

# Lao PDR Risk Management and Mitigation Model



---

The **Geneva International Centre for Humanitarian Demining** (GICHD) works towards a world free of anti-personnel landmines and for the reduction of the humanitarian impact of remnants of war by providing operational assistance, creating and sharing knowledge, and supporting instruments of international law.

---

*For further information please contact:*

**Geneva International Centre for Humanitarian Demining**

7bis, avenue de la Paix

P.O. Box 1300

CH-1211 Geneva 1

Switzerland

Tel. (41 22) 906 1660

Fax (41 22) 906 1690

[www.gichd.org](http://www.gichd.org)

[info@gichd.org](mailto:info@gichd.org)

*Lao PDR Risk Management and Mitigation Model*, GICHD, Geneva, February 2007

This project has been managed by Tim Lardner, Operational Methods Section ([t.lardner@gichd.org](mailto:t.lardner@gichd.org))

---

© Geneva International Centre for Humanitarian Demining

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Geneva International Centre for Humanitarian Demining concerning the legal status of any country, territory or area, or of its authorities or armed groups, or concerning the delimitation of its frontiers or boundaries.

---

# Contents

Acknowledgements .....	i
List of figures and tables .....	i
<b>Introduction.....</b>	<b>1</b>
Background to the project.....	1
Study methodology.....	1
Report layout .....	2
<b>Chapter 1. The explosive threat in Lao PDR.....</b>	<b>3</b>
1.1 The nature and extent of contamination .....	3
1.2 The human impact of contamination .....	3
1.3 The socio-economic impact of contamination.....	5
1.3.1 The collection and trade in war scrap metal .....	5
<b>Chapter 2. The structure and capacities of the UXO action programme .....</b>	<b>8</b>
2.1 The UXO action programme .....	8
2.2 Management of the UXO action programme .....	9
2.2.1 Management of the national UXO action database.....	9
2.2.2 Coordination of UXO action activities in Lao PDR.....	10
2.2.3 National UXO action standards.....	10
2.2.4 Licensing and accreditation.....	10
2.2.5 Human Resources.....	11
2.2.6 Monitoring and evaluation .....	11
2.3 Priorities for clearance.....	11
2.4 Key operators and their achievements.....	12
2.4.1 UXO Lao .....	13
<b>Chapter 3. Key challenges for the UXO action programme .....</b>	<b>15</b>
3.1 National strategic challenges for the UXO programme .....	15
3.1.1 Resource allocation .....	15
3.1.2 Clearance methodology.....	16
3.1.3 Data analysis and planning.....	17
3.1.4 Survey methodology.....	18
3.1.5 Targeting of UXO risk education.....	18
3.1.6 The increasing scrap metal market.....	19
3.2 Operational challenges for the UXO action programme.....	20
3.2.1 The operational structure of UXO Lao at provincial level.....	20
3.2.2 Operational reporting .....	21
3.2.3 Better targeted response .....	21
3.2.4 Clearance standards and risk management.....	22
<b>Chapter 4. Risk Management .....</b>	<b>23</b>
4.1 What is risk management?.....	23
4.2 What is risk mitigation?.....	24
4.2 Methodology.....	24
4.3 Risk management at the strategic level .....	25
4.4 Risk management at the community level.....	26

<b>Chapter 5. National risk management decision-support tool.....</b>	<b>28</b>
5.1 The use of UXO Lao data.....	28
5.2 Background to the decision-support tools .....	29
5.2.1 Available Data.....	29
5.2.2 The logic of the decision-support tools .....	30
5.2.3 Updates and Knowledge Base Improvement .....	33
5.3 The national decision-support tool .....	33
5.3.1 Comments on the national decision-support tool .....	34
5.3.2 Testing & Development of the Model.....	34
<b>Chapter 6. Community risk management decision-support tool .....</b>	<b>36</b>
6.1 The community-level tool .....	37
6.1.1 Comments on the Community Level Model .....	38
6.1.2 Testing and development of the tool .....	39
<b>Chapter 7. Study conclusions, findings and recommendations .....</b>	<b>40</b>
7.1 The evolution of UXO action in Lao PDR.....	40
7.2 Key challenges for the UXO action sector .....	40
7.3 Information management.....	40
7.4 Areas of deployment of clearance teams .....	41
7.5 Operational structure and methodology .....	41
7.6 The proposed decision-support tools .....	42
7.7 Monitoring of progress .....	43
<b>Bibliography.....</b>	<b>44</b>
<b>Glossary of abbreviations and acronyms.....</b>	<b>45</b>
<b>Annexes .....</b>	<b>46</b>
Annex A. Major evaluations and assessments in Lao PDR since 2000 .....	46
Annex B. Local perspectives on living with UXO -.....	47
A study of two Lao villages.....	47

