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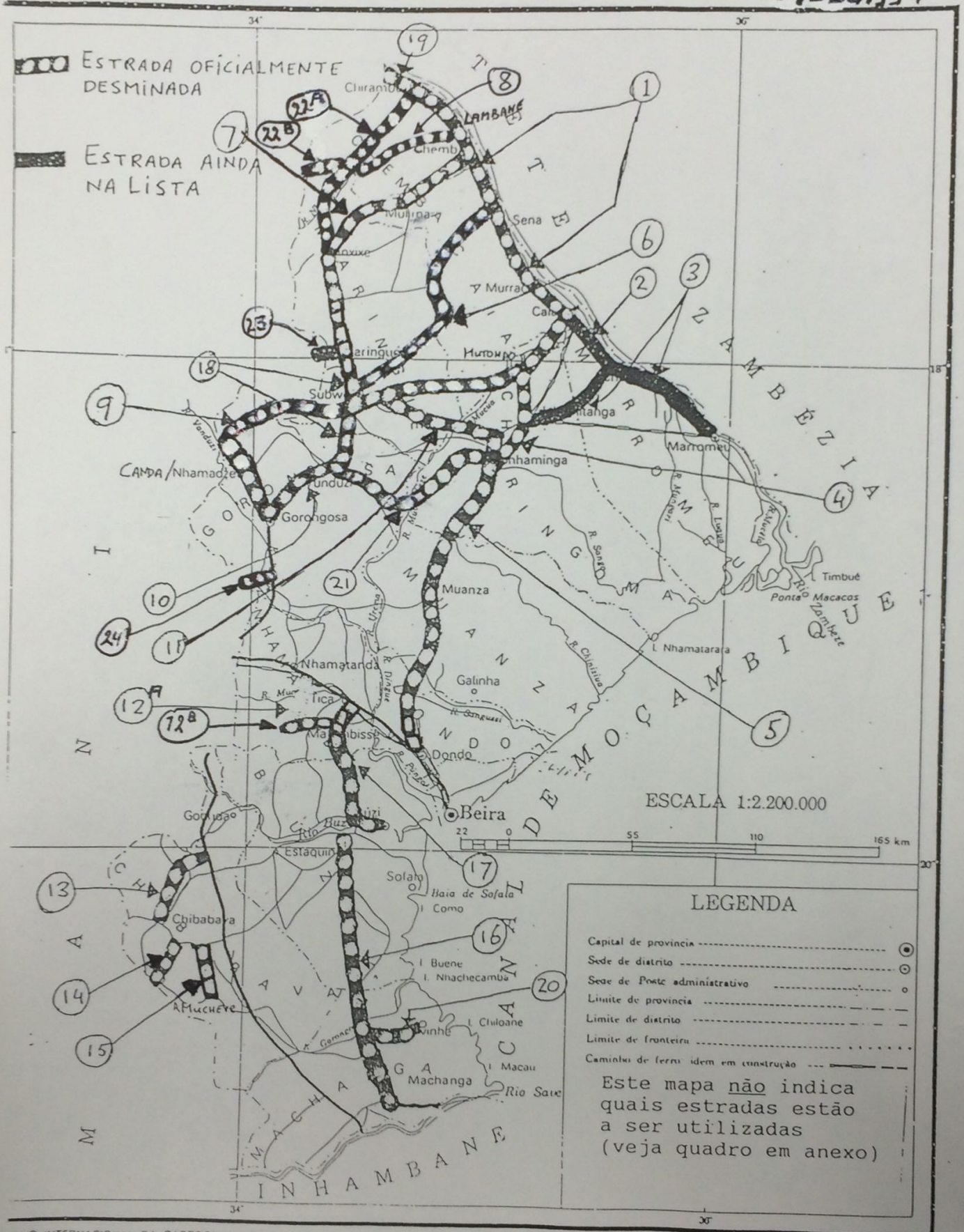

ANO INTERNACIONAL DA CARTOGRAFIA EM AFRICA
de Publicação 1988

Direcção Nacional de Geografia e Cadastro
(DINAGECA)

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To: Bill Paton - UNOHAC

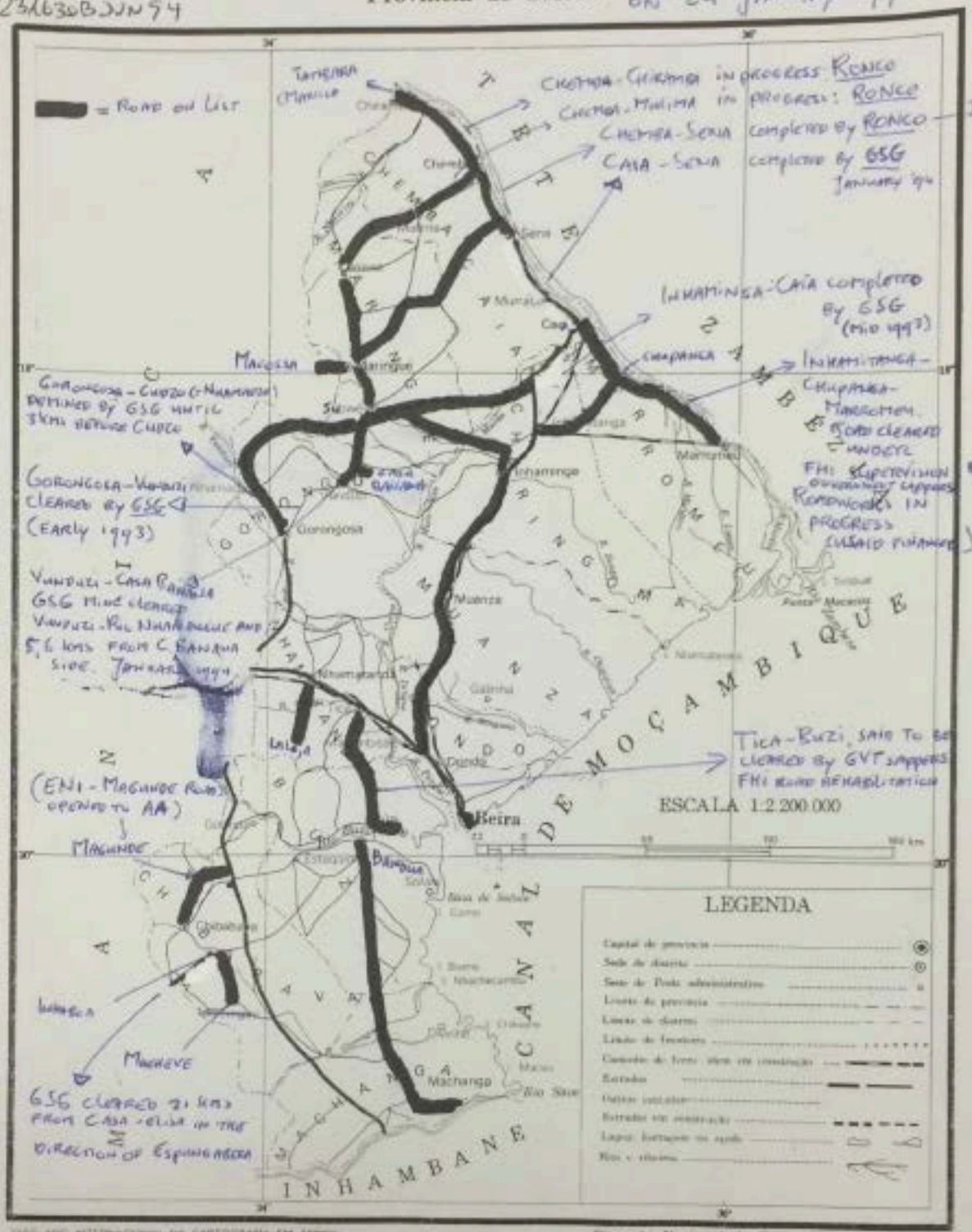
Fax : 01-425136

Sent 357

23/6/30 BJJN 94

Roads on list of priority roads for demining, update accepted in provincial HAC on 24 January 1994

Provincia de Sofala



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THE HALO TRUST / UNOHAC

MINES SURVEY

OF

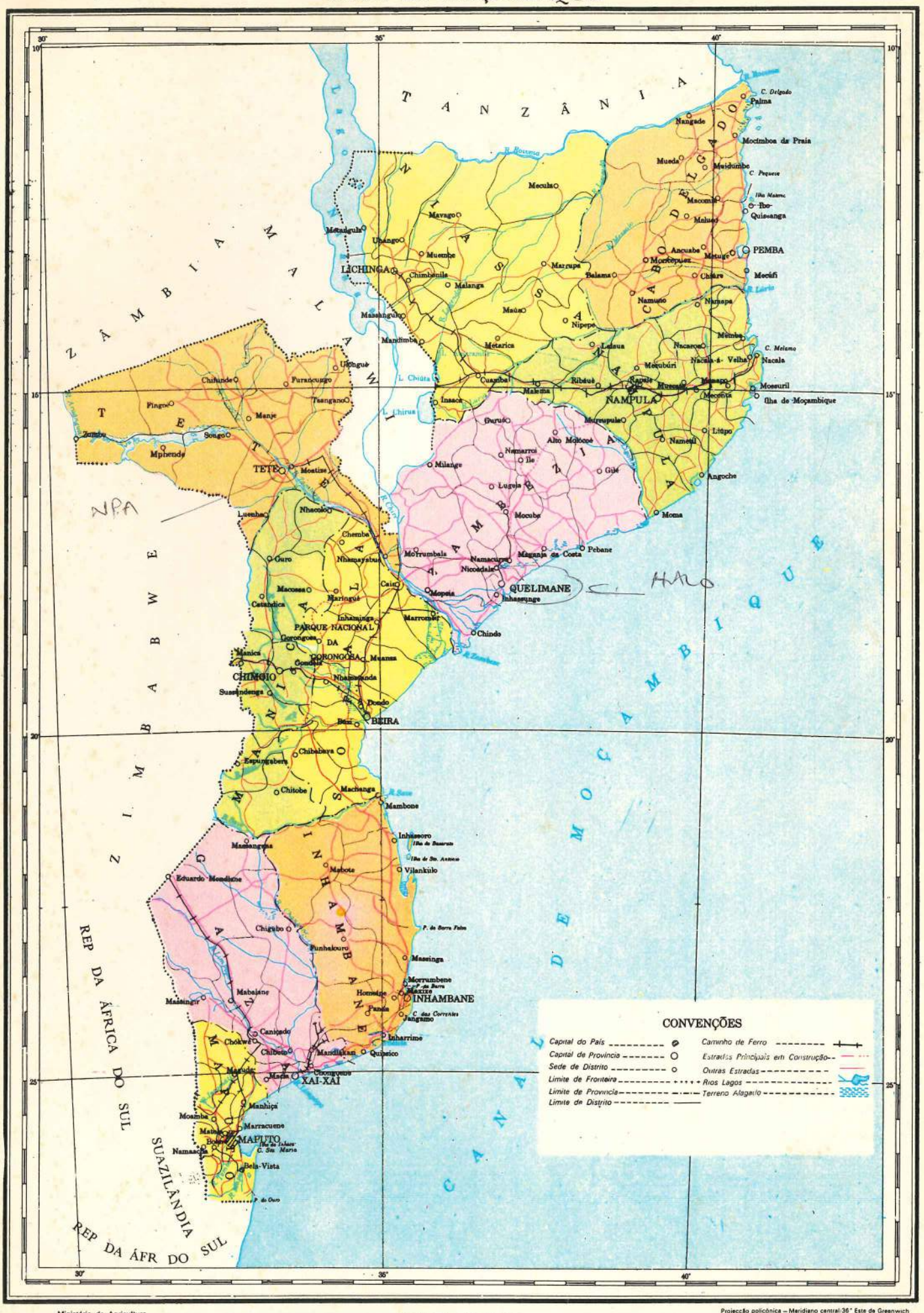
MOZAMBIQUE

1994

REPORT ACCOMPANYING SHAMAN MINES DATA

Incorporating: THE HAZARDOUS AREAS LIFE-SUPPORT ORGANISATION
Registered in England as a private limited company No. 2228587. Registered Office: 179 Great Portland Street, London W1N 5FD

