

# Transforming supervision practice: Deployment of field Indoor Residual Spraying Commanders for enhanced supervision essentials, Zambia



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## Abstract

Superior supervisor support (SSVS) through field IRS Commanders has greater influence on spray teams' affective commitment. The purpose of the present study is to address impacts of commandeering (Superior Supervisor support) on affective commitment of the spray teams. Variables such as motivation, job satisfaction, logistical support, enhanced adequate supervision, data quality audit, quality of IRS performance and performance improvement were proposed to enhance spray teams' affective commitment of their spraying implementation campaigns. SSVS, motivation, job satisfaction and affective commitment were proposed as independent, intervening and outcome variables respectively. The data for this study have been collected from different field reports by the field IRS Commanders. Further, the data was shared at different for a discussed and recommendations were given. The field findings revealed that SSVS through commandeering has significant relationship with job satisfaction and affective commitment. Likewise, this study suggested that commandeering (SSVS) can improve the spray teams' affective commitment by presenting a significant relationship between SSVS and affective commitment through the mediation of motivation and job satisfaction. It has to be well recognized that commitment is a multi-faceted construct which can promote quality of IRS performance and universal coverage of the intervention.

**Keywords:** Transforming; Supervision; Practice; Indoor Residual Spraying; Commanders

**Abbreviations:** SSVS: Superior supervisor support; NMEP: National Malaria Elimination Program; IRS: Indoor Residual Spraying; DDT: Dichlorodiphenyltrichloroethan; LICs: low-income countries; SOPs: spray operators

## Background

Zambia National Malaria Elimination Program (NMEP) with authority from the Ministry of Health (MOH) [1], deployed Indoor Residual Spraying (IRS) Commanders in 2020 as a public health innovation to enhance support supervision of the IRS campaign [2]. Support supervision is being perceived as an intervention that strengthens Indoor Residual Spraying Campaign system and that it enables spray teams to offer quality IRS services and improve performance [3,4]. Unfortunately, numerous studies and reports show that supervisory mechanisms in many districts of developing countries are suboptimal. Further, the understanding of the concept and its implementation is still shrouded in misinterpretation and inconsistencies. This analysis contributes to a deeper understanding of the concept of supervision and how its recognition of the approach can contribute to improved performance through enhanced supervision. Over decades, the

IRS campaign organization and coordination have been faced with inadequate supervision and control, leading to weak outcomes of IRS coverages and ultimately not satisfactory malaria incidence trends, that have been seen to be consistently on the increase overtime. The objective of deploying the field IRS Commanders was to improve district IRS organization, through providing timely operations attached with improved IRS quality assurance and to also ultimately attain extremely excellent coverages of 100% of targeted structures, in each district catchment area. All this was to be achieved through enhanced supervision, advocacy and intensified community engagement.

The commanders were also tasked to ensure efficient and accurate reporting as a critical element of the IRS program. Further, accurate reporting during planning and implementation of the IRS campaign was to generate information on the management

effectiveness and performance in terms of coverage and impact. This study and many others offered partial insight into some of the behaviors that supervisors exhibit that positively or negatively influence supervisees; however, few were methodologically sound investigations/findings, and most of them were conducted over a decade ago [5]. Recently, a few researchers have qualitatively examined primarily effective supervisors' interventions or supervisory events. Jacobsen and Tanggaard<sup>9</sup>, investigated supervision experiences of good and bad supervisory events. Their findings indicated that beginning supervisees found the supervisor guidance and support helpful; however, there were large individual differences with respect to what supervisees found unhelpful.

