

HUMANITARIAN  
MINECLEARANCE IN:

AFGHANISTAN  
GEORGIA KOSOVO  
COLOMBIA SRI LANKA  
ANGOLA MOZAMBIQUE  
CAMBODIA SOMALILAND  
NAGORNO KARABAKH



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## Getting the Survey Right

### 1. Introduction

The HALO Trust views survey as multidisciplinary process to locate, define, and prioritize hazardous areas for clearance. HALO has refined its survey methodology over 22 years of fieldwork and earned an enviable reputation for accuracy. HALO has conducted 7 UN sponsored surveys and 6 other internationally recognized surveys. Notable recent survey work includes comprehensive surveys of all remaining minefields in Somaliland (2009), Kosovo (2007), Mozambique (2007) of cluster munitions and landmine contamination in Georgia (2008). HALO has provided training for and is participating in ongoing national surveys of Afghanistan and Cambodia. In September 2009 HALO began survey and clearance in former strongholds of the defeated Tamil Tigers in northern Sri Lanka. HALO employs survey teams within all its programmes to register newly-discovered minefields and to monitor the evolving impact of known minefields as populations move and expand.

People unfamiliar with mineclearance often wonder how minefields can be identified and mapped when concealment is often a requirement of minelaying. Generally speaking, the accuracy of survey depends on (1) the quality of information available and (2) the experience of the person tasked to collect it.



*A HALO Afghan Survey Officer notes where farmers have stopped cultivation*

## **2. The Problem**

When professional armies lay mines, they usually map and mark the minefields. The clearance of these minefields is straightforward because the mines lie in pattern and at set intervals. These minefields are often fenced and/or lie within areas closed to civilian populations. By contrast, most humanitarian demining occurs in developing countries which experienced civil war or occupation by a foreign military. Government and rebel forces generally lacked training, laid what mines they had to hand, and seldom kept maps or marked minefields. Over the years, territory changed hands, soldiers moved, and memories faded.

Survey attempts to recover the information that was lost through interviews with the people involved in or affected by the conflict and through intelligent guesswork. Mines are often laid in predictable scenarios such as to defend military and infrastructure installations and to deny troop movements along roads or tracks. The hard part of minefield survey is translating this understanding of tactics from the general to the specific. For example, bridges are frequently mined but is there evidence to suspect that this specific bridge is mined?

In some cases there may be no tactical reason to suspect mine-laying but mines are present nonetheless. For example, a retreating force may have conducted 'nuisance mining', i.e. indiscriminate mine-laying to inflict casualties upon an advancing force or a returning population.

## **3. Government and Community Requests for Clearance**

Affected populations sometimes take charge and create lists of minefields within their midst. Such lists may be commissioned by government officials at a national or sub-national level. Or they may be the work of civic institutions, NGOs, or sources of authority not recognized by the government such as traditional, tribal and clerical leaders. In such cases, the role of survey is to assess each task: to confirm or discredit the minefield and to determine its priority for clearance. These lists can be very useful. As a neutral humanitarian organization, HALO engages with all parties and evaluates any source of information thoroughly. In practice, such lists vary in quality and thoroughness. Government lists may fall victim to politicization or corruption, while the rural poor rarely have a voice or may have supported the wrong side in the civil war.

## **4. Police and Military**

Police and military may be privy to information unavailable to the wider public or can point survey teams in the right direction. They may have maps or records of mine-laying. They may have served in the area at the time of mine-laying or they may have spoken to those who did. Frequently they have mines or ammunition handed in by the local population. Communities often notify the police or military in the event of accidents or the discovery of suspicious items. Moreover, it is important for survey teams to liaise with police and military because the survey teams may be investigating sensitive areas. The participation of a police officer in a survey investigation may facilitate the solicitation of information from a community. However, the survey officer's understanding of local context is essential: in regions where there is mistrust between a government and its citizens the presence of a policeman often makes people reluctant to talk about mines.

## 5. Community informants

Local communities are good sources of information, and they often know more than they realize when their fragmentary information is pieced together and analyzed by experienced survey officers. During the survey process, HALO engages the entire community. Whenever possible, survey officers arrange their visits in advance to allow the entire community to gather and participate. In the first part of the process, the survey officer interviews all persons who have relevant information about mines in the area. In the second part – discussed in a separate section below – the survey officer collects information about the community’s needs, assesses the impact of local minefields, educates the community about the risk of mines, and explains how the mineclearance process will proceed.



