



Ministry of Health
National Malaria Control Centre

June 2009



General IRS Guidelines

Indoor Residual Spraying

01



Ministry of Health
National Malaria Control Centre



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Zambia is a signatory to the 2000 Abuja Declaration and committed to fulfilling the goals of the Roll Back Malaria campaign. It is promoting the use of Indoor Residual Spraying as one of its core interventions in its malaria control programme in an effort to reduce the vector population and hence decrease malaria incidence.

The National Malaria Control Programme of Zambia has identified the need to have a standardized protocol that guides districts in implementing and assessing their Indoor Residual Spraying programmes. These guidelines have been developed to meet that need. They highlight key points applicable to all the districts and facilitate monitoring and evaluating that will ensure that programmes are successful. We recommend that each district adhere to these guidelines and to note that these guidelines will be revised from time to time as need arises.

We hope that the users of this document will find it useful in their daily operations in a bid to reduce malaria morbidity and mortality and attain the relevant Millennium Development Goals by 2015.

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Abbreviations

| | | | |
|-------------|--|----------------|---|
| CEHO | Chief Environmental Health Officer | M&E | Monitoring and Evaluation |
| DDT | Dichlo Diphenyl Trichloroethane | MCM | Mopani Copper Mines |
| DEHO | District Environmental Health Officer | MOH | Ministry of Health |
| DHMT | District Health Management Team | NGO | Non-Governmental Organization |
| DHO | District Health Office | NMCC | National Malaria Control Centre |
| DMO | District Medical Officer | NMCP | National Malaria Control Programme |
| EC | Emulsifiable Concentrate | PEHS | Provincial Environmental Health Officer |
| ECZ | Environmental Council of Zambia | PHO | Provincial Health Office |
| EH | Environmental Health | PMO | Provincial Medical Officer |
| EHO | Environmental Health Officer | POP | Persistent Organic Pollutant |
| EPPA | Environmental Protection and Pollution Act | PPE | Personal Protective Equipment |
| GIS | Geographical Information System | PPM | Parts Per Million |
| HSSP | Health Services and Systems Programme | PVC | Polyvinyl Chloride |
| IEC | Information, Education, and Communication | TOT | Training of Trainers |
| IRS | Indoor Residual Spraying | UNZA | University of Zambia |
| ITN | Insecticide Treated Net | USAID | United States Agency for International Development |
| KAP | Knowledge, Attitudes, and Practices | WHO | World Health Organisation |
| KCM | Konkola Copper Mines | WHOPES | World Health Organisation Pesticide Evaluation Scheme |
| LD | Lethal Dose | WDP | Water-Dispensable Powder |
| LD50 | Lethal Dose 50 | WG | Wettable Granule |
| | | WP | Wettable Powder |
| | | ZANIS | Zambia National Information Services |
| | | ZSC | Zambia Sugar Company |

Overview of Compendium

This document is the first of a compendium of five Indoor Residual Spraying (IRS) guidelines that have been developed to guide IRS operations in Zambia. Each guideline is user friendly and can be easily understood and followed by all who implement and all who intend to implement IRS in Zambia (such as district managers).

The compendium comprises the following:

- 01 General Guidelines for Indoor Residual Spraying (this document)
- 02 Insecticide Guidelines for Indoor Residual Spraying
- 03 DDT Guidelines for Indoor Residual Spraying
- 04 Guidelines for Sound Management of Indoor Residual Spraying Insecticides
- 05 Indoor Residual Spraying Spray Operator Training Manual

The guidelines provide information and direction to health workers in Zambia who are involved in malaria prevention and control through the use of insecticides for IRS. They include fundamental information about IRS, the use of insecticides, safety, storage, and

training.

They are important because insecticides are poisonous and can cause harm if improperly used. Using them can help ensure that IRS staff is fully aware of the hazards insecticides pose. They also give staff a basic understanding of insecticides and the knowledge of special safety precautions that minimize risks to the environment, people, and other non-target organisms.

