monitoring molluscicides application

#### Scope and purpose

To assess the impact of molluscicide application on the population density of snail and snail infectivity including:

- Reduction of snail density.
- Evaluation of the quality of work done by field personnel (application schedule, methodology of spraying and filling of data capturing tools).
- Comparison of baseline and post-intervention data

#### Procedure

##### Routine monitoring and evaluation of snail population density

Use the following approaches to monitor and evaluate snail occupancy and density post-intervention in permanent and temporary snail-infected water bodies.

- The monitoring team should sample the snail population before and one month after molluscicide application.
- Investigate each site for the presence of freshwater snails in a standardized manner and keep

standardized and regular records of application.

- Take photographs of the site to record how the habitats change over the seasons.
- Monitor the site for snails before and after application – including the use of sentinel snails treated area to determine the efficiency of the molluscicide application.
- Take a sketch map of the intervention area
- Put on Personal Protective Equipment (PPE)
- Use sketch map for systematic location of the intervention site
- Conduct snail survey in the areas sprayed with molluscicides within 1 to 4 weeks; if living intermediate snail hosts are recovered, then the area should be re-sprayed
- Identify the snails in the collection using appropriate snail identification keys.
- For *Bulinus* and *Biomphalaria species*, choose a sample area along the perimeter of the water body of around 15–20 meters, which can be measured with a tape, and instruct two trained staff to sample within that area for 15 minutes.
- Collect all snails and place them in a basin; count all species, alive and dead.
- Sample snails using purpose-built snail scoops and/or small hand-held sieves.
- Transfer potential intermediate snail hosts to the laboratory to check for parasites presence.
- At each site, on all survey and sample days, measure water temperature, pH, salinity and conductivity using standard protocols and forms (Annexes 1, 2 and 4)

### Laboratory snail and cercaria identifications

- Use snail identification keys during the snails' collection and identification for the African fauna (the Danish Bilharziasis Laboratory (1987)).
- Examine *Bulinus* and *Biomphalaria species* in the laboratory for parasitic infection using the shedding method.
- The snails are placed individually in flat-bottomed glass vials or multi-welled plates containing dechlorinated water and exposed to indirect sunlight for a maximum duration of 4 hours.
- Observe cercarial shedding using a binocular microscope (Annex 2).
- The best time to isolate cercariae infecting humans is usually mid-morning.
- Categorize cercariae from *Bulinus species* either as those of *S. haematobium* or those of other trematodes (non-*S. haematobium* cercariae) based on their morphology and from *Biomphalaria spp.* as *S. mansoni* or other trematodes worms.
- The team should note any domestic or wild animal contact at the transmission site.

**Note:** Snails that do not shed cercariae on the first sunlight exposure will be re-exposed on the second day.

### Indicators recommended for evaluation of the molluscicide application

The evaluating team must monitor the effect of the intervention to ensure that the approaches used are appropriate to maintain the effectiveness and to detect any early resurgence of transmission that would require immediate attention. The presence or absence of snail; snail infection rates (cercaria shedding); and human infection where water contact takes place comprise the critical indicators for evaluating molluscicide application.



## 2.13. Roles and responsibilities for snail collection

### MoH/PO-RALG

- Plan and mobilize resources from internal sources and Development Partners for advocacy, community engagement and mobilization activities.
- Prepare Snail vector control guidelines and dissemination of materials.
- Create awareness on vector control interventions to policymakers and other important stakeholders.
- Create awareness of schistosomiasis vector control interventions to Regional Primary Health Care (PHC) Committee.
- Train Regional Health Management Teams (RHMTs) and Council Health Management Teams (CHMTs) on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on advocacy, community mobilization and engagement activities in the regions and councils.
- Secure molluscicide through national regulatory body that approves molluscicide products.
- Integrate snail control interventions into schistosomiasis control programs.
- Establish an expertise team responsible for snail sampling, snail identification, parasite screening in the laboratory, habitat monitoring, molluscicide application, and data collection and reporting.
- Build Technical capacity of national and district level managers in risk assessment, programme plan-ning, implementation, and monitoring and evaluation.
- Select molluscicide intervention sites.
- Ensure adequate and appropriate communication and information dissemination to the community.

### Regional level

- Solicit resources for community mobilization for snail collection activities.
- Conduct advocacy meetings at the council level.
- Plan and train CHMTs on advocacy, community engagement and mobilization regarding snail collection activities
- Distribute snail collection guidelines, SOP and other materials to Councils.
- Conduct supportive supervision on snail collection activities in the councils.
- Reinforce the implementation of Environmental Management Act (2004) and the Public Health Act (2009)
- Prepare implementation reports and submit them to NSCP/PO-RALG.

### Council level

- Countercheck all ward weekly summary report forms before submission to the council.
- Conduct spot checks in snails' habitat in randomly sampled sites during baseline data collection and snail collection activity;
- Assist Ward supervisor in conducting quarterly community meetings
- To supervise the collection of snails, catch for surveillance.
- Review weekly summary forms submitted from the ward supervisors.
- Review the status of supplies and equipment monthly through ledgers and issue vouchers
- Compiles District monthly report of the intervention by filling district summary form.
- Conduct day to day surveillance spot check visits at ward level.
- Report progress of the intervention to the CHMT weekly meetings.

- Identify challenges and propose corrective actions timely.
- Track and report snails monitoring monthly.
- Submit reports to the National Vector Control Program monthly.

### **Ward level**

- To supply equipment, molluscicide and other supplies to CORPs every morning of the working day and keep the record in a ledger.
- To receive and check data forms from the field and file them on weekly basis(week 1,2,3 and 4).
- To compile a weekly summary report of the ward and submit it to the council office
- To compile a monthly summary report based on weekly ward reports
- To conduct quarterly public/community meetings to give feedback on the prevalence and abundance of snail.

### **Community-level**

- To scoop and estimate snails' occupancy by type and density.
- To capture and record data in appropriate forms.
- To monitor and report equipment usage.
- To submit filled forms and other reports to the ward health officer.
- Collect snails as per SOP for analysis.

### **Roles and responsibilities for advocacy, community mobilization and engagement in schistosomiasis vector control interventions: MoH/PO-RALG**

- Intensify schistosomiasis programs and initiate elimination campaigns where appropriate.
- Plan and mobilize resources from internal sources and Development Partners for advocacy, community engagement and mobilization activities.
- Prepare Social and Behavior Change (SBC) guidelines.
- Develop, print and disseminate SBC materials.
- Create awareness on Schistosomiasis vector control interventions to policymakers and other important stakeholders.
- Create awareness of snail control interventions to Regional Primary Health Care (PHC) Committee.
- Train (RHMTs and CHMTs on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on advocacy, community mobilization and engagement activities in the regions and councils.

### **Regional level**

- Solicit resources for community mobilization in Schistosomiasis vector control activities.
- Conduct advocacy meetings at the council level.
- Plan and train CHMTs on advocacy, community engagement and mobilization
- Distribute SBC materials and guidelines to Councils.
- Conduct supportive supervision on SBC and advocacy activities in the councils.
- Reinforce the implementation of the *Environmental Management Act (2004) and Public Health Act (2009)*.
- Prepare implementation reports and submit to NSCP/PO-RALG.

### Council level

- Incorporate SBC and advocacy activities for Schistosomiasis vector control in their Council Comprehensive Health Plans (CCHPs).
- Plan and implement schistosomiasis vector control awareness to the community through different approaches.
- Sensitize and educate community members on the benefit of Schistosomiasis vector control in preventing schistosomiasis transmission in the wards and villages.
- Train wards and village teams on advocacy, community mobilization and engagement.
- Disseminate and distribute SBC materials and guidelines to the wards and villages.
- Conduct supportive supervision on advocacy, community engagement and mobilization activities at the ward and village levels.
- Reinforce the implementation of the *Environmental Management Act (2004) and Public Health Act (2009)*
- Prepare implementation reports and submit them to the regional level.

### Ward level

- Prepare community mobilization and engagement plan.
- Raise awareness on Schistosomiasis vector control to village and hamlet levels.
- Support CORPs on acquiring all requirements for conducting community mobilization activities for Schistosomiasis vector control.
- Coordinate dissemination and distribution of SBC materials in targeted groups and places in the community.
- Reinforce the implementation of the *2004 environmental management act and the 2009 public health act.*
- Receive, review, summarize and file reports on community mobilization collected by Community Owned Resource Persons (CORPs) from the field and submit to the council level.
- Supervise all CORPs implementing community mobilization activities for Schistosomiasis vector control.

### Village level

- Select CORPs in their respective villages according to the established selection criteria based on the National Operational Guidelines for Community-Based Health Services (Section 3.1.1)
- Prepare a community mobilization plan in collaboration with CORPs.
- Conduct community sensitization meetings.
- Support CORPs to conduct community mobilization for snail control.
- Disseminate and distribute SBC materials in targeted groups and places in the community.
- Reinforce the implementation of the *2004 environmental management act and the 2009 public health act.*
- Maintain proper storage of SBC materials, forms/documents and other supplies.
- Submit implementation report on community mobilization to ward level.

## CORPs

- Sensitize and educate community members on schistosomiasis vector control and how to avoid contact with infected water bodies in Village/Community meetings through house-to-house visits and group discussions.
- Distribution and placement of Informational and Educational materials (posters, fliers).
- Reinforce the implementation of the *2004 environmental management act and the 2009 public health act*.
- Prepare community mobilization plan in collaboration with the village leaders (village level).
- Fill in the community mobilization reporting tools and submit them to the village level.

## Community-level

- Provide support to CORPs during community mobilization activities.
- Actively participate in community sensitization meetings.
- Take appropriate actions in conformity with all Schistosomiasis vector control messages and instructions during sensitization meetings.
- Allow the implementing teams to access the breeding sites for molluscicides application, and snail collection in schistosomiasis infested water bodies.

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## 3.0. | Tsetse flies control

### 3.1. Burden of Human African Trypanosomiasis

Tsetse fly transmitted African Trypanosomiasis (AT) is a zoonotic vector borne disease caused by the protozoan parasite *Trypanosoma brucei* and is endemic in 36 sub-Saharan African countries (1). The disease affects both human (Human African Trypanosomiasis, HAT or sleeping sickness) and animals (Animal African Trypanosomiasis, AAT or Nagana). Human African Trypanosomiasis is extremely debilitating disease and is presented into two forms: the first form being chronic caused by the subspecies -*Trypanosoma brucei gambiense* which occurs in 24 countries in West and central Africa. The second form is acute caused by the subspecies *Trypanosoma brucei rhodensiense* which occurs 13 countries in Eastern and Southern Africa; and Uganda being the only country with both forms (1, 2). HAT is of public health significance with 100% case fatality if untreated.

Historically, HAT in Tanzania, is mainly caused by *Trypanosoma brucei rhodensiense* (3) and transmitted to humans through an infective bite of *Glossina*, commonly known as tsetse fly. There are seven species of *Glossina* namely *Glossina morsitans*, *G. pallidipes*, *G. swynnertoni*, *G. austeni*, *G. fuscipes*, *G. brevipalpis*, and *G. longipennis* (4). Among these species; *Glossina morsitans*, *G. pallidipes*, *G. swynnertoni* and *G. fuscipes* have high vectorial capacity. Transmission of the disease occurs in discrete focalized ecological habitats in endemic areas within the geographical distribution areas of tsetse fly. Historically, the first HAT case was recorded in Maswa district - South of Lake Victoria in 1922. Since then, twelve HAT foci in were reported in Kigoma, Arusha, Manyara, Lindi, Ruvuma, Mtwara, Morogoro, Mara, Kagera, Tabora, Mbeya and Rukwa (5,6). Tsetse flies distribution maps in Tanzania showed that infestation covers about 60% of the total land (7). Currently, the ecological habitat for tsetse flies has been reduced from 60% to 32.8% of country total area (4).

### 3.2. Situation analysis of Human African Trypanosomiasis

In recent decades, Africa, has been recording decreasing numbers of HAT cases. In 1995, WHO reported that about 30,000 HAT cases were diagnosed and treated in Africa compared to 2804 cases in 2015 . In Tanzania, between 1922 -1990 some regions were reporting up to 3,000 HAT cases per annum. In late 1990's, HAT cases reported fall to 300 and continued in a declining trend to 186 in 2005, 59 cases in 2008 and 3 cases in 2017 (6).

HAT containment in Tanzania has been dependent of vector control since the beginning of the early 19th century. Different tsetse control techniques such as bush clearing (sheer and selective), host elimination (animal destruction), traps, chemical control (aerial and ground insecticide spraying), Insecticide Treated Targets (ITT), Insecticide Treated Cattle (ITC) and Sterile Insect Technique (SIT) (8-10). However, for environment conservation approaches like bush clearing, host elimination and application of chemicals with long residual effects were abandoned (11). It is these reasons that Tanzania has embarked on use of ITT and ITC through plunge dipping of livestock. Furthermore, the use of community-based techniques such as the use of live baits e.g., Insecticide Treated Cattle (ITC), artificial baits (stationary or mobile) and traps were initiated in the mid 1980's (12,13) has contributed to the decrease of tsetse flies population (4).

### 3.3. Rationale for tsetse flies control

Untreated cases of tsetse transmitted HAT progress from haemato-lymphatic (early stage) to meningoencephalitic (late stage) involvement with fatal consequences. Diagnosis and treatment of HAT is complex and require highly skilled staff. Drugs used for treatment of HAT are very old, highly toxic and have shown to have undesired side effects (14) Moreover, treatment regime for HAT requires long hospitalization of the patients. Therefore, deploying vector control is crucial to reduce abundance and disrupt the transmission of HAT (4).

### 3.4. Goal of tsetse flies control guidelines

To guide the implementation of tsetse flies control interventions for improved public health, food security and socio-economic development in Tanzania.

### 3.5. Broad Objective

To reduce *Glossina* (tsetse fly) to the level whereby HAT is not a disease of public health importance in Tanzania by 2030

#### 3.5.1. Specific objectives

- a) To increase community awareness on HAT and tsetse flies control in the country by 2027.
- b) To strengthen tsetse flies control interventions in endemic areas by 2027.
- c) To solicit human and financial resources for deployment of tsetse flies control interventions.

### 3.6. Tsetse flies control guidelines

Tsetse flies free zones can be created and sustained in the country by the use of Area-Wide Integrated Pest Management (AW-IPM) principles with focus on environmentally friendly techniques. Moreover, the approach to control AT (HAT & AAT) depends exclusively on the biology and ecology of the vector. Tsetse flies do not lay eggs but have a unique reproduction way known as adenotrophic viviparity. This way of reproduction (giving birth to mature larva) allows the adult stage to be the only one available for control. Tsetse flies ecological niches, population dynamics and distribution dictates options for control in a given area (12). In Tanzania tsetse fly distribution is limited to low lands of all regions. The distribution permits the use of integrated techniques such as Mobile and artificial stationery baits (ITC, ITT and Traps) to control (Table 18). Moreover, novel techniques will be used when targeting tsetse elimination (15). Integrated tsetse flies control will be implemented in targeted foci to maximize the impact through One Health platform.

Table 18. Tsetse flies vector species, priority control interventions and their associated performance indicators.

S/No.	Vector Species	Diseases	Geographical distribution of vectors	Recommended control interventions	Performance indicators
1	<i>Glossina morsitans</i> (Savannah)	<ul style="list-style-type: none"> <li>Human African Trypanosomiasis (HAT),</li> <li>African Animal Trypanosomiasis (AAT/ Nagana)</li> </ul>	Mara, Mwanza, Manyara, Arusha, Shinyanga, Lindi, Mtwara	<p><b>Chemical:</b> Live bait technique (insecticide treated cattle-ITC)</p> <p>Insecticide Treated Targets –ITT &amp; traps)</p>	<ol style="list-style-type: none"> <li>Reduction of tsetse population apparent density at HAT endemic areas by 80%</li> <li>Zero report of HAT cases for three consecutive years, later HAT eliminated by 2030</li> <li>Endemic HAT districts have guidelines and SOPs for tsetse control.</li> <li>Number of deployed Insecticide treated targets (ITT)</li> <li>Number of community members participated in tsetse control activities</li> <li>Number of sensitized members of the community on HAT</li> <li>Availability of budget line for tsetse control in the HAT endemic councils</li> </ol>
2	<i>Glossina fusca</i> (Forest)	<ul style="list-style-type: none"> <li>Human African Trypanosomiasis (HAT)</li> <li>African Animal Trypanosomiasis (AAT/ Nagana)</li> </ul>	Kigoma, Geita,		
3	<i>Glossina palpals</i> (Riverine)	<ul style="list-style-type: none"> <li>Human African Trypanosomiasis (HAT)</li> <li>African Animal Trypanosomiasis (AAT/ Nagana)</li> </ul>	Kigoma, Kagera		



### **3.7. Capacity building**

Capacity building for tsetse flies control will be preceded by training needs assessment to establish gap of tsetse flies control intervention. Strengthening of capacities to sustain entomological and parasitological surveillance in HAT endemic areas is crucial. Under One Health platform and in collaboration with other stakeholders, capacity building on areas relevant to tsetse flies and trypanosomiasis control techniques will be conducted by the Regional, District council and health facility (HF) personnel. The health personnel at the Region and Districts level will be responsible for training and refresher courses to the community health workers and the general community-based tsetse flies control techniques such as ITT and ITC. Primary health care workers will be empowered to detect HAT using Standard Case definition as per Community based Disease surveillance guideline of 2020.

### **3.8. Resource mobilization**

Resources for implementation of tsetse flies and trypanosomiasis (T&T) control will be mobilized by One Health platform and in collaboration with other stakeholders including Development partners.

### **3.9. Tsetse flies surveillance**

Effective entomological and parasitological surveillance systems are important in containment of HAT towards disease elimination. Strengthen HAT technical working group under One Health platform will enhance trypanosomiasis surveillance. Districts/councils will be empowered to conduct vertical surveillance of tsetse flies and HAT cases. Endemic districts will be guided to include the use of micro-copy for malaria diagnosis in addition to malaria rapid diagnosis test for early detection of HAT cases.

### **3.10. Monitoring and evaluation**

Monitoring and evaluation will be implemented in all HAT endemic districts in the country where control interventions are implemented using selected indicators through One Health platform. The M&E framework will be developed by the One Health team based on specific intervention and timing of the monitoring. Tsetse flies and trypanosomiasis data collected during M&E will be integrated in user friendly electronic database capable of generating maps for risk forecasting in the country for decision making.

#### **Indicators**

- Continuous decreasing of tsetse flies population (abundance).
- Decreasing infestation areas.
- Absence of HAT cases.

## 3.11. SOP for tsetse flies vector control

### 3.11.1. SOP for community mobilization, engagement and advocacy

#### Scope and purpose

The purpose of this standard operating procedure (SOP) is to guide delivery of effective advocacy, community mobilization and engagement activities in support of tsetse flies control interventions. These SOP are intended to be used by stakeholders at National, Regional, Council, ward, village and hamlet levels. For successful tsetse flies control interventions, communities ought to have the right knowledge to accept the program and support its implementation.

#### Roles and responsibilities

**National Level: Prime Minister's Office, Ministry of Agriculture, Ministry of Health, Ministry of Natural Resources and Tourism, President's Office, Regional Administration and Local Government (PO-RALG)**

- Plan and mobilize resources from internal sources and Development Partners for advocacy, community engagement and mobilization activities for tsetse flies control interventions.
- Prepare Social and Behaviour Change (SBC) guidelines for tsetse flies control interventions.
- Develop, print and disseminate SBC materials for tsetse flies control interventions.
- Create awareness on tsetse flies control interventions to policy makers and other important stakeholders.  
Create awareness to tsetse flies control interventions to PHC Committee.
- Train RHMTs and CHMTs on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on advocacy, community mobilization and engagement activities in the regions and councils.

#### Regional level

- Solicit resources for community mobilization in tsetse flies control interventions activities.
- Conduct advocacy meetings at the council level.
- Plan and train CHMTs on advocacy, community engagement and mobilization
- Distribute SBC materials and guidelines to Councils.
- Conduct supportive supervision on SBC and advocacy activities in the councils.
- Prepare implementation reports and submit to NMCP/PO-RALG.

#### Council level (endemic districts)

- Plan and implement tsetse flies control interventions awareness creation activities to the community through different approaches.
- Sensitize and educate community members on the benefit of tsetse flies control interventions in preventing tsetse disease transmission in wards and villages.
- Train wards and village teams on advocacy, community mobilization and engagement.
- Disseminate and distribute SBC materials and guidelines to wards and villages.
- Conduct supportive supervision on advocacy, community engagement and mobilization activities at the ward and village levels.

**Ward level**

- Raise awareness on tsetse flies control interventions to village and hamlet levels.

**Village level**

- Conduct community sensitization meetings.

**Community Health Workers (CHWs), WEOs, VEOs, village chair person, Live-stock Field Officers (LFO) and Influential persons**

- Actively participate in tsetse flies and trypanosomiasis control interventions mobilization activities.

**Community members**

Participate in tsetse flies and trypanosomiasis control interventions and mobilization activities.

**Procedure****National Level: Prime Minister's Office, Ministry of Agriculture, Ministry of Health, Ministry of Natural Resources and Tourism, President's Office, Regional Administration and Local Government (PO-RALG)**

- Advocate for funding from domestic sources and identify development partners who are interested in tsetse flies and trypanosomiasis control interventions.
- Develop and print SBC materials for tsetse flies control interventions
- Disseminate and distribute SBCC materials.
- Conduct national level advocacy meetings on trypanosomiasis and tsetse vector control targeting policy makers and other important stakeholders.
- Conduct training for RHMTs and CHMTs on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on community mobilization activities at all levels.

**Regional level**

- Translate tsetse flies and trypanosomiasis policy guidelines for prevention and control of tsetse and trypanosomiasis at councils' level.
- Conduct tsetse flies and trypanosomiasis supportive supervision at council level
- Advocate for funding of tsetse and trypanosomiasis control interventions from different stakeholders within and outside the region.
- Conduct preparatory meetings for advocacy and community mobilization activities in the region.
- Mapping of tsetse flies hot spot at district level and resource mobilization.

**Council Level**

- Prepare council community mobilization and engagement plan.
- Receive SBC materials and guidelines from the regional level and disseminate to wards and villages.
- Conduct supportive supervision on community mobilization activities.

**Ward level**

- Prepare ward community mobilization and engagement plan.
- Conduct ward level sensitization meetings on tsetse flies control interventions.
- Sensitize and educate community members on the benefit of tsetse flies control interventions in preventing HAT transmission in their areas.

- Disseminate and distribute SBC materials in targeted group and places in the community.

### **Community Health Workers (CHWs), WEOs, VEOs, village chair person, Livestock Field Officers (LFO) and Influential persons**

Community mobilization and engagement focal persons

### **Community members**

Support implementation of tse tse fly control interventions such as protection of deployed trapas and dip/spray their animals with approved effective acaricides.

## **3.11.2. SOP for traps setting and deployment in tsetse control**

### **Scope and purpose**

Traps are used for, monitoring (detecting presence, abundance) and control of tsetse flies' populations. Usually, Deployment depends on the objective of survey: monitoring may be done biannually or quarterly. In general, deployment of traps reduces a proportion of the tsetse flies thus disrupting the transmission cycle leading to a reduction of HAT cases. Moreover, in the case of human-infective trypanosomes, where the infection rate in the tsetse flies tends to be very low, the infection will not spread once the vector population is below a threshold level. In this aspect, any out-break of HAT shall be contained by a sustained trapping campaign that keeps low density of tsetse flies.