*Leaders of a Mozambican women’s group: civic institutions can be focal points of mines information*

Broadly speaking, a community’s information derives from two sources: the people who laid the mines and/or discovery of evidence of mine-laying. Civil wars often displace populations and the members of community living in an area today may or may not have been living in the area at the time of the conflict. However, there are myriad ways in which information may have been transmitted from the people who laid the mines to the current residents of the area. The following is a partial list of possible informants who may still be living in the area: the mine-layer or his family; a local commander at the time of mine-laying; a soldier who fought in the area at the time of mine-laying; a soldier who fought in the area after mine-laying; a civilian who assisted the mine-laying force; a civilian who lived in the area at the time of mine-laying; a civilian who moved into the area after mine-laying and spoke to soldiers; any person with information about mine accidents that occurred during the conflict.



*A Survey Officer interviews residents who lived in the area at the time of minelaying*

HALO ranks each informant on the basis of the quality of their information and their reliability. The survey officer tries to establish how each informant knows what he/she knows. It is important to determine how many links exist in the chain of transmission from the source of the information - i.e. the people who laid the mines - to the informant. The closer a person is to the source of information, the more reliable their information is. By contrast, general rumour is least helpful. In some cases, there may be no continuity between a community living in an area and the soldiers who laid mines. Refugee populations or families seeking resettlement are particularly vulnerable to mine accidents because they are least likely to know the location of minefields. However, these people too may have important information to consider. They may know the location of accidents involving humans, livestock, or wildlife or they may have uncovered mines, a common occurrence during ploughing or construction. They may also have encountered telltales of mine-laying such as blast craters, transport cases or tripwire stakes.



*A P4 anti-personnel mine peaks through the leaf litter at a minefield in Somaliland*

On their own, these pieces of information may not amount to much. However, a good survey officer will plot each relevant point on a map and then consider the terrain, mine-laying tactics in the area, and the history of fighting in the area.

Imagine a worst case scenario: a farmer treads on a mine as she is reclaiming farmland from the surrounding bush but the local community knows of no minefield in the area. It may seem impossible to draw a minefield map on the basis of a single data point. However, an operationally-trained survey officer is often able to extrapolate additional data points that are not are apparent to an interviewer who comes from a non-technical background. For example, the survey officer may look for evidence of a path used by troops, an encampment, a source of water, a prominent shade tree, old cultivations or fruit trees that would have attracted hungry soldiers. These are places that may have merited mine-laying. In most civil wars, logistics were difficult and soldiers did not have limitless supplies of mines. Consequently, they laid mines in those places where they most expected an enemy soldier to step or drive.



*Mines victims are important sources of information*

The survey officer also considers the terrain. Features that channel human movement such as valleys are likely to be mined, as are features that form natural defensible positions such as hilltops. Minefields often incorporate natural boundaries such as rivers, cliffs and ravines. Satellite imagery or aerial photography can reveal terrain features or human disturbances such as trench lines which may not be obvious when standing on the ground. The survey officer will know the scale and history of fighting in the area, and this should give an indication of the size of the suspected minefield. It is worth considering if the mine accident occurred along a possible attack route to an important settlement or resource or if it lay in the vicinity of a former front line. The injuries or mine fragments from the mine accident may indicate the mine type, and mine type may reveal which side laid the mine. For example, if the mine type is associated with a guerrilla force known to have had few mines available to them, the minefield is likely to be small. If repeated cultivation and ploughing have occurred nearby without the discovery of mines, the survey officer may be able to narrow the dimensions of the suspected area. Through these and other considerations, the survey officer sketches a map of the area most likely to be mined.



*Cuito Cuanavale, Angola: sometimes the scale of the problem only becomes apparent from the air. The uncultivated areas within the red polygon are the only suspect areas that require investigation by survey teams.*

This is only the starting point because clearance itself is a form of ongoing survey. The discovery of mines during clearance creates additional data points for consideration and guides the direction of clearance. Usually a mine pattern will emerge and clearance will continue until senior members of staff determine that all mines have been found.