## Acknowledgements

Many people guided our work and our thanks go to all of them. But several are worthy of special note. The initial concept came from Joe Wenkoff, formerly the UN Development Programme's Chief Technical Advisor to the National Regulatory Authority who then began the process of development. He was closely followed by Tim Horner who assisted throughout his current tenure. At the field level, many of the fundamental ideas were generated with the assistance and advice of Leonard Kaminski; his work has already made a significant contribution to making UXO action in the Lao People's Democratic Republic more effective. Finally, Dr Maligna Saignavongs, Director of the NRA, made all our work possible – and indeed a pleasure.

## List of figures and tables

Figure 1. Recorded casualties by UXO Lao in its nine operational provinces

Figure 2. Risk management model

Figure 3. Land cleared compared with average cost per hectare

Figure 3. Risk flow model at community level

Figure 4. A comparison of risks in hazardous industries

Table 1. Risk management model

Table 2. A comparative table of risk-taking in two villages

Table 3. Available data for input into the decision-support tools

Table 4. Strategic data use in the national decision-support tool

Table 5. Data required on site in the community decision-support tool

# Introduction

## Background to the project

In 2005 and 2006, although the area of land released through clearance in the Lao People's Democratic Republic (Lao PDR) has continued to increase, so too has the number of casualties caused by unexploded ordnance (UXO) left over from conflict between 1964 and 1973. This observation triggered a chain of events that resulted in UNDP Lao PDR issuing a Request for Proposals (RFP) for the development of an “EOD Risk Management/Mitigation Model in the Lao PDR”. The GICHD was subsequently awarded the project.

The aim of the project is to design and specify a new approach to addressing the Lao PDR contamination problem that is practical to implement and is based on nationally accepted risk management principals. In order to do that, it is important to define processes and procedures and develop practical and concrete models for Risk Management in Lao PDR. At the national (strategic) level the model recommends where the National Regulatory Authority (NRA) should plan ground clearance tasking within the guidelines of the government of the Lao PDR, whereas at field level it suggests how such actions should be undertaken by the operators.

This dual goal is complicated by multiple layers of perception of risk. Each of the stakeholders in Lao PDR has different perspectives and varying levels of resources to pursue risk reduction. At one extreme, villagers caught in a poverty trap have a dilemma: they have sometimes to choose between starvation and either collecting UXO for income from scrap metal or using contaminated land. As a consequence, even if they have received UXO risk education, it is likely that they will opt for one of the latter options.

Thus, the risks posed by UXO rarely appear in isolation nor do they exist in a static milieu since local perceptions of risk may vary according to time, situation and the household coping abilities to survive. Therefore, the villager, the community, the country and the donors need to constantly balance risk-taking behaviours against the potential benefits derived from them.

## Study methodology

During a period of two weeks in July 2006, a team of three specialists including Oboni Riskope Associates Inc. as a subcontractor/advisor to GICHD, visited Lao PDR to gain an understanding of the situation in order to allow the development of such a risk management/mitigation model. The team visited field operations and headquarters and at the end of the mission facilitated a workshop to ensure stakeholder participation in the process. A

draft of the study report was submitted to the NRA in early December 2006 for comment and review.

## Report layout

This report is composed of seven chapters. Following this overview, Chapter 1 reviews briefly the explosive threat confronting the UXO action sector in Lao PDR, looking at the nature and extent of contamination and its consequent impact on life in Lao PDR. Chapter 2 details the structure and capacities of the UXO action programme, as well as some of its achievements. Chapter 3 sets out the main challenges for the UXO action programme, as identified by the study team, both at national and community level.

Chapter 4 sets out the basic approach to risk management – the process of optimising the use of scarce resources to reduce the risk that a person or community faces from a hazard. Following from this, Chapter 5 outlines the proposed national risk management decision-support tools for Lao PDR, with particular focus on resource allocation and the future planning of UXO action operations. Chapter 6 then proposes a corresponding community-level risk management decision-support tool for use by operators. Finally, Chapter 7 summarises the main conclusions, findings and recommendations of the project. Following a bibliography and glossary of abbreviations and acronyms, Annex A contains a synopsis of key evaluations and assessments of the UXO sector in Lao PDR undertaken in recent years. Annex B comprises 2 case studies of community perspective to UXO issues in Lao PDR.