### Methods/Materials

In the selection of the IRS field Commanders, we looked at the requirements for a successful supervisor who requires a combination of talents, interests, experience as an IRS Master trainer, knowledgeable and being an Environmental Health Office/Environment Health Technologist, working for the government or partner organizations and with personality characteristics: leadership, judgement and reasoning, interpersonal skills, ability to plan and organize, tolerance to pressure, communication, interest in motivating/coaching others, initiative and results orientation. Each Commander was given a job purpose to follow that determined the rate of performance at the end of the campaign. The job purpose performance thereafter has been described in more details in the discussion section. We carefully pre-screened the IRS Field Commanders selection and weeded out in advance some unsatisfactory Master Trainers to be Commanders. The selection criteria also balanced the gender requirements. After thorough selection, the officers were taken through capacity building on the broad objectives, key result areas, main duties, expected accomplishment, indicators of achievements and main activities/approaches.

The selection relied upon past experience of our candidates on how well they can continue doing the same job including their performance where they operate in the provinces. The Commanders were paired in two and deployed in selected districts in the provinces with high incidence of malaria. It took unbiased professional skills to judge whether the selected Commander can step into higher responsibilities of being super supervisor under great pressures. The right supervisors have always been more productive leaders. So, productivity of the IRS teams who together work with the IRS field commanders remain almost always improved for quality of IRS performance. What's more, good leadership promotes higher morale and as morale rises, union grievances usually drop.

### Major Findings

From the support supervision provided by the IRS commanders, key findings emerge frequent pumps breakdown,

inadequate IRS supplies and logistics such as pumps, personal protective equipment, first aid and spill kits. Most of the personal protective equipment were insufficient and non-durable for spray operators in the monitored districts. As per IRS standards and recommendations by WHO, each Spray operator must have two pairs of overalls. The PPEs must be durable to withstand the heavy-duty activities being conducted by the IRS teams more especially the SOPs. So, boots, goggles and respirators were equally not adequate and durable. Dichlorodiphenyltrichloroethane (DDT) distributed in the districts was found to be about to expire in June, 2021 and the total to expire was about 5,800 plus sachets [6]. The services provided for the Community-Based IRS Delivery Model equally did not match with the cost and needs for the model in all the districts monitored. The IRS operations at the depots were not satisfactory such as pump cleansing and clearing of the Wash Bays. Most of these IRS depots were not in an improved state of rehabilitation including the IRS storage facilities were found not to meet the standards; inadequate space for storing chemicals, poor ventilation in the stores, lack of bathing facilities for SOPs. This suggests that there is a need to consider building or relocating these facilities to other suitable locations.

The findings hint that DDT operating procedures were also not followed such as returned diluted chemicals not used as a "refill" the following day. Inadequate supervision of SOPs was noted, for example in cleaning pumps after field work, house preparation and spraying techniques. This points out to the need to provide central training of all supervisors in each province and more need for enhanced supervision. This is an important finding in the understanding that there are possible risks that are high for DDT during delivery transportation of it to service delivery areas such as accidents, damages, spillage from the shipment and delivery. In addition, the same also goes to storage facilities that have similar propensity of facing thefts, accidents, damages/spillage from transportation. This risk factor at this stage is very high. The present study confirmed the finding about environmental health and safety: land/soil, water, air contamination equally in terms of spillage/accident, theft of DDT sachets for agricultural purposes which has been considered on as very high risk. Further, this also applies to spray operator's exposure to powder/solution including annual exposure and waste disposal. Another promising finding was that in some districts, there was a delay in timing of spray operations; the spraying campaign with the use of DDT was done in the rainy season which has been described as unfortunate and very risky, compromising the safety of the environment and the population being served. Our results demonstrated that the DDT monitored districts must use DDT under strict control and must be safe guarded for use only for the intended purposes according to a World Health Organization (WHO) position statement on IRS [7].