In the early 1900s, sticky traps worn by plantation workers were deployed on the Island of Principe and successfully eradicated the *G. palpalis*. Since then, trapping techniques have been greatly enhanced by scientists through development of designs that mimic the fly's perception of vertebrate hosts. These traps generally use blue and black cloth in a shape that attracts the flies and then funnels them upwards into a netting cage. There are different types of traps which are used to trap different species of *Glossina*. These include pyramidal trap (*G. morsitans*, *G. pallidipes*, *G. austeni*), Ngu trap (*G. palidipes*, *G. morsitans*), biconical (*G. pallidipes*, *G. morsitans*, *G. brevipalpis*, *G. swynnertoni*, *G. austeni*, *G. longipennis*), H trap (*G. brevipalpis*, *G. morsitans*), Epsilon trap (*G. pallidipes*, *G. morsitans*) and Nzi Trap. The SOP's for setting and deployment of biconical trap (Figure 34), NGU trap (Figure 35) and pyramidal traps (Figure 36) are elaborated below.

### **Roles and responsibilities**

Tsetse control roles and responsibilities to be performed by stakeholders at all levels. National:  
Ministry of Health

- Prepare and disseminate policy guidelines, strategies and SOP for vector control in the country.
- Coordinate and supervise vector control programs in the country.
- Support the regional and district in vector control planning, management and preparation of distribution maps.
- Receive and analyze entomological data.
- Mobilize human and financial resources for vector control.
- Facilitate training of field tsetse control personnel.
- Collaborate with High learning and Research Institutions on tsetse control.
- Collaborate with development partners for technical support and leverage team provided by an external agency.

- Undertake monitoring and evaluation of all programs and activities on tsetse control.
- Prepare monthly, quarterly and annual report of tsetse control.
- Send feedback to all implementing levels.

### **Region**

- Guide regional tsetse control plan in hotspots, in collaboration with district.
- Collaborate implementation of vector control activities in hotspot areas
- Mobilize resource for tsetse control interventions with regional partners/institutions.
- Supervise all tsetse control activities in infested councils.
- Prepare and submit monthly, quarterly and annual reports tsetse control activities to National level (MoH).
- Send feedback to district

### **District**

- Conduct entomological and parasitological baseline data collection.
- Prepare district/council tsetse control plan in hotspots, in collaboration with ward/village.
- Implement vector control activities in hotspot areas with involvement of community.
- Use community-based tsetse control techniques.
- Mobilize resource for tsetse control interventions with partners/institutions in the district.
- Prepare budget line for tsetse control activities.
- Supervise tsetse control activities in infested Health facilities, wards/villages.
- Prepare monthly, quarterly and annual reports report of tsetse control activities
- Conduct training of field tsetse control personnel in collaboration with Institutions and other stakeholders.
- Facilitate training to district staff and Community Health Workers (CHWs) on (i) basic knowledge in entomology (i.e., tsetse identification (ii) use of GPS, (iii) criteria for selecting suitable sites for deploying targets or traps and (iv) data recording.
- Collect and analyze tsetse field data (entomological, parasitological).
- Facilitate transport, required equipment and all other technical support required.
- Prepare budget line for tsetse control activities.
- Prepare and submit monthly, quarterly and annual reports relevant levels.
- Send feedback to ward /village.

### **Ward/village**

- Community Health Workers (CHW) to sensitize community to participate in tsetse control.
- Participate in tsetse control activities - survey and deployment of traps and targets.
- Report to District /Health facility about high tsetse /hotspot areas.
- Ward /Village leaders Establish community committee for tsetse control with assistance from CHWs.
- Community Committee prepare monthly reports.

## Procedure: Biconical trap

### Required tools

Pole (Steel/wood), Trap (two equal fabric cones), steel cone, steel cage, white net cage cover.

### Steps

- i. Assemble all required tools at the site of trap deployment.
- ii. Select straight thin wood pole and trim to fit the trap (in absence of steel pole).
- iii. Find a seam and central hole /pore at the base of a black cloth within the lower blue part of the trap.
- iv. Insert the pole vertically through a central black seam hole/pore at the bottom /base of the blue fabric of the trap.
- v. Push the pole vertically to go through the black seam to the upper (white net) apex pole of the trap.
- vi. Dig a hole at the selected trap site and insert, hit to fix well the pole to the ground.
- vii. Through one of the four big holes of the trap; insert the steel cone to the pore at upper part of the pole (in absence of pole take four thin stick and tie them to the wood/steel pole (trim properly to fit the upper white net pore ring).
- viii. Pull up the upper white net cone and fit it on the apex of the steel /stick cone (trap erected).
- ix. Place the white net cage cove at the top of the fixed white net cone pore.
- x. Tilt the cone and secure its position.
- xi. Pull down the lower blue fabric part and tie to the bottom of the pole with wire/string (secure its upright/ vertical position).
- xii. Smear grease /Vaseline on the exposed bottom part of the pole to avoid predation of the caught flies.
- xiii. Dig a hole and place attract bottle below the trap / insert attractant sachet in the trap pocket.
- xiv. Record the position of the tgrap using GPS and date of trap deployment.
- xv. Make relar follow up to ensure the trap is in position.



**Figure 34:** Setting and deployment of biconical trap.

### **Procedure: Ngu trap**

#### **Required tools**

Four poles (Steel/wood), Trap (triangular white net flapped with blue black cloth), steel cone/four thin sticks 3 inches each, steel cage, white net cage cover, string /wire and attractant bottle.

#### **Steps**

- i. Assemble all required tools at the site of trap deployment.
- ii. Select straight thin wood poles and trim to fit the trap (in absence of steel pole).
- iii. Dig a hole at the centre of selected trap site and insert the first pole in the hole, hit to fix well the pole to the ground.
- iv. Find a seam at central pore at the base of a black cloth within the triangle base black part of the trap.
- v. Insert the first pole vertically through a central black seam pore at the bottom /base of the black fabric of the trap.
- vi. Pull the cloth trap down through the first central pole to go through the black seam to the upper triangle (white net) apex of the trap.
- vii. Put a cone at the end of central pole through the space inside the net triangle (in absence of pole take four thin stick and tie them to the wood/steel pole (trim properly to fit the upper white net pore ring).
- viii. Pull the pore of the netted triangle to fit the pore of the cone/four small sticks.
- ix. Pull the long blue flap/tail straight back to align the central (first) pole to determine the distance to position the second pole.
- x. Dig the hole, insert the second pole and hit to secure.
- xi. Make 2 knots at the edge angle of the blue flap by tying it with a wire/string.
- xii. Pull the wire/string from the two knots and tie to the second pole to stretch the flap.
- xiii. Pull the one base angle of the white netted triangle to determine the distance to position of the third pole.
- xiv. Dig a hole insert and fix in position the third pole.
- xv. Tie a knot using wire/string at the base angle of the white netted triangle.
- xvi. Tie another knot below at the blue cloth using wire/string and align it to upper base angle of the white netted triangle.
- xvii. Pull the wire/string from the white netted knot and tie it to the upper part of third pole.

- xviii. Pull the wire/string from base of blue cloth knot and tie it to the lower part of the third pole.
- xix. To fix stretch the short blue flap to the fourth pole repeat procedure 13-18.
- xx. Put a white netted cage (collecting cage) on the top of the trap at the pore of the cone.
- xxi. Tilt the cone and secure its position.
- xxii. Smear grease /Vaseline on the exposed bottom part of the pole to avoid predation of the caught flies by ants.
- xxiii. Dig a hole at the first (central) pole and place attractant bottle below the trap / insert attractant sachet in the trap pocket.
- xxiv. Record the position of the trap using GPS and date of trap deployment.
- xxv. Make a regular follow up for catch and ensure the trap is in position.



**Figure 35:** Setting and deployment of Ngu trap

### **Procedure: Pyramidal trap**

#### **Required tools**

#### **Requirements**

The following requirements are needed; GPS device, Ropes/string for hanging traps, traps, notebook, sticks, pens, safety gears, grease/ Vaseline, machetes (pangas), slasher

#### **Steps**

- Select the area and site to deploy trap
- Clear the vegetation at the deployment site of about 2 – 3 meters diameters
- Set the trap by
  - i. Take two sticks which are long enough to reach across the width of the trap.
  - ii. Place the first stick through the open part in the center of the trap, and insert the point into the corner pocket
  - iii. Place the other end of the stick into the opposite corner pocket so that the trap is stretched out.
  - iv. Insert the 2nd stick into the other two corner pockets, so that the trap is stretched open by the crossing sticks.
  - v. Tie the trap to a branch or stick in good tsetse habitat with the bottom of the trap about 30cm above the ground.
  - vi. Smear the grease or Vaseline around the branch on which the trap is tied to avoid predation of caught flies
  - vii. Close the collection cage inside the white netting with a small knot (ensuring you can untie it later).



- viii. Undertake regular monitoring of the trap every 24 hours and record the position (GPS), date and number of flies caught. (Form No 2)
- ix. Place the trap flat on the ground and open the collection cage.
- x. For live flies, gently squeeze the flies' thorax (chest) between thumb and index finger to crush the flight muscles so that the fly can be handled easily.
- xi. Record the data and replace the trap.
- xii. Deploy 2-4 traps approximately 100 m apart in each site



**Figure 36:** Setting and deployment of pyramidal traps.

### 3.11.3. SOP for targets deployment in tsetse control

#### Scope and purpose

Tsetse target is a suspended screen of blue and black cloth (tsetse target) treated with a biodegradable pyrethroid insecticide such as deltamethrin, used for killing tsetse. The blue segments attract the flies which then lands on the black segment on doing so they pick insecticide and succumb. The effectiveness of targets can be greatly enhanced by addition of bait (odour such as acetone or octenol or fermented cow urine). Insecticide Treated Targets (ITT) used for HAT control are rectangular (1.0 m 1.0 m or 1.5 m × 1.0 m) black-blue-black or blue-black-blue cloth / black net black cloth black net treated with special cloth adhering deltamethrin. The length of time each target remains operational depends on following factors: Resistance to environmental damage (wind, damage by wild animals), theft of all or part of the trap component, degradation (colour fade, depletion of odour bait, loss of insecticidal activity) for targets. However, in most cases longevity of target in the field is about six to nine months.

## Roles and responsibilities

*The same as those of using traps*

## Procedure

### Setting and deployment of targets

#### Required tools

Two sticks for horizontal supports of the target, Ropes/string for hanging targets, rectangular piece of cloth blue and black size 100 cm X 70 cm treated with insecticide or sticky blue surface panels, GPS device, notebook, pens, safety gears, grease/ Vaseline, machetes (pangas), slasher, hoe, soft wire, attractants, insecticide, two poles per target.

#### Steps

- Select the area for target deployment.
- Clear the site to the diameter of 2 -3 meters.
- For hanging of the target follow the following steps from 1 to 4
  1. Insert the sticks into the top and bottom loops and corners.
  2. Tie a rope at the Centre of the top part of the target.
  3. Hung the target at the branch.
  4. The bottom of the target should not be more than 50cm above the ground.
    - In case of tying the target follow the following steps from number 1 – 11
- For both hanged and tied targets do the followings 1 – 11
  1. Select some suitable poles and trim them.
  2. Lay the target on the ground to see where you can place the poles and mark each end
  3. Dig a hole for each pole.
  4. Insert the pole and ensure secure it.
  5. Attach the target to the pole.
  6. Repeat this process for the other edge.
  7. And do the same with the other two corners.
  8. Fasten the target.
  9. Bait the target with acetone, octenol, phenols/fermented cow urine
  10. Place the bait/odour attractane to the target
  11. For untreated targets spray them with insecticide
- For both hanged and tied targets do the followings 1 – 4.
  1. Record the position (GPS) and date of deployment.
  2. make a regular follow up to ensure the targets are in position.
  3. Deploy 4 to 8 target in 1sqkm depending on vegetation density.
  4. Deploy targets at interval of 50-100m in a linear (roadside) depending on vegetation density and 20m away from the road side to avoid dust.

### 3.11.4. SOP for insecticide treated cattle in tsetse flies' control

#### Scope and purpose

Similar to the concept of traps and targets, the live bait technique involves treating cattle with appropriate insecticide formulations, usually by means of cattle dips, spray race, pour-on/ spot-on using standard veterinary formulations. These are highly effective against ticks, and have the additional advantage of controlling other vectors including tsetse flies. In order to attain dipping effectiveness, ensure the dip is mixed according to manufacturer's instructions, paying attention to correct strengths, premixing and mixing instructions. Avoid under dosing of dip to provide effective control and reduce the risk of developing the insecticide resistance. For the case of tsetse flies the dip should be treated with pyrethroids such as deltamethrin, cypermethrin or flumethrin.

#### Roles and responsibilities

Tsetse control roles and responsibilities to be performed by stakeholders at all levels.

#### National: Ministry of Health

- Prepare and disseminate policy guidelines, strategies for tsetse fly control in the country.
- Mobilize human and financial resources for construction and maintenance of spray and dips.
- Undertake monitoring and evaluation of all programs and activities on tsetse control.
- Prepare monthly, quarterly and annual report of tsetse control.

#### Region

- Guide regional tsetse control plan in hotspots, in collaboration with district.
- Collaborate implementation of vector control activities in hotspot areas.
- Mobilize resource for construction and maintenance of dip and spray facilities for tsetse control.
- Supervise all tsetse control activities in infested councils.
- Prepare and submit monthly, quarterly and annual reports tsetse control activities to National level (MoH).

#### District

- Prepare district/council tsetse control plan in hotspots, in collaboration with ward/village.
- Implement cattle dipping /spraying with effective acaricides in hotspot areas with involvement of communities.
- Mobilize resource for construction and maintenance of dip wash for cattle in collaboration with partners/institutions in the district.
- Prepare budget line for dip maintenance and acaricide replenishment.
- Supervise cattle dipping and spraying in hot spot areas within the wards/villages.
- Prepare monthly, quarterly and annual reports report of tsetse control activities
- Facilitate transport, required equipment and all other technical support required for effective operation of dip/spray race.
- Send feedback to ward /villages on tsetse fly control activities.

#### Ward/village

- Community Health Workers (CHW) to sensitize community on importance of cattle dipping/spraying to control tsetse fly.
- Maintain and replenish dip wash with effective acaricide for tsetse fly control.

## Community members

- Send their animal for dipping or spaying on specified dates.
- Protect dip and spraying facilities.
- Where applicable, participate in cost sharing programs for maintenance of dip/spraying facilities including the cost of acaricides.

## Procedure

### i) Plunge dip management

District livestock Extension officer shall undertake the plunge dip management as follows;

- Keep records of the laboratory testing reports (laboratory name and number; testing date; chemical name; and test result).
- Maintain the recommended concentration of the dip wash by adding calculated ratios of acaricide and water (replenishment).
- Monitor the volume regularly and the dip volume must not be allowed to drop by more than 2,000 liters of water before replenishing:
- Carry out the replenishment as required, to minimize the effect of stripping.
- Take samples of dip wash each dipping day for laboratory analysis of chemical concentration.
- Record the dip wash volume before and after each dipping day, always take the measurement at the same point.
- Keep the dip, sump, crush, draining pen and surrounds clean to prevent undue pollution of the insecticide /dip-wash.
- Measure the acaricide accurately and premix it in water before adding to the dip. If possible, chemical should be added on non-dipping days or stirred thoroughly prior to dipping by allowing a few numbers of animals (20-30 head) to plunge in the dip tank.
- Ensure the acaricide in the dip is maintained at the manufacturers recommended concentration before undertaking any treatment for the purposes of complying with the risk minimization requirements.
- Submit dip wash samples to a laboratory facility for testing either; on a monthly basis during the recognized tick season; or within 30 days prior to the use of the facility.
- Adjust the dip chemical concentration promptly when required.

### ii) Dipping

- Provide drinking water to animals prior dipping to avoid swallowing of dip-wash.
- Make sure the dip-wash is not dirty. This can render the dip-wash less effective.
- Agitate the dip wash by running 20-30 head through the dip and then returning them to the main herd to be dipped again.
- Start herding animals to the dip tank.
- All animals must be submerged completely. Use a long-forked stick to push heads under if necessary.
- As dips 'strip out' a maximum of 1000 head should be dipped before replenishing the dip.
- All cattle must be dipped in every dip day except the small calves which should be handtreated.

- Record cattle count for each dip day.
- Dipping intervals must be adhered according to the dip insecticides/ acaricides and manufacturer's instructions.

### iii) After dipping

- Close inlet and open outlet pipes.
- Clean collecting pen and drainage pen to prevent build-up of mud and dung.
- Clean footbaths.
- Repair broken pens.
- Collect remaining dip and,
- Do the Safe disposal of empty dip containers,

### iv) Hand spraying

Prepare and maintain the recommended concentration of acaricide in the knapsack sprayer by ensuring;

- Measure accurately the total capacity of the knapsack sprayer.
- Add the correct ratio of acaricide by volume of acaricide and water.
- The spray tank is calibrated so that the amount of acaricide and water prepared is correct to complete the treatment.
- Acaricide is measured accurately before being added to the water in the spray tank.

### Maintain the spray unit as follows

- Spray tank, hoses and hand piece are maintained in good working order.
- There should be no leaks from the hand piece, hoses or tank.
- The unit must deliver a low-pressure high-volume output and the hand piece must be able to be adjusted to control the required flow depending on the situation.
- Adequate stirring is undertaken prior to cattle spraying (stirring can be done mechanically by using the hand piece to re-circulate the prepared acaricide back into the spray tank).
- Keep detailed records of the following information: i) date of activity ii) volume of water and acaricide added iii) volume of spraying fluid at commencement of spraying iv) volume of spraying fluid at completion of spraying; v) number and species of stock sprayed.

### Spraying

- Start by aiming the nozzle at the animal's feet and bring the spray on as a fine spray at first, gradually increasing the volume output.
- Move up the front leg to the top line of the animal; work the acaricide into the coat of the animal by directing the spray horizontally across the body, leaving the head dry, until the underline is reached.
- Inspect the animal to ensure that the rump and tail have been thoroughly sprayed;
- Inspect under the front shoulder, the udder and the flank to ensure these areas have been thoroughly sprayed.
- Ensure the animal has been thoroughly sprayed; • repeat the above steps on the opposite side of the animal.
- Commence spraying the head by standing either directly in front or slightly to the side of the animal; this should be first done as a fine spray, gradually increasing the volume output to thoroughly wet

the area.

- Inspect the ears and under the jaw to ensure these areas have been thoroughly sprayed.
- Complete a thorough visual inspection of the whole animal to ensure no areas have been left untreated.
- Watch as the animal moves to ensure all hard to access areas have been treated.

### **Pour on**

- Apply steady pressure to the trigger of the applicator to minimize excessive splashing of chemical off the animal's back during treatment.
- The pour-on must be applied topically along the mid-line of the back from the withers to the tail head of the animal or as per the manufacturer's recommendations.
- Do not apply the pour-on to wet animals.
- Do not treat if case heavy rain is expected.

### **Acaricide handling**

- Limit the amounts and types of acaricides stored.
- Storage of acaricides should not be in basements or areas prone to flooding and should be accessible in the event of an emergency.
- The storage cabinets should be kept locked and the door to the storage area should be properly identified with a warning sign.
- Mixing should be avoided in areas where a spill, a leak or overflow could allow acaricides to get into the environment and water systems.
- Washing and rinsing of acaricide residues from application equipment, mixing equipment or other items used in storing, handling or transporting acaricides should occur on a pad.
- No acaricide application equipment or mix tank should be filled directly from any source waters unless a back-siphon prevention device is present.
- Materials Safety Data Sheets for each acaricide should be posted in a prominent location.
- An emergency response plan should be developed. Such a plan lists actions to take and personnel to contact in the event of a spill or accident.
- Personal protection equipment such as respirators, chemical resistant gloves, footwear, coveralls with long sleeves, protective eyewear, headgear, aprons and a first-aid kit should be available immediately outside the storage area.
- Rinse liquid acaricide containers three times when emptied. The rinse material should be poured into a spray tank and applied to a registered site. Triple-rinsed containers are considered non-hazardous and should be disposed of according to state recommendations.

### **Health and safety warnings**

The activities described in this SOP involve long hours operating in bushes where tsetse flies live there is active HAT transmission. Physical barriers against tsetse bites are the only possible protection in endemic areas. There are biological hazards including animals (such as lions, snakes, elephants etc.) and thorny plants present in these areas hence the following measures are recommended to reduce the risks:

- Wearing of protective gear (overall, gum boots etc.)
- Snake ant venom serum and kit for injection should be available.
- Inform the national park authorities in case working in human wildlife interface areas
- Bring mobile phones to the field and ensure they are fully charged and enough credit/airtime to make an emergency call.
- Ensure that everybody involved has the relevant phone numbers recorded in the phones.
- Identify the closest village where help could be found in case of necessity.
- In case of accident, seek medical care in the nearby health facility.
- Bring enough portable water to the field.

### **Quality assurance/ quality control**

Routine target maintenance may be required to replace lost or damaged targets. The same procedure is followed as for target deployment by slashing, redeployment or fixing of sites and recording. Proper record keeping of these activities are needed to highlight problem areas, such as poor initial site clearing, areas prone to animal invasion etc. Make sure there are enough targets and sticks available to compensate for losses. Regular field inspections are needed from the district vector focal person to ensure that targets are deployed correctly and are still in position. In addition, unannounced inspections in the field should be carried out by the district vector focal person or program leader on a regular basis.

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## 4.0. | Black flies control

### 4.1. Burden of Onchocerciasis in Tanzania

Onchocerciasis is a vector borne disease caused by infection with nematodes *Onchocerca volvulus* that is transmitted by black flies. Black flies breed in fast flowing rivers and streams (1). It is also known as “river-blindness” due to the fact that most affected communities are those living along the fast-flowing rivers. Currently, onchocerciasis is endemic in 28 district councils across seven regions of Tanzania (Tanga, Morogoro, Iringa, Njombe, Ruvuma, Mbeya and Songwe) with about 6 million people at risk of infection. Seven transmission zones (foci) have been identified in accordance to disease prevalence. The foci include Tukuyu (5.2%-62.8%), Ruvuma (2.4%-40%), Usambara/Tanga (6%-45%, Morogoro/Uluguru (17%-66%), Kilosa (5%-46%), and Mahenge (43%-80%) and Mufindi/Njombe (2-4). The foci are largely associated with the Eastern Arc Mountains and southern highlands. Despite over 15 years of mass drug administration (MDA) with ivermectin in most foci, vector infectivity rate and prevalence in human remains relatively high at 10.5% and >2%, respectively (National NTD control 2021, unpublished)). Therefore, concerted efforts such as vector control interventions are needed to complement the main MDA strategy for complete interruption of transmission in all transmission foci.

### 4.2. Black flies and their distribution patterns in Tanzania

Black flies belonging to the *Simulium damnosum complex* and *Simulium neavei* group are the main vectors in Tanzania (5). Blackflies of the *S. neavei* group, whose immature stages are associated with freshwater crabs, are responsible for transmission in the Usambara and Uluguru Mountains (6) and in Mahenge focus (5). Although the species are not highly anthropophilic, they are highly susceptible to infection and with high vectorial potential. On the other hand, the *S. damnosum* vector complex is rich in its distributions (Table 19) across mountainous areas including the southern highland areas of Tukuyu and Ruvuma foci (7). The sibling species of *S. damnosum*, though commonly occur in sympatry, they exhibit variable anthropophilic levels. In the surveillance system, it's essential sibling species in each complex species or group to be established as they exhibit variable ecological, behaviours and vectorial capacity (4).