## **6. Vetting community information**

As noted, it is essential to use operationally-trained mineclearance staff to gather and vet information. Local community members are not mines experts. Those living in a post-conflict environment may develop a generalized fear of all unused land and they may believe that huge swathes of ground are suspect. Survey staff who do not come from a mineclearance background often accept the community's fears at face value and file paperwork reporting huge areas as suspect minefields. This information is then entered into national databases where it becomes extremely difficult to discredit. Not uncommonly this reaches absurd proportions. For example, a 2001-2002 Landmine Impact Survey of Cambodia suggested that the contaminated area extended to 4,466km<sup>2</sup> across the country (more than 150 years of clearance at present rates). The actual extent of mined ground is certainly much smaller, and in 2009 a new survey began to reassess just how much smaller. The declaration of so much land as mined is defeatist because it suggests that the mines problem is prohibitively expensive to resolve. The unfortunate reality is that in Cambodia, as in other countries, donor money is being expended to resolve a problem that donor money was used to create.



*Informants may offer conflicting information about a minefield's size and location*

## **7. Examples of successful survey**

HALO has prided itself on conducting accurate surveys the first time around and cleaning up flawed surveys. A brief discussion of Mozambique will serve as an illustrative example. In the early 1990s a carve-up of mineclearance responsibilities in Mozambique allocated the northern four provinces to HALO (40% of the country's land area and an estimated 60% of its minefields) and the southern six provinces to a variety of other operators. By 2004, HALO had cleared most of the known minefields in the north. In preparation for leaving the region, HALO started a new process called a Mine Impact Free District survey (MIFD). MIFD was an all-inclusive, participatory process whereby HALO teams, together with district officials and with sanction from the national demining authority, visited every community in the North to confirm that they knew of no remaining minefields. When the teams discovered new tasks, HALO clearance teams were then deployed. By the end of the process in 2007, all known minefields had been cleared and all communities had had one final opportunity to raise any concerns. During the course of the MIFD process 6,395 communities were visited and 401,007 people were interviewed. The total cost of this 14 year effort was approximately \$30 million.

By contrast, approximately \$150 million was spent on mineclearance in the south. By 2007 the national database still listed 1,844 suspect hazardous areas (SHAs) in the southern six provinces. Those familiar with the subject suspected that this figure overstated the remaining problem, but no one knew for sure. At the invitation of the Government of Mozambique, HALO visited every site. 652 sites were confirmed as hazardous areas (487 of which are minefields), while 1,192 were cancelled. Confirmed hazardous areas were further classified as Minefields, EOD/UXO call-out tasks, Battle Area Clearance tasks or Road tasks.

The cases of Mozambique and Cambodia are symptomatic of a broader problem: national databases populated by poor survey information (and poor data management by national administrators). It is for this reason that HALO contends that survey officers must have a background in mineclearance. As noted, this happens in two ways: (1) they assess existing minefields to be larger than they are;

and (2) they designate non-mined areas as mined. The result is that donor money is wasted because non-mined ground is cleared unnecessarily and because thousands of staff hours are consumed by paper exercises like 'Land Release,' which was invented to remove mined ground from national databases that should never have been entered in the first place.

## **8. Survey officers**

The survey officer is the most important component of the survey process. Accurate survey requires survey officers who know their patch and understand local mine-laying tactics; who record their findings with accurate maps and appropriate survey forms; and who liaise effectively with affected communities.



*Survey work requires a sound understanding of mapping, among other skills*

The last point merits special discussion. For all the reasons present above, grassroots work at the community level is essential. However, survey should be guided by inputs from the community, not directed by it. Survey officers should be chosen who can engage a community. For example, in areas with ethnic, religious or linguistic divisions, communities respond best to persons who share their heritage. But it is also important that the survey officer can be sufficiently removed to be impartial. Most communities understand that survey is going to lead to mineclearance and they may tailor the information they provide to steer mineclearance to suit motives that are not necessarily humanitarian. Mineclearance is often seen as a source of revenue. This is particularly true in countries where locals are hired to demine their own communities. This saves money on logistics and transport costs but it encourages communities to exaggerate the size of their mines problem.