MAPA DE MOÇAMBIQUE



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CONTENTS

Paragraph			Page
1.	SUMMARY		2
2.	OBJECTIVES		3
3.	INTRODUCTION	Background and History	3
		Situation	4
4.	GENERAL		5
5.	CHRONOLOGY	Preparations	5
		Province sequence	6
6.	METHODOLOGY AND INFORMATION GATHERING TECHNIQUES		7
		Provincial planning	7
		NGOs, and other key sources	7
		District centres and rural areas	8
7.	DATA HANDLING	Mine reports	9
		Mapping	10
8.	ORGANISATION AND LOGISTICS		12
9.	SAFETY		13
10.	SURVEY COVERAGE		13
11.	PROVINCIAL SUMMARIES		15
		Maputo Province	16
		Gaza Province	20
		Inhambane Province	22
		Manica/Sofala Provinces	25
		Tete Province	28
		Zambezia Province	31
		Niassa Province	33
		Cabo Delgado Province	35
		Nampula Province	38
12.	NATIONAL SUMMARY		40
13.	CONCLUSIONS		40
14.	RECOMMENDATIONS		41
	APPENDICES:	Communications	42
		Vehicles	42
		Navigation and position finding	42
		Personnel	43
		Medical	44
		Roads and accessibility	44
		Mine Types	45
		Financial Report	46

1. SUMMARY

The HALO Trust, a British registered charity, was contracted by the United Nations to conduct a nationwide mines survey of Mozambique. The Survey was conducted on behalf of The United Nations Office For Humanitarian Assistance Coordination (UNOHAC) with funding through The United Nations Development Programme (UNDP). The data collected and the maps made by the Survey Teams were lodged with UNOHAC on 9th June 1994 and will be disseminated to aid agencies and used to draw up a list of priority tasks for mine clearance.

The objectives of the survey were to provide an overall assessment of the landmine situation in Mozambique for the benefit of all organisations and agencies working in Mozambique and to enter this information into the Shaman database. Whether planning refugee return, food distribution, medical programmmes, election education or economic development, the information supplied by the survey will be of vital importance. The results will also of course, be of fundamental importance to the demining programme in Mozambique, allowing detailed investigations of individual sites before demining operations begin.

Landmines were laid by both FRELIMO and RENAMO, as well as by the Portuguese, Tanzanians and the Rhodesians during the liberation struggles. Mines were used for defensive and offensive reasons, principally in and around areas of strategic and other importance such as military headquarters, towns and villages, sources of water and power, pylon lines and dams as well as on roads, tracks and paths and alongside bridges and railway lines. Rural areas have been mined where the reason is no longer obvious, and many of the old transit routes used by the combatants have now become indistinguishable from the bush. In addition to a number of fixed, defensive minefields, the use of landmines in Mozambique is characterized by a highly dispersed pattern.

The survey was conducted by two groups, each consisting of three mobile teams. Expatriate landmine surveyors were equipped with Landrover Defender 110s, Codan HF radio transceivers and Magellan Satellite Navigation Systems, and were assisted by drivers and interpreters, recruited locally. All vehicles travelled as entirely self-contained units which allowed the teams greater work flexibility, and therefore increased the survey rate of progress. Although coordinated from Maputo, the teams depended on their own resources and initiative, receiving little external support.

For the purposes of the survey the country was split in two, using the Rio Zambeze as the dividing line, though Tete was included in the northern section, with one group operating in each section. The fieldwork of the survey began on 2nd February 1994 and the teams spent a total of 55 vehicle weeks covering over 110,000 kilometres of roads and tracks throughout Mozambique interviewing people from Provincial Governors and Military

Commanders to village inhabitants stopped beside the road, who were able to provide details of mined locations.

Once drawn up, the completed Danger Area Reports were returned to The HALO Trust Head Office in Maputo where they were entered into the mines database. The quality of reports on mined or suspected mined areas varies enormously. At best, mine maps were available from the military, or the soldier who had laid the mines accompanied the survey team to the site and the mines were visible. In other cases, however, even with cross referencing, the details on the extent of mines and their exact location remained unclear.

During the Survey, 981 separate Danger Area Reports were filed, in areas covering the length and breadth of the country. In most sites, the number of mines involved was less than five, though in a small number of strategic locations, there exist fields of upto hundreds or thousands of mines. Although the survey cannot claim to have covered all of the mines in Mozambique, it is evident that the total number in the country is significantly less than the two million figure that was previously feared.

Although knowledge generally exists in the community about mine threats in the vicinity, accidents were documented in some of those same communities, notably involving children. Continuing awareness and caution is necessary in communities and in government and non-government organizations. Everyone travelling in rural areas is encouraged to ask questions about the local mines situation.

2. OBJECTIVES

The objectives of the survey were to provide an overall assessment of the landmine situation in Mozambique for the benefit of all organisations and agencies working in Mozambique and to enter this information into the Shaman database. Whether planning refugee return, food distribution, medical programmmes, election education or economic development, the information supplied by the survey will be of vital importance. The results will also of course, be of fundamental importance to the demining programme in Mozambique, allowing detailed investigations of individual sites before demining operations begin.

3. INTRODUCTION

Background and History

Mozambique gained Independence from Portugal in 1975 after a nine year struggle led mainly by the nationalist group FRELIMO, who then established itself as the Government of a Marxist-Leninist one party state. In the mid 1970s an insurgent organisation named RENAMO was established by the Rhodesians and civil war

ensued between FRELIMO and RENAMO. After Rhodesia gained Independence it was the South African government who provided financial and material support for RENAMO along with a number of private right wing sources in South Africa, the United States and Portugal, amongst others.

Although RENAMO controlled limited areas of the country during the war they caused significant disruption to the Government and the civilian population by frequent attacks on infrastructure.

In 1987 FRELIMO adopted an IMF Structural Adjustment Programme to effect a transition from centrally planned to market economy and in 1990 changed the Constitution to allow free elections, a multi-party system, a free press and an independent judiciary system.

Peace talks between the two sides began in earnest in July 1990 and a Peace Agreement was finally signed on 4th October 1992. On 16th December of that year the United Nations passed Resolution 797 establishing ONUMOZ.

Situation

Apart from a brief respite after Independence, war had been waged in Mozambique for twenty five years. During the fighting, a large proportion of the rural population left their homes either for the larger towns and cities, which saw very little of either conflict, or crossed the border into neighbouring countries.

Both FRELIMO and RENAMO laid landmines in Mozambique during the civil war, as had the Portuguese and the Rhodesians during the Independence struggles. The result is that large parts of the country are severely affected by landmines and the long-term effects they will have on the population and the economy of Mozambique should not be underestimated.

Mines were laid for defensive and offensive reasons principally in and around areas of strategic importance such as military headquarters sites, towns and villages, sources of water and power, pylon lines and dams as well as on roads, tracks and paths and alongside bridges and railway lines. Other rural areas have also been mined where the reason for mining is now not obvious.

In addition those people who have information on these areas are not always either still in the area or able to remember their locations and other vital details.

Following the signing of the Peace Agreement and the consequent return of confidence in the ceasefire the millions of people displaced during the fighting have started to return home. Many are being organised by the Aid Agencies but a significant number are returning independently. Those not returning under the auspices of aid agencies are likely to use landscape dominating features such as pylon lines as navigational aids thus increasing the risk of moving into mined areas.

4. GENERAL

Six vehicle mounted teams spent a total of 55 Team weeks covering over 110,000 kilometres of roads and tracks throughout Mozambique talking to people who were able to provide details of mined locations. There are some areas of the country which are still inaccessible by road, whether due to mines or other factors such as bridges that have been destroyed or the road has become overgrown. As a result there are a few parts of the country which the Survey Teams were not able to reach, either by vehicle or by helicopter.

A total of 981 reports have been filed on separate mined locations in Mozambique, ranging from small stretches of road closed by a single mine, to large defensive minefields of many thousands of devices.

The working maps made by the Survey Teams whilst travelling the country are available for inspection at the United Nations Demining Office in Maputo. These show roads travelled by the Teams, other roads in regular use, known mined locations and suspected areas. (For further details on Mapping see Section 7)

A large number of NGOs, military personnel and administration staff were contacted by the HALO teams during the course of the Survey. Consequently The HALO Trust and the UNOHAC Mines Survey is well known nationwide.

5. CHRONOLOGY

Preparations

The objectives and wide ranging importance of this programme are such that it would have been desirable for it to start as early as possible in the United Nations mandate in Mozambique. The start of the programme was delayed through various factors. The following paragraphs outline the chronology of the operation:-

February 1993 — The HALO Trust representative for Mozambique arrives in country and has initial discussions about the need for a mines survey.

The enthusiasm of Mr Bernander and Mr Scholtes contributed greatly to the rapid progress over objectives and the production of a proposal. The arrival of Mr Millorit in Maputo provided a permanent point of contact for demining issues.

March 1993 — The HALO Trust is requested by UNOHAC to carry out the survey as soon as possible, dependent on political clearance. It is made clear that a waiver of competitive bidding has been obtained.

The failure of the Cease Fire Commission to sit delayed the decision on political clearance for the survey. The perception that demining was not a humanitarian issue and that the survey was merely part of demining rather than of broader significance prevented immediate progress.

August 1993 The Cease Fire Commission gives clearance for the survey to proceed with the full cooperation of both the government and Renamo. There are no further barriers in country to the survey starting.

The fact that, despite repeated pressure from the United Nations in Maputo, no contract had been prepared in New York and it was decided to go through a long and tortuous competitive bidding waiver process, meant that the survey in Mozambique, although ready to start, was delayed.

October 1993 The UN in New York states that HALO should start work immediately. The HALO Trust recruits expatriate and local staff.

December 1993 The UNDP/HALO contract is signed.

January 1994 The first financial transfer is made.

1 February 94 The practical phase of the survey begins.

Operations

The survey was planned with geographic and logistic considerations foremost. Two groups of survey teams aimed to provide as near as possible a blanket coverage of all areas of the country. The sequence in which the provinces were covered was:-

Southern Group

Maputo Province
Gaza Province
Inhambane Province
Manica/Sofala Province

Northern Group

Tete Province
Zambezia Province
Niassa Province
Cabo Delgado Province
Nampula Province

The practical phase of the programme was completed on 20 May 1994, 10 days ahead of the 4 month schedule predicted in the original proposal.