**Table 19: The distribution of Simulium species and their forms**

Foci	Regions	Vector Species	Vector forms (any)
Tukuyu	Mbeya/Songwe	<i>S. damnosum s.l.</i>	<i>S. thyolense</i> , Kasyabone
Ruvuma	Ruvuma/Njombe	<i>S. damnosum s.l.</i>	<i>S. thyolense</i> , Njombe
Tanga	Tanga	<i>S. neavei comp.</i>	<i>S. woodi</i> , Sanje
Morogoro	Morogoro	<i>S. damnosum s.l.</i>	Nyika, Nkusi
Kilosa	Morogoro	<i>S. damnosum s.l.</i>	Turiani, Kilibanum, Nkusi
Mahenge	Morogoro	<i>S. damnosum s.l.</i>	Nkusi, Kilibanum
Mufindi/Njombe	Iringa/Njombe	<i>S. damnosum s.l.</i>	Njombe form

### 4.3. Historical perspective of blackflies control in Tanzania

The first attempt to control blackflies in Tanzania, dates back in 1968, where larviciding in rivers using organochlorine Dichloro-diphenyl-trichloro-ethane (DDT) was implemented in Mzelezi stream in Morogoro. The intervention resulted in significant reduction in black fly density and biting (8). Later on, elimination attempt was implemented in Tukuyu, using ground larviciding with Temephos between 2003 and 2005 (9). Drastic reduction in vector biting rates and parasite transmission between four to eight months post interventions was recorded. The reduction of biting rates continued until after two years later when resurgence of vector *Simulium thyolense* was reported (Kalinga et al, 2018; unpublished). However, vector elimination attempt along MDA activities in the Tukuyu focus has contributed to reduction of parasitemia to < 2% which is the threshold in human sample and none in the vectors. As of now, Tukuyu is the only focus in Tanzania that has qualified for transmission survey assessment to conclude whether MDA could be stopped.

### 4.4. Rationale of black flies control

Onchocerciasis continues to be a public health problem in Tanzania. This disease affects residents of rural communities, therefore, exacerbates the burden to the already impoverished communities. Despite success with MDA intervention, elimination target by 2030 (10) is unlikely to be realized with this sole approach. Complementing MDA with vector control will accelerate onchocerciasis elimination efforts. However, the success will depend on how well vector control interventions are implemented and managed. These SOP provide guidance to decision makers, partners and implementers to ensure effective planning and delivery of high impact black fly control interventions.

### 4.5. Goal of black flies' vector control guidelines

The goal of this guideline is to steer implementation of priority high impact vector control interventions to contribute to elimination of Onchocerciasis by 2030.

### 4.6. Broad objectives

The main objective of the guideline is to integrate vector control initiatives in the disease control package that will enable the country to reach the goal of Onchocerciasis elimination by 2030.

#### 4.6.1. Specific objectives

- i. To reduce the adult blackfly vector density through proven high impact larval and adult control methods.
- ii. To create community awareness and engage them in the control of blackfly vectors.
- iii. To build capacity to the health-care personnel and other implementers in surveillance of blackflies in endemic areas of Tanzania.
- iv. To conduct M&E of the interventions implemented to control blackflies in Tanzania.
- v. To guide resources mobilization efforts for adequate implementation of blackflies control interventions.

### 4.7. Purpose

The purpose of this guideline is to provide guidance to implementers, partners and other stakeholders in planning and implementing interventions; capacity building; vector surveillance as well as monitoring and evaluation of onchocerciasis vector control activities. The guideline aims at enlightening policy

makers, planners, partners and implementers on how to implement Onchocerciasis vector control to supplement MDA intervention in country by using other appropriate intervention options and their operationalization at various levels of implementation.

#### **4.8. Recommended black flies vector control methods**

This section recommends control strategies which are in line with WHO recommendations. The primary control method is larviciding by treating the breeding sites of *Simulium* species, with WHO approved larvicides including Temephos (*Abate*) or *Bacillus thuringiensis var. israelensis* (*Bti*) (11,12). The recommended treatment schedule is weekly application by trained community members in their re-spective localities under supervision of Community health workers. Detailed procedures on the identification, mapping, quantification of larvicides application and implementation structure is found in the specific SOP. Other vector control approaches include slashing and clearing of trailing vegetation in river banks to minimize suitable breeding sites, personal protection through use of repellents and/or wearing protective clothing, trapping of adult blackflies and catching crabs to minimize blackfly larval development (Table 20).

**Table 20. Black fly vector species, priority control interventions and their associated performance indicators**

S/No.	Vector species	Disease	Geographical distribution of vectors	Recommended Control Interventions	Performance indicators
1	<p>Simulium damnosum</p> <p>Simulium neavei</p>	Onchocerciasis	<p>7 foci in Tanzania namely; Tukuyu, Ruvuma, Usambara/Tanga, Morogoro/Uluguru, Kilosa, Mahenge and Mufindi/Njombe</p> <p>Three foci (Tanga, Morogoro and Mahenge)</p>	<ol style="list-style-type: none"> <li>1. Larviciding (Bti, Bs, Temephos)</li> <li>2. Environmental management (Slash and clear, diversion of river section)</li> <li>3. Personal protection (Repellents, clothing etc.)</li> <li>4. Trapping of adult Blackflies using approved methods</li> <li>5. Catching crabs to minimize hosts as larval support</li> </ol>	<p>Reduction in larval density</p> <p>Reduction in biting rates</p> <p>Reduction in infection and Infectivity rates</p> <p>Vector distribution pattern and species composition</p>

#### 4.9. Capacity building

Capacity strengthening at all levels is a critical component for the effective implementation of onchocerciasis control and elimination. Capacity building should be preceded by needs assessment to identify gaps in human capacity, resources and infrastructure required to perform appropriate vector control and entomological evaluations. For case of human capacity, it is recommended to develop a two long training plan to training local field entomologists to support endemic foci, and specialized Onchocerciasis training for national entomologists. Specific training in the form of workshops to suit the need for vector control will be implemented.

#### 4.10. Black flies vector surveillance

Surveillance of vector infectivity is critical to inform the success of onchocerciasis interventions which primarily relies on MDA with ivermectin. According to WHO guideline, in order to stop MDA, a minimum of 12,000 blackflies must be screened and confirmed infections-free by PCR method. The sample have to be spatially collected during the peak transmission representative of a transmission zone. In elimination phase, surveillance coverage should be beyond foci areas to encompass the nearby buffer areas and including areas that are classified as hypo endemic (<20% prevalence of onchocerciasis nod-ules).

In addition to the above-mentioned surveillance activities in endemic foci, there is a need to conduct intensive blackfly sampling for estimation of fly densities, infectivity and infectiousness with Onchocerciasis parasites. The information obtained will enable calculation of the standard entomological indices of transmission (Annual biting rates (ABR), weekly, monthly and annual transmission potentials.

#### 4. 11. Monitoring and evaluation

Monitoring and evaluation are an integral part and essential element to inform the impact of intervention or optimization of intervention. The process, input and output indicators should be monitored across the implementation cycle of control intervention (Table 21). Entomological assessments are used to monitor progress towards elimination, evaluate whether Onchocerciasis MDA has been successful in eliminating transmission, and monitor that transmission has not recurred through post-treatment and post-elimination surveillance. WHO guidelines for certifying elimination of Onchocerciasis requires that entomological assessments be conducted in three phases. Phase 1 aim to assess the decline in infection level and confirm the breakpoints for stopping interventions. Phase 2 or “post- treatment surveillance” aim to confirm for 3-5 years that the decision to stop treatment was correct, and that has not resulted in recurrence of infection and transmission. Phases 1 and 2 employ the same methodology and catching points as described below although the timing and frequencies are defined differently. Phase 3 or “post-elimination surveillance” is a routine surveillance undertaken for 3-5 years. Entomological surveillance is undertaken in small scale where by pool screening by PCR is done in a few selected sentinel sites in the community-directed treatment with ivermectin (CDTI) areas that would be monitored at a time. The WHO recommends monitoring Onchocerciasis transmission every 4-5 years but has not provided guidelines on how to conduct these assessments. Countries are currently using multiple methods to collect information on the status of infection in humans.

The primary method for entomological assessments should be through 0-150 pooled screening PCR analysis of captured *Simulium* species to determine the level of infective stage of *O. volvulus* larvae (L3 stage) in female black flies based on amplification of the parasite-specific DNA probes. A minimum of 12,000 *S. damnosum* collected from a transmission zone must be tested and all found to be free of infective larvae. The upper bound of the 95% confidence interval of the prevalence of infective flies as measured by PCR should be less than one infected black fly for 1000 parous flies ( $< 1/1000$ ) tested, representing a prevalence of less than 0.1% or one infected black fly in all flies examined, equivalent to a prevalence of less than 0.05 %.

**Table 21: Blackfly monitoring and evaluation framework**

Indicator	Outcome/definition	Usefulness
Occurrence	Adult female blackfly present or absent.	Know whether your site is receptive to onchocerciasis transmission and 2) detect the presence of vector species.
Density	Number of adult blackfly vectors collected, usually sampled using human landing catch per unit time.	Monitor the impact of vector control interventions on vector populations.
Biting rate	Total number of adult blackflies caught per unit time e.g., Monthly biting rate is calculated by the sum of the flies caught per month divided by the number of catching days and multiplied by the number of days per month	Used to assess the effectiveness of vector control intervention
Infection rate	The sum of the infective L3 of <i>O. volvulus</i> , from the head, thorax and abdomen found in all parous flies divided by the sum of dissected flies	Used to assess the effectiveness of vector control intervention and MDA to control disease transmission.
Transmission Potentials	This a product of infection rate with the respective biting rate e.g., monthly biting rate x monthly infection rate=Monthly transmission potential	Used to assess the effectiveness of vector control intervention and MDA to control disease transmission.
Larvicide resistance status	Classification of larvae that can survive the concentration of larvicide which normally kills them.	Inform optimization on choice of larvicide and impact of larvicide based intervention. Using a discriminating concentration of larvicide in a standard test.
Larvae habitat availability	Number of blackfly breeding habitat present in river streams	Used to assess the effectiveness of vector control intervention and also to plan for the larviciding using appropriate larvicides

#### 4.12. Resource mobilization

To ensure sufficient and timely availability of personnel and funds to implement onchocerciasis vector interventions the NTD program (under coordination of the Vector control unit, MoH) will regularly develop costed vector control business plans. This costed business plan will be used to mobilize resources from the Government of Tanzania, development partners, and the private sectors to enable effective and efficient implementation of blackfly vector control interventions.

### 4.13. SOP for Control of larvae of Simulium species

#### Introduction

Larviciding for black fly larvae is one of recommended interventions practiced for wide scale onchocerciasis vector control. This method can be integrated with other vector management for better results such as environmental management (slashing and clearing, diversion of river section), personal protection, trapping of adult blackflies using approved methods and catching host crabs to minimize larval substratum support.

Larviciding for blackflies control is a cross cutting intervention, which needs involvement of different sectors including, Ministry of water, Ministry of environment, Ministry of Agriculture, Ministry of health, and PO-RALG. Community engagement and participation is of paramount importance for the impact to be realized. Effective application of larvicides for river breeding habitats that primarily target the immature stage of blackflies reduces population density of adult blackflies, nuisance bites and human-vector contact, which overall leads to interruption in disease transmission.

The main objective of larviciding is to control disease transmission by killing the flies before emergence from their breeding habitats. There are two types of larviciding in Onchocerciasis vector control namely ground larviciding, using hand operating equipment and aerial larviciding by using helicopter or aircraft. Based on cost-effective interventions, ground larviciding is recommended in areas with high population size per square metre, accessible at any seasons and zone with high adult blackfly density. Two types of insecticides are recommended for larviciding: Biolarvicides (*Bacillus thuringiensis israelensis* and *Bacillus sphaericus*) or insecticides (e.g., Temephos, Insect Growth Regulators). However, biolarvicides are highly recommended in rivers with small flow rates due to their shorter carry downstream, its environmental safety and pose no harm to humans or untargeted organisms.

#### Scope and purpose

To apply larvicide evenly in fast flowing river with black fly larvae after every seven days to kill larvae and reduce vector density with subsequent reduction of vector-human contact. Successful killing of black fly larvae is expected 24 hours after correct application of effective larvicide in the river. To be applied by actors from different levels namely; national, regional, councils, and community. It can also be used by the vector control officers and/or any other trained personnel.

#### Choice of zones to be treated

The zone selected for ground larviciding should meet the following characteristics;

- Be a focus where MDA coverage is reported and confirmed as not successful.
- Be well known focus with large human population.
- Be accessible at any season, especially during the period of high blackfly productivity and transmission peak.
- Be a zone with high blackfly density causing nuisance to human population.

#### Identification of potential breeding sites and their productivity across the seasons

Before spraying, maps of river systems and potential breeding places should be obtained to enable the team to assess the general hydrological network and feasibility of vector control in the targeted area. It is preferable to spot larval breeding sites on a topographic map. In the absence of a map, an exploration must be undertaken in order to locate breeding sites on foot, by boat or canoe. The assessment of the

productivity of the breeding sites is made by collecting larvae on trailing vegetation. Geographical coordinate of breeding places should be taken using GPS.

### **Determination of spraying points**

After identification of productive breeding sites harbouring blackflies larvae in a river basin, get ready to start vector control. Conduct a pilot trial to ascertain how far your insecticides can be carried downstream. The distance at which the carry ends should be marked and established. Any breeding site beyond the carry of downstream treatment requires a separate application of larvicides. Understanding the carry length could be done by studying defined concentration of larvicides and assess its dilution down the stream or through estimation of river discharge as explained below. This may apply essentially during the rainy seasons. However, in situation where breeding sites are focally distributed, a common situation which can be found during the dry season, focal larvicides application is recommended.

#### **4.13.1. SOP for estimation of river discharges**

River discharge refers to the volume of water passing through a measuring point or gauging station in a river per unit time, and it is measured in cubic meters per second. Estimation of river discharge is critical as it allows optimal quantification of larvicides dose per unit area, thereby avoiding either under dosing which can be ineffective or overdosing which can be detrimental to the environment and human safety, resulting in economic losses. Estimation of river discharge can be done using either of the two approaches:

##### **a) Estimation of discharge using a water gauge**

###### **Steps to follow**

- Use the water gauge near the point of insecticide application to determine river discharge. A water gauge is made of a series of vertical metal post on which graduated plates are fixed. Each plate measures one meter and is divided into units of one centimeter.
- Make the reading from bottom to top.
- Once the height of water is known, find the corresponding discharge by using the scale of the water gauge or the calibration curve.

##### **b) Direct measurement of river discharge**

The calculation of river discharge by direct measurement is done based on three parameters namely: width, average depth and current speed. It is recommended to choose a point of the river that has a uniform flow and an even bottom.

Each of the three parameters is estimated as follow:

##### **i) Measurement of current speed**

###### **Steps to follow**

- use float method usually a pillbox partially filled with water and leave to drift with the water.
- choose a portion of the river of length L (in meters),
- determine the time (in seconds) taken by the float to cover L,
- making 3 successive measurements and record the time: T1, T2 and T3
- Calculate the Surface speed (Ss) using the following formula:



**Surface speed (Ss) is equal to: (Distance L x 3)/ (T1 +T2 + T3)**

Calculate the average speed (As) using a correction coefficient to correct for the current speed which is normally faster at the surface than the bottom; i.e.  $As = Ss \times 0.8$

**ii) Measurement of width and depth of a river**

- Tighten a graduated rope across the river, perpendicular to the current; measuring the width (L) while avoiding edges where the current is insignificant.
- Crossing the river, carry out 3 or 4 depth measurements (d1, d2, d3, d4)- using a depth measuring stick and a tape measure.
- Calculate the average depth (Ad) using the following formula;

**Ad is equal to:  $(d1 + d2 + d3 + d4)/4$**

**Note:** These measurements must be made at the same place as those of speed

**i) Calculation of discharge**

Establish discharge (Q) based on average speed (As), average depth (Ad) and the width (L) of the river, according to the formula:  $Q(\text{m}^3/\text{sec.}) = As \text{ (second)} \times Ad \text{ (meter)} \times L \text{ (meters)}$ .

**ii) Quantity insecticide to be sprayed**

The quantity of insecticide to be applied depends on larvicide dosage and river discharge. Calculate the amount of larvicide using the following formula:  $\text{Quantity (liters)} = \text{Dose (liters/m}^3/\text{s)} \times \text{discharge (m}^3/\text{s)}$ . For *Bacillus thuringiensis* H-14, doses of 0.712/m<sup>3</sup>/s and 0.541/m<sup>3</sup>/s are usually sprayed for Tecknar and Vectobac respectively. Insecticides usually used for larviciding are: *Bacillus thuringiensis* H-14 (Bti), *Bacillus sphaericus* (Bs) and Temephos.

### 4.13.2. SOP for larvicide application

The choice of application method depends on the insecticide used, size of the river and configuration of larval breeding sites. Always apply the larvicide 100 meters above the breeding site for each dosing point.

- If the river is narrow and not very deep, apply larvicide starting from the banks or river fording (a shallow place with good footing where a river or stream may be crossed by wading,) upstream the breeding site to be covered.
- If the river is broad and deep, apply the larvicide using a boat or canoe.
- The insecticide may be sprayed with a sprayer or a watering can (if the quantity is less than 10 liters).
- If not, it is necessary to use a barrel fitted with a tap and a pipe segment, which helps to regulate the flow of insecticide. The flow must be uniform and continuous, and it must cover the whole width of the river. A test with an equivalent quantity of water is often useful for regulating insecticide spray.

#### Equipment and supplies required

- i. Backpack sprayers (hand type and motorized)
  - ii. Watering cans
  - iii. Measuring tapes
  - iv. Measuring cylinders
  - v. Timer
  - vi. Pill box Float
  - vii. Depth Measuring sticks
  - viii. PPEs (face masks, gumboots, gloves, overalls, headgears, ear guards, life jacket)
  - ix. Rope
- a) **Application on foot starting from the banks**

This method of application uses a knapsack sprayer. The sprayer helps to project insecticide under pressure, in several two way motions covering the whole width of the river. The maximum carry of the flow of the device may be up to 10 meters.

In the absence of a sprayer, a watering-can or a bucket may be used. It is then a matter of crossing the river and pouring insecticide, making sure to place the watering-can between oneself and the breeding site. In addition, for *Bacillus thuringiensis* H-14 application, it is necessary not to raise as little mud as possible because it decreases the effectiveness of this insecticide.

#### ii) Treatment by boat

Make sure to use a reliable safe boat and the applicant should wear a life jacket throughout the exercise.

- The insecticide may be sprayed with a sprayer or a watering can (if the quantity is less than 10 liters).
- If not, it is necessary to use a barrel fitted with a tap and a pipe segment, which helps to regulate the flow of insecticide.
- The flow must be uniform and continuous, and it must cover the whole width of the river.
- A test with an equivalent quantity of water is often useful for regulating insecticide spray well.

### **Frequency of treatments**

Blackflies complete their larval development within 8 - 10 days and sometimes less (5 days) when temperature is above 35°C. Therefore, treatment should in principle be carried out every week to prevent larvae from completing their development between two treatments. However, treatments may be suspended over the whole period when the presence of blackflies does not cause nuisance to the population.

#### **ii) Aerial larviciding**

This is the application of larvicide using drone, helicopter or other type of aircraft. All preparatory pro-cedure required in the ground larviciding can also apply for the aerial larviciding.

### **Assessment of treatment effectiveness**

Ground treatments usually have an unspecified duration and may in the long run create problems related to larvicide resistance. It is therefore important to assess the effectiveness of treatments regularly. The direct method of assessing effectiveness of larviciding is through river prospection. This is done by surveying active breeding sites in stretches of the treated river. The density of larvae and their distribution before and after treatment are compared during evaluation. The evaluation helps to check the effectiveness of treatments and ascertain the causes of failure. Assessment of effectiveness of the insecticide carry is done 24 hours post larvicide application. Larvicide carry is the distance at which the effective larvicide is carried in the flowing water killing at least 95% of larval populations estimated before the application of insecticide. Absence of larvae in normally active breeding sites is a sign of effective larviciding.

Monitoring vector breeding sites is known to be inaccurate because it is very difficult to quantify (13) and there can be difficulties in breeding site access, and therefore reliance is usually placed upon the monitoring of biting vector populations to assess effectiveness of larviciding (14). This indirect method of assessment through catching of adult Blackflies is done in selected catching points distributed evenly along the river systems in the respective focus. Adult Blackflies are caught on weekly basis by trained village vector collectors (VVCs) from 6.00am to 6.00pm. Two VVCs would collect flies on alternating hourly basis and preserve them in 80% ethyl alcohol (for lab analysis) or freshly stored in moistened catching tubes for identification and dissection by trained technicians.

### **Health and safety warnings**

Larviciding operation must be preceded by environmental impact assessment (EIA).

### **Caution and interference**

Heavy rain, accompanied with increased water flow interferes with the effectiveness of the larvicide. Larviciding is mainly recommended in the dry season.

### 4.13.3. SOP for environmental management

#### Introduction

Larviciding uses insecticides that are expensive and may be ecologically detrimental. Community-directed removal of the trailing vegetation where black fly larval attach has been shown to dramatically reduce vector biting densities. This method is known as slash and clear. In addition to slash and clear of trailing vegetation, the river section that support blackfly breeding can be diverted to reduce water speed. The diversion of river section to control blackfly is a huge undertaking that need multisectoral consultation. For river section diversion, sectors such as infrastructure development, environment, water, agriculture, and health need to be involved in planning and implementation. Specific SOP for diversion of a river section from the relevant sector(s) will be used in this undertaking. This section will only describe the SOP for slash and clear as one way of environmental management to control black fly vectors.

#### Procedure for Slash and Clear (S&C) implementation

- Community sensitization and engagement.
- Selection of community members to be involved in the localities (youngsters are preferred for energy and vigour to prospect rivers and slash trailing vegetations. It is recommended that recruitments to be done in collaboration with village leaders.
- Community-member training on field ecology of blackflies and participatory mapping of the rivers in a village.
- Identification of stretches of breeding sites.
- Deployment of working gears at the sites.
- Implementation of slash and clear by communities under supervision of village/ward supervisors/ entomologists.
- Cut both grasses and tree branches that trail on river banks.
- Cut and remove them from the river and throw them out of the river banks to dry for larvae to die.
- Cut for a stretch of one kilometer (km) upstream and downstream of the river in reference to each selected village for slash and clear. The stretch distance can be increased.
- All villages should be involved in the process for 2 days simultaneously for two months.
- Slash & clear – conducted normally during the first half of the rainy seasons and at the end of the rainy seasons.

**NOTE:** Before implementation of slash and clear - it is essential to establish baseline data on larval occupancy to enable assessment of impact.

#### Working gears required for slash and clear

- Backpacks.
- Prospection shoes.
- Machete, “Panga/Nyengo” etc. for cutting trailing vegetation.
- Vegetation scuppers.
- Ropes.
- Other locally available/suitable gears.

#### Assessment of the effectiveness of treatments

Monitoring vector to assess effectiveness of *Simulium* control can be done through biting vector

populations. This indirect method of assessment through catching of adult blackflies is done in selected catching points distributed evenly along the river systems in the focus. Adult blackflies are caught on weekly basis by trained village vector collectors (VVCs) from 6.00am to 6.00pm. Two VVCs would collect flies on alternating hourly basis and preserve them in 80% ethyl alcohol (for lab analysis) or freshly stored in moistened catching tubes for identification and dissection by technicians.

#### 4.13.4. SOP for river prospection for breeding sites

Prospection is the act of searching for larvae and pupae of black flies in any aquatic habitat that is presumed to be a breeding site. It also involves the process of identifying alleged vector breeding sites. Prospection is important in elimination mapping and identifying first line villages for vector collections and epidemiological evaluations.

Larval and pupae prospection of black fly vectors in any breeding site can be carried out to:

- Establish that breeding site of *Simulium* occurs in a river or points on the river system,
- Identify where human landing capture and or Esperanza Window trap should be established for collection of female black flies for evaluation,
- Collect *Simulium* larvae for cytotaxonomic studies (and identify cytospecies of black fly larvae present in a breeding site)
- Collect *Simulium* larvae/pupae for rearing to adult flies for confirmation of cytotaxonomic results.

When a river system is under vector control, entomological prospection of black fly helps to estimate the density of residual pre-imaginal population and hence helps to evaluate the effectiveness of the larvicide treatment campaigns. The result of this will give an indication whether the larvicide is effective or that the black fly has developed resistance to the larvicide.