Other conflicts of interests may be less obvious. For example, farmers like mineclearance because it removes brush and rubbish they would have had to clear themselves. Local land disputes often spill over such as when one party claims an area is mined to keep another party from using the land. Managed poorly, grassroots efforts can lead to abuse. For example, a well-meaning NGO hired local assistants to travel around their home regions and draw up lists of mined areas. In theory, this kind of community liaison is brilliant: its a home-grown solution that empowers locals to address their own problems. But some of the informants realized that they would keep getting paid as long as

they continued to add minefields to the list. The cost of striking off the spurious 'minefields' far exceeded the intended benefits.



*An operations officer liaises with a landowner before commencement of clearance*

Incentive schemes require careful consideration and management. Human nature is such that once a suspicion has been raised, however spurious the motivations for that suspicion, it becomes difficult to convince people the danger never existed. The problem becomes even more intractable when inexperienced survey personnel install Danger Mines signs around non-mined sites. The placement of marking encourages a suspicion of the presence of mines and some communities will refuse to use the land until it is demined even if there was no evidence to suspect the area in the first place.

## **9. Assessing socio-economic impact**

HALO believes that mineclearance should be targeted at areas that cause accidents, as a corollary, non-mined ground does not cause accidents and should not be cleared. HALO prioritizes clearance on the basis of the socioeconomic value that the clearance will provide to the community. These two rationales are related: mine accidents impose a high socioeconomic cost on a community. Without arguing the relative value of human life, most agree that the value of preserving a life exceeds the value of returning a field to productive use. Furthermore, in many developing countries, local populations store at least part of their wealth in livestock – particularly cattle – and they fall back on this reserve in hard times. The loss of livestock to mines depletes this reserve and renders populations already living on the edge more vulnerable in the event of emergencies such as drought or disease. Additionally, agrarian communities often rely on draft animals for ploughing and transporting goods to market, and the loss of an animal may eliminate a family's means of wealth generation.



*Rural communities often rely on livestock for sustenance and wealth creation*

## **10. Non-mined ground**

A good survey officer should, in most cases, be able to distinguish between mined ground and feared ground. Local communities are rich sources of information when interviewed properly but their fears may be ill-founded. If the survey officer disagrees with the local population's contention that an area is mined, the survey officer may recommend steps short of full-scale clearance such as technical survey or area reduction through mine rollers. Often the survey officer is able to demonstrate to the local community that their fears are misplaced. For example, many local populations cannot distinguish between mines, ammunition, and other items of military provenance. What they believe to be a minefield may be a single, stray grenade. An ops-trained survey officer knows the difference, and HALO provides its survey officers with Explosive Ordnance Disposal (EOD) training so that they can destroy the item. This means that less land is earmarked for expensive clearance and that a hazardous item is destroyed without the need for follow-on visits which cost money and disrupt the community.

The rationale that non-mined land should be treated as seriously as mined land ignores the cost of mine accidents. Imagine a town at night in which a fire breaks out and threatens a factory and a house. The town has a single fire truck. Most would agree that the fire truck should extinguish the house because it's more likely to save lives even though the factory has greater socioeconomic value to the town. The same is true of mine clearance. The clearance of non-mined ground often occurs when accident-causing minefields are just down the road. There is an understandable conviction, when it comes to suspicion of mines, to err on the side of caution. But the allocation of finite resources to high-value, non-mined ground – ground often characterized as having a 'residual threat' – is doing a disservice to the villagers down the road who are having accidents but whose land apparently does not rate as highly.

Accident-causing land should take priority. In those countries where accidents have become rare, socioeconomic considerations become more important. HALO recognizes that predicting the likelihood of accidents is difficult but there are important indicators such as a minefield's proximity to human habitation, population density in the vicinity, the number of mines, the functionality of the

mines, and the attractiveness of that land. For example, if a minefield blocks the closest well in town, the population may cross the minefield despite the known risks. The reality is that many, if not most, accidents occur on land which the victim knew to be mined.