6. METHODOLOGY AND INFORMATION GATHERING TECHNIQUES

Provincial planning

Prior to the Survey starting the Team Leaders met with the UNOHAC Representatives for the different Provinces. It was explained how the Survey was to be carried out and they were briefed on the planned progression through the country. Their assistance was also requested in gathering information prior to the Teams arrival in their area.

On entering a new Province the Survey Teams normally spent at least two days conducting meetings in the Provincial capital. The UNOHAC Representative was the first person consulted by the Teams in order to gain a good overview of the Provincial mines situation. Their advice was sought on which of the numerous other Aid Agencies in the Province should be met to gain further information.

Provincial Governors and Military Commanders were also consulted and all of the available information transposed on to Province planning maps. These maps provided the framework for the Teams to plan the most effective route around the Province covering as much of the ground as possible. The rate of progress through the Province was determined by the quantity of information being received and the availability of District Administrators, local Military and Police Commanders. The nature of the Survey meant that it was rarely possible to warn these people in advance of the Teams arrival and it was often necessary to return to an area in order to see the relevant people. Other influencing factors were fuel availability, road conditions and the weather.

Planning on a day to day basis at District level was a complicated process; road conditions, detours and survey questioning times were extremely hard to anticipate, making accurate rendezvous locations and times difficult to predict. In addition, roads and tracks of which the Teams had been previously unaware often opened up other areas and provided new links between Districts. All Teams quickly had to adopt a very flexible approach to the task.

NGOs, and other key sources

Organisations approached for information on known or rumoured mined sites and road accessibility during the Survey included:

Action Aid
AICF
CARE
ECMEP
German Agro Action
Hospitals
IOGOS
MSF
Agua Rural
Border guards
Concern
Electricity pylon repair crews
Handicap International
ICRC
IOM
Missionaries

NPA
Police
SCF
World Vision
Oxfam
RRR
UNHCR

Due to the nature of the survey work and its obvious importance to all NGOs working in the field, meetings were relatively easy to arrange. It did, however, quickly become clear that in some areas much time was being spent gathering duplicate information and although cross referencing was useful, it was a more productive use of time to take the recommendation of the UNOHAC representative as to which Agencies to see in order to gain the best coverage of the Province as a whole.

District centres and rural areas

Although much background information had been acquired through the meetings in the Provincial capitals, the main source of accurate mine location data came from the local population.

The usual procedure on entering a new district was to arrange a meeting with the administrator and local military and police chiefs. The format for such meetings was to target the following:

- known or suspected mined areas or accident locations.
- location of former military camps
- local knowledge of roads and tracks
- contacts with demobilised soldiers

The quality of information from these sources varied enormously. Many administrators were new to the area or simply had little knowledge of their district; others were invaluable and accompanied the Teams to known mined locations in the vicinity.

Within the district, at village level, chiefs and village secretaries were interviewed and in between settlements locals were questioned along the roadside. This last category, of locals seen en route, accounts for a significant proportion of the sources approached for mines information.

Liaison officers were generally very helpful; many had fought in a particular area and knew the mines situation well, both in terms of where mines had been laid and where casualties had been suffered, thus giving an indirect method of determining the locations of enemy mines.

The Government and RENAMO Assembly Areas were important locations for gathering information which was obtained through meetings with the camp commander and several "key" soldiers. The UN Team leaders at the assembly areas were often able to supply information on the types of mines which had been handed in by the soldiers on arrival which gave a good indication of types that might be expected on the ground locally.

Wherever possible reports of mined areas were crossed referenced in an attempt to resolve the details and to pin down the location of mines. It was not uncommon to have suspected mined locations varying by several kilometres depending on the source. This problem was particularly applicable to sites some distance into the bush, well away from accessible tracks. In attempting to locate an apparently vague site, by speaking independently to a Government soldier, a local inhabitant and a RENAMO soldier, it was sometimes possible to correlate the information and gain a realistic idea of the details and location of the mined area.

7. DATA HANDLING

Mine Reports

Once drawn up, the completed Danger Area Reports were returned to The HALO Trust Head Office in Maputo where they were entered into the SHAMAN Database system.

The quality of reports on mined or suspected mined areas varies enormously. At best, mine maps were available from the military, or the soldier who had laid the mines accompanied the Survey Team to the site and the mines were visible; in other cases, however, details on the extent of mines and their exact location were vague and cross referencing between sources failed to pin-point locations.

Errors of this nature are identified on the Danger Area Reports by "est" following the grid reference or "Grid ref approx" which appears in the remarks paragraph. In the worst case, where the potential mine site cannot be accurately identified, dotted or hatched red highlighter on the 1:250,000 scale maps indicates the approximate area in which the mines are presumed to be.

In some cases the Surveyor has drawn a sketch map of the mine field on the back of the original Danger Area Report. Such reports are identified in the SHAMAN Database and interested parties should refer to the original data sheets held by UNOHAC.

Inaccuracies recorded on the Data sheets are likely to be as a consequence of one or more of the following:

- Rumours and exaggeration from the source of information

- Unrecorded demining or removal and repositioning of mines without local knowledge

- Complications, especially at strategic locations such as dams and bridges, of different phases of mining. At one site it became clear that information had been recorded for one particular mining phase which in fact proved to be a "top-up" of mines already laid, which in turn were additional to those laid during the war for independence.

- Mines that have been shifted by rain and flood waters particularly those that were laid on steep ground and those which have been in the ground for several years. e.g. those around bridge supports and on river banks.

- Difficulty in determining exact locations of remote reports.

The speed with which raw information from the field was turned into useful data for general distribution was not as fast as had been hoped. The main reason for this was the extreme intensity of the information collection operation. The survey needed to be completed as quickly as possible to make up for the delays in 1993. The collated data had to be checked by the staff who originally collected it, and this was not possible until the end of the practical field stage. Had staff returned to Maputo between each province survey, the momentum would have been lost and the cost would have been higher.

The other factor that influenced the speed with which the information could be processed was the limitation of the Mapinfo system. The problems of displaying mines data, correctly positioned on the Mapinfo were not overcome during the programme and this meant that the time required to transfer information onto readily reproducible A4 maps was greatly increased. While original 1:250,000 scale maps were made available as soon as possible during the survey, they are not easily reproducible without more sophisticated equipment.

The balance between overall completion of a survey programme and the production of interim results is one that needs to be addressed when considering the format of future surveys in other countries. What should be avoided at all costs is pressure to produce interim results as a consequence of misplaced outside persuasion, which could lead to putting survey staff under additional pressure in what is a highly dangerous and physically difficult programme.

Overall, this survey gathered its data and provided it to UNOHAC within the timescale originally proposed. It only managed to do so through the energy and commitment of the expatriate and local staff who spent 4 months living in the bush.

Mapping

The working maps made by the Survey Teams whilst travelling the country are available for inspection at the United Nations Demining Office in Maputo. These show roads travelled by the Teams, other roads in regular use, known mined locations and suspected areas.

The maps the Survey Teams used are at scale 1:250,000 most of which date from pre-Independence. This was unavoidable. Since these maps were produced many towns and villages have been renamed, abandoned or destroyed. Many of the roads and picadas

marked on the maps are no longer in existence or could not be found having become overgrown - many such roads are identified on the maps by dotted red (it was not considered practical to mark all such roads as it would give a false impression of the mines problem particularly in areas where there have been dense road networks). Similarly, new roads have been created and old ones abandoned whether through mining or lack of use or repair. Where possible the Survey Teams have plotted the new roads on their maps and the alternative names for settlements are included in Danger Area Reports as well as being marked on maps.

The colour coding used on the maps is as follows:

ROADS

Green: Roads travelled by The HALO Trust.

Yellow: Roads reported travelled by other Aid Agencies and in regular use.

Red: Solid - Reported or suspected to be mined.
Dotted - Not found or inaccessible.

OFF ROADS

Red: Solid - Known to be or suspected to be mined.

Dotted/Hatched - Suspected to be mined.

Village name highlighted - mined.

All mined locations marked on the maps have a reference number beside them which matches that on the SHAMAN Database.

The scale of the maps used means that accurate plotting of Danger Areas and new roads is impossible. It is therefore essential that the maps are used in conjunction with the Danger Area reports on the SHAMAN Database.

During preparations for this programme it had been intended that Mapinfo be used as much as possible for production of A4 size photocopiable maps summarising the provincial mines situation and allowing most users of the data to avoid dangerous areas. It was clear that specialist users within the demining or other programmes would require access to maps with much more detail. Mapinfo does not have the ability to produce such a level of information.

Original maps are available for inspection and provide much valuable information, but a system of reproduction or digitising of such maps would enhance the information enormously. The UN demining programme office in Maputo has already suggested that a Geographical Information System (GIS) be purchased allowing for computer scanning and reproduction of map information at any required scale. There is no doubt that the availability of such a system would increase the speed with which information could be produced and distributed and make the tailoring of such information to specific users requirements simple.

8. ORGANISATION AND LOGISTICS

The survey consisted of six vehicles each led by a British expatriate assisted by a driver and an interpreter.

Each team was equipped with a Landrover Defender 110 Station Wagon, fitted with a Codan HF radio Transceiver and Magellan Satellite Navigation System. All vehicles travelled as entirely self contained units with their own tents and cooking equipment and resupplied with fuel, food and water as and when available. The self-sufficiency of each team increased the progress of the survey and allowed teams greater flexibility of work.

The expatriate personnel were trained to deal with traumatic injuries and to administer and maintain an IV drip, along with IV antibiotics and morphine. Further training dealt with the recognition and immediate treatment of tropical diseases likely to be encountered. In addition the Southern Team had a nurse attached for 10 weeks. Medical assistance to the local population was not part of the contract specification although on encountering car accidents and other incidents assistance was given. Where appropriate the patient was transported to the nearest medical facility.

The system for casualty evacuation was adapted by each team as they moved through the country, changing the procedure to fit in with the fastest and most efficient method available. Methods planned included the use of UN helicopters and other civilian aircraft. Daily briefings by team leaders ensured that the system was well known and regularly practised by all personnel. The casualty evacuation procedure was employed once by the Southern Team in order to evacuate the injured passengers of a vehicle which was involved in a head on collision with one of the HALO vehicles.

Both food and water were often difficult to locate on a daily basis. Fresh and tinned food was bought when available. Water came from a variety of sources ranging from UN assembly areas to local wells. Water from non pure sources was either boiled or chlorinated.

As a general rule the teams worked on the ground from 0600 hrs until last light, normally around 1900 hrs. Subsequent to that the expatriates wrote up the mine reports and planned the following day usually ending at around 2200 hrs.

Each vehicle carried two 2 man tents which were used most nights. Other accommodation was provided by the UN assembly areas, NGOs and occasionally District Administrators.

All vehicles ran on diesel and The HALO Trust entered into a contract with British Petroleum (Mozambique) to be able to refuel at their main depots. Once in the interior, fuel supply proved more difficult and expensive. Logistical planning therefore revolved to an extent around refuelling at provincial capitals.