The guidelines stress proper insecticide management and monitoring that lead to safety in both daily operations and long-term implementations of IRS programmes. Storage, transportation, and use of insecticides, as users will find, require proper regulatory control, handling, application, and disposal to minimize adverse effects and accidental poisonings. IRS implementers should refer regularly to these guidelines for specific rules and conditions. The guidelines also lay out basic rules for public relations that establish and maintain rapport with households and standardize trainings of spray operators.

We hope they will help facilitate effective implementation of IRS operations.

1.0 Introduction

Indoor residual spraying (IRS) is the regular application of a persistent insecticide inside a house to reduce mosquito lifespan and density, and as a result, reduce malaria transmission and prevent epidemics is called IRS. The method relies on the fact that most mosquitoes enter houses at night and rest on the walls and ceilings before and after feeding on occupants. If walls and ceilings are treated with an effective residual insecticide, mosquitoes will pick up lethal doses upon resting.

Zambia reintroduced the IRS Programme to control malaria in 2002. It is one of the main interventions currently being carried out by the National Malaria Control Centre (NMCC), partners in the private sector (such as mining companies and the Zambia Sugar Company), local authorities, and District Health Offices (DHOs). These guidelines are necessary to standardize protocols that guide the implementation of IRS in Zambia. They have been developed with help from various local and external consultants and partners, including the World Health Organisation (WHO). Much advice was given by a technical

committee, comprising members from the private sector, provincial and district health offices, the National Malaria Control Centre, and partners, during two consultative meetings. The first was in Kabwe in June 2007, and the second in Lusaka in January 2008. The final version of these guidelines is a result of those meetings.

The contents of these guidelines are oriented to helping implementers successfully plan and implement IRS operations.

Purpose

These guidelines have been developed to:

- (a) Enable the National Malaria Control Programme (NMCP) in Zambia to conduct IRS campaigns through standard country specific guidelines
- (b) Ensure that districts, partners, and interested institutions and persons who are either considering adopting IRS or are already implementing IRS to consider operational, technical, and logistical issues necessary for an effective IRS programme in line with national policy.



2.0 IRS Principles

IRS involves regular periodic spraying of houses with WHO approved persistent insecticides to kill mosquitoes in order to reduce their population and therefore reduce malaria transmission. IRS is a highly technical method that requires competent, qualified environmental health practitioners and entomologists.

IRS is the most cost-effective method to control malaria transmission. Implemented well, IRS can obtain a rapid large-scale impact at an affordable cost.

IRS is carried out to the following ends:

- (a) To control epidemics of malaria in areas of high population density, that is, urban and peri-urban communities
- (b) To reduce seasonal peaks of malaria transmission in areas of intense seasonal transmission
- (c) To prevent malaria epidemics in epidemic prone areas
- (d) To eliminate any new foci of infection in malaria-free areas

3.0 IRS Considerations

Consider the following when planning an IRS campaign:

- (a) Baseline data collection
- (b) IRS area selection
- (c) Geographical reconnaissance
- (d) Planning and preparation of spraying
- (e) Spraying
- (f) Post spraying review and monitoring
- (g) Insecticide selection
- (h) Storage and transport
- (i) Personal protective equipment (PPE)
- (j) Spray operators
- (k) Quality control

They are outlined in more detail below.

3.1 Baseline Data

Baseline data should include the following:

- (a) The burden of malaria in the district: figures of incidence, mortality, morbidity, and case

- (b) fatality rate
- (b) Population at risk in various "hotspot" areas and each areas' relation to one another (e.g. distance and direction from district centre)
- (c) Total number of structures to be sprayed (both formal and informal)
- (d) Amount of each item left over from previous sprayings (insecticides, etc.)
- (e) Parasitological data (e.g. parasite prevalence rates)
- (f) Entomological data (e.g. vector densities, identification and susceptibility studies and bioassays)
- (g) Knowledge, Attitudes, and Practices (KAP)

"Implemented well, IRS can obtain a rapid large-scale impact at an affordable cost."