Using DDT in any other way would have important consequences, such as the contamination of food, poisoning animals, and agricultural products, including export goods with a

potential to impact on the international trade. Effective use and safe storage of DDT rely upon compliance with well-established and well enforced rules and regulations in accordance with DDT Guidelines and with WHO Technical Guidance and must be in the context of Stockholm Convention. The use of DDT for IRS must be closely monitored and reported to WHO and to the secretariat of the Stockholm Convention [8]. This result highlights that little is known about the pre-requisites for safe and effective implementation of IRS [7] that apply to DDT including susceptibility status of vectors and proper monitoring of insecticide resistance to implement resistance management tactics. There is need to avoid undue exposure to householders and spray operators to DDT. Standard operating procedures and national guidelines must be in place and strictly followed. Appropriate management of DDT also entails adoption and enforcement of stringent rules and regulations to avoid leakage into the environment, for example agriculture and misuse. To complement the continued review of information on DDT safety, there is need to establish and implement appropriate monitoring strategies to better characterize DDT exposure (to humans and to the environment) under the operational conditions in which DDT is used in vector control [7].

A further novel finding is that vehicles used to transport SOPs to the field and back were not in compliance to the stipulated IRS guidelines. There was also not enough transport for IRS supervisors, and this compromised the effectiveness of the support supervision to IRS teams in some provinces. As a result, as indicated in some studies; have linked supportive supervision to positive outcomes such as job motivation for IRS teams, staff retention, satisfaction, and better performance [9,10]. We further found that virtually all districts, supportive supervision was weak, associated with in some cases unavailable district leadership in the field to monitor IRS activities and identify any discourse and rectify it. The findings extend to those of effective support supervision confirming that a longer more intensive support supervision under the name of commandeering tends to produce more effective skills than when those skills are input over a shorter period. In addition, the improvements noted in our study were unrelated to the availability of money in part but staff attitude. This study therefore indicates the benefits gained from IRS implemented. Most notably, this is the first study to our knowledge to investigate the effectiveness of commandeering. We have evidence of attaining high coverages in areas where commanders were deployed and where logistical support was up to date as required for Quality IRS performance. We also saw low coverages where logistical support was not adequate despite deployment of the commanders. Seemingly the spray teams were working under low morale and hardships.

It is also still not clear whether deployment of commanders reduced; high refusal rates, number of locked homes, absenteeism and missed homes as these parameters were enshrined in commanders job purpose. It goes to mention that though

commanders were overseeing on the IRS Spray teams, deployment of teams and SOPs on daily basis could not be evaluated, whether was achieved or not (1 SOP to 13/15 structures per day). As a consequence, IRS was implemented in the times of COVID 19 pandemic. However, no reported cases of COVID -19 in the districts where Commanders were deployed. This attests the efforts by commanders and spray teams of making sure COVID-19 mitigation measures were well observed on daily basis at every stage of IRS processes. This includes the general management: organization, planning, motivation, and control of teams to achieve results. Spot checks on community mobilization strengthened the availability of household owners and increased the acceptance levels to the campaign. In addition, the onsite meetings as well encouraged capacity building to increase the knowledge levels of the spray teams [11]. The newly developed Monitoring and Evaluation Toolkit strengthened the impact of quality of IRS performance among other checklists, job aids and other documents.

Our results provide compelling evidence for long term involvement with such IRS teams and suggest that this approach appears to be effective in counteracting challenges/problems that may exacerbate the disorder. Future study should therefore include follow up work designed to evaluate whether the skills are retained in the long term and whether they continue to be used to improve IRS performance. Notably, supportive upper vision as an intervention strengthens the health system, enables health workers to offer quality services and improve performance. Unfortunately, numerous studies show that supervisory mechanisms in many low-income countries (LICs) and including Zambia are suboptimal. Further, the understanding of the concept and its implementation is still shrouded in misinterpretations and inconsistencies. This analysis contributes to a deeper understanding of the concept of supportive supervision and how re-organization of the approach can contribute to improved performance. On the other hand, supervisory dimensions of task assistance, social and emotional support and interpersonal interaction have been highlighted as beneficial outcomes for IRS teams [12]. Additionally, there has been evidence that shows that improving supervision quality has a greater impact than increasing the frequency of supervision alone [13]. Because of many noted negative issues, the morale of the supervisors was affected, also were the SOPs who singly remained stuck due to lack of support in repairing their bicycles by the district health management system. It was further noted that SOPs covered long distances to spray areas due to lack of transport means compromising quality of IRS performance due to low morale.