#### Basic requirements for river prospection for breeding sites

Map of the river system showing endemic areas, lists of pre-selected breeding sites, Cold box, Ice packs, Knife, magnifying hand lens, dissecting kit with soft forceps, Zip lock plastic bags, water proof papers/note book, Pencil, Thermometer, exclusion box, Labeling materials, Reagents for preservation (70% alcohol), and reagents for the preparation of Carnoy's solution.

#### Methods of river prospecting for blackfly aquatic stages

- Naturally, black fly larvae are found attached to appropriate substrate in the fast-flowing river/stream.
- Pick substrates from the river and inspect for presence of pupae and larvae.
- Using fine forceps, detach and collect alive and undamaged larvae, pupae and Cocoon.
- Dry the collected aquatic stages on the Whatman filter paper before putting them on absolute alcohol or 80% ethyl alcohol for preservation.
- Larvae for cytotaxonomy identification must be placed in Carnoy's Solution (3:1 Absolute Alcohol: Acetic Acid).
- When at collection sites, put Carnoy solution in cold (Ice packs in cool Box) and upon arrival at the laboratory, put it in the refrigerator; preferably at freezing temperatures.

### 4.13.5. SOP for collection of adult blackflies

#### 4.13.5.1. Human Landing collection (HLC) method

##### Introduction

Human landing collection (previously called human bait) is the gold standard for blackfly collection globally. The method usually gives information on the density of the populations of biting females of the *Simulium* vectors in a given place and period (15). It involves collection of blackflies attracted to human before they bite for blood in an exposed human skin. Human beings are required to sit along the bank of the river or designated areas to collect the flies that land on the exposed legs before they suck blood. It is a direct method to collect anthropophilic black flies (blackflies that prefer biting human beings), and thus, making it easy to estimate vectorial capacities (potential to transmit infection) of the flies and transmission indices of onchocerciasis.

##### Selection of catching points for human landing collection

The selection of catching points for HLC usually follows two patterns namely sitting along established breeding sites (section above on river prospection) for routine entomological surveillance and setting based on spot catches involve random selection of some spots for blackfly collection without prior knowledge on biting density of black flies in such areas. The human landing collectors are positioned for few hours at a spot to collect flies. The spot catches are used to establish whether or not the blackflies bite in an area.

##### Materials needed for Human landing collection of blackflies

Bags (made of cotton materials) for collecting tubes with flies, dissecting kit, Cotton wool, Bijou bottles, Isopropanol/80% alcohol, Cold box with ice pack, Indelible pencil/marker, labelling sheet and Recording forms, etc.

##### Methods of Human Landing Collections

There are two types of conducting HLC namely normalized and bulk catching. Normalized catching is referred to as standardized method of fly collection for the estimation of transmission indices of onchocerciasis in a focus (16).

- For normalized catch, train at least two fly village vector collectors (VVCs) in the community.
- Position two VVCs at a catching point (about 10 meters away from established breeding site of *Simulium* vector) to collect flies alternating (rotationally) on hourly basis between 7.00 am and 6.00 pm every catching day.
- The fly collector exposes the lower part of his legs and collects any blackfly coming to feed on the exposed parts (Figure 38)
- The blackfly is caught before feeding by inverting a small plastic tube (catching tube) over it and the cap of the tube is replaced immediately to prevent the fly from escaping.
- The catching tubes containing blackflies are kept in the field box with ice-pack before being transported to the laboratory for further analysis. Alternatively, in remote areas where it is difficult to get ice pack, the tubes can be wrapped with moist cotton wool before being transported to the laboratory.
- The blackflies are best dissected in the field or inside the laboratory for parity and infectivity few hours after collection.

- If the blackflies are collected for molecular assay, they should be transferred into bijou bottles containing isopropanol or 80% alcohol (80 ml of absolute alcohol + 20 ml of distilled water) for further analysis.
- Keep the bijou bottles containing the black flies at 4°C in the refrigerator until use.

### Bulk catch

This is another method of human landing collection whose essence is to collect as many as possible, the black flies biting in an area at a particular time sufficient for Polymerase Chain Reaction (PCR) Pool Screening Assay. PCR-Pool Screening Assay requires at least 6,000 flies in a transmission zone or geographical area for valid inferences and conclusion to be made.

The procedure for bulk catches is similar to normalized catches. However, instead of one person collecting flies per hour, at least four persons will be positioned to collect flies between 7.00 am to 12.00 noon while another team (comprising at least 4 persons) resumes by 12.00 noon and collect flies till 6.00 pm. The collectors are placed between 20-50 meters from each other.

### Preservation of collected blackflies

The flies collected through these methods are usually preserved inside bijou bottle containing isopropanol or 80% alcohol (80 ml of absolute alcohol + 20 ml of distilled water) for PCR analysis. The bijou bottles are kept at 4°C in the refrigerator until use.



**Figure 38:** Collection of *Simulium damnosum* by Human Landing Catch method using collection tubes.

### 4.13.5.2. SOP for catching blackflies using traps

#### Scope and purpose

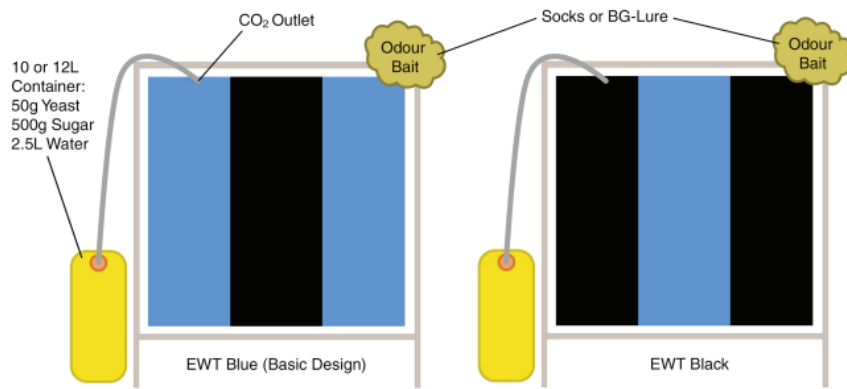
There is an increasing need to evaluate the impact of chemotherapeutic and vector-based interventions as onchocerciasis affected countries work towards eliminating the disease. Using human bait to collect blood-feeding insects is an ethically sensitive issue. Researchers working on other insect-borne diseases such as sleeping sickness, leishmaniasis and malaria have a range of traps at their disposal. However, there is limited methods to use in collecting blackflies. Alternatives to human bait to collect blackflies are needed to monitor disease transmission as onchocerciasis control programmes approach their elimination phase. The recently developed Esperanza Window Traps (EWT) provides a possible alternative to human landing collections (HLCs) for the collection of anthropophilic blackflies, yet it is not known whether current designs will prove effective for onchocerciasis vectors throughout sub-Saharan Africa. The traps were built and used in Tanzania for experimenting the catching of Blackflies in Mahenge focus. The trap was designed based on previously published methods used while conducting blackfly research in Uganda in order to evaluate their efficacy and ease of use. Generally, findings from experiments revealed that in Uganda the traps worked well for the collection of *Simulium damnosum*, the blackfly primarily responsible for onchocerciasis transmission in sub-saharan Africa. The trap was less effective at collecting the same species in Tanzania. Blackfly behaviour and response to traps are probably varying from one country to another. Esperanza Window Traps show promise for blackfly collections, but further research and development is required.

#### Basic design of trap and how it works

EWTs are constructed using blue fabric with red, yellow and black fabrics when baited with either industrial CO<sub>2</sub> released at 150-200ml/min, or CO<sub>2</sub> produced by mixing sugar, yeast (*Saccharomyces cerevisiae*) and water. Alternatively, traps can be prepared using black traps baited with BG-Lure and yeast-produced CO<sub>2</sub> as the basic design. EWTs of differing heights are also prepared and are compared for efficiency. ‘Short’ traps, standing within 15cm of the ground were more effective than ‘tall’ traps.

Traps are constructed using locally sourced materials. Frames are composed of a light gauge steel and trap faces measured approximately 1m<sup>2</sup> (Figure 39). Traps stood on 0.25m sharpened legs which were easily pushed into the ground. The basic design included a blue tarpaulin screen that was hung tightly inside the frame. Blue was chosen as the base-colour as blue traps yielded the greatest number of blackflies during collections by Rodriguez-Pe´rez and colleagues (17). A black central stripe 1/3 the width of the blue screen was painted onto the trap using a matt black emulsion (Sadolin Paints (U) Limited, Uganda) during initial experiments in Uganda in 2015. The paint was allowed to dry for two days before traps were deployed. During subsequent collections in Tanzania and Uganda, the black paint was replaced with black tarpaulin which was sewn together with the blue tarpaulin to form the screen. A CO<sub>2</sub> outlet and host odour attractants were attached to the top corners of the EWT frame. Traps were covered with a black plastic sheet when not in use.





**Fig 1. Blue and black trap designs showing position of CO<sub>2</sub> and odour baits.** Blue screens with a black vertical stripe (basic design) were used for all trapping experiments in Uganda. Black screens with a blue vertical stripe were additionally used in Tanzania.

**Figure 39.** Esperanza Window Trap set up by colours

#### 4.14. Roles and responsibilities

In order for proper planning of vector control activities there must be a well established structure with role and responsibility clearly defined.

##### National level

- To coordinate multi-sectoral relationship, NGO's and private sector
- To solicit fund and other required resources
- To conduct geographical reconnaissance (GR)
- To prepare SOP and guidelines
- To organize multi-sectoral meetings and establish collaboration
- To work jointly with Tanzania Onchocerciasis Expert Elimination Advisory
- To form national task force for blackfly control campaign.
- To take coordinates of the targeted sites (GPS).
- To estimates beneficiaries or population to be protected.
- To prepare local maps of sprayable river length.
- To estimate larvicide requirements and transportation method.
- To collect and analyze epidemiological and entomological data in order to establish the area at risk from the disease.
  - To conduct training of trainers (TOTs).
  - To procure equipment and supplies.
  - To procure personal protective equipment (PPE).
  - To conduct supervision.
  - To mobilize resources and financial management.
  - To monitor and evaluate the entire program.

##### Regional level

- To translate policy and guidelines.
- To link between National, other departments within the region and councils.
- To conduct routine supervisions.

##### Council level

- To plan for community sensitization, advocacy and awareness creation before launching larviciding and environmental control program.
- To recruit and Conduct training to field technical staff and community health workers.
- To inspect river, search for blackfly larvae and larval density.
- To arrange for larvicide safe storage facility.
- To set and implement surveillance system.
- To conduct larval and adult Monitoring.
- To collect data and write implementation report to be shared with community leaders and higher authorities.

##### Community level

- To participate and accompany technical teams to targeted sites during field larviciding trials.
- To apply larvicide at selected dosing points in the river sections in their respective communities.

- To participate in river prospection for blackfly larvae collection and preservation.
- To participate in the larval and adult sampling.
- To participate in slash and clear (S&C) to reduce black fly breeding sites.

## **Procedure**

### **Steps in using EWT for collecting Blackflies**

- Identify a suitable breeding site along the river
- Set a trap at a distance of at least 200m away from the river, at a point where it cannot be disturbed by villagers
- EWT collections is to be set between 07:00 and 18:00 at multiple location
- At day time let the trap exposed for trapping Blackflies (including other insects)
- Collet Blackflies from EWT three times preferably at 11:00, 14:00 and 17:00 to minimize the impact of desiccation on specimen quality
- Remove all Blackflies from EWTs using forceps after applying a drop of white spirit to specimens in order to partially dissolve the adhesive.
- Remove the Flies in the morning and late evening
- Use 10x magnification hand lens to verify identification of insects where necessary.
- Preserve identified Blackflies in >95% ethanol
- In the laboratory, identify to species level, preserved flies using morphological keys

### **Required materials for preparing EWT**

- Tarpaulin screen (Blue + black in colour)
- Frame (any material-preferable iron made)
- Adhesives (Tangle-Trap insect trap coating paste)
- Emulsion (e.g., Sadolin paint)
- Ropes
- Carbon dioxide (prepared from sugar-yeast solution in gallon)
- Human bait materials (Worn socks, Mosquitoes Or BG-Lure (Biogents AG, A synthetic)

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## 5.0. | Fleas and rodents control

### 5.1. Burden of plague

Fleas and rodents are responsible for plague transmission. While fleas transmit the causative agent of the plague “*Yersinia pestis*”, rodents are reservoirs of the plague causative agent. Globally, plague is among the notifiable diseases and is subject to the International Health Regulations (1). The pathogen causing plague disease circulates in animal reservoirs, particularly in rodents in the natural foci of infection. Transmission of plague occurs between rodents and other mammals when bitten by fleas infected with *Yersinia pestis* (1-3). Wild plague exists in its natural foci independent of human populations. Domestic plague is intimately associated with rodents living with humans and can cause epidemics in both human and rodent populations.

Several flea and rodent species have been incriminated for plague transmission in Tanzania. Flea ectoparasite that has been incriminated for plague transmission includes *Pulex irritans*, *Ctenocephalides canis*, *Xenopsyla brasiliensis*, and *Dinopsylla lypusus*. The rodents that serve as reservoirs of plague causative agents include forest rodent species namely; *Lophuromys makundi*, *Lophuromys sabunii*, *Lophuromys stan-leyi*, *Praomys delectorum*, *Grammomys colichorus*, *Grammomys ibeatus*, *Lemniscomys rosalia* and *Lemniscomys cf. zebra.*, *Dasymys capensis*, *Dasymys incomitus*, *Dasymys robertisii*, *Mus minutus*, *Graphiurus murinus*, and *Hylomyscus arcimontesis*. Field/fallow rodent species that include *Mastomys natalensis* and domestic rodent species *Rattus rattus* and *Mastomys natalensis* are considered to be the most abundant.

### 5.2. Situation analysis of plague burden

In Tanzania, plague foci have been potentially divided into three categories namely active foci (Lushoto, Mbulu, Karatu, and Babati districts), potential foci (Chunya and Longindo), and quiescent foci (Bukoba, Mwanza, Singida, Kondo, Arumeru, Same, Hai, Rombo, and Iringa) (4). Based on the information above, plague remains a disease of concern in Tanzania, and this situation needs a concerted effort for its prevention and control. The obstacles prevailing in Tanzania include inadequate knowledge and skills, infrastructure, and funding for surveillance, control, monitoring, and evaluation. These obstacles are the results of little priority given to the control of plague vectors and their hosts.

### 5.3. Rationale of flea and rodents vector control guidelines

There is no guideline for fleas or rodent control in the public health context in Tanzania despite the fact that their control is a cornerstone for effective plague control. Furthermore, an outbreak of plague has an international concern and is subjected to international notification. To address the gap between plague vectors and rodents’ control in the country there is a need to guide stakeholders in fleas and rodent control that will include capacity building, strengthening rodents, and fleas’ surveillance system and resources mobilization for fleas and rodents’ control.

### 5.4. Goal of flea and rodents vector control guidelines

To control fleas and rodent hosts to effectively prevent outbreaks of plague in Tanzania.

## 5.5. Broad objective

To effectively control flea vector and rodent hosts in order to reduce transmission of plague in endemic areas of Tanzania.

### 5.5.1. Specific objectives

- i. To build capacity to the health-care personnel in fleas and rodents' surveillance in plague endemic areas of Tanzania.
- ii. To build the capacity of the health-care personnel and community members on early plague warning signs and how to take appropriate actions to mitigate plague outbreaks.
- iii. To develop a program to raise awareness on flea and rodents' control to various community groups to achieve effective and sustainable control efforts.
- iv. To mobilize resources for fleas and rodent control in the endemic areas of Tanzania.

## 5.6. Recommended methods for fleas and rodent control

To have appropriate fleas and rodents' control the following interventions are recommended:

- i. Environmental cleanness in and around human residences should always be taken as a primary tool.
- ii. Community education and participation in fleas and rodents control activities including house cleaning, wall plastering, appropriate food storage practices, watering dust floor, sleeping on the bed to avoid flea bites, animal dipping, avoiding sleeping in the same house (building) with animals to minimize the risk of fleas' infestation.
- iii. Under one health approach, MoH, livestock and agriculture sectors will guide selection of effective pesticides and put forward plans to mitigate insecticides resistance.

Based on the ecology and transmission of plague, the following guidelines are recommended for fleas and rodents' control in any plague endemic area in Tanzania (Tables 22&23).

Table 22: Plague vector species, priority control interventions, and performance indicators.

S/No.	Vector species	Disease	Geographical distribution	Recommended interventions	Performance indicators
	<i>Xenopsyla brasiliensis</i> , <i>X. cheopis</i> , <i>Ctecephalides canis</i> , <i>C. felis</i> , <i>Pulex irritans</i> , <i>Dinopsyllus lypus</i>	Plague	Mbulu, Karatu, Lushoto and Babati (Active foci) Chunya and Longindo (Potential foci) Iringa, Kondoa, Singida, Rombo, Hai, Same, Arumeru, Mwanza, Bukoba and Rorya (Quiescent foci)	Use approved insecticides by dusting floor and rodents' burrows House improvement; <ul style="list-style-type: none"> <li>• Plastering of the houses</li> <li>• Wetting of the floor in dust floor</li> <li>• Provision of shelter livestock outside the main house</li> <li>• Provision of beds in sleeping places (height of above 30 cm from the floor)</li> </ul>	<ol style="list-style-type: none"> <li>1. Reduction of flea index to 0.5 from the baseline in plague endemic areas.</li> <li>2. Increased number of houses plastered in plague endemic areas</li> <li>3. Reduction of flea's index inside the houses in plague endemic areas</li> <li>4. An increasing number of people sleeping on beds in plague endemic areas.</li> </ol>

Table 23: Rodent species, priority control interventions and performance indicators.

S/No	Reservoir species	Disease	Intervention	Performance indicators
	<i>Mastomys natalensis</i> , <i>Rattus rattus</i> , <i>Lophuromys kilonzoii</i> <i>Lophuromys makundii</i> , <i>Lophuromys stanleyi</i> , <i>Lophuromys sabunii</i> , <i>Arvicanthis niloticus</i> <i>Praomys delectorum</i> , <i>Grammomys colichorus</i> , <i>Grammomys ibeatus</i>	Plague	Rodenticides (second-generation –anticoagulants- Bromadiolone) Environment management; <ul style="list-style-type: none"> <li>• Proper storage of post-harvest crops.</li> <li>• Use of rodent-proof storage food material (Per due Bags)</li> <li>• Clear rodent breeding sites around houses/farms.</li> </ul>	<ol style="list-style-type: none"> <li>1. Reduction of rodent's abundance in plague endemic areas</li> <li>2. Number of houses provided with rat-proof food storage facilities increased in plague endemic areas</li> <li>3. Reduction of rodent abundance in the house in plague endemic areas</li> </ol>

### **5.7. Capacity building**

Plague being a neglected disease, it faced by limited expertise particularly in biology, ecology, transmission, surveillance and control of flea and rodent. Due knowledge and skills gap, the capacity building becomes a critical need to effectively control fleas and rodents, and therefore, prevention of disease epidemics (5). Under One Health Platform, basic training on identification of potential flea vectors and rodents' reservoirs, identification of preferred habitats and their distribution over time and space, trapping of fleas and rodents, estimation of flea index, and how that translates to the prediction of epidemics, and control approaches is a requirement. Practical and applied training should be designed to enable health workers and other stakeholders including the community members to take the appropriate actions to mitigate the occurrence of plague in endemic areas. The following groups will be included in the training program, namely; community health workers (CHW), youth of both genders, community leaders, religious leaders, traditional healers, influential people hamlet leaders, Vector control officers, integrated disease surveillance and response (IDSR) team and other community groups. Additionally, training needs assessment should be conducted to determine if fleas and rodents training needs exist and, what training is required to fill the gap.

### **5.8 Resource mobilization**

To implement effective fleas and rodents' control activities in plague endemic areas in Tanzania, financial and human resources are required. Under one health platform, the vector control unit under MoH, in collaboration with development partners, private sectors and local government from the endemic communities will solicit and allocate financial and human resources for fleas and rodents' surveillance and control.

### **5.9. Fleas and rodents' surveillance and response**

Under One Health platform, a practical, cost-effective, and longitudinal surveillance system will be developed to generate information on transmission dynamics, risk factors, prediction of early warning signs of potential epidemics, and timely response with effective control strategies (6). The framework of surveillance system will be community-based and indicators not limited to flea index determination, abundance of rodents and other small carnivores, plague endemicity levels, and plague risk factors (such as food storage practice and housing structure) will be included.

### **5.10 Monitoring and Evaluation**

Under One Health platform, monitoring and evaluation will be conducted to ascertain progress and impact on the intervention with regards to flea and rodents' control. The M&E framework developed by One Health platform under coordination of the Vector Control Unit, MoH will be used to assess the progress of flea and rodent control (Appendix 29 & 30).

### **5.11 SOP for control of flea vectors and their reservoir rodents**

#### **Scope and purpose**

These SOP have been developed to outline responsibilities and activities for handling the tools, chemicals, and application thereof for control of purposes.



## Roles and responsibilities

### National

- Prepare and disseminate policy guidelines, strategies, and SOP for fleas and rodents' control in the country.
- Coordinate and supervise fleas and rodents' control programs in the country.
- Support the regional and district in planning, management of control of fleas and rodent, and preparation of distribution maps of fleas and rodent.
- Receive and analyze fleas, rodent, and plague data.
- Mobilize human and financial resources for fleas and rodent control.
- Facilitate training of field personnel on fleas and rodent
- Collaborate with R and D institutions on fleas and rodent control.
- Collaborate with development partners in flea and rodent control.
- Undertake Monitoring and evaluation of all programs and activities on fleas and rodent control.
- Prepare and respond to any occurrence of plague outbreaks.
- Prepare monthly, quarterly, and annual reports of fleas and rodent control.
- Send feedback to all implementing partners.

### Regional level

- Guide regional fleas and rodents control plan in all foci, in collaboration with the district.
- Participate in the implementation of fleas and rodent control activities in active foci.
- Mobilize resources for fleas and rodent control interventions within the regional level.
- Supervise all fleas and rodents' control activities in councils with active foci.
- Prepare and submit monthly, quarterly, and annual reports of fleas and rodents' control activities to the National level.
- Formation of Permanent Plague Control Team, which composes of District Medical Officer, District Vector Control Officer, District Health Officer, District Agricultural Officer and District Community Development Officer.
- Send feedback to the district.

### District level

- Conduct flea and rodents' baseline data collection.
- Prepare district/council fleas and rodents control plan in active foci, in collaboration with ward/village
- Implement fleas and rodents' control activities in active foci with involvement of community.
- Mobilize resources for fleas and rodent control interventions with partners/institutions in the district.
- Prepare budget line for fleas and rodent control activities.
- Supervise fleas and rodent control activities in active foci within wards/villages.
- Prepare monthly, quarterly, and annual reports of fleas and rodents' control activities.
- Conduct training of field fleas and rodent control personnel in collaboration with Institutions and other stakeholders.
- Facilitate training to district staff and Community Health Workers (CHWs) on (i) basic knowledge in entomology (i.e., fleas' identification (ii) use of GPS, (iii) criteria for selecting foci for deploying interventions, and (iv) data recording.
- Collect and analyze fleas and rodents' field data (entomological, epidemiological)
- Facilitate transport, required equipment and all other technical support required

- Prepare a budget for fleas and rodents' control activities.
- Prepare and submit monthly, quarterly, and annual reports for all relevant levels.
- Send feedback to ward /village.

### Ward/village

- Community Health Workers (CHWs) and Community-Owned Resource Persons (CORPs) to sensitize the community to participate in fleas & rodents' control.
- Participate in fleas and rodents' control activities survey and deployment of interventions.
- Report to District /Health facility about rodents' outbreak in potential foci.
- Ward /Village leaders establish community committee for fleas and rodents' control with assistance from CHWs and CORPs.