3.2 Area Selection

Collecting baseline survey information

The following criteria should be followed when selecting an area for IRS. A selected area should have:

- (a) Adequate population density (normally a cluster of at least 25 structures) to keep IRS cost effective
- (b) Above normal malaria burden for several years (two or more times over the district annual average in the case of incidence)
- (c) Identified, highly endophilic (indoor resting) malaria vectors
- (d) Houses that are permanent and roofed with well covered partitions

In order to spray systematically and effectively with good coverage, geographical reconnaissance should be undertaken for each selected area so that the following is available:

- (a) Map of the area with boundaries (sketch maps for daily operations)
- (b) Geo-mapping of structures
- (c) Information on important ecological and social features, such as mosquito breeding sites or church buildings in the vicinity
- (d) Information on the accessibility of the area
- (e) Information on the available routes to, and within, the area
- (f) Total number of structures to be sprayed, types of structures, total surface area of structures to be sprayed, and average surface area of structures to be sprayed
- (g) Total population to be protected
- (h) Information on social factors (e.g. outdoor sleeping)

3.3 Geographical Reconnaissance

Geographic reconnaissance in this document refers to the mapping and compilation of all information concerning geographic characteristics of a particular area necessary for planning and effective implementation of IRS.

3.4 Planning and Preparation for Spraying

An effective residual spraying programme is rooted in a plan of operations that is created early (commencing at latest in January) which defines a geographical area, methods and procedures of spraying, programme duration, personnel requirements, supplies, equipment, a deployment plan, completeness of coverage, and an estimated cost. More specifically, planning should include:

- (a) Calculation of the amount of insecticide required.
- (b) Selecting the dates to begin and to complete spraying in each area, and the dates for the whole spraying programme of the season (keep in mind the short residual life of pyrethroids)
- (c) Assessing the status of various logistics such as the availability of spray pumps, spare parts, protective clothing, spray operators, transport, drivers, and infrastructure (e.g. storage)
- (d) Assessing the status of transport and planning to overcome shortages
- (e) Calculating the financial requirements of the IRS operations
- (f) Making available (by recruiting and training if necessary) the necessary manpower
- (g) Preparing clear terms of reference

“In order to spray systematically and effectively with good coverage, geographical reconnaissance should be undertaken for each selected area...”

- for all staff involved in spraying
- (h) Preparing a reporting system and necessary forms
- (i) Preparing supervision programmes and supervision checklists
- (j) Preparing safe and sound insecticide management plans for the field and the storage facility

3.5 Spraying

A typical spraying day should include the following:

- (a) Reporting and roll call
- (b) Feeding personnel
- (c) Checking spray equipment and PPE
- (d) Triple rinsing equipment at the station
- (e) Filling pumps with initial fill left over from previous day
- (f) Collecting and signing for insecticide supplies and daily report forms by supervisors
- (g) Transporting spray operators, equipment, and supplies to the field
- (h) Creating mobile field stations
- (i) Refilling cans at mobile field stations
- (j) Issuing insecticides for first fills
- (k) Issuing report forms
- (l) Visiting structures chosen and prepared the previous day
- (m) Introducing and inspecting prepared houses in company of householders (spray operators)
- (n) Closing windows and doors and spraying
- (o) Giving instructions to householders, affixing stickers, and recording jobs
- (p) Inspecting and double-checking work done and signing stickers (supervisors)
- (q) Allocating structures to be sprayed the following day to each spray operator who must then visit them

- and prepare them
- (r) Transporting spray operators, equipment, and empty insecticide sachets back to station
- (s) Balancing insecticides back at station
- (t) Finalizing reports and handing them to supervisors who aggregate them for the IRS manager
- (u) Cleaning equipment (triple rinsing), checking it, and hanging it upside down on racks ready for use the following day
- (v) Washing PPE , showering, and signing out
- (w) Updating all data and accounting for all chemicals and equipment (supervisor)

3.6 Post Spraying Review and Monitoring

Activities that should be done after a spraying campaign include the following:

- (a) Monitoring malaria mortality and morbidity data
- (b) Environmental management, including focused larviciding
- (c) Mapping and updating structures data
- (d) Producing maps
- (e) Maintaining equipment
- (f) Planning and budgeting the next spraying campaign
- (g) Information, Education, and Communication (IEC)
- (h) Disseminating IRS results
- (i) Conducting malaria surveys, including bioassays, basic entomological surveys, and follow-ups of confirmed positive cases of malaria

3.7 Insecticide Selection

The World Health Organisation Pesticides Evaluation Scheme (WHOPES)

recommends certain insecticides for use in IRS against malaria vectors. Based on these recommendations, the NMCC chooses one or more insecticides for spray operations in Zambia.