Together, the present finding confirm that quality of IRS performance has been compromised year in, year out and human safety and that of the environment has remained compromised. There has been also unsystematic deployment of SOPs in the field overtime and what remains is to encourage, train supervisors in objective supervision(spray procedures and techniques,

observing morning drills, transportation, field deployment, community mobilization, Covid-19 mitigation measures and monitoring IRS activities. The findings demonstrate three things: First, unsystematic deployment of SOPs in the field lead to poor quality IRS performance. Second, Inadequate support supervision of spray operators in the field and possible pilfering of insecticides. As a matter of fact, it has been recommended that, to control insecticide usage, filling stations must be re-introduced so that the supervisors can get hold of SOPs mischievous activities. The team leader's role must be re-defined by all the districts. Third, lack of a standard number of rooms; one insecticide sachet could be set depending on the type of spray pumps/nozzles being used and number of rooms covered by SOPs to range from 4 to 16 per sachet. However, we acknowledge that there are considerable discussions among researchers on quality of IRS performance. We further speculate that this might be due to inadequate training of the IRS teams in quality assurance including inadequate logistical support and motivation. It remains under how the coordination between spray teams and health promotion and mobilization teams lead to inadequate sensitization including community mobilization for the IRS program campaign.

### Discussion

The purpose of this study is to gain a better understanding of the efforts made by the field commanders. The aim is to evaluate superior supervisor support that was given to the districts through monitoring of district IRS teams that has greater influence on the spray teams' affective commitment. Over the past decades, the empirical literature has pointed out that supervision, arguably with benevolent intentions, has also proven at times to be problematic, counterproductive, harmful and unethical [14]. The results of the present study support the hypothesis that deployment of commanders though they can undergo these experiences can still improve quality of IRS performance and coverage than district IRS teams self-supervising. Self-Supervision cannot meet the demands of quality of IRS performance and improved universal coverage. According to organizational support theory [15], superior supervisor support (SSVS) facilitates changes in spray teams' levels of affective commitment [16]. Supervisor support has been defined as spray teams' views concerning the degree to which their supervisors' value their contributions and care about their wellbeing [15]. As agents of the National Malaria Elimination Program (NMEP), field commanders are responsible for directing and evaluating spray teams job performance. Thus, spray teams often view of their supervisors' feedback as indicative of NMEP's orientation towards them [17]. Moreover, because spray teams are aware that the supervisor's evaluation of their Job performance are often communicated to the District Health Directors and others, evaluations of their Job performance are often communicated to the executive and others who are seen as the representatives of NMEP. The association between affective commitment and supervisor support is here further strengthened [15].

As has been noted, field Commanders support leads spray teams to high commitment through Job satisfaction and motivation. The commanders in the first steps get a valuable satisfactory and also successful Job environment that matches the spray teams' main interest. Spray team Job satisfactory factors; related to payment, recognition, admiration, and interaction with fellow spray team members and superiors. While spray teams' satisfaction with values, social status, position and professional responsibility indicate internal satisfaction. Individuals' assessment of their job and expression of satisfaction or dissatisfaction can be regarded as the general outcome [18]. The results of this evaluation of the engagement of commanders in IRS activities provide supporting evidence that the spray teams were not well supported environmentally in terms of poor state of the PPE's, lack of transport and lack of supervisory visits by the district supervisors. The first hypothesis proposed has been improved quality of IRS performance. This means that due at high level of perception they will reciprocate from the supervisor support to good satisfaction [19]. Our findings high light that frequent break down of pumps, inadequate IRS supplies and logistics such as pumps, personal protective equipment, first Aid kits and spill kits might have compromised performance and lowered the morale of both the field IRS commanders, district teams and in general the spray operators (SOPs). It is interesting that anticipating quality of IRS performance is a dream, hence doubting the value of IRS among other interventions unless the health system is strengthened.