At the end of four months of driving over 100,000km on some of the worst roads in Africa all vehicles continued to operate remarkably well. With only one serious accident that required a vehicle to be in workshops for 5 days and one vehicle that rolled over on treacherous ground, the equipment used on the survey stood up to the extreme conditions well. On-going maintenance was part of the daily routine for all team members and resulted in the minimum amount of deterioration to the vehicles. Inevitably, after such a punishing period, it is expected that all vehicles will show to some degree the effects of the survey.

9. SAFETY

Prior to the commencement of the survey all team members were fully trained in First Aid, the use of HF radio communications, and position finding using the Magellan Satellite Navigation System. Thus all members of the survey teams were able to react confidently in the case of an emergency.

In the interests of safety, the policy of the teams was that only roads and tracks that had been well travelled by other vehicles would be driven by HALO. Considering the number of potentially dangerous roads and tracks that exist in the country, using those which had not been well travelled was an unacceptable risk. The decision to use any road was ultimately at the discretion of the vehicle leader.

10. SURVEY COVERAGE

Summary maps of each province, indicating the basic network of roads along which HALO survey vehicles travelled are illustrated in the separate Provincial reports. The routes highlighted in green correspond to roads covered by HALO; it does not show the numerous minor roads that vehicles attempted but were unable or unhappy to advance any appreciable distance.

A number of factors affected the degree of survey coverage many of which have already been mentioned in section 6. Further problems are listed below:

- Road accessibility:

The first constraint on provincial coverage is the extent of the road network

- Problems with the rains:

Some roads are only passable during the dry season. In practice there were very few roads of importance that fell into this category. This is emphasised by the small fraction of yellow roads indicated on the coverage maps of the provinces.

- Biased coverage between RENAMO and FRELIMO areas:

Since areas of RENAMO influence are typically areas of difficult access, there is not the flexibility found in other regions to approach different sources at different locations around the vicinity of the suspected mines.

- Areas of low population:

In places it was only possible to interview locals at intervals of perhaps 10-20km (sometimes even greater distances). Since some locals appear to have a "radius of knowledge" often limited to 10-15km, there is a chance that some mined areas were missed.

- Military assistance:

Where the local and provincial military were forthcoming, the confidence in coverage is high; especially where quality liaison officers were available from both the Government and RENAMO. However, some commanders were extremely reluctant to release any information even when shown a letter proving that the survey had the full approval of the Cease Fire Commission.

- Absence of key military personnel or locals:

Usually this meant arriving at a village where the person of most use was absent; other locals pointed out the danger area but often could give no further details of the site.

- Limitations of helicopter recce:

Carrying out survey operations using helicopters brings with it many disadvantages. The lack of mobility once on the ground restricts the surveyors ability to follow up information and the understandable reluctance of aircrew to land in areas without detailed mines information means that some areas are inaccessible.

The survey will not have covered every part of Mozambique nor will it have gathered every item of information. It is a basic framework for continued updating as further information is received. Undoubtedly, new information will become available, some of it possibly at variance with information in this report. Indeed it is to be hoped that publication of the information gathered during the survey will provoke many into providing new information that was missed by the surveyors.

There may well be a tendency to use such information, if different from that gained by the HALO Trust, as cause to doubt

the value of the information in this report. It would be short-sighted to do so. Any new information simply adds to the body of data relating to a particular area. If information appears to be contradictory then that is simply an indication that the situation is not clear in an area. Similarly it should not be assumed that everything contained in this body of data is indesputably correct.

The sensible user of this data will draw on it to increase understanding of the situation in an area or location, but will continue to think and seek more information whenever working in areas that may be dangerous.

11. PROVINCIAL SUMMARIES

The following Provincial Summaries provide an overview of the mines situation in each Province at the time they were surveyed. As more information is gathered it will be possible to update these summaries. The HALO Trust is aware that since completing the ground reconaissance some roads have been reopened and more details are being provided on specific mine sites.

However, these summaries provide a useful starting point for all Agencies working in the Provinces and indicate many of the tactics used by the opposing forces during the years of conflict. They also give a clear indication of the prevalent mine types found in each Province and the accompanying maps show the extent of the usable road network at the time they were surveyed.

The maps are marked according to the following key:-

Green: Roads travelled by The HALO Trust during the survey. Assumed clear of mines.

Yellow: Roads in regular use by other Aid Agencies or local inhabitants. Assumed clear of mines.

Red: Roads reported to be or suspected of being mined.

It must be remembered that although a road is reported to be free of mines that in many places throughout Mozambique mines have been laid on roadsides and that extreme caution must be exercised at all times when travelling the country.

Anyone who receives more information on mined areas is requested to forward all details to the UNOHAC Demining Office in Maputo.

MAPUTO PROVINCE

Surveyed February 1994

INTRODUCTION

Maputo is the most densely populated Province in Mozambique, with possibly the highest number of strategic locations. Additionally it saw some of the most concentrated fighting during the war. It was therefore expected that there would be a large number of mined or suspected mined areas in the Province.

Two vehicle mounted teams spent 14 days covering over 5,000 kilometres of roads and tracks throughout Maputo Province talking with people who were able to provide details of mined locations. There are some areas of the Province which are still inaccessible by road, whether due to mines or other factors such as bridges that have been destroyed or the road has become overgrown. As a result there are a few parts of the Province which the Survey Teams were not able to reach, notably in the far South and extreme North-west.

102 reports have been lodged on separate mined locations in Maputo Province, ranging from small stretches of road closed by a single mine, to large defensive minefields of many thousands of devices.

Although the Survey Teams were as thorough as possible it must not be assumed that because no report has been filed for a particular location, that area is free of mines. Nor should it be taken that this Summary provides details of all the tactics and mine laying patterns used in the Province.

The working maps made by the Survey Teams whilst travelling the Country are available for inspection at the United Nations Demining Office in Maputo. These show roads travelled by the Teams, other roads in regular use, known mined locations and suspected areas.

ROADS

a. Anti-vehicle / Anti-tank mines.

There are a number of known mined locations which are referred to in the SHAMAN database. However, as a general rule all routes leading to known RENAMO HQs should be assumed to be mined and local guides taken if travelling to them. In addition roads and tracks that are not well defined and obviously well used should be avoided. There are roads such as those between Magude and Mapalunguene, and Sabie and Chinhanguanine, where diversions have been made around anti-tank mines. These vary from a few, to several hundred metres. Some diversions have been marked as mined, but not all. Equally, diversions do not automatically mean there are mines as there are other

reasons for the creation of minor or major detours. It should be noted that not all anti-vehicle/tank mines were laid on roads. There is evidence of anti-tank mines being laid in the scrub and bush beside the road and obstructions being put on the road to force a detour over the mine, as on the road from Uanetzi to Panjane.

b. Road sides and verges.

Long stretches of roadsides have been mined under different tactics, using both anti-personnel and anti-group mines. FRELIMO laid long strips of mines parallel to roads to inhibit movement across them by RENAMO forces. These strips range in length from a few hundred meters up to 10 kilometres and are often only on one side of the road. They also vary in the distance they are set back from the track edge and can be within a few centimetres or up to 1 kilometre away. Similarly they vary in width from 5 to 500+ metres. An example of this is between Pessene and Moamba where it is reported that there is a 500 metre wide strip to the west of the road and east of the railway line running parallel to it, some six kilometres in length which is laid with a mixture of anti-personnel and anti-group mines. The road from Namaacha to Goba is also reported to have a similar mine pattern although narrower and shorter. RENAMO Commanders have described the tactic where an anti-tank mine has been laid in the road with a circle of anti-personnel and/or anti-group mines laid around it in the bush up to 50 metres away, although no specific locations were reported.

POPULATION CENTRES

a. All towns and villages visited within a radius of approximately 20 kilometres of the national border, and most others throughout the Province were found to have a defensive ring of mines. Although many of these are fenced or otherwise well defined such as at Palmeira and Bela Vista, some, for example Sabie and Manhica, are not, and many of the fences are beginning to collapse. Normally consisting of anti-personnel or anti-group mines, there are differing mine laying patterns. At Bela Vista there is a zigzag pattern with mines laid 30cms to 2m apart, which is a common pattern. In other places the outer fence has anti-group mines along it whilst the inner fence, 2-10m inside, has anti-personnel mines under it with the ground in the middle sometimes clear of mines. Those towns and villages not directly covered in the SHAMAN reports should be assumed to have a defensive ring of mines.

b. There are a very large number of deserted villages and abandoned houses in the Province. The fact that they are not occupied means it was not always possible to gain information on the reasons for them being empty of people.

However, from the information gathered it is clear that the vast majority were abandoned due to military activity at one time during the war. Those which were used as bases by either side are usually heavily mined, not only on the perimeter but also amongst the buildings, and on the approaches. Examples include Mapalunguene and buildings in Matatuine district near Pochane. Many of these locations changed hands several times during the fighting and each successive occupying force laid more mines.

KEY POINTS

a. All dams, railway lines, electricity sub-stations and pylon lines should be assumed to be mined. The Sabie and Boane dams have extensive protective minefields and the railway line from Ressano Garcia to Moamba has anti-personnel mines alongside it and on the path running parallel. The electricity sub-station at Pessene is mined and the pylons between Maputo and Ressano Garcia are reported to be mined although some limited clearance is believed to have taken place. There are also many water sources, pumping stations, and river crossing points which have anti-personnel or anti-group mines around them. Examples include the pumps near Pochane and at Betinho near Pessene. For more specific details refer to the reports in SHAMAN.

UNMARKED MINEFIELDS

a. There is strong evidence, particularly in the Border areas around Ressano Garcia and Namaacha, of heavily mined hill sides and summits which are completely unmarked. Other reports show areas in the bush, away from the Border which are mined, and unmarked, but it is not always possible to determine the reason behind the laying. In all such places the locals either do not enter the areas or keep on the well worn paths at all times.

CASUALTIES

a. Accurate assessment of casualty figures is difficult, as they are often inflated, by including livestock losses for example, in an attempt to gain priority for clearance operations. Generally, though, the numbers of civilian mine victims is low when the population size is compared to the numbers of mined areas. This is largely because the existing local population is well aware of the areas which are unsafe. The problem of casualties may increase with returnees coming back. Most of these people will use high ground and features such as water courses, pylon and railway lines as navigational aids. It is these areas which are often heavily mined. Further problems will arise as Returnees swell the population and sizes of villages

thus encroaching on defensive, and often unmarked perimeter minefields.

MINE TYPES

There are many areas in which the source of information was unable to identify mine types. However, those types which have been positively identified as being present in Maputo Province include:

Anti-personnel:	PMN and PMN 2	Russian
	PMD 6	Russian
	M 969	Portuguese
	M 14	American
	Type 59	French
Anti-group :	Type 69	Chinese
	OZM 3, 4 and 72	Russian
	POMZ	Russian
	M 966	Portuguese
	Valmara 69	Italian
Anti-tank :	Pt-Mi-BA III	Czechoslavakian
	Type 72	Chinese

In addition to those listed, there were reports of "homemade" devices using explosives and fuses taken from various sources and on occasion including whole mines.