# Chapter 1. The explosive threat in Lao PDR

## 1.1 The nature and extent of contamination

During the period 1964–1973, Lao PDR was subject to massive aerial bombing and limited ground warfare. As a result, the country was contaminated by an unknown, but substantial, quantity of UXO. The only comprehensive national survey of contamination in Lao PDR was undertaken by Handicap International for UXO Lao in 1997.<sup>1</sup> The survey provided an overview of the scope of the problem, identifying 10 “severely” contaminated provinces and a further eight of the remaining nine provinces with lesser levels of contamination.

Most of the explosive contamination present in the country (in terms of unexploded, thus hazardous units), is from cluster munitions (locally known as “bombies”). These items of UXO have the most sensitive fuses and therefore are most likely to be initiated accidentally.

## 1.2 The human impact of contamination

UXO has killed several thousand civilians in Lao PDR since the 1960s<sup>2</sup> and continues to kill and injure several hundred more each year.<sup>3</sup> UXO Lao’s own database, which covers parts of the nine provinces in which it is operating, recorded 164 victims in 2005. Of these, 89 per cent were male, 54 per cent were under 18, 45 per cent were due to “playing” and 9 per cent to “tampering”. These figures are, sadly, insufficient in coverage and detail and too inaccurate to be representative of the country as a whole and the classifications used do not allow sufficient discrimination between activities. Thus, for example, it is virtually impossible to distinguish between “playing” and “tampering”. Furthermore, the system appears to be extremely subjective, based primarily on the perspective of the person who reported the accident rather than the result of a systemised data collection process.

---

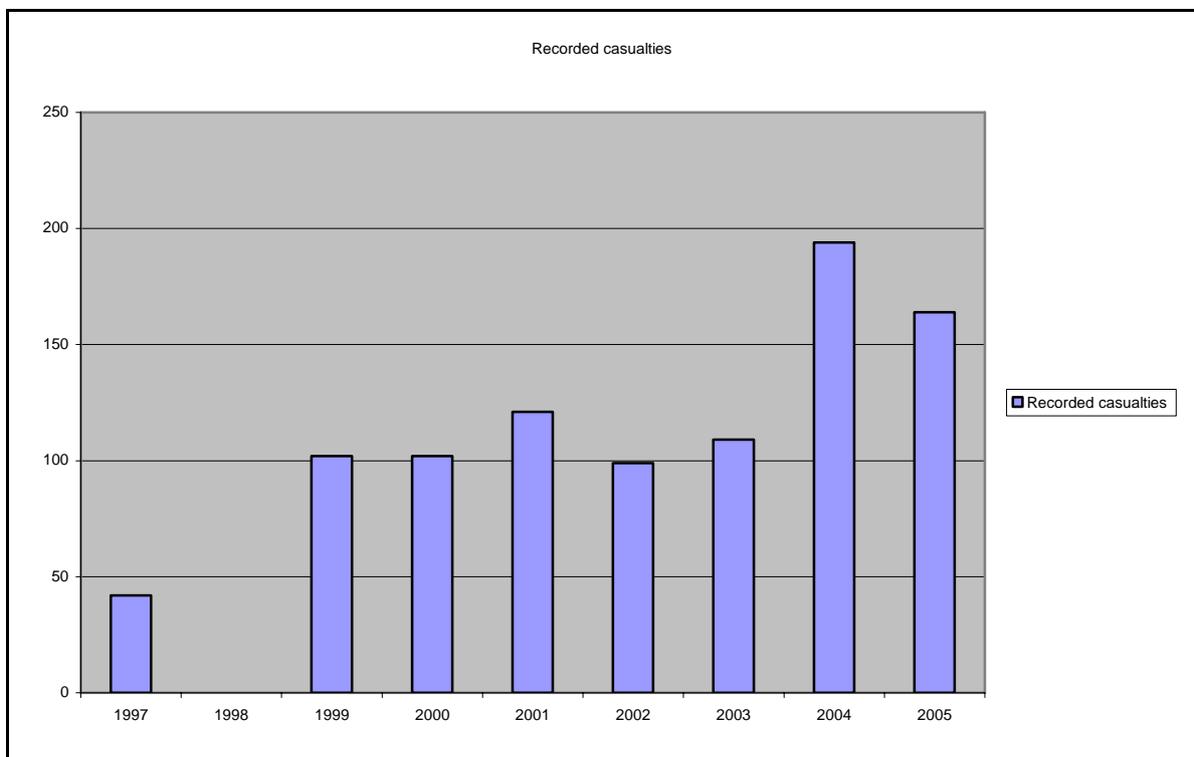
<sup>1</sup> Handicap International, *Living with UXO: National Survey on the Socio-Economic impact of UXO in Lao PDR*, Vientiane, 1997.