In our view, the most compelling explanation for the present set of challenging and demanding needs of supervision to so many spray teams. Field commanders were able to build the capacity of district IRS teams. This finding may be explained by the idea that the number of Field commanders must be increased with adequate logistics for them to stay in the field throughout the IRS campaign. Taken together, our findings indicate that deployment of Field IRS Commanders is a good idea that need to be supported by NMEP and that the current Field IRS Commanders must remain on the capacity building fora till the next campaign to teach other commanders, that need to be deployed in order to saturate the supervision circles during the future campaigns. Regular supervision is critical to retaining and motivating staff in resource constrained settings. Previous studies have shown the contribution that supportive supervision can make to improving job satisfaction amongst the over -stretched spray teams in such settings. Prior work has been documented and the effectiveness of support supervision in improving quality of IRS service delivery. It was found that support supervision has the potential to improve the quality of IRS performance and enhance skills of the spray teams. In addition, supervisory mechanisms have also been found to have low coverage effects, are irregular, unsupportive and demotivating. Evidence on realizing and sustaining envisaged benefits from support supervision is mixed. To realize the full benefit that the intervention accords limited understanding on what constitutes effective supportive supervision and how

different supervision approaches influence performance in different social and cultural contexts need to be addressed.

If, as the present study suggests about the need to increase the number of IRS Field Commanders, then there is a need for research that explores the improvement in IRS coverage and the reduction to malaria morbidity and mortality in the previous campaign outcome. The Commanders were selected for the purpose of setting goals for quality of IRS performance and to meet the deadlines in ways that comply with the IRS campaign plans for 2020 and vision 2030. This involved monitoring IRS team's productivity and providing constructive feedback and coaching on the IRS implementation. Supervision has been often found to include conducting basic management skills (decision making, problem solving, planning, delegation and meeting management), organizing IRS teams and noticing the need for designing new assignments, IRS teams performance management (setting 100% IRS coverage). The Field IRS Commanders were mainly in part deployed to: 1) Improve HHs IRS Coverage 2) Manage refusals, locked homes, absenteeism, missed homes etc. 3) Ensure insecticides and other IRS logistics do not run-in short supply during the course of the exercise as it disturbs the HH owner's own time. This reads to different types of refusals; 4) Ensure proper deployment of teams and SOPs as this has to be done timely with the right ratio needed against the number of structures 5) Promote on spot observation of the general IRS activities 6) Manage district IRS activities with teams and with more supervisory emphasis in high malaria burden areas 7) Supervise teams and activities by providing oversight technical supervision 8) Provide onsite capacity building when necessary 9) Deliver level of authority & decision making 10) Monitor activities for impact 11) Use wisdom and experience where necessary.

The Commanders were also targeted to use indicators for achievement such as: 1) Social performance indicators 2) Coverage indicators 3) Indicators for quality assurance [Efficiency, impact, effectiveness, customer satisfaction (customer complaints) 4) Safety indicators. Although supervision is recognized as a significant tenant of professional growth for IRS spray teams, the variability of the effectiveness, or ineffectiveness of supervision has come under scrutiny in recent times [20]. Commanders shed light on the most effective support supervision (e.g., encouraged autonomy, strengthened the supervisory relationship, and facilitated open field discussions) [21-24].

### Conclusion

The quality of IRS performance is the core component of equity of access to the intervention by the targeted community. The inadequate logistical support, lack of motivation incentives, poor operative environment and other system wide challenges in the majority districts, accentuate the need for superior supportive supervision (SSVS). The limitation in the understanding of commandeering on what constitutes superior supportive supervision and the imperative to understand how commandeering approaches can fill the field gaps to realize the

full benefits of understanding the need to continuously review the SSVS approach and to improve its effectiveness and that district-based SSVS embodies as many as possible. The commandeering provided answers to quality of IRS possible. And intensified community participation. The quality of SSVS as opposed to frequency; spray teams interactions built on trust, confidentiality, respect, empathy, recognition and emphasis on job enrichment of the spray teams are crucial to have a successful campaign.

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