“Allocating structures to be sprayed the following day to each spray operator who must then visit them and prepare them”

The NMCC’s selections must be strictly adhered to by anyone working in the national programme; insecticide choice is a matter of country-wide insecticide management policy. Districts and IRS partners are therefore required to coordinate with the NMCC regarding the choice of insecticides.

3.8 Storage and Transport

To avoid adverse effects and accidental poisonings, insecticides must be stored and transported in accordance with specific rules and under specific conditions. These rules and conditions are detailed in the Guidelines for Sound Management of Indoor Residual Spraying Insecticides. Please refer to it.



Insecticides should be stored properly on a raised pallet

4.9 Personal Protective Equipment



Spray operator in full Personal Protective Equipment

Provisions of PPE per person should include the following:

- (a) Overalls (2 pairs)
- (b) Gumboots (1 pair)
- (c) Spare respirator cartridges (2 sets)
- (d) Respirators (1 set)
- (e) Hardhat (1)
- (f) Clear goggles (1 pair)
- (g) PVC gloves (at least 2 pairs)
- (h) Mutton cloth (1)
- (i) Socks (2 pairs)
- (j) Towel (1)
- (k) Bath soap
- (l) Washing detergent

3.10 Spray Operators

Spray operators must fit the following criteria:

- (a) 21 years or above
- (b) Male or female (sex is irrelevant)
- (c) Grade nine level education or above
- (d) Ability to read, write, and do simple arithmetic
- (e) Height of 1.5 m or above
- (f) Weight of 50 kg or above
- (g) Physically fit
- (h) No allergy to insecticides
- (i) No respiratory problems
- (j) Presentable
- (k) In need of minimum supervision
- (l) Neither pregnant nor breastfeeding

Take note that spray operators cannot be allowed to work consecutively for more than 3 years.

3.11 Quality Control

The central authority conducts quality control in collaboration with districts. They do intra-district quality testing to ensure exchange of information among districts.

A number of technologies have been suggested to complement the usual supervision of spray operators conducted at the district level. These include:

- (a) The use of florescent dyes in insecticides which can be read on walls using ultra violet lamps but are otherwise invisible
- (b) The use of paper stickers on walls that can be used to check the amount of insecticide deposited after sprayings
- (c) WHO contact bioassays on sprayed structures
- (d) The testing of random samplings of insecticides at both national and district levels for laboratory quality control checks



IRS training in full Personal Protective Equipment

4.0 Training

Spray operators should be trained in accordance with specifications outlined in the Indoor Residual Spraying Spray Operator Training Manual to ensure quality and standardization. Districts should coordinate with the NMCC for technical assistance and help in implementing successful trainings.

4.1 Training of Trainers (TOTs)

Spray operator trainers shall be trained by the NMCP and taught how to use the Indoor Residual Spraying Spray Operator Training Manual. No one can train spray operators unless approved by the NMCC.

5.0 Information, Education, and Communication (IEC)

For a spraying programme to be successful, people need to accept the programme and support its implementation. This requires effective IEC interventions. The IRS Communication Strategy, obtainable from NMCC, should be referred to. In an IRS programme, IEC is important for the following:

- (a) Creating awareness about IRS

- (b) Increasing levels of knowledge about malaria and IRS
- (c) Building approval of IRS as an effective intervention
- (d) Developing positive attitudes toward IRS
- (e) Developing skills and ensuring action with regard to what the households should do before and after their house is sprayed

5.1 Creating Awareness

Programme implementers should use multiple and various channels of communication to inform community members in their zones about spray programmes. Examples include the use of:

- (a) Community centres, such as churches and schools
- (b) Posters
- (c) Local public announcement systems
- (d) National media (e.g. radio, television, newspapers)
- (e) Community radio stations

5.2 Increasing Knowledge

Programme implementers should also identify and engage in IEC activities that give IRS related knowledge (e.g. how malaria is transmitted) to community members in their zones. In addition to the channels mentioned above, they should also use local drama groups and NMCC-approved leaflets.