<sup>2</sup> The United Nations Common Country Assessment for Lao PDR, issued in June 2006, repeats the figure of 11,000 recorded casualties. There is a belief among a number of interlocutors that this figure actually overstates quite significantly the true number of casualties from UXO.

<sup>3</sup> In 2004 and 2005, there are around 200 recorded casualties each year in Lao PDR. The true number is extremely difficult to quantify due to the lack of reliable data recording mechanisms.

In many parts of Lao PDR, UXO poses a particular threat because it has value as scrap metal, resulting in the unofficial and unregulated civilian collection of UXO. There are provincial decrees in all provinces outlawing trade in UXO for scrap metal but it seems that these decrees have had little effect on the ground. In 2004–2005, this practice was said to be increasing, with the establishment of at least three new foundries in three of the most contaminated provinces (Xieng Khouang, Khammouane and Savannakhet).<sup>4</sup>

In parallel with an increase in the scrap metal trade, a sharp rise in the number of related casualties was reported beginning in 2004 (*see Figure 1*)<sup>5</sup> and subsequently asserted widely.<sup>6</sup> It is difficult to determine whether the reported increase is due to an *actual* increase or merely the result of vagaries in the reporting system. Moreover, although the total number of UXO accidents is difficult to assess effectively, it appears, on the basis of the limited data available, that children constitute the majority of victims.



**Figure 1. Recorded casualties by UXO Lao in its nine operational provinces<sup>7</sup>**

In addition, the root causes of accidents is generally unclear as the UXO Lao database appears to be inconsistent and post-accident investigation/reporting mechanisms are not formalised and standardised. Although hearsay suggests that a significant number of people fall victim to

<sup>4</sup> International Campaign to Ban Landmines, *Landmine Monitor Report 2005, Toward a Mine-Free World*, Mines Action Canada, Ottawa, September 2005, p. 789.

<sup>5</sup> International Campaign to Ban Landmines, *Landmine Monitor Report 2006, Toward a Mine-Free World*, Mines Action Canada, Ottawa, August 2006, p. 973, citing a UNDP press release from July 2004.

<sup>6</sup> Including, specifically, the RFP for this project issued by UNDP in March 2006.

<sup>7</sup> Figures were not available for 1998

UXO while collecting for scrap metal, the database indicates otherwise.<sup>8</sup> A recent needs assessment for UXO risk education commissioned by UNICEF identified that the casualties caused by ‘voluntary’ activities, i.e. activities other than daily livelihood activities that the victim “chooses” to do comprised more than 70 per cent of the total.<sup>9</sup>

### 1.3 The socio-economic impact of contamination

Overall, the extent of the socio-economic impact of UXO contamination in Lao PDR has been surprisingly poorly quantified. For example, although it is generally agreed that UXO has impeded economic development,<sup>10</sup> particularly in highly contaminated areas, details of this impact are sketchy. Thus, while the Lao PDR Sixth National Socio Economic Development Plan (2006–2010), issued by the Committee for Planning and Investment, declares that UXO contamination poses a continuing challenge to development in Lao PDR it does not provide much detail on how the contamination affects the country.

An excess cost to civilian infrastructure works (such as road and power line construction) has been estimated by the Ministry of Transport<sup>11</sup> at between US\$2,500 and US\$5,000 per hectare. In total, the UXO action sector costs about US\$7 million per annum including survey, clearance, risk education and victim support, but excluding commercial operators. However, part of the total sum includes expenditure on salaries and goods (as well as job creation) that is an input to the Lao economy.

#### 1.3.1 The collection and trade in war scrap metal

In the framework of this risk management and mitigation model, a community-based study was carried out in two villages classified as ‘high impact’ by UXO Lao. In both villages, no UXO-related accident has been recorded since 2003. It found contrasting realities with respect to engagement in collection of UXO for scrap metal.

##### *Overview of Case Study 1: Ban Phalou village*

Ban Phalou is a small village located on the Ho Chi Minh trail in Phine district in Savannakhet province. It is a very poor village and the 30 families living there rely on subsistence farming: growing various crops, raising domestic animals, hunting in the jungle, collecting non-timber forest products, and undertaking slash and burn cultivation. All cultivated crops are used exclusively for family consumption and the household revenue is either supplemented by logging or war scrap metal trade (SMT).