#### 5.11.1. SOP for application of insecticides for fleas or rodents' control

##### Procedure

- Conduct community sensitization to create awareness and acceptance of the application.
- Determine rodent and house flea indices before application of the insecticides.
- For a dust formulation, use recommended dust blower.
- Do not sweep or mop the floor for three consecutive days after dusting/spraying. This ensures the persistence of the insecticides.
- Wear appropriate Personal Protection Equipment- (PPE: e.g., mask, gloves, boots, and overalls) during dusting.
- Apply dust insecticides on floors and walls of the houses and burrows as well as rodent runways.
- In the case of liquid formulation follow the manufacturer's instructions for preparing the correct formulation.
- Determine flea indices after seven days of initial dusting /spraying.
- Where possible, use bamboo pipes, plastic pipes, or baiting boxes for simultaneous control of fleas and rodents.

#### 5.11.2. SOP for application of rodenticides

##### Procedure

- Conduct community sensitization to create awareness and acceptance of the application.
- Trap live rodents for three consecutive days to determine the magnitude of rodent infestation.
- Use rodenticides according to the manufacturer's instructions.
- Mix with appropriate bait and put in strategic sites.
- Keep rodenticides in baiting tools (e.g., bamboo, plastic pipes, baiting box, etc.) to prevent access of children and livestock.
- Check and remove any dead rodents (carcasses).
- Conduct trapping to check the reduction of rodents' populations after treating with rodenticides.
- Dispose of the rodent carcasses safely (e.g.: bury in deep pits, pit latrines).

### 5.11.3. SOP for disposal of remaining insecticides and rodenticides, packaging, and contaminated materials

#### Procedure

- Collect all used packaging materials.
- Bury them in deep pits not less than two feet dug away from water sources watercourses or waterways.
- Collect all defective equipment.
- Store in a secure place until ordered for disposal by the respective authority.
- In the case of liquid pesticides, ensure there is a standard effluent waste disposal facility at each site.

### 5.11.4. SOP for insecticides and rodenticides application equipment in flea and rodent control

#### Procedure

- Ensure availability of standard equipment for liquid (knapsack) and powdered (Dust blower) pesticides.
- Thoroughly clean all equipment used in insecticides and rodenticides application soon after use.
- Ensure that water used for cleaning such equipment does not reach any water source or contaminate any food material.
- Repair and maintain the equipment regularly for proper application and prevention of leakage.
- Label all insecticides and rodenticides application equipment properly.

### 5.11.5. SOP for environmental management of fleas

#### Procedure

- Regularly clean houses and surroundings.
- Sprinkle boiling water on dusty floors.
- Encourage community members to sleep on beds.
- Regularly clean and sun-dry all beddings.
- Human and animal should be housed in separate buildings.
- Regular plastering of house floors and walls.
- Regular dipping/spraying of domestic animals (dogs, cats, pigs, sheep, goats, cattle, rabbits, and guinea pigs) with recommended pesticides.

### 5.11.6. SOP for environmental management of rodents

#### Procedure

- Proper storage of crops e.g., use of rodent-proof facilities such as rat-proof Vihenge, perdue bags, drums, hanging maize cobs on tall trees, etc.
- Proper storage of food using rodent-proof containers.
- Proper disposal of food remains by using improvised refuse bins when necessary or digging small pits into which food remains are disposed and covered with soil.
- Keep house surroundings clean (at least between 24 -30 meters between houses and bushes).
- Advocating the community on keeping of domestic cats.
- Eliminating nesting materials and breeding sites of rodents in and around human residences and nearby farms.
- Covering water storage containers (e.g., clay pots, buckets etc) with lids to prevent access of rodents.

- Cutting down of bushes close to residential houses that are likely to harbour rodents.
- Keeping of clothes, paper materials, hides and skin, and candles in closed cupboards or any other rodent proof containers.

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## 6.0. | Ticks and body lice control

### 6.1. Burden of tick and louse-borne relapsing fever

Soft ticks are vectors of relapsing fever with worldwide distribution. There are 193 species of soft ticks, belonging to four genera. The most medically important species is *Ornithodoros moubata*, which transmits relapsing fever, caused by spirochete bacteria *Borrelia duttonii*. This parasite causes serious illness, especially in children and pregnant women. In Tanzania, soft ticks are prevalent in Dodoma, Iringa, Mara, Mwanza, Tabora, Morogoro, Shinyanga, Manyara, Arusha, Kagera regions and Zanzibar (1). In endemic villages, house infestations rates for *Ornithodoros* goes up to 88% and *Borrelia* species over 60% (2,3). Likewise, Lice are ectoparasites blood-sucking insects with a worldwide distribution, especially for the people who live in crowded condition with poor hygiene. There are three types of lice species that infest humans namely body lice, head lice and pubic lice. Apart from sucking blood, *Pediculus humanus* is a vector transmitting bacteria such as *Rickettsia prowazekii*, *Bartonella quintana* and *Borrelia recurrentis* which cause epidemic typhus, trench fever and relapsing fever, respectively (4-7).

### 6.2. Situation analysis

Tick and lice-borne relapsing fevers is among the neglected diseases and a public health problem in Tanzania. Lice is bound to poverty, poor hygiene and overcrowding (prisons, refugee camps, military camps and slums). However, due to improvements in living conditions, the body lice infestation has significantly decreased.

### 6.3. Rationale

In Tanzania, information on relapsing fevers and their vectors is scant due to few conducted research activities. However, few research information indicates that louse-borne relapsing fever (LBRF) can cause severe disease. In addition, lice infestation in human can cause severe itching and allergic reactions. On the other hand, Tick-Borne Relapsing Fever (TBRF) has a profound effect on pregnancy with high perinatal mortality. A seroprevalence study among pregnant women from the port city of Dar es Salaam found TBRF sero-positivity rate of 28% and in the town of Moshi and murine typhus seroprevalence was detected in 0.5% of febrile patients (1). Therefore, there is a need to develop effective ticks and lice vector control methods to prevent occurrence of TBRF and LBRF.

### 6.4. Goal

To reduce infestation of soft ticks and lice in endemic areas to the level which they are not of medical importance.

### 6.5. Broad objective

To provide guidelines for the prevention and control of soft ticks and body lice to control relapsing fevers in endemic areas.

#### 6.5.1 Specific objectives

- i. To raise awareness on the prevention and control of lice and soft ticks to control relapsing fevers.

- ii. To map lice and soft tick distribution in the country.
- iii. To implement effective control interventions to reduce soft ticks and lice in endemic areas.
- iv. To establish a framework for surveillance, monitoring and evaluation of lice and soft ticks control interventions.

### **6.6. Interventions recommended for ticks and lice control**

Recommended interventions include contact avoidance, house improvement, use of repellents to prevent ticks from attaching to the body, application of acaricides to domestic animal, infested houses and animal resting places (Table 24). Insecticides such as malathion, carbaryl, organo-phosphorus and permethrin have been found to be effective ticks. Prevention and control of body lice relies on improving hygienic conditions and insecticides can be applied to infested households, clothing and beddings (Table 24). Common insecticides used for lice control include carbaryl 5%, deltamethrin, malathion, permethrin in different formulations such as lo-tion, dust and aerosols.

**Table 24: Soft Ticks and Lice priority control interventions and performance indicators**

S/No	Vector species	Disease	Geographical distribution of the vectors	Recommended control interventions	Performance indicators
1.	<i>Ornithodoros Moubata</i>	Tick Borne Relapsing Fever	Dodoma, Iringa, Mara, Mwanza, Tabora, Morogoro, Shinyanga, Manyara and Arusha and Zanzibar prisons (8).	House improvement e.g., filling of cracks and crevices, house sanitation, personal hygiene.	• Number of households improved.
				Treatment of animals using acaricides	• Number of animals treated with acaricides
				<ul style="list-style-type: none"> <li>• Social Behaviour Change (SBC) and Advocacy</li> <li>• Community sensitization on preventive measures</li> </ul>	• Number of community members educated and sensitized on tick control
				Establish a surveillance system to identify districts and regions with ticks	• Risk maps for ticks and lice
2.	<i>Pediculus humanus humanus.</i>	Louse borne relapsing fever	Dodoma, Iringa, Mara, Mwanza, Tabora, Morogoro, Shinyanga, Manyara and Arusha and Zanzibar prisons (8).	<ul style="list-style-type: none"> <li>• Improve personal hygiene</li> <li>• Wash infested clothing and bedding using the hot water (at least above 60°C)</li> <li>• Discourage sharing clothes and beddings with an infected person.</li> <li>• Dusting of clothing with chemical insecticides</li> <li>• SBC on the dangers of body lice and proposed control methods</li> <li>• Treat non-washable clothing with insecticide and repeat after 1 week</li> </ul>	<ul style="list-style-type: none"> <li>• Number of schools/ community visits sensitized about head lice.</li> <li>• Decrease of Lice population</li> <li>• Decrease of Incidence of Louse Borne Relapsing fever and Typhus fever</li> </ul>

## 6.7. Capacity building

Capacity building is crucial for the control, surveillance, monitoring and evaluation of lice and ticks control interventions. However, training needs assessment has to be conducted to facilitate identification of knowledge and skill gaps. Once the gap in knowledge and skills are identified, appropriate training packages will be developed for appropriate control of soft ticks and lice.

## 6.8. Resources mobilization

Under One Health platform and in collaboration with other stakeholders, resources for implementation of ticks and lice control will be mobilized in a vector control strategic plan developed by vector control unit of MoH. Furthermore, resources will be mobilized at Region and District councils' level in endemic councils to supplement resources required for sustainability of interventions.

## 6.9. Surveillance

The surveillance of ticks and lice is a prerequisite for effective control efforts. Under One Health platform, a practical, cost-effective, and longitudinal surveillance system will be developed to generate information on ticks and lice occurrence and timely response with effective control strategies.

## 6.10. Monitoring and Evaluation

A monitoring and evaluation (M&E) framework for the prevention and control tick and lice in line the proposed control interventions will be developed. This will enable routine monitoring of the progress of implemented interventions and the evaluation of the outcome and impact of the tick and lice control interventions.

## Roles and responsibilities

### National level

- Develop policies and guidelines on ticks and lice vector control.
- Mobilize human and financial resources for ticks and lice management.
- Routinely conduct planned surveillance for ticks and lice.
- Conduct monitoring and evaluation in the regions and district levels.
- Develop tools to capture and analyze data from different sources.
- Conduct and sustain capacity building of vector control personnel.
- Develop and distribute vector control SBC materials, policies and guidelines to region level.
- Build the capacity of RHMTs on tick and lice control through formal training and mentoring.

### Regional level

- Solicit resources for community mobilization on vector control activities.
- Analyze, interpret data from district level and use them as guidance for vector control.
- Conduct advocacy meetings at the council level.
- Train and capacity building of CHMTs on tick and lice control.
- Capacity building on data collection and use for decision making at the district level.
- Distribute SBC materials and guidelines to councils.
- Conduct supportive supervision on ticks and lice control in the councils.
- Routinely conduct planned surveillance and routine monitoring.
- Compile and prepare implementation report and submit to the national level.



### **Council level**

- To implement activities related ticks and lice control and management according to guidelines and policies.
- Train ward and village teams on lice and tick prevention and control.
- Plan and implement ticks and lice awareness creation activities for the Community through different approaches and channels.
- Disseminate and distribute SBC materials and guidelines to wards and villages.
- Include vectors control activities in the Comprehensive Council Health Plan (CCHPs).
- Conduct supportive supervision on tick and lice control activities at the ward and village levels.
- Use ticks and lice control data from health facilities, analyze, interpret, and plan for use
- Prepare implementation reports and submit to the regional level.

### **Health facility level**

- To conduct appropriate tick and lice control interventions according to national guidelines.
- Keep and compile data on lice and tick control.
- Analyze and interpret data at facility level.
- Conduct surveillance, monitoring and evaluation of ticks including their density and infestation.
- Conduct capacity building regarding ticks and lice for the community.
- Prepare vector control implementation reports and submit to the district level.

### **Ward level**

- Conduct ward level sensitization meetings on ticks and lice control.
- To supervise villages and hamlets on the vector control activities.
- To sensitize and educate the community members on the benefits of controlling ticks and lice in their areas.
- To support villages and hamlets on acquisition of all requirements for conducting community mobilization activities for ticks and lice control.
- To disseminate and distribute SBC materials in targeted group and places in the community.
- To receive, review and file reports on community mobilization collected by village leaders from the field and submit to the council level.

### **Community level**

- Participate in planning and implementation of ticks and lice control activities.
- Resource mobilization for vector control.
- Household visits to advice community members on ticks and lice control measures.
- Active participation in implementations regarding ticks and lice.
- Collect data and conduct simple analysis for magnitude of problem of ticks and lice.
- Prepare vector control report and submit to ward level.

### **Household and individual level**

- Maintain personal and environmental hygiene (houses and surroundings)
- Report any infestation of lice or ticks to the head of household and subsequently to village leadership
- Seek medical advice from health facilities in case of any infestation.
- Adhere to the control and prevention recommended by health facility.
- Conduct routine check-up of children bodies, head, clothes, beddings, and other parts for early detection of infestation.

## Heads of schools, camps, orphanage centers and prisons

- Conduct routine inspection to their resident member for detection of infestation.
- Report any infestation of ticks and lice to the health department and health facilities
- Adherence to personal hygiene and sanitation in the rooms and dormitories.
- Routinely, treat with appropriate insecticides on beddings, rooms, dormitories and other materials suspected to be infested with lice/ ticks.
- Regular inspection to make sure adherence to the personal hygiene and sanitation to occupancy of the room/ dormitories.
- Avoid overcrowding in schools, camps, orphanage centers and prisons

## 6.11. SOPS for control of lice and ticks

### 6.11.1. SOP for advocacy, community mobilization and engagement

#### Scope and purpose

The purpose of this SOP is to guide effective advocacy, community mobilization and engagement activities for lice and ticks' prevention and control. These SOPs are intended to be used by stakeholders at national, regional, council, ward, health facilities, community, household, individual, and heads of schools, camps, orphanage centers and prisons levels. For ticks and lice control operation to be successful, communities need to have correct knowledge that will influence them to accept the program and support its implementation.

#### Roles and responsibilities

##### National level

- Plan and mobilize resources from internal and development partners for advocacy, community engagement and mobilization activities for vector control.
- Develop, print and disseminate SBC materials for ticks and lice control.
- Conduct national level advocacy meetings on ticks and lice control targeting policy makers and other important stakeholders.
- Conduct regional level advocacy meetings on vector control to regional PHC Committee.
- Train (RHMTs and CHMTs on advocacy, community mobilization and engagement.
- Conduct supportive supervision on advocacy, community mobilization and engagement activities in the regions and councils.
- Conduct and sustain capacity building to regional level.
- Solicit resources for community mobilization for ticks and lice control activities.
- Conduct advocacy meetings at the council level.
- Plan and train CHMTs on advocacy, community engagement and mobilization
- Distribute SBC materials and guidelines to Councils.
- Conduct supportive supervision on SBC and advocacy activities in the councils.
- Prepare implementation reports and submit to the national level.

##### Council level

- Include SBC and advocacy activities for ticks and lice control in their CCHPs.
- To sensitize and educate community members on the benefits of ticks and lice control in Wards and Villages.

- Train Wards and Village teams on advocacy, community mobilization and engagement.
- Plan and implement ticks and lice control awareness creation activities to the community through different approaches and channels.
- Disseminate and distribute SBC materials and guidelines to Wards and Villages.
- Conduct supportive supervision on advocacy, community engagement and mobilization activities at the Ward and Village levels.

### **Ward level**

- Conduct ward level sensitization meetings on ticks and lice control.
- Supervise all CORPs conducting community mobilization activities for ticks and lice control.
- Sensitize and educate the community members on the benefit of ticks and lice prevention and control.
- Support CORPs on acquisition of all requirements for conducting community mobilization activities for ticks and lice control.
- Disseminate and distribute SBC materials in targeted groups and places in the community.
- To receive, review and file reports on community mobilization collected by CORPs from the field and submit to the council level.

### **Community level**

- To select CORPs in their respective villages according to the established selection criteria
- Support CORPs to conduct community mobilization for Relapsing Fevers (RFs) and vector control.
- Attend dissemination meetings.

### **Community Owned Resource Persons (CORPs)**

- To sensitize and educate community members on ticks and lice and how to improve habitats in their plots/surroundings through;
  - Village/Community meetings
  - House to house visits
  - Group discussions
  - Distribution and placement of information and educational materials (posters, fliers).
  - To fill in the community mobilization reporting tools and submit to the village level.

### **Procedure**

#### **National level**

- Advocate for funding from domestic sources and identify development partners who are interested in ticks and lice control interventions.
- Develop and print ticks and lice control interventions SBC materials.
- Disseminate and distribute SBC materials and tools for CORPs to the identified regions.
- Instruct regional team on the dissemination of SBC materials.
- Provide ticks and lice control interventions guiding messages for radio advert and Public Address (PA) to the regions for lower-level community mobilization activities.
- Prepare a national plan for advocacy and community mobilization activities.
- Conduct national level advocacy meetings with policy makers and other important stakeholders.
- Conduct regional level advocacy meetings on ticks and lice control interventions to PHC Committee.

- Conduct preparatory meetings for advocacy and community mobilization activities in the country.
- Conduct training to RHMTs and CHMTs on facilitation skills and coaching for advocacy, community mobilization and engagement.
- Conduct supportive supervision on community mobilization activities at all levels.

### **Regional level**

- Advocate for funding of ticks and lice control interventions from different stakeholders within and outside the region.
- Identify all councils implementing ticks and lice control intervention activities and their timeline and conduct training to CHMTs on advocacy, community engagement and mobilization.
- Conduct preparation meetings for advocacy and community mobilization activities in the respective region.
- Review council's community mobilization and engagement implementation plan.
- Assist councils to plan and budget for community mobilization and engagement activities.
- Distribute ticks and lice control interventions information and educational materials to the councils.
- Supervise council's community mobilization and engagement activities.

### **Council level**

- Prepare budget for community mobilization and engagement activities and incorporate to CCHP.
- Prepare council community mobilization and engagement plan.
- Conduct preparation meetings for advocacy and community mobilization activities in the respective councils.
- Identify approaches/channels (e.g.print, electronic & social media), target audience, key messages and timeline.
- Receive SBC materials and guidelines from the regional level and distribute to wards and villages.
- Use National message guide to prepare cultural, specific and relevant ticks and lice control interventions messages and key talking points for radio interview and PAs.
- Conduct sensitization meeting to the Ward Development Committee (WDC).
- Conduct sensitization meeting to community leaders and other influential person in the community.
- Identify local/community radio for airing ticks and lice control interventions messages.
- Select key council staff for radio interview/talk shows.
- Participate in the radio interview/talk shows.
- Organize and arrange vehicles for PA messages and deploy according to route plan.
- Conduct training to CORPs to effectively implement community mobilization activities and provide Scope of Work (SOW).
- Conduct supportive supervision on community mobilization activities.
- Prepare community mobilization report and submit to the regional level.

### **Ward level**

- Prepare ward community mobilization and engagement plan.
- Conduct ward level sensitization meetings on ticks and lice control interventions.
- Sensitize and educate community members on the benefit of ticks and lice control interventions in preventing RFs transmission in their areas.

- Disseminate and distribute SBC materials in targeted group and places in the community.
- Receive, review, summarize and file reports on community mobilization collected by CORPs from the field and submit to the council level.

### **Village level**

- Prepare community mobilization implementation schedule with COPRs and hamlet leaders.
- Inform community members and hamlet leaders on the dissemination of SBC materials and village committee meetings on community mobilization activities that will be carried out in the village.
- Inform hamlet leaders on roles and responsibilities of CORPs.
- Conduct meeting to introduce CORPs to hamlet leaders.
- Supervise and oversee the implementation of community mobilization activities.
- Submit community mobilization reports to the ward level.

### **Community Owned Resource Persons (CORPs)**

- Prepare participatory community mobilization/sensitization plan.
- Select approaches and channels (use a combination of these recommended channels; house to house visits, village/community meetings, group discussion, distribution of information and educational materials).
- Implement community mobilization plan.
- Prepare community mobilization report and submit to the village level.

### **Materials and supplies**

The following equipment and supplies will be needed at different levels for successful implementation of advocacy, community mobilization and engagement activities for ticks and lice control interventions:

- ticks and lice control interventions messages
- SBC materials e.g. posters, fliers, banners
- Stationeries
- Transport facilities for officers/staff during advocacy and community mobilization

### **Precautions**

The following points should be observed while conducting community mobilization and engagement activities:

- Do not communicate messages which do not comply with the National ticks and lice control vector guidelines.
- Do not use communication approaches that can create chaos in the community.
- Make sure you have consent from the head of household before conducting household dialogue.
- Use effective communication skills.
- Use key/influential persons.

## 6.11.2. SOP for adult soft ticks' surveillance

### Scope and purpose

The impact of ticks control interventions is measured by reduction in the number of adult soft ticks' population in the households after application of acaricides. Therefore, it is important to conduct soft tick entomological spot check to assess the abundance of soft ticks before and after initiation of control intervention. The purpose of this SOP is to Assess the impact of acaricides application on the population density of adult soft ticks.

### Roles and responsibilities

#### National level

- To develop policies and guidelines on application of acaricides for soft ticks control
- Provide technical guidelines to regions and councils on soft ticks control.
- Capacity building for regions and councils on ticks' surveillance and control.
- Assist regions and councils on the monitoring of soft ticks control initiative.

#### Regional level

- Translation of policies and guidelines regarding application of chemical insecticides in ticks and lice control.
- Conduct supportive supervision to guide councils in the implementation of ticks control initiatives.
- Report progress on soft tick control to national level.

#### Council level

- Routine inspection of household to identify houses infested with soft ticks.
- Provide technical guidance at council's level on the selection and application of acaricides to control soft tick infestation
- Monitoring the implantation of soft tick control intervention at council level.
- Report progress of soft ticks control intervention to region level.
- Educate community on the house improvement to mitigate soft tick infestation.

#### Household and individual level

- Maintain house sanitation and hygiene to prevent soft tick infestation
- Plastering of floor and walls to prevent harborage of soft ticks
- Watering of dust floors to discourage soft ticks' infestation in the houses
- Report any soft tick infestation to ward Health Officer.

**Note:** It is recommended that acaricide to be used for soft tick control should be that registered by legal authority for that purpose.

### Procedure for acaricides application for tick control

Unless in severe household infestation where insecticides/acaricides will be applied indoors, animal dipping or spraying with effective acaricide (as described for tse tse control) is the method of choice for control of ticks.

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## 7.0. | Other insects of public health importance

### 7.1. Background

Bed bugs and lice are of public health importance. Although they do not transmit diseases but they cause biting nuisance and sometimes severe irritations. Lice, they are of different species (Head lice '*Pediculus humanus capitis*', Pubic lice '*Phthirus pubis*' and Body lice '*Pediculus humanus corporis*'). Of the three species, only body lice is a vector of louse Borne Relapsing fever (covered in section 6.0). However, control methods for all lice species is the same and generally falls under basic personal hygiene principles.

### 7.2. Adult lice control in human

#### Head lice (*Pediculus humanus capitis*)

Person infested with head lice should do the following:

1. Inspect the head of suspected person for presence of lice and nits
2. Use a lice comb to comb out the nits, nymphs and adults from the hair.
3. After removal, wash head using vinegar and water, applying a mixture of essential oils and comb the hair thoroughly using a comb/brush.
4. Wash brushes, combs, hats, pillowcases, or bed sheets in hot water at temperature over 60 °C to avoid a new infestation or even spread the parasite to another person.
5. Repeat all steps 1-4 after 9 days (lice have a life cycle of 9 days).
6. Improve personal hygiene including taking shower daily.

#### Body lice (*Pediculus humanus corporis*)

Person infested with body lice should do the following:

1. Remove contaminated clothing and beddings.
2. Wash infested bedding, clothing and towels with hot soapy water over 60 °C and dry the fabrics under the sun heat and iron them.
3. Clothing that can't be washed may be dried under the sun and hot ironed.
4. Contaminated items that cannot be washed or dried should be sealed in a plastic bag and stored in a warm area for two weeks.
5. Take shower and clean any personal belongings that may be contaminated.
6. Mattresses, couches, and other upholstered furniture items should be sprayed with appropriate registered insecticide.
7. Improve hygienic condition in the households, clothing and beddings.