Regardless of channel, programme implementers must make sure that people understand that mosquitoes are the only cause of malaria and that killing mosquitoes would thus contribute significantly to reducing the incidence of malaria.

5.3 Building Approval and Developing Positive Attitudes

To ensure that communities approve of IRS campaigns, programme implementers should:

- (a) Look out for any misinformation about IRS that may disillusion communities
- (b) Develop messages that answer the specific concerns raised by communities
- (c) Liaise with relevant authorities such as the District Commissioner and the District Director of Health so that they help campaign for IRS
- (d) Reinforce messages by having prominent members of communities also help campaign for IRS. Provide them with information and have them emphasise that IRS is a national public good
- (e) Hold advocacy meetings with the local leadership to solicit their support
- (f) Identify people who have suffered from malaria to give testimonies and appeal to other community members to cooperate with spray operators
- (g) Encourage community members who have had their houses sprayed give testimonies

5.4 Interpersonal Communication with Households

Spray operators should provide the following to households:

- (a) Simple explanations of how insecticides work to kill the mosquitoes (i.e. mode of action) and how long they will be active
- (b) Assurance that spraying does no harm to walls, ceilings, or furniture

“Encourage community members that have had their houses sprayed give testimonies”

- (c) Assurance that they are responsible people who handle and protect household property responsibly
- (d) Assurance that insecticides are not hazardous to humans, dogs, chickens, cats, or other domestic animals provided that precautions are followed
- (e) Explanations about how insecticides have a flushing effect and how households will probably see large numbers of non-target insects, such as cockroaches, for a certain period after spraying

They should also prepare houses for spraying with households in participation.

6.0 Monitoring and Evaluation

IRS M&E should be a continuous process. It should help with the following:

- (a) Correcting actions in planning and re-planning
- (b) Improving actions in efficiency, performance, and quality
- (c) Determining effectiveness and controlling costs
- (d) Measuring accomplishments and needs against time
- (e) Disseminating knowledge and techniques
- (f) Modifying programme technology
- (g) Justifying the programme technically, socially, economically, and politically
- (h) Establishing priority for programme

resource allocation and activities

Programme M&E should be designed to provide information on or for the following:

6.1 Progress

M&E should document whether activities are carried out as planned, ensure accountability, and detect problems quickly.

6.2 Outcomes and Impact

M&E should document results in terms of improved delivery quality, coverage, and changes in malaria morbidity and mortality.

6.3 Research

M&E should help answer questions tied to specific research problems that require rigorous studies in need of information in addition to tracking indicators.

6.4 Periodic Review

All M&E information collected as a basis for planning should be brought together and reviewed. Review includes assessment of broader programme aspects such as quality of policy, effectiveness and efficiency of interventions, sustainability, and management.

6.5 Indicators

M&E indicators should be as follows:

- (a) Number of structures sprayed
- (b) Percentage of targeted structures sprayed
- (c) Number of unsprayed structures
- (d) Number of people protected
- (e) Incidence rate from both sprayed and unsprayed areas