These were sometimes a number of anti-personnel mines packed into a box and fitted with a fuse to create an anti-vehicle mine.

CONCLUSION

a. Maputo is the most densely populated Province in the Country and that which saw some of the heaviest fighting and mine laying.

b. Mines only cause a problem when they are in areas where there are people.

c. Although the existing population is generally well aware of mined areas it will be necessary to undertake intensive mine awareness programmes for returnees not only in general terms but also the specific mine locations in the places to which they are going back. For many of them it will not, initially at least, be the places which they left during the war and they will be unfamiliar with the area. It will therefore be vitally important to involve the existing population in the mine awareness programmes.

d. All personnel travelling the country are advised to remain fully aware of the possibility of mines and to continue to ask questions wherever they go.

GAZA PROVINCE

Surveyed February / March 1994

INTRODUCTION

The vast majority of people living in Gaza inhabit the area south of a line drawn between Massingir in the west and Mandlakazi in the south-east. To the north of this line, apart from the Limpopo Corridor where there are concentrations of villages, the Province is very sparsely populated.

The Province borders both South Africa and Zimbabwe with the Rio Limpopo entering Mozambique at the point where the three countries meet. The railway line, forming an important link between southern-most Mozambique and Zimbabwe, crosses the border approximately 50 kilometres further north.

The Province saw its fair share of fighting during the wars in Mozambique and was also involved in the Rhodesians struggle for Independence, particularly along the border and also into the Limpopo Corridor. Thus there are many locations in these areas where the mines have been in place for many years having been laid by the various factions from what is now Zimbabwe.

There are some areas of the Province which are still inaccessible by road. As a result there are a few parts which the Survey Teams were unable to reach by vehicle, notably in the far north of the Province and the area around Dindiza, in east central Gaza.

Although the Survey Teams were as thorough as possible it must not be assumed that because no report has been filed for a particular location, that area is free of mines. Nor should it be taken that this summary provides details of all the tactics and mine laying patterns used in Gaza.

The working maps made by the Survey Teams whilst travelling the Country will be available after completion of the Survey. These show the roads travelled by the Teams, other roads in regular use, known mined locations and suspected areas.

For full details of the mined locations found during the Survey, refer to the SHAMAN Database at the UNOHAC Demining Office.

ROADS

There are a large number of roads closed due to mines in Gaza. In the south of the Province these are, in the main, the secondary roads, and most towns and villages are accessible.

In the western part of Gaza, roads crossing the provincial boundary into Maputo are mined to the south of Massingir and the primary road on the south side of the Rio Limpopo between

Ntlavene and Mapai is suspected to be mined. To the north of Massingir there are a number of roads which are suspected of being mined although some of these are being used with detours.

In the east, Dindiza is inaccessible by road and Chigubo cannot be reached from within Gaza Province as the routes to it from the north, Machaila, and south, Dindiza, are reported to be mined. Access is only possible from the east and Inhambane Province.

The road from Mapai to Machaila is open but a parallel road some 40 kilometres to the north was reported to be mined and closed. The road east from Machaila to Mabote in Inhambane is closed, as is the road running along the Zimbabwe border between Chicualacuala and Mavue on the Rio Save.

In some of the places where anti-vehicle or anti-tank mines have been laid it is reported that anti-personnel mines have been laid around the main mine. There are also reports in a few parts of the Province of anti-personnel mines being laid along the roadside not in conjunction with to anti-tank mines.

POPULATION CENTRES

Unlike Maputo Province, where a large proportion of the towns and villages have defensive mine fields around them, the majority of the population centres in Gaza show less formal mine laying tactics. Here the tendency was to lay mines in patches at various points around the settlements, although some do have defensive mine rings. The prevalent tactic in Gaza was to place fewer mines beside and on the approaches to buildings which may have been used as headquarters sites.

KEY POINTS

Dams, pylon lines and many wells, other water sources and river fording points are reported to have been mined. In particular the dam at Massingir is mined at both ends. The mines at the southern end link up with a belt of mines around a FRELIMO radio station. There are numerous points along the railway in the Limpopo corridor which are mined and many of the train wrecks are suspected of having various explosive devices apart from mines, in the way of booby-traps, in and around them.

The fence running along the border with Zimbabwe to the south of Chicualacuala is reported to have been mined by the Rhodesians.

CASUALTIES

Accurate assessment of casualty figures is difficult as they are often inflated, for example by including livestock injuries, in an attempt to gain priority in the clearance programme. In general though numbers of civilian casualties are relatively low. This appears to be because the local populations are well aware of the danger areas and the problems caused by mines.

MINE TYPES

There are many areas where the source of information was unable to positively identify specific mine types. However, those which were known include:

Anti-personnel:	PMN and PMN 2	Russian
	PMD 6	Russian
	VS 50	Italian
Anti-group:	Type 69	Chinese
	POM Z	Russian
	MON 50	Russian
	OZM 3 and 4	Russian
Anti-tank:	Mk 5	British

The above list must not be regarded as a complete inventory of mine types in the Province.

CONCLUSION

Mines only cause a problem when people come into contact with them.

The existing population is generally well aware of mined locations. All personnel travelling are advised to exercise extreme caution and to continue to ask questions.

INHAMBANE PROVINCE

Surveyed April 1994

INTRODUCTION

Inhambane Province, in the southern zone of Mozambique, is bounded to the west by Gaza Province and to the north by the Rio Save, which separates it from Manica and Sofala Provinces. The Indian Ocean is to the south and east. The coastal strip is heavily populated, particularly around the cities of Maxixe and Inhambane. The southern districts of Zavala, Inharrime, Jangamo and Homoine are densely populated, with the concentration of population diminishing quickly north of Maxixe. Large numbers of refugees are expected to return to the coastal areas of Inhambane, both from the cities and from outside Mozambique. The inland districts of Panda, Funhalouro and Mabote are sparsely populated as are large areas of some of the northern coastal districts.

ROADS AND ACCESS

The absence of an international trade route of the importance of the Limpopo or Beira Corridors seems to have resulted in fewer regular troops being committed to route protection in Inhambane than elsewhere in Mozambique. Consequently the main road EN1 is in some areas in very poor condition, with trenches having been dug across the road in many parts of Vilankulos, Inhassoro and Govuro. Nearly all roads leading off the EN1 are unmetalled tracks, varying greatly in quality. The Survey Teams managed to gain access to most areas, exceptions being western parts of Mabote,Funhalouro and Panda. There is no vehicle access to the area south of Rio Save between Save and Massangena, but this area is said to be virtually empty of people.

In some areas such as Homoine District, new roads have been cut parallel to roads suspected to be mined. As with all other provinces, many roads shown on the pre-war maps which were used are completely unidentifiable on the ground. Mined roads were found south of Funhalouro and west of Homoine. There are several minor tracks around Jangamo and the town of Inhambane which are reported to be mined (see maps for detail). As is true in Maputo and Gaza Provinces, the tactic of sowing anti-personnel mines along roadsides at likely enemy crossing points was used.

POPULATION CENTRES

The south eastern area of Inhambane is heavily contaminated with anti-personnel mines. Many towns and villages have perimeter defensive minefields, particularly in Jangamo and Homoine districts. The towns of Quissico, Inharrime, Panda, Jangamo, Homoine, Morrumbene and Massinga, as well as many of their satellite villages all have barrier minefields. The Inhambane peninsula is reported to have a zone of mines which stretches from the Baia de Inhambane across to the Indian Ocean.

RENAMO officers at Neves assembly area reported defensive minefields around their former base at Lagoa Nhavarre. Near here the track Mavume-Pembe-Fanhafanha is mined. Several areas in Jangamo were identified as sites of former military harbour areas, and undoubtedly A/P mines would have been laid forward of trenches wherever defensive positions were established. At one such site visited in Jangamo District, a fatal accident had occurred three days previously when a woman had exploded a mine while clearing bush.

Most of the villages on the EN1 north of Inhambane are mined to some extent. Evidently FRELIMO troops were stationed in many villages on this road in Massinga, Vilankulo and Inhassoro districts and attacks by RENAMO were common. Normal procedure was to mine footpaths approaching these villages in order to disrupt enemy patrols. This was found to be the case in Mavanza, Cheline, Murruri and Mapinhane. Undoubtedly there will be other villages with similar problems.

KEY POINTS

The major bridges on the EN1 are reported to have been mined as a matter of routine. Typically this involved placing anti-personnel or anti-group mines around the bases of abutments and piers to prevent saboteurs from destroying the bridge from below. Certainly there are barbed wire fences indicating mines around some concrete bridges which marks and it must be assumed that others are unmarked. Mining of water sources, wells, water tanks and livestock dipping tanks appears to have been common, though the number of mines laid at each location was probably very small. Churches, school buildings and village hospitals also appear to have been targetted, probably because of their potential as temporary military refuges. Pylons, electricity sub-stations and lighthouses were also reported to have been mined.

CASUALTIES

There is a high ratio of mines to people in south east Inhambane and consequently accidents happen frequently. It is hard to pin down exact casualty figures but evidence suggests that there is a mine accident in the Province approximately every month. This will probably increase as refugees return to the area and begin to cultivate new areas.

MINE TYPES

There are many areas where the source of information was unable to positively identify specific mine types. However, those which were known include:

Anti-personnel:	PMN and PMN 2	Russian
	PMD 6	Russian
Anti-group:	Type 69	Chinese
	POM Z	Russian
	OZM 3, 4 and 72	Russian

The above list must not be regarded as an exhaustive inventory of mine types in the Province.

CONCLUSION

From the evidence gathered during this survey it appears certain districts in south eastern Inhambane are among the most heavily mined in Mozambique. These areas are invariably densely populated. The majority of these mines were laid defensively around villages and in many cases the local population has reasonable knowledge of dangerous areas, but these areas are rarely marked. Inevitably accidents happen and it is likely that

the incidence will increase as refugees return to the area and begin to reclaim land for agriculture.
Many roads are, at present, suspected to be mined - particularly in the west of the Province. Many of these will, no doubt, eventually be proven to have held very few or no mines at all, but at the moment they must be considered dangerous until more detailed surveys or clearance operations are undertaken.

MANICA AND SOFALA PROVINCES

Surveyed April / May 1994

INTRODUCTION

These "twin" provinces were, for the purposes of the survey, considered as one and are therefore summarised together. The area forms the central region of Mozambique, bounded to the south by the Rio Save which is crossable only by the bridge at Save on the EN1. To the north the area is bounded by the Rio Luenya, a tributary of the Zambezi, in the north western corner and for the remainder by the Zambezi itself. Two routes exist from the area northwards: via the bridge over the Rio Luenya on the main road to Tete, and across the Zambezi on the Caia ferry, which was inaugurated in April 1994. The western boundary is the Mozambique/Zimbabwe border and to the east is the Indian Ocean.