**11. Task prioritization**

HALO assesses the impact of minefields using a matrix which considers the likelihood of accidents; the number of beneficiaries; the value of the mined land to the community if cleared; and the use and value of the resources to which access is blocked by the minefield. This information is collected as part of a wide-ranging consultation with all beneficiaries. The survey officer has a form with a series of questions and tick boxes. For example, a section may look like this:

11. Roads:

11.1 Road blocked

Yes

No

11.2 Road in use

Yes

No

**Road alternatives:**

11.3 Is there any alternative to the road

Yes

No

11.4 Alternative to road by bicycle or foot

Yes

No

11.5 Alternative to road by car

Yes

No

11.6 Alternative to road by car during rainy season

Yes

No

The survey officer ticks all conditions that apply. Each answer is later fed into a simple computer program which assigns weightings for each response. For example, a mined road that is currently in use scores higher than a road which is not in use (because the risk of accidents is higher). By design, the survey officer does not know the weightings assigned to each response in order to limit personal considerations from influencing the score. The questionnaire tries to anticipate every possible situation. For example, a minefield may occupy ground that is not particularly valuable to the community but that same ground may block access to important land or resources.

Sometimes there are socioeconomic considerations that cannot be neatly represented by tick boxes. Thus the survey officer fills out two narratives: his own risk assessment of the minefield and its impact on the community and the community's own opinion of the risk and their intentions for the cleared ground. The survey officer also records technical considerations such as the soil type, the assessed mine type and depth, vegetation density, metal contamination and difficulty of clearance.



*The survey process should encompass a wide range of informants*

Survey culminates in the creation of a work plan and commencement of mine clearance. It should be noted that a task which has high impact is not necessarily a high priority for clearance. The clearance provider determines priority based upon available resources and conditions on the ground. Prioritization is, essentially, the creation of a work plan. For the purposes of logistics and command-and-control it may be advisable to clear all tasks in an area, regardless of their impact, at once. Likewise, it may be geographically or politically impossible to clear some high-impact tasks. HALO is responsive to requests for clearance made by other NGOs, by local communities and by national or provincial authorities. HALO maintains good relations with local government wherever it works. Consequently, HALO often entertains requests to provide mineclearance in advance of development projects. This can provide critical support to at-risk communities and can result in small or large scale engagements. Projects can significantly change the impact scores assigned to a minefield. For example, in 2008 heavy rains washed out a causeway supporting the road linking southern Angola with Namibia. HALO had previously surveyed a minefield along the causeway but had other tasks in the area warranting higher priority for clearance. Overnight, traffic halted and the minefield became an emergency high priority. HALO commenced immediate clearance at the request of the governor in order to provide access for rehabilitation efforts.



*A washed-out causeway on a road linking southern Angola and Namibia: a minefield's impact can change abruptly*

Tying survey to development projects can improve outcomes for communities. However, there is a delicate balance to strike. Integration of demining into broader development schemes risks the allocation of scarce clearance resources onto non-mined ground. For example, not every potential school site requires demining but development actors from a non-mineclearance background may insist on demining as a precaution. The end result may look very good to donors: happy children playing in a new schoolyard cleared of mines. But this appealing scene may mask the reality that there was no cause to demine the land in the first place. For example, between 2002 and 2007 57% of the 'minefields' cleared by a major demining NGO in Cambodia contained no mines.

## **12. Synergy**

Over the years the remit of HALO's survey officers has grown to create highly flexible teams. Flexibility means costs savings and better outcomes for affected communities. A survey team's responsibilities may include EOD callout, collection of arms and ammunition, negotiation for the surrender/destruction of arms caches, technical survey (i.e. limited mineclearance), community liaison, risk education, collection of socio-economic data for task prioritization, collection of census data, polygon mapping, cancellation of reclaimed or non-mined land from databases, provision of medical assistance to mine victims, provision of emergency supplies to communities, training of host government agencies and mineclearance NGOs, security briefings, risk assessment of roads, minefield marking, recruitment of local deminers and staff and analysis of post-clearance land use.

## **13. Conclusion**

In survey, as in any complex process, small errors compound into big problems. This underscores the necessity of fielding experienced staff and getting the basics right. Each survey report fits together to form the larger picture of a country's mines problem. Donors need good information to make good decisions when determining the allocation of their aid budgets. Better data collection means better-targeted clearance and better value for money.