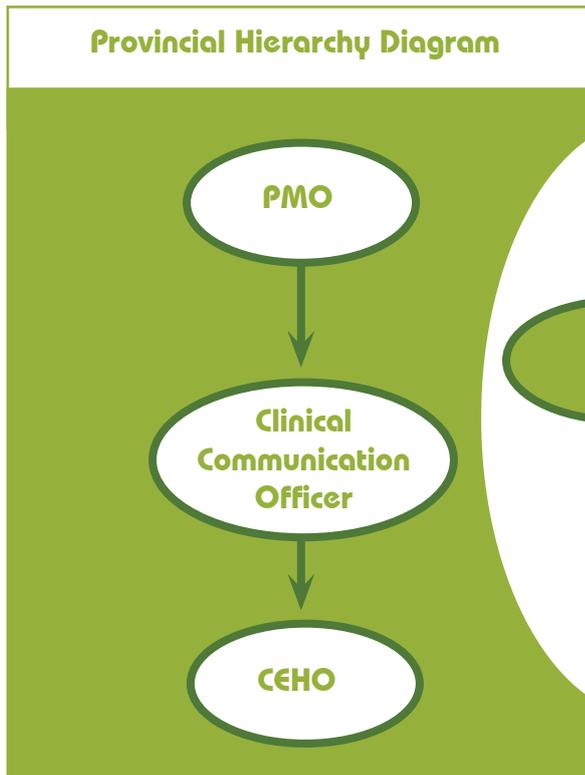
6.6 Routine Entomological Studies

- (a) vector susceptibility tests
- (b) Bioassay spot-checks of application quality, dosage and persistence of insecticides on treated surfaces
- (c) Anopheline indoor resting density assessed by pyrethrum spray catches and other appropriate entomological methods
- (d) Mosquito infectivity

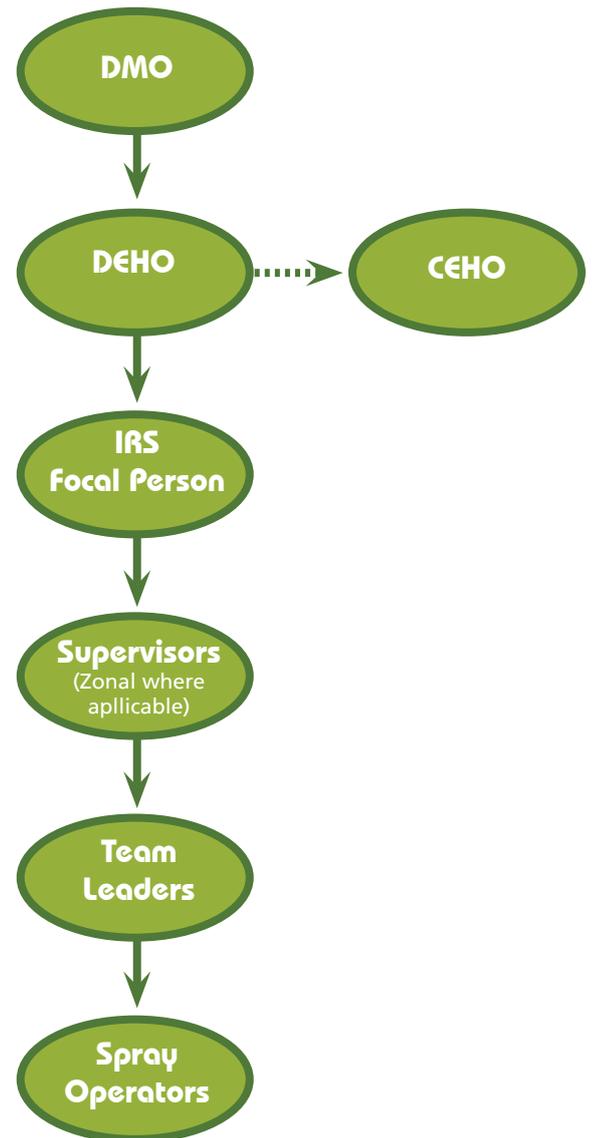
7.0 Supply Chain Management

Current policy mandates that the MOH procures all IRS commodities and distributes them to districts as needed. Partners may support the procurement of IRS commodities through the central authority. For details, refer to the Guidelines for Sound Management of Indoor Residual Spraying In

I. IRS Hierarchy, Roles and Responsibilities



District Hierarchy Diagram



Roles and Responsibilities of Personnel

National IRS Principal Officer

1. Facilitate planning, coordination, implementation, and monitoring (including quality control) of IRS activities
2. Supervise national IRS activities
3. Generate reports (weekly, monthly, quarterly, and annually)
4. Facilitate procurement and distribution of IRS supplies
5. Facilitate IRS TOTs
6. Ensure regular review of IRS implementation
7. Ensure coordination of IRS in the NMCP
8. Facilitate development of standards and guidelines

Chief Environmental Health Officers (CEHO – Provincial Level)

1. Conduct performance assessments
2. Provide technical assistance
3. Serve as link between districts and the NMCC
4. Support development of standards and guidelines