PRIMARY ROADS AND ACCESS

The area is bisected by the west-east road from the border post of Machipanda to the port city of Beira. The Beira Corridor has long been a key trade route, serving neighbouring land locked nations with access to the Indian Ocean, and it was heavily guarded during the conflicts. It remains in good repair and is possibly the best maintained road in Mozambique carrying much heavy traffic. Similarly the road north to Tete which leaves the Beira Corridor west of Chimoio is an excellent metalled road. The road EN1 which carries all traffic from the southern region of the country joins the Corridor at Inchope. This road is in need of repair in areas but is easily passable and in constant use. The road north from Dondo through Muanza and Inhaminga to Caia is a bulldozed dirt track which is currently being improved. Other roads in the Province were found to be unmetalled tracks varying in quality from very good, to passable with difficulty in a Land Rover.

Although the Survey Teams were as thorough as possible this report does not claim to be exhaustive and there are likely to be contaminated areas which have not been identified. The need for caution and mine-awareness cannot be overstressed, and the normal precautions should be exercised as much in these Provinces as in any part of Mozambique.

POPULATION

The Provinces are heavily populated along the Beira Corridor- notably Chimoio and its satellite towns of Sussundenga, Vanduzi and Gondola; as well as Manica, Nhamatanda, Dondo and the city of Beira itself. There are minor settlements and agricultural development along the entire length of the main road. Catandica and Guro in the north of Manica are sizeable population centres but there is much evidence of depopulation in most other areas both north and south of the corridor. The UNOHAC projection of population movement suggests many refugees will repatriate the northern central area of Sofala, notably the towns of Muanza and Inhaminga. Local reports from Chimoio indicate many people currently occupying makeshift accommodation on the outskirts of the city are beginning to return to the bush areas of Gondola district.

ROADS

In the northern extremity of the area no safe route currently exists along the southern bank of the Rio Zambezi. The route from Mandie to Nhacolo is considered mined, as is the road between Chiramba and Chemba. Roads within the Mandie-Nhacola-Mungari triangle are said by RENAMO to be clear but are not in regular use and are suspected by the local population. The Nassala-Bazua road is not in use.

The road north from Mavonde to the Zimbabwe border is mined, as are two tracks linking Mavonde with Pungue-Sul. Vanduzi has access only from the south: the road from Inhaminga to the east is considered mined. The only through route from the Tete corridor to the eastern side of the area north of the Beira corridor is from Nhampassa-Macossa-Maringue-Inhaminga. The Maringue-Inhaminga leg is particularly difficult terrain. Tracks leaving this picada to the north and south are mined. Several tracks east of Inhaminga leading towards the coast are suspect. Many roads in Gorongosa District are thought to be mined including all roads from Vunduzi except that from the town of Gorongosa.

South of Chimoio the roads are clear to 35km south of Sussundenga and as far as the Rio Revue south of Macate. Both of these roads are mined between these points and the town of Dombe. There is no access to Espugabera other than from Zimbabwe. The roads from Espungabera to Dombe and Machaze (formerly Chitobe) are mined. All other tracks from Machaze are suspect with the exception of that to Hode. The tracks north and south from Chibabava are mined.

POPULATION CENTRES

Most large towns in Sofala and Manica lie on vital trade routes and were heavily guarded during the conflict. Many anti-personnel mines were laid for defensive reasons though not to the same extent nor as universally as was found in the heavily

populated areas of Maputo, Gaza and Inhambane. Typically the prevalence of anti-personnel mines is higher in areas held by FRELIMO during the conflict, though in many towns which were taken by RENAMO defensive trenches dating from previous FRELIMO occupation are still to be found and these are invariably mined. The towns of Dombe and Maringue are notable examples of this. Other towns known to have anti-personnel mines are Machanga, Chibabava, Vunduzi, Mavonde, Catandica and many small settlements along the Tete corridor. Most towns on the banks of the Zambezi are also mined.

KEY POINTS

Many bridges and ferries in tbe area were destroyed in air strikes by Rhodesian aircraft during the "Ian Smith war" and it is likely that some UXO remains in these areas. There does not appear to have been the same degree of protective mining of bridges as was found in Inhambane Province, although there are a number of bridges along the EN1 reported as mined. In cases where bridges have been wholly or partially destroyed, some improvised crossing points have been created such as south of Caia and over tbe Rio Pungoe between Inchope and Gorongosa. Other roads have fallen into disuse as a result of denied bridge access.

CASUALTIES

It is difficult to assess accurately the incidence of mine casualties as in some remote areas genuine incidents may go unreported whereas the general tendency is to inflate figures. Recent casualties were reported at Dombe, Machaze, Chemba and Mungari but generally it was found that locals are aware of dangerous areas and avoid them. This situation will undoubtedly worsen when returning refugees begin cultivating the bush, and mine awareness will be of great importance for these people. In almost every case there were no warning signs or fences indicating the presence of mines.

MINE TYPES

Several types were identified including:

Anti-personnel:		PMN	Russian
		PMD6	Russian
		M969	Portuguese
Anti-group	:	POMZ-2	Russian
		OZM-4	Russian
Anti-tank	:	Pt-Mi-Ba III	Czech

The above list should not be considered exhaustive.

CONCLUSION

In the most densely populated areas along the Beira Corridor there does not appear to be a great problem of anti-personnel mines surrounding villages. However there are areas in the north of both provinces where perimeter mining is common. In some cases large numbers of returnees are expected to repopulate areas where at present there are very few people indeed and awareness of dangerous zones is limited. Many roads in southern Manica and Sofala are currently not in use and considered mined, particularly in the districts of Mossurize, Machaze and Chibabava. Where mines exist in populated areas, generally it was found that the local population are aware of dangerous zones.

TETE PROVINCE

Surveyed February 1994

INTRODUCTION

Tete is a land-locked province having national borders with Zimbabwe, Zambia and Malawi and internal boundaries with Zambezia, Manica and Sofala Provinces. The Rio Zambezi bisects Tete.

A tarred road connects Zimbabwe with Malawi across the Tete Corridor; there is also a relatively good road running from Tete capital to the Zambia in the NW. Few roads are accessible in the west and north within the districts of Magoe, Zumbu, Maravia, Chifunde and Macanga. A number of border locations within these districts are, however, possible to reach through neighbouring countries.

Like Niassa, Gaza and western Inhambane, Tete has a low population density. Most of the population are concentrated along the Tete Corridor in the SE and along the Malawi border in the west. Tete has seen a considerable influx of refugees into these western regions from Malawi since the end of the war.

Tete has few extensive areas of RENAMO influence; some pockets of territory are notably Padula, Ndzaladzi, Matenje, Gadjia, Muzembezi and Necungas in the east. Other areas exist in southern Mavaria and eastern Magoe and on the boundary between Cahora Bassa and Changara districts in the south of the province. Mutarara extending on the SE limb of Tete is an exception due to its close proximity to the large RENAMO areas of western Zambezia and northern Sofala.

Colonial Portuguese defenses are present around some strategic sites and there is evidence of Rhodesian offensive mining in Tete; later, Zimbabwe also laid mines.

Two survey teams worked 28 days travelling down the vast majority of accessible roads and tracks in the province - transitting through Zimbabwe, Zambia and Malawi where necessary to reach isolated regions. The Chief Engineer for Tete, Capt. Khembo accompanied one vehicle for the duration of the survey while other military liaison officers were picked up en route.

The survey coverage of the provincial roads and tracks was extremely thorough. Problem areas created by inaccess-iblity, however, limited mine data coverage on the ground within some districts. Air assistance was therefore required for a number of locations. The helicopter reconnaissance was a valuable addition to the ground survey providing 8 further danger area reports and a large amount of important information on road conditions (collected using the airbourne GPS, in conjunction with low level flying).

The district of Zumbu and the far east of Magoe District however, provided a number of difficulties within the framework of the survey. Zumbu district is totally inaccessible by road, it is also outside the range of the AB 212 aircraft used for the helicopter recce. Although it was not possible to visit the interior of the district, one survey team travelled through Zambia and reached the district capital by canoe. Several accurate danger area reports were completed around the vicinity of the town. In addition, a constructive meeting with the district administrator and a number of key military personnel, enabled confident reports of the mine situation within the district to be submitted. Much of the mine data gathered here was cross referenced with information obtained from sources in the surrounding districts.

General mine information

- Mines laid by:

  FRELIMO, RENAMO, Portugal, Rhodesia and later Zimbabwe

- common mine types:

Anti-personnel:	PMN	Russian
	Type 72	Chinese
	PMD 6	Russian
	M 14	American
	Type 59	French
	M 969	Portuguese
Anti-group:	POMZ-2	Russian
	OZM 3, 4	Russian
Anti-tank:	PT-Mi-Ba III	Czech
	Type 72	Chinese
	Tm-46	Russian

SUMMARY

- no. of reports submitted: 121 (approximately 5% represent UXO)

- location of important areas:

Generally, mines are found scattered about the province in small numbers; the large majority of locations appear to have mine numbers less than 10 and often only 1. In some cases a danger area report has been submitted based on a single accident. It is possible that this may have been the only mine present but all potentially dangerous areas identified by The HALO Trust teams were recorded.

Areas where mines appear to have been laid in quite large numbers are typically around military bases such as at Chisswithi, Angonia and Fonte Boa, Domue and some villages, Chifunde for example and along border regions particularly with Zimbabwe around Mutumbura.

The most significant concentration of mines in the province are undoubtedly around the Songo Dam; this is reflected by the high number of accidents recorded by Handicap International in and around the vicinity. The mines were first laid by the Portuguese and then later "topped up" by FRELIMO forces after the Liberation War. Power lines run SE to a substation west of Tete and from here one line of pylons follows the road SW into Zimbabwe and another continues in a SE direction towards Quelimane in Zambezia Province. Although several of these pylons were sabotaged it does not appear that many have defensive mines (HALO teams followed the pylons where possible and interviewed many of the population living nearby).

During the survey an anti-tank mine detonated under a food convoy truck in Angonia District and a further Type 72 AT mine was removed from a well used track south of Moatize District which had already been travelled down by The HALO Survey teams. Both these instances highlight the small chance that some roads that are considered open still remain potentially dangerous.

While many of the communities have members who appear to be aware of the danger in their locality, this has not stopped people from having accidents in "no-go" areas. Returning refugees, who have become unfamiliar with their surroundings, will create further problems, especially around military bases where soldiers have recently moved to assembly areas leaving no information on the whereabouts of defensive mines.

ZAMBEZIA PROVINCE

Surveyed March 1994

INTRODUCTION

Zambezia is centrally placed in northern Mozambique with provincial boundaries with Niassa and Nampula to the north, Sofala to the south and to the west Malawi and the SW extension of Tete.

In general Zambezia has poor links with surrounding provinces and restricted internal access. Chinde district in the south is totally inaccessible to vehicles, with restricted accessibility in many other districts, especially those that are under RENAMO influence.

It is the second largest province after Niassa and is highly populated throughout. Refugees are trickling back from Malawi mainly into Milange and Morrumbala

The area of RENAMO influence is just under 50% of the total area of Zambezia, particularly concentrated in western parts of the province (Metolola, Derre, Chivele and Namanjavira) but also in bands across to the east at Mucubela and some areas in the north such as Nauela. Zambezia Province has consequently seen some of the fiercest fighting of the war.

Tanzanian forces had temporary bases, notably at Zero in Mopeia district. Colonial forces are also a potential origin of mines in the province.