#### Pubic lice (*Phthirus pubis*)

In case of pubic lice infestation, the following should be done;

- Remove contaminated clothing and beddings and wash them thoroughly with hot water and sun dry them.
- Shave the pubic hairs and wash the whole body with soap and hot water.
- Use over-the-counter lotions and shampoos to remove pubic lice from the body.
- Remove any leftover nits with tweezers and use home remedies such as hot baths.
- If several people are infested in the household treat them at the same time to prevent reinfection.



- Decontaminate the household including bathrooms with bleach solution.
- Wash all towels, bedding, and clothing in hot water and dry them under the sun.
- If fabrics are not washable seal them in air tight plastic sack for 72 hours.

### **7.3. Recommended methods for controlling lice**

#### **Using combs**

Combing removes adult lice and nits have been used since ancient times. Combing can be under taken every 1–3 days to remove mature lice which might otherwise lay eggs and perpetuate the life cycle. It was also demonstrated that the diagnosis of louse infestation using a louse comb is four times more effective than direct visual examination and twice as fast.

#### **Shaving**

Head shaving can be a simple method to remove the lice and eggs. However, head shaving should be avoided whenever possible because it is humiliating, especially for girls. Complete shaving of the head generally does eliminate lice and prevents re-infestation but is rarely an appropriate measure to take in response to infestation.

#### **Washing**

Regular washes of hair with soap and warm water (20 to 37 degrees Celsius) is effective in lice control.

#### **Chemical products**

Application of insecticidal lotions and emulsions, kerosene and vegetable oil mixture. After application of the lotion leave it for 12 hours before washing. The best application time recommended is in the evening before going to the bed.

#### **Discourage sharing of belongings**

Sharing of bedding, caps, and combs should be discouraged to prevent head and pubic lice infestation.

### **Recommended methods for bedbug's control**

#### **1. Environmental control**

- Cracks and crevices in the house should be plugged.
- Wooden skirting picture rails and window frames with time crevices make excellent hiding places for bed bugs. Such areas can be sealed with adhesive tape and painted.
- Light infestations within the house can be dealt with by thorough cleaning of household articles and by keeping house tidy.
- Furniture and bedding can be taken away from the house and heated to dislodge the bugs
- Beds can be treated by pouring boiling water over bed frames or running lighted candles under bed springs.
- Passive conveyance of bedbugs into the house with clothing, furniture, suitcases should be prevented.
- Sharing clothing and bedding with another person should be avoided

#### **2. Non-chemical controls**

- Ironing of clothes after washing and drying
- Sanitary disposing of heavily infested items

### 3. Insecticide treatments

- The use of synthetic pesticides such as dichlorvos on infested areas such as cracks and crevices in walls, bed frames, spaces around the bed, behind wall plates, and along the junction of wall and floor.
- Also, new harborages found during follow-up inspections should be treated.

### 4. Follow up monitoring

The monitoring after insecticides application takes one to two weeks to kill bedbugs and two months to eliminate an infestation.

Conduct visual inspection and check the interceptors placed under the furniture every one to two weeks.

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## 8.0. | Appendices

### 8.1. Appendix 1: Activities plan during set up of IRS operation

SN	ACTIVITY	PROCESS	OUT PUT	LEVEL	RESPONSIBLE
	Assemble baseline epidemiological	Review Routine malaria surveillance data from health facilities	Baseline epidemiological report	National	NMCP
		Conduct Community based malaria prevalence survey	Report on malaria prevalence in the	National	NMCP
		Calculate and tabulated the Annual parasite incidence (API) and malaria mortality rates by administrative unit's example village, ward, etc.	Report on malaria morbidity and mortality rates by age and locality	National	NMCP
	Collect Geographical information	Collect meteorological data especially rainfall and temperature for the previous two to five years.	Report on meteorological information for the previous two to five years	National	TMA & NMCP
	Collect entomological information	Identify the anopheline vector species in the targeted areas	Report on potential malaria vectors	National, Regional & District	NIMR, RVCO & DVCO
		Determine distribution and seasonality	Report on distribution and seasonality of malaria vectors	National, Regional & District	NIMR, RVCO & DVCO
		Determine indoor and outdoor resting habits, host preferences, time of feeding	Report on resting and feeding behaviours malaria vectors	National, Regional & District	NIMR, RVCO & DVCO
		Conduct insecticide susceptibility test using the WHO Tube Assay	Report on insecticide susceptibility status of malaria vectors	National, Regional & District	NIMR, RVCO & DVCO
		Determine the sleeping habits (time and location of sleep) of the human population in relation to the feeding habits of the vector	Report on sleeping habits of the human population in relation to the feeding habits of the vector	National, Regional & District	NIMR, RVCO & DVCO
		Collect the ecological data on the breeding habits of local vector species	Report on ecological data on the breeding habits of local vector species	National, Regional & District	NIMR, RVCO & DVCO
		Collect baseline vector parameters, including parity rates, human biting rates, human blood indexes, sporozoite rates and entomological inoculation rates (EIR).	Report on baseline vector parameters	National, Regional & District	NIMR, RVCO & DVCO

SN	ACTIVITY	PROCESS	OUT PUT	LEVEL	RESPONSIBLE
	Assess socio economic and demographic data	Collect Demographic information up to hamlet level	Report on Demographic information	National	NBS & NMCP
		Collect information on distribution, location, number, type, size and accessibility of households and structures to be sprayed and other structures used as sleeping places such as health facilities, schools and religious structures	Report on Distribution, location, number, type, size and accessibility of households and structures to be sprayed	Regional & District	RVCO & DVCO
		Collect information on physical features such as roads, mountains and the best means of transportation to gain access to the area, Availability of water bodies such as rivers, streams, wells, taps, springs, swamps, lakes, reservoirs and Locations of health facilities or other institutions like government owned stores that are potential to IRS staging sites.  sub-district, and structures to be sprayed	Report on Physical features and the best means of transportation to gain access to the area, sub-district, and structures to be sprayed	Regional & District	RVCO & DVCO
		<p>Map and identify the number, type and size of dwellings and provide a reference number for each household</p> <p>Paint household reference number on a door or a wall</p> <p>Geo-reference all households and structures using handheld PDAs or GPS.</p> <p>Calculate the average surface area of unit structures/houses to estimate the total number of square metres of surface to be sprayed and the amount of insecticide needed.</p> <p>The names of administrative areas (e.g., region, district, ward, village) broken down to the lowest levels</p> <p>The names of major urban centers</p> <p>Population numbers by administrative areas and by rural and urban distribution.</p> <p>Population structure by age groups (less or more than 5 years, male or female)</p> <p>Population distribution and density Average household size (number of people per household)</p> <p>Number of rooms per household or dwelling</p> <p>Type of household and materials used for construction)</p> <p>Name of head of household</p>	Maps of dwellings and reference number for each household characteristics will be produced	Regional & District	RVCO & DVCO

SN	ACTIVITY	PROCESS	OUT PUT	LEVEL	RESPONSIBLE
	Reviews of health facility surveillance reports	HIMS report	Health facility Report surveillance	Regional & District	RVCO & DVCO

## 8.2. Appendix 2: Surfaces that should and should not be sprayed

SPRAY	DO NOT SPRAY
Structures—including all sleeping quarters	Floor
Non-metal ceilings	Metal roof
Outdoor eaves	Metal door
Wooden or straw doors	Glass
Underside of furniture	Seating side of furniture (should be covered)
Behind heavy furniture not taken outside	Insides of cupboards
Behind picture frames	Newsprint wallpaper
Both sides of the main door	Beddings and cushions
	Food stores/granaries
	Curtains
	Kitchens that are separate from the main living quarters
	Latrines
	Animal pens (depending on vector species)
	Offices or commercial structures
	Structures with people inside
	People

### 8.3. Appendix 3: Quantification of insecticides in IRS operation

Calculate the quantity of the required insecticide for IRS targeted using standard formulas or experience from the previous spraying round. For procurement purposes make all calculations in term of Kg (or litres) of active ingredient. It is recommended that at least 10% extra insecticide to be held in reserve

Calculation of amount of insecticide needed for one round of spraying

The total amount of insecticide (T) needed depends on:

N: Total number of houses

S: The average sprayable surface per house (m<sup>2</sup>)

Y: The target dosage of insecticide (g/m<sup>2</sup>)

C: The concentration of active ingredient in the formulation (%)

$$T = [(N \times S \times Y) / C] \times 100$$

The total amount of standard unit dose (U) needed depends on:

T: Total amount of insecticide

D: Total unit dose (or spray charge)

Knowing the amount of active ingredient in a unit dose (G) it is easy to calculate the total amount of standard packages (unit doses) needed:

$$U = T / G$$

Example

A village has 100 houses. The surface that can be sprayed per house is 200m<sup>2</sup>. The recommended dosage of DDT is 2 g/m<sup>2</sup>. The DDT is available as a 75% water – dispersible powder.

$T = [(100 \times 200 \times 2) / 75] \times 100 = 53.3 \text{ kg of DDT (75\% water -dispersible powder)}$ .

Knowing that a unit dose (G) has 500 gr of active ingredient the total amount of standard doses (U) is

$$U = 53.3 \times 1000 = 53,300 \text{ gr} / 500 = 107 \text{ unit doses (sachets)}$$

Calculation of unit dose (or spray charge) of insecticides needed for one round

Many manufacturers provide insecticides in packages ready to be diluted in a standard spray pump (8-10 litres). These packages are often referred as unit dose (or pump charge). One pump charge, at the ideal spray rate of 40 ml per m<sup>2</sup>, is usually covering 250 m<sup>2</sup>. For logistic purposes (storage and distribution) it is useful to calculate the number of standard unit doses.

D: Total unit doses (or spray charge)

N: Total number of houses

S: The average sprayable surface per house (m<sup>2</sup>)

A: The average sprayable surface per one unit dose (or spray charge), usually 250 m<sup>2</sup>

$$D = [N \times (S / A)]$$

Knowing the active ingredient content in one unit dose (G) of the insecticide it is easy to calculate as well the total amount of insecticide (T):  $T = D \times G$

Example

A village has 100 houses (N). The surface that can be sprayed per house is 200m<sup>2</sup> (N). The average sprayable surface per one unit dose for Bendiocarb is 250 m<sup>2</sup> (A) and a unit dose (G) is equal to 125g.

$D = [(100 \times (200/250))] = 80$ -unit doses (sachets) of Bendiocarb.  $T = 80 \times 125 = 10,000 \text{ gr} / 1000 = 10 \text{ kg}$ .

The total amount of insecticide (T) needed is:  $T = 80 \times 125 = 10,000 \text{ gr} / 1000 = 10 \text{ kg}$ .

## 8.4. Appendix 4: IRS Countdown checklist

Activity	Months Before & After IRS Operations									
	-6	-5	-4	-3	-2	-1	***	***	+1	+2
<b>Partner/IRS Strategy Meetings</b>										
Conduct bi-monthly meetings (strategy, pesticide selection, registration, etc)										
Establishment of country technical IRS Committee										
<b>Needs Assessment (Field Visit)</b>										
Environmental Assessment										
Logistics, Financial and Admin Assessment										
Entomological and Epidemiological data collection										
Draft Environmental Assessment										
Draft budget										
<b>Environmental Compliance</b>										
Revise & approve EA and budget										
Environmental monitoring										
Environmental compliance inspection										
<b>Entomological Surveillance</b>										
Identify/train technicians										
Baseline survey										
Periodic surveillance										
<b>Logistics &amp; Procurement</b>										
<i>Issue requisitions</i>										
<i>Pesticide &amp; equipment delivered</i>										
<i>Detailed planning</i>										
<i>Quality Control/product delivery</i>										
<i>Logistics arrangements</i>										
<b>IEC Program</b>										
Formative research/develop IEC materials										
Produce IEC materials										
Supervisor & mobilizer training										
IEC in coordination with IRS operations										
Post-spray survey										
<b>IRS Operations</b>										
Geographical reconnaissance / mapping										
Development of guideline for spraying operators (local language)										
Admin and Data management team training										
Supervisor & operator training										
Physician training (pesticide management)										
Medical check-up for sprayers										
IRS Launch Day set up										
<b>Spraying operations</b>										
Inventory & operational assessment										
<b>Post Operation Plan</b>										







### 8.1. Appendix 1: Activities plan during set up of IRS operation cont.....

### 8.5.2. Appendix 5(b) Team leader daily spray record (#2)

#### KAMPENI YA KUNYUNYIZIA DAWA YA KUAU MBU WAENEZAO MALARIA MAJUMBANI FORM 2 MKUU WA KUNDI

SITE \_\_\_\_\_ KATA \_\_\_\_\_

KUJIJI \_\_\_\_\_ KITONGOJI \_\_\_\_\_ TAREHE \_\_\_/\_\_\_/\_\_\_ Siku ya Zoezi  NAMBARI NA JINA LA MKUU WA KUNDI: \_\_\_\_\_

Mpiga dawa	c	d	e	Wakazi			Idadi ya Vyandara	Waliolelea usiku uliopita chandara kichotwa dawa	n	Kadi	p	q	r	s	t	u	w	x	y	z																					
				Me	Ke	J																																			
Nambari ya Mpiga dawa M = Ibita wa mtape S = Ibita wa SamZ N = Ujaua Mwingine Idadi ya misingo katika kaza Jamia ya vyumba Chini ya Mkaa Miano Wajawazito Mkaa mitano na zadi LLIM Vyandara Vikiyo na dawa Chini ya Mkaa Miano Wajawazito Mkaa mitano na zadi Mjiyo Hupana Hupana 1- Maza 2- Mchizi 3- Mgrajira 4- Kafungu 5- Kasa 6- Mpingano Vyumba vilivyopigwa dawa Vyumba vilivyopigwa dawa 0- Hakuna 1- Kupigwa mariti 2- Kupigwa mbu 3- Kutamba chandara 4- Mpingano HJ = Hakuna Jibu 0- Hakuna 1 = Virobo 2 = Watoto wengine 3 = Kuwacha Kukitoka kwa mada 4 = Mpingano HJ = Hakuna Jibu 0- Hakuna tarifa 1- Mwingine Mwingine 2- Mwingine Mwingine 3- Mwingine Mwingine 4- Mwingine Mwingine 5- Bado 6- Mwanzi wa misingo 7- Mpingano HJ = Hakuna Jibu Vihiko vilivyopigwa Vihiko vilivyotumika Vihiko vilivyotumika vilivyobaki Vihiko vitanu vilivyovaaibwa																																									
Jumla	M	S	N		Me	Ke	J			N	H	N	H	1	2	3	4	5	6																						

Uhakiki thabiti 3  $c(M+S+N)-n(N+H)=0$

Uhakiki thabiti 4  $(e)-(q+r)=0$

Uhakiki thabiti 5  $[p(1+2+3+4+5+6)-n(H)]=0$

Uhakiki thabiti 1  $x-z=0$

Uhakiki thabiti 2  $y+z=w$

### 8.5.3. Appendix 5 (c) Site manager daily spray records

#### KAMPENI YA KUNYUNYIZIA DAWA YA KUAU MBU WAENEZAO MALARIA MAJUMBANI FORM 4 MENEJA

TE \_\_\_\_\_ KATA \_\_\_\_\_

JILI \_\_\_\_\_ KITONGOJI \_\_\_\_\_ TAREHE \_\_\_/\_\_\_/\_\_\_ Siku ya Zoezi  NAMBARI NA JINA LA MENEJA WA ENEO: \_\_\_\_\_

Mpiga dawa	c	d	e	Wakazi			Idadi ya Vyandara	Waliolelea usiku uliopita chandara kichotwa dawa	n	Kadi	p	q	r	s	t	u	w	x	y	z																			
				Me	Ke	J																																	
Nambari ya Mkuu wa kundi M = Ibita wa mtape S = Ibita wa SamZ N = Ujaua Mwingine Idadi ya misingo katika kaza Jamia ya vyumba Chini ya Mkaa Miano Wajawazito Mkaa mitano na zadi LLIM Vyandara Vikiyo na dawa Chini ya Mkaa Miano Wajawazito Mkaa mitano na zadi Mjiyo Hupana Hupana 1- Maza 2- Mchizi 3- Mgrajira 4- Kafungu 5- Kasa 6- Mpingano Vyumba vilivyopigwa dawa Vyumba vilivyopigwa dawa 0- Hakuna 1- Kupigwa mariti 2- Kupigwa mbu 3- Kutamba chandara 4- Mpingano HJ = Hakuna Jibu 0- Hakuna 1 = Virobo 2 = Watoto wengine 3 = Kuwacha Kukitoka kwa mada 4 = Mpingano HJ = Hakuna Jibu 0- Hakuna tarifa 1- Mwingine Mwingine 2- Mwingine Mwingine 3- Mwingine Mwingine 4- Mwingine Mwingine 5- Bado 6- Mwanzi wa misingo 7- Mpingano HJ = Hakuna Jibu Vihiko vilivyopigwa Vihiko vilivyotumika Vihiko vilivyotumika vilivyobaki Vihiko vitanu vilivyovaaibwa																																							
Jumla	M	S	N		Me	Ke	J			N	H	N	H	1	2	3	4	5	6																				

Uhakiki thabiti 3  $c(M+S+N)-n(N+H)=0$

Uhakiki thabiti 4  $(e)-(q+r)=0$

Uhakiki thabiti 5  $[p(1+2+3+4+5+6)-n(H)]=0$

Uhakiki thabiti 1  $x-z=0$

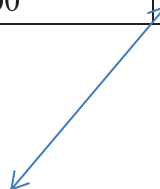
Uhakiki thabiti 2  $y+z=w$



right end vertical axis corresponding to the expected last operation day for the site, which depicts the 100% target of eligible households. Make sure the line reflecting the 100% target is stretched according to the maximum number of operation day.

9. Follow the same procedure to plot a straight line from “Zero” to “80%” using a different coloured pen (preferably dark blue). This depicts the 80% of the target met. For IRS to be effective, spray performances should be within the 80%-100% boundary.
10. For each operation day, enter the total number of houses sprayed by operators in the “Daily Sprayed” boxes located just below the graph. These numbers will be used to plot the graph on daily basis.
11. The “Cumulative Sprayed” boxes are the sum of each spray day performances. Usually on day 1, the cumulative sprayed is equal to the daily sprayed. For example, if on operation day 1, the total number of houses sprayed was 400, then the cumulative sprayed will also read 400. However, on the second and proceeding days, the numbers for daily sprayed households will be cumulated. See illustration below:

	Day 1	Day 2	Day 3	Day 4	Day 5
<b>Daily Sprayed</b>	400	200	300	0	500

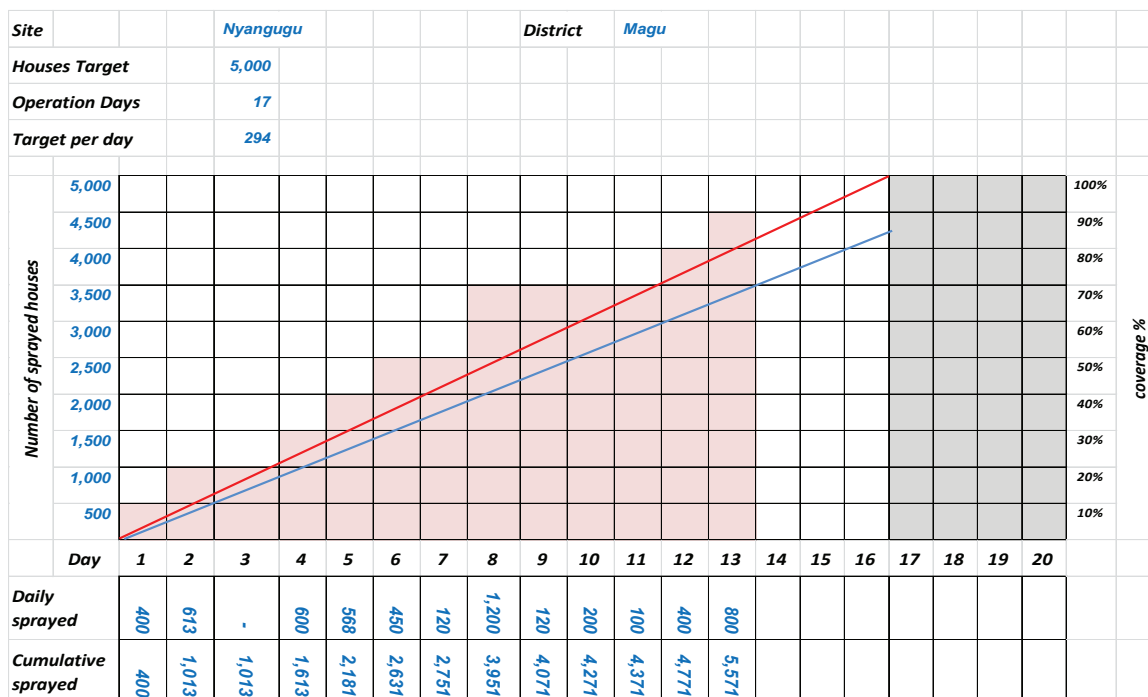


12. For each spray day field entered, plot a graph in a histogram form against that value and shade it in a dark colour to make it visible. See illustration below.

**NB:** The Daily Monitoring Chart has space to capture performances for 20 operation days. However, there are some sites that will stretch beyond this number of days. In such a scenario, the Site Manager should take a new Daily Monitoring Chart which can be used as an extension to the first one. This chart will be a continuation from the previous one, and should be pinned side by side.

It is easy to manipulate values for each coordinate for even numbered targets. However, for odd numbered targets, getting a workable value for each coordinate can be challenging. For example, an overall target of 5679 when divided by 10 gives 567.9; to assign this and a consequent value on the vertical axis is difficult. In such instances, the best way is to calculate a value that is within bounds of the original target. As an example, for the above situation, a workable number of 5750 can be taken and divided by 10, for which values can be obtained and entered for each coordinate. This will not affect the plotting of daily performance because at the end of the operation, the daily target will be within bounds of the original stated target.

### Example of a Daily Performance Monitoring Chart score



#### 8.5.5. Appendix 5 (e) Summary of supervision report on quality of spraying

SUPERVISOR NAME .....

TITLE: TL [ ] SM [ ] VCO [ ]

DISTRICT.....

SITE.....

VILLAGE .....

OPERATION DAY .....

SN	Name of spray Operator	Marks	%	Gap found	Action/Recommendation
1					
2					
3					
4					

#### OTHER GENERAL FINDINGS AND COMMENTS

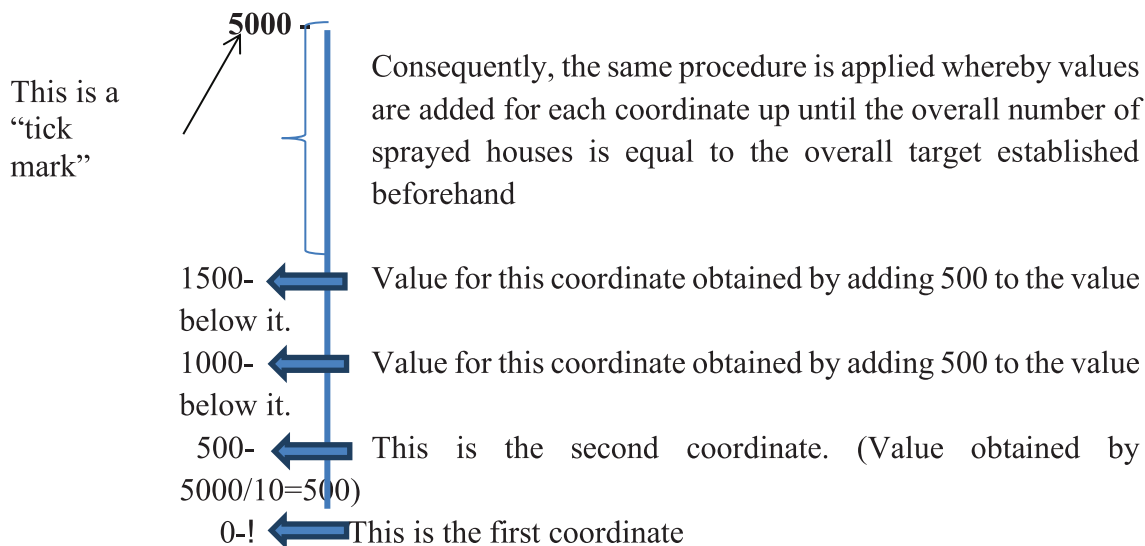
.....