District Environmental Health Officers (DEHO)

1. Conduct IRS planning in collaboration with NMCC and partners
2. Ensure IRS activities are part of district work plans
3. Supervise IRS focal person
4. Mobilise IRS resources (e.g. funds)
5. Support development of standards and guidelines

IRS Focal Persons

1. Plan, coordinate, implement, and monitor (including quality control) IRS activities
2. Supervise IRS activities
3. Generate reports (weekly, monthly, quarterly, and annual)
4. Manage IRS supplies
5. Conduct spray operator and supervisor trainings and identify training needs
6. Support development of standards and guidelines
7. Collaborate on development and dissemination of IECs
8. Ensure conduct and quality of day-to-day operations in the field
9. Coordinate aspects of Geographical Information Systems (GIS) field components, intervention assessments, and section control programmes

Supervisors (Zonal Where Applicable)

1. Report to IRS Focal Person
2. Ensure conduct and quality of spraying teams' activities
3. Supervise spray operators
4. Ensure distribution of insecticides and spray pumps
5. Organize reports on IRS
6. Assist in recruitment of spray operators
7. Ensure proper use of insecticides and proper management of waste in the field and at station

Districts with high numbers of target structures may have more than one supervisor, in which case each supervisor is given responsibility of a zone rather than an entire district. In addition to the roles and responsibilities above, a Zonal Supervisor must also:

8. Implement, manage, coordinate, monitor and evaluate all IRS control activities in his zone

Spray Operators and Team Leaders

Spray Operators are temporary contracted workers hired only during spraying campaigns. Spray Operators:

1. Spray structures
2. Number structures and note sizes of households
3. Record types and amounts of insecticides used in each house sprayed

From among Spray Operators, a Team Leader is selected and, in addition to the roles and responsibilities above, must assist supervisors in supervision

Stores Officers

1. Issue, care for, and manage insecticides, PPE, spray pumps, and accessories at storage facilities

Partnership

Districts should facilitate the formation of suitable IRS teams: committees, commissions, or task forces. They should ensure the teams' smooth operation and nurture their sustainability.

II. Budgeting for IRS Activities

The following should be considered in developing an IRS budget. A budget plan, funds for operations, logistics, transportation, monitoring, supervision, planning, baseline assessment, and community sensitization.

Below is a typical example of an implementation budget template taking into consideration: the number of spray operators, number of days and the target structures. The cost of insecticides and that of cascade training are not included.

| IMPLEMENTATION BUDGET | | | | |
|---|-----|---------------------------|-----------|------------|
| District _____ | | Targeted Structures _____ | | |
| Spray operators _____ | | Number of days _____ | | |
| Description | No. | NO. OF DAYS | UNIT COST | TOTAL COST |
| Allowances - Operators | | | | |
| Loaves of bread | | | | |
| Milk | | | | |
| Drink | | | | |
| Lunch Allowances (Supervisors, Drivers & Store Keepers) | | | | |
| Stationery | | | | |
| ID Cards | | | | |
| Community Sensitization | | | | |
| Local Adverts | | | | |
| Monitoring & Supervision | | | | |
| IEC | | | | |
| Social Mobilisation | | | | |
| Stationery | | | | |
| Other requirements (e.g. drums and buckets) | | | | |
| Bathing Soap For Daily Wash Ups | | | | |
| Washing Soap For Cleaning Overalls | | | | |
| Tooth Brushes For Pump Unblocking | | | | |
| Fuel (Liters) | | | | |
| Camping | | | | |
| Polyethene Sheets | | | | |
| Vehicle Hire | | | | |
| Total | | | | |

III. Members of the IRS Guidelines Technical Committee

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| Wamulume Pauline | NMCC | IEC Specialist |
| Fordson Nyirenda | MOH | EH Specialist |
| Philip Mulenga | MOH | EH Specialist |
| Emmanuel Chanda | NMCC | Entomologist |
| Peter Mukuka | MCM | Chief Health Officer |
| Mary Mtonga | MOH | Health Inspector |
| Chuzu Scholastica | NMCC | Secretary |

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