The survey of Zambezia was very different from other provinces in that there was no clear systematic method of working across the Province; it is an area of many roads but few connections between them largely due to the inaccessibility of areas of RENAMO influence. The summary map of roads covered illustrates some of these distinct zones of inaccessibility. Although "remote" reports have been submitted for these areas a heli recce was considered necessary to gather further information. Four key areas were identified:

a. Chinde district including Luabo, Micaune and Mucupia

b. Eastern Pebane district at Nova Naburi (which was inaccessible due to a river crossing)

c. Morrumbala district particularly Chire which is surrounded by a considerable number of inaccessible roads reportedly mined

d. Lugela and parts of Milange district in the vicinity of Muabanana which is centered within a large inaccessible zone

- Mines laid by:

  FRELIMO, RENAMO, Tanzanians and Portuguese

- common mine types:

Anti-personnel:	M/969	Portuguese
	PMN	Russian
	M14	American
	Type 72	Chinese
	PMD 6	Russian
	Type 59	French
Anti-group:	POMZ	Russian
	OZM 4	Russian
	Type 69	Chinese
Anti-tank:	PT-Mi-Ba III	Czech
	Type 72	Chinese
	TM-46	Russian

SUMMARY

- no. of reports submitted: 145

- location of important areas:

  Many roads are off limits, particularly affecting access to small towns in central Zambezia, this includes: The main Milange - Mocuba road linking Malawi to Quelimane (recently demined); Megaza - Chiure road; Megaza - Morumbala; Megaza - Liciro; Nawela - Alto Molocue; Maganja da Costa - Mocuba; the triangle Mulevala /Mugeba/Mocubela; Alta Benefica - Tacuane - Muabanama - Regone; roads south of Campo and road verges between Namanjavira - Mocuba. The road Morumbala - Point Zero has old vehicle ambush sites with mined wrecks.

  Populated areas which are mined around include Megaza, Pinda, Tacuane and Nauela. The mango trees at Alto Pica are mined.

  At Gurue the power turbines for the tea factories were mined to prevent RENAMO sabotage, other nuisance mining in these areas also occured. Other similar locations include the factories in the Socone area and buildings at Cariua.

  Key points mined around include: Rio Ligonha bridge to Nampula; the airstrip at Maganja da Costa; an old FRELIMO camp at Point Zero and RENAMO's camp at Nauela.

  Vehicle ambush sites road Morrumbala - Point Zero should not be approached.

Niassa Province

Surveyed April 1994

A. Background

- geographic location:

  Borders Tanzania and Malawi in the north and west. Provincial boundaries with Cabo Delgado to the east and Nampula and Zambezia to the south

- road and district accessibility:

  All districts are accessible (Mecanhelas via Malawi) but the overall road network is restricted considering the size of the Province. Particular areas of inaccessibility are in the north along the Tanzanian border.

  n.b. RRR are currently pushing a road through to Matchedje.

- population density & area:

  Niassa is the largest province and least populated. Population is largely concentrated along the Malawi border districts with additional refugees returning from there and Tanzania.

- military forces active in the Province:

  RENAMO controlled areas are estimated at 10% which is considerably less than the provinces to the south. The main concentrations of RENAMO are in Mavago district in the north, Mecanhelas district in the south and around Muacanha RENAMO base.

  Colonial activity is assumed to be similar to that in Cabo Delgado where defensive tactics along the north hindered FRELIMO movement from Tanzania during the War of Independence.

B. Survey coverage

  The survey of Niassa province was completed faster than anticipated - this was largely due to the addition of a 3rd vehicle to the survey team and the restricted access to the northern districts. Assistance from the Government and RENAMO military was extremely useful for gathering information in these remote areas especially when combined with evidence from the most northerly settlements reached by the HALO teams (Mavago and Mecula). Southern, western and areas in the east had considerable coverage but unfortunately the 7th Brigade commander and engineer were not available in Cuamba at the time of the survey.

C. General mine information

- Mines laid by:

  Predominantly FRELIMO but some Portuguese and a few RENAMO

- Identified mine types:

Anti-personnel:	PMN	Russian
	PMD-6	Russian
	M 14	American
	M 969	Portuguese
	Type 59	French
	Type 72	Chinese
Anti-group:	OZM 4	Russian
	POM-Z	Russian
Anti-tank:	None specifically identified	

D. Summary

- no. of reports submitted: 97

- location of important areas:

  The border with Malawi was rumoured to be heavily mined especially north of Mandimba and on the Mecanhelas district border with Malawi at Entre Lagos; mine reports have been submitted by HALO for these areas but the number of mines is considerably less than expected. More mines appear to exist further east along and in the vicinity of the Mecanhelas - Cuamba road (now closed); and along and at the sides of the Chamba - Cuamba road which runs north of the border with Zambezia (also closed over 45km stretch).

  To the west of Cuamba the Rio Lurio bridge connecting Niassa with Nampula, though fully functional is reportedly heavily mined.

  The Cuamba - Maua road has a scattering of reports either side of the road though the road itself is free of mines. An old disused track running in a NW direction towards Revia (approx. 30km before Maua) is the scene of an old anti-tank accident and the wreckage is reportedly ringed with anti-personnel mines. 20km beyond Maua the road to Marrupa is closed due to a suspected anti-tank mine.

  On the main Cuamba - Lichinga road a large number of mines are suspected between the road and railway line just north of Mepica. At Mitande defensive mines have been laid in the vicinity of the town and the road running north to Malanga

is reportedly mined though no details were available. The remainder of the road to Lichinga has a few Frelimo laid mines sites to the east and west then in a radius of 30km around Lichinga itself the area is considered free of mines.

Very few RENAMO mines exist in this province and certainly above the Lichinga - Marrupa road (which bisects the province) HALO could find little evidence for any RENAMO laid mines. The FRELIMO military in Lichinga had the same impression and furthermore the camp commander at the RENAMO assembly area in Mavago confirmed that in 12 years with RENAMO (he was previously FRELIMO) he had rarely received mines and these, if any, were stolen from FRELIMO.

Portuguese mines still however, remain a problem. There are plenty of rumours around but no strong evidence from those with authority. Up to December 1993, 25,000 refugees have returned to the northern districts (source: NAR/UNHCR/UNOHAC). The landmine survey of Niassa took place in April 1994 and the teams were unaware of any accidents that had occurred in these northern districts.

Cabo Delgado Province

Surveyed April 1994

A. Background

- geographic location:

  Far NE of Mozambique, bordering Tanzania to the north, Niassa to the west and Nampula to the south.

- road and district accessibility:

  All district capitals are relatively accessible. The central, coastal and southern parts of the Province are well served by roads but areas to the west, north of Montepuez and Mueda are inaccessible or extremely difficult even in the dry season.

- population density & area:

  In relation to the surrounding provinces Cabo Delgado has a greater population than Niassa but significantly less than Nampula. Some refugees are returning from Tanzania but not on the scale that is seen in Niassa.

- military forces active in the Province

  In terms of RENAMO influence Cabo Delgado has relatively

small pockets of RENAMO control: around the bases of Nacololo, Namayico, Napaco and to the south Napito, Neneira, Katapua, Nanlia, Natuco. It does however border large areas of RENAMO control in Nampula particularly the southern central region bordering Mecuburi district and in the east Namapa.

During the War of Independence the Portuguese were active across the northern districts of the province, close to the Rio Rovuma where they attempted to hinder the movement of FRELIMO from Tanzania to the north.

There was fighting throughout the province during the last war particularly around the Montepuez area. The war in Nampula however, was more intense and the Government forces in Pemba spent much time assisting to the south.

B. Survey coverage

Good ground coverage was achieved along the southern portion of the Province although much of the border with Nampula was difficult to reach. The Rio Lurio was approached at 3 locations: south of Mecufi, Chire and Machoca. Coastal areas (up to approximately 40km inland) were easily accessible and areas within the north, central and eastern parts were well covered with many roads previously considered impassable being surveyed and mapped by HALO teams.

Central and western areas of the Province were less accessible but good cooperation by the military in Pemba and both RENAMO and FRELIMO camp commanders in assembly areas provided information for many of the remote areas.

C. General mine information

- Mines laid by:

FRELIMO and Portuguese (very few reports of RENAMO mining, this is largely due to the logistic problems that RENAMO faced in this province and the lack of support available from any nearby source)

- Identified mine types:

Anti-personnel:	PMN	Russian
	POMZ-2	Russian
	Type 72	Chinese
	M 969	Portuguese
	PMD 6	Russian
Anti-group:	OZM 4, 72	Russian
	Type 69	Chinese

- a couple of reports of AT mines have been submitted but the military in Pemba can not recall any AT detonations in the province during or since the war.

D. Summary

- no. of reports submitted: 104

- location of important areas:

The coastal region of Cabo Delgado is largely free of mines. Portuguese and some FRELIMO mines occur in a band in the north of the province. Mined areas have been identified around N'gapa eastwards towards Nangade and along the northern side of the Nangade - Pundanhar road where several accidents have been reported. Beyond here, eastwards to Palma on the coast there is no evidence for mines. The area from N'gapa and Mueda westwards to Negomano was not accessible but reports suggest that mines may continue.

Only three major roads are thought to be mined in the Province: Nairoto - Chapa, Montepuez - Meluco and Meloco - Muico. The closure of the Chapa road in particular meant that the only road connecting the north of the Province with the south was the Pemba - Ancuabe - Macomia - Chitundi road. This was therefore heavily patrolled during the war with mines being laid in lines or individually along the sides of the road or on tracks that lead into the bush; these were placed in an attempt to hinder RENAMO ambushes. In addition, the 3 spans of the bridge over the Rio Messalo are mined north of Chai and Portuguese mines are suspected on the western flanks of the bridge over the Rio Montepuez. South, between Metoro and Namapa (Nampula) the bridges over the Rios Megaruma, Titimare and Lurio have mines around them.

On the stretch of road that runs west from Pemba there are sections, especially to the south of the road, where mines are suspected. These were presumably laid by FRELIMO to interfere with ambush attempts by RENAMO from bases to the south. Areas most affected are the section Pemba - Metoro and to the west and further off the road to the south between Montepuez and the Niassa border.

The vast majority of the mined sites recorded are FRELIMO mines. RENAMO, as in northern Niassa appear to have had little access to mines.

Nampula Province

Surveyed May 1994

A. Background

- geographic location:

  Nampula is a coastal Province in northern Mozambique bounded by the River Lurio to the north (borders Niassa and Cabo Delgado) and the River Ligonha to the south (bordering Zambezia).

- roads and accessibility

  The road network in coastal and southern areas of the Province is extensive and road conditions are generally good. The north-western regions are less accessible particularly along the Rio Lurio west of Muite.

- population density and area

  Nampula is a highly populated Province having greater numbers of people than Niassa and Cabo Delgado but fewer than Zambezia.

- military forces active in the Province

  Approximately 25-30% of the Province is considered strong areas of RENAMO influence. The RENAMO areas are scattered across the Province but are particularly concentrated along the coastal regions around Lurio in the north and an area south between, Ilha de Mocambique and Angoche. A strong RENAMO presence also occurs in the north-central area of the Province around Namahia and Marcelino RENAMO camps. Although Nampula saw much fighting during the war, there are some areas where mine-laying did not appear to be a common tactic by the local military.