.....

.....

.....

.....



SIGNATURE.....

DATE.....

**8.5.6. Appendix 5 (f) IRS Site decommissioning Form English and Swahili versions**

**HANDING OVER NOTE FOR THE SITE USED FOR IRS OPERATION WITH THE OBJECTIVE OF CONTROLLING MALARIA IN HUMAN DWELLINGS**

Site name.....  
 Village.....  
 Ward.....  
 District.....  
 Owner.....  
 Site in-charge.....

The site was constructed and renovated by the Ministry of health and Social Welfare for the purpose of serving the communities in the following wards

.....  
 .....  
 The IRS exercise employ long lasting insecticides to kill mosquitoes which cause Malaria. The intervention targets the mosquitoes which rest in the indoor environment. The IRS operation was executed and completed on.....and therefore the IRS site is closed until the next IRS round. For the entire period of which the site will be closed will be under the custodianship of Mr/Ms/Ms.....with the title of ....., The custodian of the site will be responsible for care and maintenance of the site until next IRS operation. This site has the following essential parts

- i. Store used for storage of insecticides and other IRS items
- ii. Bulbed wire fence which restrict unauthorized entry to people, and domesticated animals
- iii. Washing slab that is used for cleaning insecticide contaminated items that are used during IRS operation e.g., sprayers
- iv. Drying lines that are used for hanging cleaned coveralls, gum boots etc
- v. Toilets and bathrooms for IRS workers
- vi. Soak pits for treating insecticide effluents

The IRS site was handed over this day of ..... between;  
Mr/Ms.....IRS Site in charge (Handing over).  
Signature.....  
Mr/Ms.....  
In charge of the health centre where the IRS site is located  
Signature.....  
Mr/Ms..... District Medical Officer/District  
Executive Director for follow-up

### 8.5.7. Appendix 5 (g) Hati ya makabidhiano ya kambi ya kupulizia dawa ya ukoko kwa ajili ya kuuu mbu waenezao malaria majumbani

Jina la Kambi.....

Kijiji.....

Kata.....

Wilaya.....

Miliki.....

Msimamizi.....

Kituo hiki kimejengwa au kukarabatiwa na Wizara ya Afya na Ustawi wa jamii ili kitumike katika kuhudumia wananchi wa kata za.....

.....katika zoezi la kupulizia dawa ya ukoko majumbani ili kuuu mbu waenezao malaria. Zoezi hili limetekelezwa na kukamilika tarehe..... na kambi inafungwa mpaka awamu ijayo. Wakati woteambao kambi hii haitumiki inakabidhiwa kwa

Nd.....ambaye ni.....

ili awajibike kutunza kambi hii kwa usalama mpaka awamu ijayo. Kambi hii ina sehemu muhimu zifuatazo

- i. Ghala la kutunzia madawa na vifaa
- ii. Uzio wa kuzuia watu na wanyama kuingia eneo la kambi
- iii. Karo la kuoshea vifaa vinavyotumika katika zoezi la kupulizia dawa ya ukoko
- iv. Nguzo na nyaya za kukaushia nguo
- v. Vyoo na bafu kwa ajili ya watumishi wa zoezi
- vi. Mashimo ya kuvyonzea maji taka

Makabidhiano ya kambi hii yamefanyika leo tarehe.....na wahusika ni

- i. Ndugu.....Mkuu wa kambi (Anayekabidhi)  
Saini.....
- ii. Ndugu.....Msimamizi wa kituo/eneo ambamo kambi imejengwa (anayekabidhiwa)  
Saini.....
- iii. Ndugu.....Mganga mkuu (w)/ Mkurugenzi mtendaji (w) Kwa ufuatiliaji  
Saini .....



### 8.5.8. Appendix 5 (h): IRS Site End-of-Spray Report

Site name \_\_\_\_\_

Site location \_\_\_\_\_

Village \_\_\_\_\_ Ward \_\_\_\_\_ District \_\_\_\_\_

Duration of IRS \_\_\_\_\_

Commencing date \_\_\_\_\_ Ending date \_\_\_\_\_ Total days \_\_\_\_

Report on Human Resource Management

Category and number of staff that served at the site

No.	Staff category	At Opening			At Closure		
		Male	Female	Total	Male	Female	Total
1	Site manager						
2	Site IEC manager						
3	Team leaders						
4	Spray operators						
5	Pump technicians						
6	Washers						
7	Site attendants						
8	Site guards						
<b>Total</b>							

If there was variation between the number of staff at the opening of the site and the number at closure of the site, state the reasons (e.g., termination, dropout, other reasons).

#### Training

If IRS training was conducted during the spray operation period, report the following

Training date \_\_\_\_\_

Total number of trainees (Male) \_\_\_\_\_ (Female) \_\_\_\_

Topics covered \_\_\_\_\_

#### Staff Health Issues

During the IRS operation, how many staff experienced health issues that were reported at any health facility?

#### Cases of illness reported

Type of Case Reported	Male	Female	Total
Cases related to insecticide adverse reaction			
IRS-related injury cases			
Other cases			
<b>Total</b>			

### 8.5.10. Appendix 5 (j) IRS Stock Management

Complete the following charts from the site reconciliation form.

#### Stolen/Lost Items

No.	Type of Property	Total
1		
2		
3		
4		
5		

Measures taken and the outcome

---



---

Attach the site reconciliation form.

#### IRS Performance

Complete the following table, which shows the village targets and IRS performance.

Households					
No.	Name of village	Targeted	Sprayed	Percentage Sprayed	Recapture (Yes/No)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

#### Adverse Event Reported

Describe any adverse event that happened during IRS and how they were handled. \_\_\_\_\_

---



---



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---

#### Recommendations

(a) Describe, in list form, any areas of strength that you appreciated and you would like to recommend to continue. \_\_\_\_\_

---



---



---

(b) Describe any areas of weakness that you recommend changing. \_\_\_\_\_

---



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### 8.5.11. Appendix 5 (k) Daily Insecticide Sachet Control (#15)

#### Daily Insecticide Sachet Control

Region:

SITE MANAGER [ ] TEAM LEADER [ ]

District/Site:

Date:

Number	Name of Team Leader [ ] / Spray operator [ ] /Code No	Issuing		Returns			Remarks
		No. of Sachet Issued	Signature of Spray operator	No. of Sachet returned	No. of empty sachet returned	Signature of Spray operator	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

Name of Site Manager / Team Leader: \_\_\_\_\_

Signature: \_\_\_\_\_

### 8.5.12. Appendix 5 (l) Weekly Insecticide Stock Records (#7)

#### WEEKLY INSECTICIDE STOCK RECORDS

District: \_\_\_\_\_ Site: \_\_\_\_\_ Week starting: \_\_\_/\_\_\_/\_\_\_ Week ending: \_\_\_/\_\_\_/\_\_\_

Week day	Date	FULL SACHET					EMPTY SACHET			
		Brought forward	Sachet Received	Sachet Issued	Sachet returned	Balance	Brought forward	Sachet returned	Sachet missing/ Damaged	Balance
		A	B	C	D	E	F	G	H	I
1										
2										
3										
4										
5										
6										
7										
	Consistency check	E of previous day				A+B - C+D	I of previous day	C-D	C-D-G c-d-g-h=0	F+G -H

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_







**8.5.17. Appendix 5 (q) IRS Human Resources Management - Medical Attendances (#9)**

**MEDICAL ATTENDANCE CARD**

District: \_\_\_\_\_ Site: \_\_\_\_\_

Name: \_\_\_\_\_ Code: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: M  F

Position: \_\_\_\_\_

Date	Health Facility	Diagnosis/Lab test	Treatment/procedure





### 8.5.19. Appendix 5 (s): Temporary Staff Consent Form (#18)

**TAARIFA BINAFSI ZA WATENDAJI KATIKA ZOEZI LA UNYUNYIZIAJI WA KIUWATILIFU CHA KUUU MBU WAENEZAO MALARIA MAJUMBANI (IRS) – 2011**

1. Jina Kamili: \_\_\_\_\_

2. Nafasi yako Katika Zoezi: \_\_\_\_\_

3. Jina la Kituo: \_\_\_\_\_ Wilaya: \_\_\_\_\_

4. Anuani ya Posta: \_\_\_\_\_ Namba ya Simu: \_\_\_\_\_

5. Umri: \_\_\_\_\_ Jinsia (Mme/Mke): \_\_\_\_\_

6. Umeoa/Umeolewa/Hujaoa/Hujaolewa/Mgana/Mjane: \_\_\_\_\_

7. Kiwango cha Elimu: Elimu ya Msingi: \_\_\_\_\_  
 Elimu ya Sekondari: \_\_\_\_\_  
 Kiwango Kingine: \_\_\_\_\_

8. Akaunti ya Benki: Jina la Benki: \_\_\_\_\_  
 Tawi: \_\_\_\_\_  
 Nambari ya Akaunti: \_\_\_\_\_

9. Taarifa ya Makazi Yako: Kitongoji: \_\_\_\_\_  
 Mtaa/ Kijiji: \_\_\_\_\_  
 Kata: \_\_\_\_\_  
 Wilaya: \_\_\_\_\_  
 Jina la Afisa Mtendaji wa Kijiji/Mtaa: \_\_\_\_\_  
 Namba ya Simu ya Afisa Mtendaji wa Kijiji/Mtaa: \_\_\_\_\_

10. Taarifa ya Ushiriki Wako Katika Zoezi la Unyunyiziaji wa Kiuwatilifu la RTI Siku za Nyuma:  
 Wilaya Uliyoshiriki Zoezi: \_\_\_\_\_  
 Kituo: \_\_\_\_\_  
 Mwezi: \_\_\_\_\_ Mwaka: \_\_\_\_\_

:



## 8.5.22. Appendix 5 (v) IRS Daily Performance Monitoring Chart (#20)

### Ridhaa ya Mtendakazi katika Zoezi la Upigaji Dawa ya Ukoko

Nathibithisha kwamba nina umri wa miaka \_\_\_\_\_ (18 au zaidi) nikiwa mkazi wa Wilaya ya \_\_\_\_\_

Nafahamu kwamba nitakuwa natoa huduma kama \_\_\_\_\_ katika zoezi la upigaji dawa ya ukoko ili kuua mbu majumbani katika Wilaya ya \_\_\_\_\_ nchini Tanzania.

Nafahamu kuwa zoezi la upigaji dawa katika wilaya hii litaanza tarehe \_\_\_\_\_ na kumalizika tarehe \_\_\_\_\_ . Kila mtendakazi atapangiwa kazi katika siku maalum katika kipindi cha upigaji dawa.

Nafahamu kuwa nitapokea kiasi cha Shilingi \_\_\_\_\_ ukiwa ni ujira wa kila siku ambayo nitafanya kazi nitakayopangiwa.

Nafahamu kuwa ujira wangu utalipwa kila baada ya wiki mbili za kazi na nitalipwa katika akaunti yangu ya benki.

Nafahamu kuwa nitalipwa kama ilivyoelezwa hapo juu kwa siku ambazo nimezifanyia kazi. Inawezekana kuwa baadhi ya siku katika kipindi cha zoezi hili ikawa hakuna kazi. Hakuna uhakika kuwa kila siku kutakuwa na kazi.

Nakubali kuwa mimi ni mtoa huduma binafsi na slo mwajiriwa wa RTI na kuwa nitastahili kupewa ujira ambao umetajwa hapo juu tu na sistahili ujira mwingine zaidi au ruzuku yeyote.

Kwa kuweka saini hapa chini, nakubali kuwa nimeyaelewa na kukubaliana na masharti yaliyowekwa hapo juu.

Mshirik	
Saini:	
Jina kamili:	
Urata:	
Tarehe:	

Kumbukumbu za Maelezo ya Benki: Viambatisho: Picha 2

Jina la Benki	Tawi la Benki	Jina la Akaunti	Nambari ya Akaunti

## 8.6. Appendix 6: Samples of IEC Materials

### 8.6.1. Appendix 6 (a): Household Tear-Off Sheet

# MAMBO YA KUZINGATIA KWA MWENYE KAYA

### Kabla ya kupuliziwa dawa

- Weka vizuri vyombo na nguo ili visifikiwe na dawa kwa kuvifunika au kuviweka sandukuni au kabatini.
- Hakikisha unahifadhi vizuri au kutoa nje aina zote za vyakula, mifugo na baadhi ya vyombo vinavyo hamishika ili visifikiwe na dawa.
- Weka vifaa vyote katikati ya chumba au kuvitoe nje ili kuhakikisha kuta zote za ndani ya nyumba zinafikika kirahisi.
- Funga madirisha ya nyumba ili kuwezesha dawa kufanya kazi.



### Wakati wa kupuliziwa dawa

- Tayarisha ndoo moja ya maji safi kwa ajili ya kufanikisha zoezi.
- Jibu vizuri maswali yatakayoulizwa na mpuliza dawa.
- Unatakiwa uwe nje ya nyumba yako wakati zoezi linaendelea.
- Mpuliza dawa hatakiwa kula au kunywa chochote wakati wa zoezi.
- Msindikize mpuliza dawa kuelekea nyumba ya jirani anapomaliza kupuliza dawa nyumbani kwako.



### Baada ya kupuliziwa dawa

- Usiingle ndani ya nyumba kwa muda wa saa mbili baada ya kupuliziwa dawa.
- Baada ya saa mbili fungua madirisha na milango kuruhusu hewa safi kupita.
- Kabla ya watoto na mifugo kuingia ndani, fagia wadudu wote waliokufa na kuwachoma au kuwafukia.
- Usisiribe wala kupaka rangi kuta za ndani ya nyumba kwa muda wa miezi tisa baada ya kupuliziwa dawa.
- Baada ya nyumba yako kupulizwa dawa bado ni muhimu wewe na familia yako kuendelea kulala kwenye chandarua kilichowekwa dawa kila siku.



Tarehe ya kupuliziwa dawa ni / /20







# Ukweli kuhusu Malaria

Malaria ni ugonjwa unaosababishwa na vimeloa vinavyojulikana kama Plasmodium ambavyo huenezea na mbu ilike aina ya anopheles. Malaria ni ugonjwa unaoshiriki watu wengi nchini Tanzania.

Ugonjwa wa malaria umezoelelea sana kiasi kwamba watu wanadhani kwamba kupata 'thoma' hakuwezi kusepukika. Hii sio kweli. Ugonjwa wa malaria unazuilika na kuobika.

## Nchini Tanzania

- Malaria inaongoza kwa kusababisha vifo vingi na idadi ya wagonjwa wanaoifika kwenye vituo vya tiba;
- Malaria hua mtoto mmoja kila baada ya dakika tano kila siku;
- Wataanzani wote wapo hatika hatari ya kupata Malaria japo kwa kupindi fulani cha mwaka;
- Tanzania ni nchi ya tatu kati ya nchi zinazoongoza kwa hatari ya Malaria;
- Kati ya watu milioni 17-20 hupatawa na ugonjwa wa Malaria kila mwaka na kati yao 80,000 hufa kwa Malaria

## Kinga ya Malaria

- Unaweza kujikinga na malaria kwa kutumia chandara kilichotawa dawa kila siku;
- Kupuliza viuatilifu kwenye makazi au kuta za nyumba na kuondoa mazaha ya mbu maeneo yanayozunguka makazi yetu;
- Kuweka nyavu kwenye madirisha, milango na matundu ya nyumba

## ENDELEA KUTUMIA MIKAKATI MBALI MBALI INAYOSHAURIWA KATIKA KUPAMBANA NA MALARIA



Lala kwenye chandara chenye dawa kila siku



Nenda kwenye kituo cha afya mara tu unapo dalili za malaria



Hakikisha unamaliza dozi ya dawa za malaria



Yampasa mjamzito kwenda kliniki mapema na kupata dozi mbili za tiba ya tahadhari ya malaria kwa vipindi

# KAMPENI YA KUPIGA DAWA MAJUMBANI ILI KUUA MBU WAENEZAO MALARIA



## SHIRIKI KUFANIKISHA ZOEZI HILI

malaria haitubaki



Msaidizi unawezasababisha kwa hivisi ya watu wa Mwanakazi kupitia shirika la maendeleo la kimataifa (USAID) chini ya mpango wa Rais wa Mwanakazi katika kupambana dhidi ya malaria (PM).

## Wizara ya Afya na Ustawi wa Jamii inakuja nyumbani kwako kupiga dawa



### Kabla ya kupigwa Dawa

- Weka vizuri vyombo na nguo ili visifikiwe na dawa kwa kuvifunika au kuvifuka sandukuni au kabatini.
- Hakikisha unahifadhi vizuri au kuweka nje aina zote za vyakula na vyombo ili visifikiwe na dawa.
- Weka vifaa vyote katikati ya chumba au kuvitoa nje ili kuhakikisha kuta zote za ndani ya nyumba zinafika kirahisi.
- Funga madirisha na nyumba ili kuwezesha dawa kufanya kazi vizuri.

### Wakati wa kupigwa Dawa

- Tayarisha ndoo moja ya maji safi kwa ajili ya kufanikisha zoezi.
- Jibu vizuri maswali yanayoulizwa na mpiga dawa.
- Unatakiwa uwe nje ya nyumba yako wakati zoezi likiendelea.

Dawa hii ni ya kuua mbu ni salama na imethibitishwa na Wizara ya Afya na Ustawi wa Jamii kuwa haina madhara kwa binadamu. Wanyama na mazingira. Kwa tatizo lolote onana na wasimamizi wa wapiga dawa.

### Baada ya kupigwa Dawa

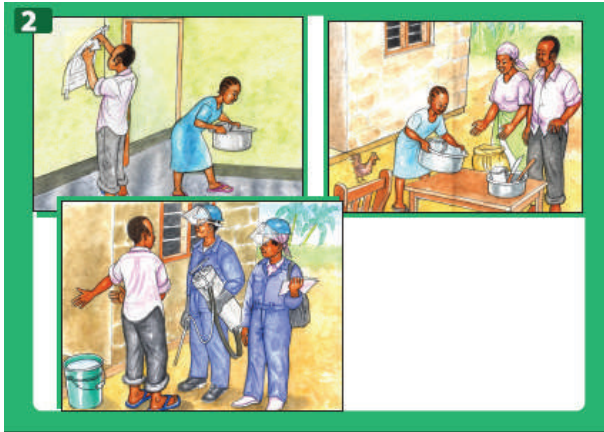
- Usiingie ndani ya nyumba kwa muda wa saa mbili baada ya kupigwa dawa.
- Baada ya saa mbili fungua madirisha na milango kuruhusu hewa safi kupita.
- Fagia wadudu wote waliokufa na kuwachoma moto au kuwafukia.
- Usisilibe wala kupaka rangi kuta za ndani ya nyumba kwa muda wa miezi tisa baada ya kupigwa dawa.

### 8.6.2. Appendix 6 (b): IRS Flipchart for IEC Mobilizer



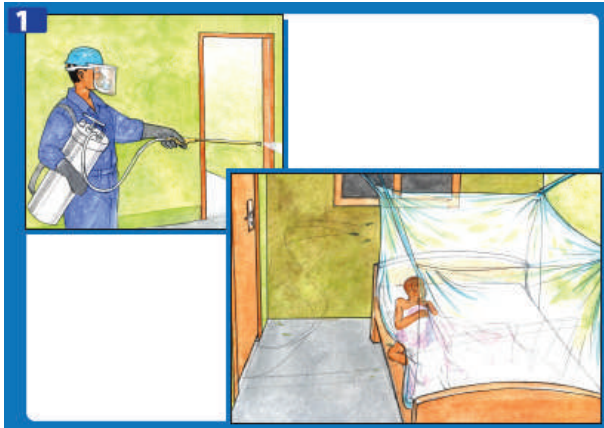
# CCAs & Health Facility Workers

## IRS Training Flipchart



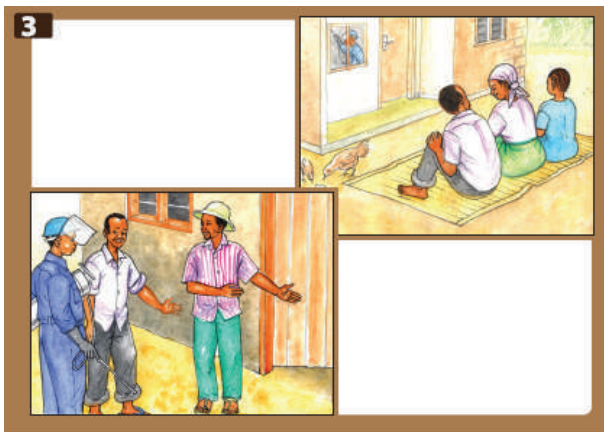
## 2 Kabla ya Kupulizia.

- Ondoa vitu vya ndani vinavyobebeka hasahasa chakula, maji, vitu vya thamani, vifaa vya kupikia, nk kabla ya kupuliza dawa.
- Ondoa kitu chochote kinachoning'inia kwenye kuta.
- Hakikisha kwamba wagonjwa, wanyama wa kufugwa na ndege pia wanahamishwa kabla ya kupulizia dawa;
- Weka ndoo (10 lita) za maji safi kwa ajili ya kupuliza dawa;
- Wakaribishe timu ya wapulizaji.
- Jisikie huru kuuliza maswali kwa wapulizaji wa dawa



## 1 IRS ni nini?

- IRS ni dawa ya kupulizia kwenye kuta za ndani ya nyumba. Inaua mbu wanaokaa kwenye kuta, kama mbu wa malaria. Hii inazuia mbu kuambukiza malaria toka kwa mtu mmoja kwenda kwa mwingine.
- Mbu anamng'ata binadamu, na anapenda kupumzika kwenye kuta za nyumba. Wakifika kwenye kuta zilizopuliziwa IRS, wanakosa nguvu na kufa.
- IRS inadumu kwa mwaka mmoja. Nyumba zinapiliziwa mara moja kwa mwaka.



## 3 Wakati wa Kupulizia.

- Kaa nje ya nyumba wakati wa kupuliziwa.
- Msindikize mpulizaji kwenda nyumba inayofuata.

4



## 4 Baada ya Kupulizia

- a. Kaa nje kwa masaa mawili baada ya kupulizia.
- b. Kisha, kufungua milango na madirisha na fagia wadudu.
- c. Tupa wadudu waliokufa katika choo cha shimo au kuzika .
- d. Usifanye marekebisho au kupiga ripu katika kuta kwa muda wa miezi 9.

5



## 5 Faida ya IRS

- a. Familia yako itakutana na malaria mara chache.
- b. Itaokoa familia yako na gharama za matibabu, na uta poteza siku chache zaidi za shule na kazini.
- c. IRS inalinda jamii nzima, na kuondoa maeneo salama kwa ajili ya mbu wa malaria.
- d. Kumbuka, bado ni muhimu kulala kwenye chandarua chenye dawa, ili kuzuia kung'atwa na mbu warukao ndani ya nyumba.

### 8.6.3. Appendix 6 (c): T-Shirt for Community Sensitizers.

**KAMPENI  
YA KUPULIZIA  
DAWA YA KUUA  
MBU WAENEZAO  
MALARIA  
MAJUMBANI**

**Shiriki  
kufanikisha  
zoezi hili!**



FRONT - A



BACK





8.6.4. Appendix 6 (d): Leaflet for House-to-House Sensitization on IRS

**UNYUNYIZIAJI**  
**DAWA YA KUUA**  
**MBU WAENEZAO**  
**MALARIA**  
**MAJUMBANI**

**Shiriki**  
kufanikisha  
zoezi hili!

Litafanyika hapa tarehe

 **USAID**  
U.S. Agency for International Development  
President's Malaria Initiative

 **JOHNS HOPKINS**  
**BLOOMBERG**  
SCHOOL OF PUBLIC HEALTH  
Center for Communication Programs

 **Wakazi wa Kenya ni wa Jumuia**

 **RTI**  
INTERNATIONAL

## 8.6.5. Appendix 6 (e): Facts sheet on IRS



**6. Je upulizaji huu una gharama yoyote?**

- Upulizaji huu hauna gharama yoyote kwani ni juhudi za serikali pamoja na wadau wengine kuhakikisha wanatokomeza ugonjwa wa malaria, kwa hivyo upulizaji huu hauna gharama.

**7. Je dawa hii halina madhara yoyote?**

- Dawa ya kuuu mbu waenenzao malaria majumbani ni salama kwako na washirika wengine wa familia yako. Ina athari mbaya kwa wadudu tu.

**8. Kwanini wapulizaji huvaa vifaa vya kujikinga?**

Wanajikinga kwa sababu ya kuepuka kushika dawa nyingi ya kuuu mbu, wingi wa dawa unaweza kumsababishia muwasho wa ngozi, hivyo inawalazimu kuvaa mavazi maalumu ya kujilinda, pia wanakinga dawa isiingie kwenye maeneo laini mwilini kama machoni.

**9. Nifanye nini endapo nitalgusa dawa hii kwa bahati mbaya?**

- Unatakiwa kunawa kwa maji mengi yaliyo safi. Endapo muwasho wa ngozi unazidi au vipere vya rasha rasha vinajitokeza kwenye ngozi unatakiwa kumuona daktari kwa ushauri wa kitaalamu zaidi.

**10. Ni kweli kuwa dawa hii inasababisha kuongezeka kwa wadudu kama chawa na viroboto ndani ya nyumba?**

- Si kweli! Dawa hii inawafanya chawa /viroboto watoke nje ya maficho yao kwa sababu chawa /viroboto hupenda kujificha kwenye miteka iliyotengenezwa kwa nyasi au majani makavu ya migomba. Mara wajitokezapo viroboto unatakiwa kusafisha nyumba na kumwaga maji ya moto ili kuwaua.

**11. Kama nyumba yangu imepulizwa dawa, je bado ninahitaji kutumia chandarua kilichowekwa dawa?**

- Kwa uhakika zaidi ni vizuri kutumia njia zote mbili pamoja, kwa ajili ya ulinzi thabiti dhidi ya m bu waenenzao malaria.

## 8.7. Appendix 7: Spray Pump Inventory Form

	<b>R e f . No.</b>	<b>DESCRIPTION</b>	<b>Part No.</b>	<b>ON HAND</b>	<b>NEEDED</b>
1	1	Spare Tank, Less Cover, 3.0 Gallons (8 Litters)	142-612		
2	1-B	Spare Tank, Less Cover, 4.0 Gallons (15 Litters)	142-615		
3	2	Shoulder Strap, 51 Mm Wide	152-829		
4	3	Plug For Gauge Adaptor (Fitting on Top)	114-152		
5	4	1/8 X 1/2 Cotter Pin	801-423		
6	5	Cover Chain	116-426		
7	6	3/32 X 1/2 Cotter Pin	801-411		
8	7	3/32 X 7/8 Cotter Pin	801-419		
9	8	Valve Pin Spring	150-605		
10	9	Valve Pin Assembly	143-000		
11	10	Cover Assembly, Complete	140-205		
12	11	Cover Gasket	151-401		
13	12	Male Fitting	115-965		
14	13	“O” Ring for Dip Tube	805-312		
15	14	Supply Tube Only, For 3.0 Gal. Tank (8.0 Litters)	129-074		
16	14-B	Supply Tube Only, For 4.0 Gal. Tank (15 Litters)	129-075		

	No.	OPTIONAL ITEMS	Part No.	ON HAND	NEEDED
17	15	100-Lb Pressure Gauge	803-311		
18	16	Filter Assembly for Pressure Gauge	146-605		
	No.	OPTION: CONSTANT FLOW VALVE	Part No.	ON HAND	NEEDED
19	17-A	CF Valve 3.0 BAR (43.5 psi) 3/4" Thread	98668		
20	17-B	CF Valve 2.0 BAR (29 psi) 3/4" Thread	98667		
21	17-C	CF Valve 1.5 BAR (21.0 psi) 3/4" Thread	98666		
22	17-D	CF Valve 1.0 BAR (14.5 psi) 3/4" Thread	98665		
	No.	OPTION: SHUTOFF COCK	Part No.	ON HAND	NEEDED
23	18	Hose Adaptor Assembly	148-704		
24	19	Hose Adaptor	115-960		
25	20	Shutoff Cock	806-428		
26	21	Supply Adapt Tube, With Wing Fitting	115-968		
	No.	PUMP & CYLINDER SERVICE PARTS	Part No.	ON HAND	NEEDED
27	22	Plunger Assembly, Complete	147-541		
28	23	Plunger Tube & Handle, only	147-501		
29	24	Bumper Pad	151-028		
30	25	Pump Cap Assembly, only (Nylon)	149-100		
31	26	Bumper Pad	115-842		
32	27	Cup Replacement Kit	140-833		
33	28	Cup Leather Only	154-007		
34	29	Washer	123-908		
35	30	Plunger Adaptor	153-812		
36	31	Cup Retainer	153-816		
37	32	Pump Cylinder Assembly, Complete	147-202		
38	33	Pump Cylinder Gasket	151-030		
39	34	Pump Cylinder Check Valve Assembly, Complete	140-055		
40	35	"O" Ring for Pump Cylinder Check valve	805-401		
41	36	Pump Cylinder Check Valve Assembly	140-054		
42	37	Spring For Pump Cylinder Check valve	150-604		

43	38	Housing For Pump Cylinder Check valve	110-790		
44	39	Pump Cap Assembly, Brass	149-102		
45	40	Stainless Steel Spring	150-409		
46	41	Plunger Adapter, Brass	153-812B		
47	42	Cup Retainer, Brass	153-816B		

48	No.	HOSE & VALVE SERVICE PARTS	Part No.	ON HAND	NEEDED
49	43	Shutoff Assembly, Complete, Thrust less	149-706		
50	44	Valve Body Cap With "O" Ring Gaskets	140-702		
51	45	Shutoff Valve Body Cap	115-733		
52	46	Valve Body Cap "O" Ring for Valve Pin	805-335		
53	47	Valve Body Cap "O" Ring	805-309		
54	48	Shutoff Valve Pin	115-716		
55	49	Teflon Valve Pin Spacer	110-243		
56	50	Shutoff Valve Pin Spring	150-400		
57	51	Shutoff Valve Pin Washer	123-911		
58	52	Shutoff Valve Pin Packing	151-016		
59	53	Shutoff Valve Body	153-377		
60	54	1/8 X 1/2 Cotter Pin	801-423		
	55	Shutoff Operating Lever	123-899		
62	56	Teflon Bearing, For Valve Pin	110-234		
63	57	Strainer Assembly, Complete	146-617		
64	58	Male Fitting for Strainer Housing	114-905		
65	59	O Ring Gasket for Male Strainer Fitting	805-310		
66	60	Strainer Assembly	152-356		
67	61	Strainer Housing Assembly	146-627		
68	62	Hose Clamp	803-623		
69	63	Hose Only	115-902		
70	64	Nut	115-970		
71	65	Hose Connector	115-950		
72	66	O Ring Gasket for Hose Connector	805-307		
73	67	Hose, With Thrustless Shutoff and Strainer Assembly	146-689		

	No.	EXTENSION TUBE & NOZZLE SERVICE PARTS	Part No.	ON HAND	NEEDED
74	68	Extension Tube & Nozzle Assembly For 8 Litter Unit	141-966		
75	69	Extension Tube & Nozzle Assembly For 15 Litter Unit	141-966		
76	70	8 Litter Extension Tube Assembly Only	141-967		
77	71	15 Litter Extension Tube Assembly Only	141-967		
78	72	O Ring Gasket for Extension Tube	805-337		
79	73	Nozzle Assembly Complete	141-989		
80	74	Nozzle Body	114-791		
81	75	Polyethylene Nozzle Gasket	123-950		
82	76	No. 8002 Hss Hardened Stainless Steel Nozzle Tip	805-855		
83	77	Nozzle Body Cap	115-680		

## 8.8. Appendix 8: House Spray Cards (#A)



**WIZARA YA AFYA NA USTAWI WA JAMII**  
**KAMPENI YA KUNYUNYIZIA DAWA YA KUUA MBU MAJUMBANI**



Kitongoji	
Kijiji	
Nambari ya Kaya	
Mkuu wa Nyumba	

Jina na sahihi ya mpiga dawa \_\_\_\_\_

**TOKOMEZA MALARIA KWA:**

- 1. Kutumia chandarua chenye dawa kila siku**
- 2. Kushirikiana na Wahudumu wakati wa Zoezi la Unyunyiziaji wa Dawa ya Kuua Mbu Majumbani**
- 3. Kuwahi kwenye Kituo cha Matibabu mara upatapo homa**

**TUNZA KADI HII USITUPEI**

Kampeni hii imefadhiliwa na



## TAARIFA YA UNYUNYIZIAJI DAWA

Awamu		1	2	3	4	5	6
Tarehe ya Kunyunyizia Nyumba							
Nambari Ya Mpiga Dawa							
Nambari Ya Kiongozi wa Kundi							
Idadi ya Wakazi							
Dawa Iliyotumika kunyunyiza							
Idadi ya vyumba	Vilivyo nyunyizwa						
	Visivyo nyunyizwa						
Idadi ya vyandarua	Vyenye dawa						
	Visivyo na dawa						

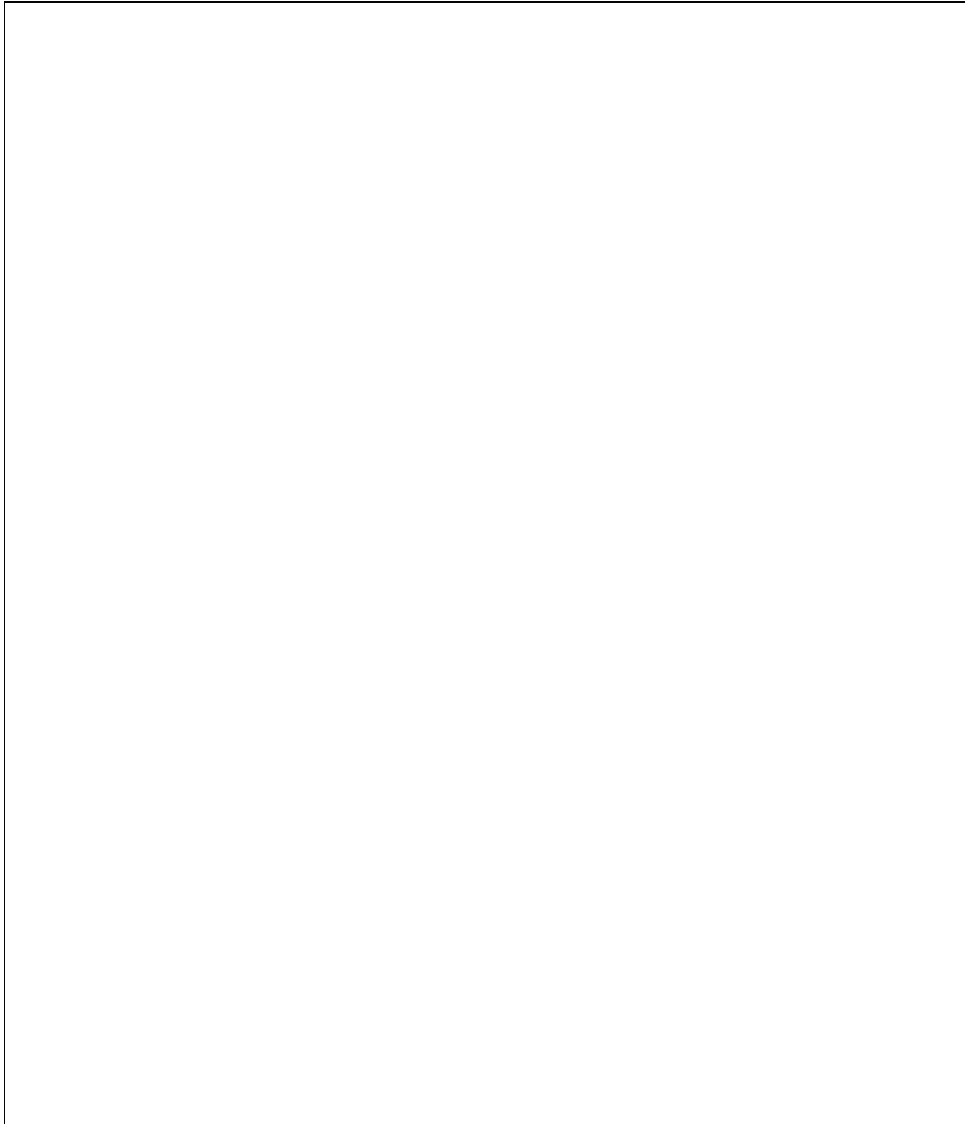


## 8.9. Appendix 9: Hamlet Sketch Map Form

Ministry of Health, Community Development, Gender, Elderly and Children  
National Malaria Control Program

### Hamlet Sketch map form

Region: \_\_\_\_\_ Council: \_\_\_\_\_ Ward: \_\_\_\_\_ Village/Street: \_\_\_\_\_  
Hamlet/TCU: \_\_\_\_\_ Hamlet/TCU No: \_\_\_\_\_ Date: \_\_\_\_\_  
Name of Hamlet leader: \_\_\_\_\_





## 8.11. Appendix 11: Types of open mosquito breeding habitats

### 1. Puddles and tire tracks



### 2. Swampy areas



### 3. Mangrove swamps



### 4. Drains and ditches



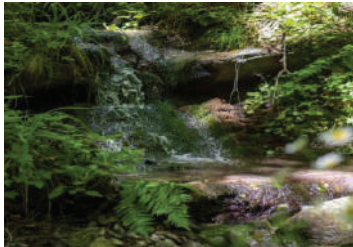
### 5. Construction pits / man made holes



### 6. Water storage containers



### 7. Seepages / springs



### 8. Rice farms



### 9. Other agricultural sources



### 10. Streams and river beds



### 11. Ponds / pools



### 8.13. Appendix 13: Types of closed mosquito breeding habitats

#### 12. Pit latrines




#### 13. Septic tanks



#### 14. Soakage pits



### 8.14. Appendix 14: Goods Received Note (GRN)



**MARANATHA PHARMACY LIMITED**  
11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

## DELIVERY NOTE

Customer: **CHUNYA**

CHUNYA DISTRICT HOSPITAL
P.O. BOX
CHUNYA
MIEYA

REF: INVOICE: 470
Date: 11/03/2019
TIN: -132-366-178

Item Code	Description	Qty	Delivered	Check	Name
V209	I.V. Giving Set For Paediatric 0 (Measured Volume)	5.00		<input type="checkbox"/>	
V1310	Methylglucos 250mg	10.00		<input type="checkbox"/>	
V1319	Mefenidazole 250mg	50.00		<input type="checkbox"/>	
V1383	Paracetamol 500 mg P1000	50.00		<input type="checkbox"/>	
V1385	Paracetamol Syrup 120 mg/ml, 100ml	10.00		<input type="checkbox"/>	
V1449	Sodium Lactate Comp (Hartmann's/Ringer ) inj 500 ml.	100.00		<input type="checkbox"/>	
V1444	Sodium Chloride + Dextrose 500ml	5.00		<input type="checkbox"/>	
V1241	Hydrocortisone inj. 100 mg	200.00		<input type="checkbox"/>	
V000384	Sulfates, chronic output no 1	50.00		<input type="checkbox"/>	
V172	Gauze absorbent type 90 cm x 100 m	100.00		<input type="checkbox"/>	
V1236	Hydrocortisone inj PDR F and 20mg/ml, 1ml	50.00		<input type="checkbox"/>	
V1235	Hydrocortisone 25 mg	5.00		<input type="checkbox"/>	
V1442	Snake venom antiserum (polyvalent) central african type inj	10.00		<input type="checkbox"/>	

Received in good order on: \_\_\_\_\_

Name and Signature: \_\_\_\_\_

**DISTRICT MEDICAL OFFICER**  
**CHUNYA**  
 MARANATHA - Delivery Note

Printed By: DICKSON, Date: 26 October 2020 12:36

1 of 1











**8.19. Appendix 19: Report and Requisition form – Council level**

**FOMU 2A: TAARIFA NA MAOMBI YA VIUADUDU – NGAZI YA HALMASHAURI**

Namba ya Utambulisho: \_\_\_\_\_ Jina la Halmashauri: \_\_\_\_\_ Tarehe ya Kuwasilisha: \_\_\_\_\_

Kipindi cha Taarifa: Kuanzia Mwezi: \_\_\_\_\_ Kuishia Mwezi: \_\_\_\_\_ Mwaka: \_\_\_\_\_

Ngazi ya Halmashauri													
Namba ya MSD	Maelezo ya Mali	Kipimo cha ugavi	Kiasi cha kuanzia (A)	Kiasi kilichopo kelewa (B)	Upotevu / Marekebisho (C)	Salio (D)	Makadirio ya matumizi (E)	Kiasi kinachohitajika (F)	Kiasi kinachoa-gizwa [F-D] (G)	Bei (H)	Gharama [GxH] (I)	Kiasi kili-choidhinishwa (J)	Gharama iliyoidhinishwa (K)
	Bactivec (Bti)	Lita								13,200			
	Griselesf (Bs)	Lita								13,200			

**8.20. Appendix 20: Report and Requisition form – Ward level**

**FOMU 2B: TAARIFA NA MAOMBI YA VIUADUDU – NGAZI YA KATA**

Namba ya Utambulisho: \_\_\_\_\_ Jina la Kata: \_\_\_\_\_ Tarehe ya Kuwasilisha: \_\_\_\_\_

Kipindi cha Taarifa: Kuanzia Mwezi: \_\_\_\_\_ Kuishia Mwezi: \_\_\_\_\_ Mwaka: \_\_\_\_\_

Ngazi ya Kata									
Namba ya MSD	Maelezo ya Mali	Kipimo cha ugavi	Kiasi cha kuanzia (A)	Kiasi kili-chopo kelewa (B)	Upotevu / Marekebisho (C)	Salio (D)	Makadirio ya matumizi [A+B+C-D] (E)	Kiasi kinachohitajika (F)	Kiasi kinachoa-gizwa [F-D] (G)
	Bactivec (Bti)	Lita							
	Griselesf (Bs)	Lita							













**8.26. Appendix 26: Bucket trap mosquito collection form**

**Ministry of Health, Community Development, Gender, Elderly and Children**  
**National Malaria Control Program**  
**NATIONAL ENTOMOLOGICAL MONITORING**

**Council Mosquito Processing Form (Bucket Trap)**

Region: \_\_\_\_\_ Council: \_\_\_\_\_ Ward: \_\_\_\_\_ Village/mtaa: \_\_\_\_\_

Hamlet name: \_\_\_\_\_ House Hold name: \_\_\_\_\_

House hold ID: | | | | | | | | | | | | | | | | Initials: | | | | | | | |

Collection Method: Bucket trap: \_\_\_\_\_ Bucket Trap ID: | | | | | | | | Bucket Trap Location: In [ ] / Out [ ]

Collection Round: | | | | | |

Did the bucket trap work throughout the night? Yes [ ] / No [ ]

Did it rain last night? Yes [ ] / No [ ]

Any insecticide used inside the house last night (aerosols, repellents, herbs or plants) Yes [ ] / No [ ]

Time of going to bed	<i>An. gambiae</i> complex						<i>An. funestus</i> group						Other Anopheline		Culex spp		Aedes spp		Mansonia spp	
	Total male	unfed	blood fed	semi-gravid / gravid	Total female	Total male	unfed	blood fed	semi-gravid / gravid	Total female	Total male	Total female	Total male	Total female	Total male	Total female	Total male	Total female	Total male	

**General comments (e.g. Traps did not work properly etc....)**

8.27. Appendix 27: Molluscicide Release Records

COUNCIL		WARD		Mtaa		CORP's name		Supervisor's name	
Week:	Day:	Date:	Amount of molluscicide received (in Lts):	Signature sprayer man	Amount of molluscicide returned (in lts)	Amount of Lts used	Total number of TCUs treated (as per mosquito control CORP data sheet)	Signature of supervisor	
	Mon								
	Tue								
	Wed								
	Thur								
	Fri								
	Weekly total								

8.28. Appendix 28: Form for monitoring tsetse flies abundance in the field during intervention

Ref Site	Id	In/Out intervention	Relative position	Latitude	Longitude	Date Set	Date Collect	Weather (Cloudy / sunny/rain)	Males	Females	Other flies	on host/ Vegetation

**8.28. Appendix 28: Monitoring and evaluation of plague control (Outcome Indicators)**

S/N	Main Intervention	Outcome Indicator	Indicator definition	Target Year 1	Target Year 2	Target Year 3
	Capacity building to the health personnel in fleas and rodents' surveillance.	Proportion of health workers trained and able to implement fleas and rodents control interventions	Number of health workers trained and started to implement fleas and rodent control interventions during past 12 months divided by Number of all health workers intended for capacity building in the plague endemic areas.	50%	75%	100%
	To build the capacity of health personnel and community on early plague warning signs.	Proportion of health workers and community groups trained and able to understand early plague warning signs and take actions.	Number of health workers and community groups trained during past 12 months divided by Number of all community groups intended and able to identify early plague warnings signs and can take action to mitigate the situation in the plague endemic areas	50%	75%	100%
	Resources mobilization for fleas and rodent control.	Proportion of resources mobilized for the targeted fleas and rodents' control and follow-up that have been implemented in plague endemic areas.	Number of activities implemented in the respective plague endemic areas.	100%	100%	100%
	Implement appropriate, sustainable and quality fleas and rodents interventions in plague endemic areas	Reduction in fleas and rodent density in plague endemic areas implementing fleas and rodents control interventions.	Percent reduction in fleas and rodents' density in plague endemic areas.	50%	75%	100%

	<b>Activities</b>	<b>Output Indicator</b>	<b>Indicator definition</b>	<b>Target Year 1</b>	<b>Target Year 2</b>	<b>Target Year 3</b>
1.1	Capacity building to the health personnel in fleas and rodents' surveillance.	Proportion of eligible plague endemic areas with capacity to plan, manage, implement fleas and rodents' interventions.	Number of plague endemic areas capacitated to implement fleas and rodents divided by the total number of areas endemic for plague in the country	50%	75%	100%
1.2	To build the capacity of health personnel and community on early plague warning signs.	Proportion of health workers and community groups able to detect early plague warning signs and ready to take appropriate action.	Number of plague endemic areas trained on detection of early plague warning signs divided by the total number of areas endemic for plague in the country.	50%	75%	100%
2.1	Resources mobilization for fleas and rodent control.	Proportion of plague endemic areas targeted for follow-up that have been stratified in the country.	Number of plague endemic areas surveyed for fleas and rodents divided by total number of targeted.	50%	70%	95%
2.2	Implement appropriate, sustainable and quality fleas and rodent interventions in plague endemic areas	Proportion of eligible investigated transmission foci implementing fleas and rodents control interventions in the country.	Foci that implemented focal interventions in the plague endemic areas divided by Number of foci surveyed and eligible for control interventions.	60%	85%	85%