B. Survey Coverage

The HALO Trust survey teams obtained good coverage of Nampula Province on the ground. A few routes however were still blocked by debris from Cyclone Nadia and although in most cases these obstacles could be by-passed, a small number of roads were totally inaccessible at the time of the survey.

Air reconnaissance for a further 3 locations may provide some additional information on a local scale; these have been submitted as a helicopter proposal to UNOHAC (Milhane, Mecuburi District; Cabo Antonio, Muecate District; Meti, Lalaua District).

C. General mine information

- mines laid by: FRELIMO, RENAMO

- Identified mine types:

Anti-personnel:	M/969	Portuguese
	PMN	Russian
	M14	American
	Type 59	French
Anti-group:	POMZ-2	Russian
	OZM 4, 72	Russian
Anti-tank:	PT-Mi-Ba III	Czech

D. Summary

- no. of reports submitted: 116

- location of important mined areas

In most cases, the military were extremely cooperative releasing numerous mine reports and allowing access to war operational charts. In addition, the chief engineering officer Capt Vaz accompanied one vehicle for the duration of the survey in Nampula Province.

The majority of the mined sites recorded in Nampula Province were FRELIMO-laid with numbers at the locations often less than 5. Sites are quite highly dispersed and significant parts of the province are reported to be free, or largely free, of landmines.

Keypoints where there was heavy mining are at the principle road bridges entering the province, on a section of pipeline near Nacala, electricity transmission pylons near Murrupula and the Monapo River Bridge on the Nacala Corridor. The extent of mining along the Nacala-Malawi railway link remains unclear because in the west the commander and the chief engineer of the 7th Brigade were unavailable for interview, and in Nampula, the senior officers of the corridor protection force were apprehensive about talking to the survey team. One section between Malema and Mutuali has been demined, uncovering more than fifty devices; other stretches and the paths near them should be treated with caution.

Towns and military camps with defensive positional mining include Murrupula, Namilasse (RENAMO), Mecuburi, Netia and Memba; Liupo is suspected by its inhabitants of being mined following accidents. Small concentrations of reports are found around the village of Mecua in Meconta, and adjacent to the Quixaxe road, south of Monapo. According to maps copied from the military, a number of mines were laid near Mt. Nicunaco in Mogovolas, though the local population did not seem to be aware of this danger.

Few roads were reported closed because of mines, and of these two have had proximate alternative routes cut (Mutivaze-Namina and Cussi-Mutulo). The main road links with Chinga are closed following a tractor accident in 1993 and the Imala-Mecuburi road is closed with an anti-tank mine reported in the vicinity of Antonio. The Quixaxe-Liupo road is closed, but for its condition of disrepair, and the mines along it are reported to be AP or AG.

12. NATIONAL SUMMARY

A figure of two million landmines has been put forward as being present in Mozambique. The survey has shown that whilst there are undoubtedly large parts of the country affected by mines the actual number of mines is likely to be significantly lower than this estimate. It is, however, impossible to give any accurate or meaningful figure for the reasons explained above, particularly rumours, exaggeration and ignorance.

The actual number of mines in the country is not of great importance. What matters is the number of areas which the local population believe to be mined and therefore do not enter. Current mine clearance operations in some parts of the country are finding very few mines in areas where the information suggested that there were large numbers to be removed. Although this may prove disheartening for the clearance teams, they are still achieving the aim of re-opening roads or clearing land for agriculture or access to buildings that are required for the rehabilitation of the community. Before clearance operations the areas were regarded as dangerous.

13. CONCLUSIONS

* The survey of the mines situation in Mozambique was successful in reaching the vast majority of inhabited areas of the country and in gathering information about the mines situation.

* The database of information was successfully created in close cooperation with members of the UNOHAC technical staff, who deserve credit accordingly.

* Some areas of the country remain inaccessible by road. Wherever possible, survey access was gained by air, by water or on foot. However, there remain some areas of the country which are impossible to enter.

* The information gathering and on-going planning process worked well. The majority of people contacted during the survey were helpful and willing to provide information.

* Much of the best information available is held by soldiers at assembly areas. If that information is not obtained before demobilisation it is likely to be lost for ever.

* The survey will not have gathered every item of information about mines in Mozambique. There will certainly be a continuing flow of information which should be incorporated into the database as it becomes available.

* The speed with which information was turned from raw data in the field into useful data for widespread use was not as fast as had been hoped.

* The information gathered will be of greatest value if used in conjunction with an advanced mapping data system of the Geographical Information System (GIS) form.

* The total number of mines in the country is unlikely to be as high as the 2 million figure that has been much quoted. A figure of some hundreds of thousands is probable.

* The precise number of mines in the country is of little importance. Of greater importance is the extent of the land preceived to be dangerous.

14. RECOMMENDATION

* Future surveys of this type should be given the highest priority such that delays of the sort suffered in Mozambique are not repeated.

* In future demobilisations, troops at assembly areas should be asked about mines in a comprehensive way, complementing any survey that may be taking place.

* New information about mines should be incorporated into the Shaman database as it becomes available from whatever source.

APPENDICES:

Communications
Vehicles
Navigation and position finding
Personnel
Medical
Roads and accessibility
Mine Types
Financial Report

APPENDICES:

i Communications

Each Land Rover was fitted with a Codan 8558 HF Transceiver and Automatic Tuning Unit. In general, these proved a good means of communication between vehicles and the HALO mine clearance base station at Quelimane, although there were several occasions when the terrain disrupted signals and relays had to be made via other HALO Callsigns. Problems were encountered with the Automatic Tuning Units some of which developed faults and failed to tune. However, the use of Dipole antennae reduced the effect on progress of the work.

All personnel received comprehensive training in the proper use of the radios, voice procedure and emergency routines and were regularly assessed to ensure that standards were maintained.

iii Vehicles

The vehicles used were Land Rover Defender 110 Station Wagons. Four of these were normally aspirated with extended fuel tanks, the two delivered later being Tdis. Considering the roads and mileage they had to cover they performed extremely well with the teams carrying out most of the regular maintenance and repairs themselves. Problems did occur with shock absorbers and the radiators which often became clogged with grass seed and required regular cleaning. Door locks also failed which posed security difficulties, particularly at night, which had to be overcome by personnel sleeping in the vehicles.

Each vehicle carried two spare wheels, extra fuel cans and spare oil, diesel and air filters, and teams became proficient at general maintenance and carrying out running repairs when specialised mechanics and spare parts were unavailable.

There were also problems with antenna mountings and roofracks which required re-welding. Most repairs were carried out by HALO personnel or by local mechanics.

All vehicles will require comprehensive servicing before further use.

iv Navigation and position finding

This was achieved using the vehicle mounted Magellan 5000D Global Positioning System and maps purchased in Maputo. For navigation around the country the UTM grid system was used but all reports are given in both UTM and Latitude and Longitude. The Primary Map Datum used was 50 WGD.

v Personnel

Control and Coordination

Programme Manager	David Hewitson
Data management	Orlanda Maria Jesus Samuel

Southern Group

Group leader and Team 1

Leader	Trevor Foster-Black
Interpreter	Amilcar Jose Zunguze
Driver	Mussa Alia Barbosa

Team 2

Leader	Henry Howard-Vyse
Interpreter	Lordes Paulino Zavale
Driver	Antonio Micas Chihale

Team 3

Leader	Cameron Whyte
Interpreter	Antonio Reis Junior
Driver	Jose Miguel Coelho

Northern group

Group Leader and Team 1

Leader	Guy Rhodes
Interpreter	Julio Jeremias Banze
Driver	Alberto Ponha

Team 2

Leader	Nick Nobbs
Interpreter	Jose Maria Cossa Nchope
Driver	Dinis Viola

Team 3

Leader	Andrew Scheiner
Interpreter	Fenias Sitefane Sitoe
Driver	Fransisco Bernado

vi Medical

Each vehicle carried a comprehensive medical kit and expatriates were fully trained in the use of its contents. The First Aid kit contained the following:

6 x 15 mg ampoules Morphine
2 x 15 mg ampoules Semetil
2 x 5 day courses Metronizadole
1 x 5 day course Tetracycline
Anti fungal cream
Anti bacterial cream
2 litres Haemacell and giving sets
1 litre Ringers Lactate and giving set
400 ml sodium chloride
4 x airways
Fansidar
Surgical gloves and a comprehensive range of bandages, dressings and associated equipment. Resupplies of drugs and equipment were organised as and when necessary.

vii Roads and accessibility

The vast majority of roads in Mozambique are not metalled although most are driveable in the dry season in four wheel drive vehicles. During the wet season many roads become impassable due to flooding and broken bridges and there are therefore areas of the country that are inaccessible for parts of the year.

A large proportion of the roads marked on the maps used during the Survey no longer exist, having fallen into disuse during various wars. HALO vehicles have travelled most of the roads in Mozambique which are passable and these can be identified from the marked maps held by UNOHAC.

Most towns of any size are accessible although often by convoluted and tortuous routes.

viii Mine Types

The following list of mines is split into two categories; those that have been visually identified and those which are suspected to exist. The list includes mines identified by other experienced mine clearance agencies and those seen in military stores.

Visually identified:

Anti-Personnel Blast

PMN	Russian
PMD-6	Russian
M/969 (NR 409)	Portuguese (Belgian)
Type 72	Chinese
M-14	American
Type 59	French

Anti-Personnel fragmentation

POM-Z	Russian

Anti-Personnel directional fragmentation

Mon-50	Russian
Mon-100	Russian

Anti-Personnel bounding fragmentation

OZM-3	Russian
OZM-4	Russian
OZM-72	Russian
Type 69	Chinese
Pp-Mi-Sr	Czech
M/966	Portuguese
V 69	Italian

Anti-Tank

Type 72	Chinese
TM 46	Russian
Pt-Mi-Ba-III	Czech
TMD 66	Russian
Mk 5	British

Suspected in Mozambique:

Anti-personnel blast

VS 50	Italian
PMN 2	Russian

ix. Financial Summary (All figures are in US dollars)

MOZ/93/801 Mozambican Mines Survey Programme

Line	Budget	Accounted 10.1.94 (a)	Other Expend (b)	Total Expend (a & b)
Personnel				
Expatriate salary/insure	78,000	-	83,150	83,150
Local staff wages/insure	7,200	-	5,902	5,902
Sub-total	85,200			89,052
Non-expend equipment				
Vehicles	149,400	149,400	-	149,400
Radios	34,900	25,698	-	25,698
GPS	26,400	26,392	95	26,487
Detectors	18,500	17,413	-	17,413
Computer	4,200	-	1,869	1,869
Sub-total	233,400	218,903	1,964	220,867
Fuel,field & vehicle maint	14,000	-	16,568	16,568
Travel				
International	11,500	6,184	5,892	12,076
National	7,200	-	1,500	1,500
Light aircraft	7,000	-	3,600	3,600
Sub-total	25,700	6,184	10,992	17,176
Accommodation and food	22,000	-	25,589	25,589
Administr support	15,000	-	26,048	26,048
TOTAL $	395,300	225,087	170,213	395,300