Discussions with the villagers concerning their intentional and unintentional interactions with UXO reveal two approaches to participation in the SMT: opportunistic trade and pre-

<sup>8</sup> It has, though, been suggested by a number of interlocutors that many such cases are reported as “tampering” or “playing” to prevent “blame” being passed across to the victim.

<sup>9</sup> MAG and the Lao Youth Union, UXO Risk Education Needs Assessment, UNICEF, Vientiane, October 2006, p. 24.

<sup>10</sup> However, in early 2005 the UN Country Team did not even identify UXO as falling within the five priority areas for in-depth causal analysis and assessment.

<sup>11</sup> Interview with Somnuk MEKTAKUL Deputy Director, Ministry of Transport, Vientiane, 10<sup>th</sup> July 2006.

meditated involvement. But these two categories are neither discrete nor impermeable. Some people may be shifting from one category to another according to time, location and the household exposure to external vulnerabilities. In a context of poverty and geographical isolation, the recourse to scrap metal trade is often regarded as a safe activity in the sense that it systematically generates an extra income to complement subsistence farming.

In Ban Phalou the male segment of the population is the more intentionally exposed to UXO, with a core group of young male adolescents continually collecting war scrap metal. As the money is often re-injected into the household budget, parents adopt a lenient attitude despite their awareness of the potential danger. In times of food shortage and illnesses, any additional income is instrumental in strengthening the family survival buffer.

### ***Overview of Case Study 2: Ban Nong Tang village***

Ban Nong Tang village is in Phoukoud district in the province of Xieng Khouang, located along the road connecting the provincial capital of Phonsavan to Vientiane. It therefore benefits from frequent traffic. Ban Nong Tang has been totally rebuilt over the years as it was completely destroyed by ground battles and intense aerial bombing during the war. Benefiting from various resources and infrastructure (access to road, school, market and the provincial hospital), it is a comparatively wealthy community where 84 households regularly sell a portion of their farming yield to the local market.

According to the village chief, around one in ten of the local inhabitants collect and sell war scrap metal on a regular basis with a persistent group of male adolescents being actively involved during the week-ends. For the collectors, especially those sufficiently experienced to know how to be careful and methodical, SMT is perceived as an activity like any other.

The puzzle remains as to why an individual chooses to go metal hunting when other safer and sometimes more profitable activities are at reach to sustain the household livelihood? Little rational explanation was provided in this regard. It might be that SMT has an adventurous feel, which other activities lack. If true, this assumption would explain why young adolescents deliberately disobey their parents to earn pocket money. For the young scrap metal collectors, hunting for UXO is a group activity with individual financial rewards. The benefits, though, are not shared with the rest of the family as they are spent on candies and personal items.

### ***Case study conclusions and findings***

The study concluded that although the two villages were both classified by UXO Lao as ‘high impact’ due to intensive aerial bombings and ground battles, the level of risk derived from the presence of UXO was limited. As the scrap metal trade appeared to be a local activity undertaken by the villagers, interviews showed that the financial contribution of scrap metal trade into the local economy or into the household economy itself varied from one village to another (*see Table 1*).

Table 1. A comparative table of risk-taking in two villages

Ban Phalou, Savannakhet province	Ban Nong Tang, Xieng Khouang province
-------------------------------------	--

Household (HH) income	LOW	MODERATE-HIGH
Village access to basic infrastructure	LOW	HIGH
HH exposure to external vulnerabilities	HIGH	LOW
HH exposure to UXO risk	MODERATE	LOW-MODERATE
UXO-related accidents over the past 10 years	LOW	LOW
SMT prevalence in the village economy*	MODERATE	LOW-MODERATE
Price of metal per kilo	1,000 kip (US 10 cents)	1,300 kip (US 13 cents)
SMT contribution to the HH budget	MODERATE-HIGH	LOW
UXO Community Awareness	HIGH	HIGH
Law enforcement (provincial decrees)	LOW	MODERATE

\* meaning the overall economic value this activity has for the whole community.

In terms of economic sustainability, villagers of Ban Phalou are extremely vulnerable to natural disasters and chronic diseases. In this sense, scrap metal collection constitutes an activity which, although supplementary to land cultivation, remains a contributor to the household income that may not be insignificant. As young metal collectors go metal hunting on a regular basis, the money they earn often benefits all the members of the household. Children contribute their share to the family income so that parents can buy food and other supplies for the rest of the family.

The same conclusion cannot be applied to Ban Nong Tang where children collect and sell metal for their own individual purposes. In fact, it is a relatively safe farming village which offers scope for various types of farming and business opportunities. In light of this, SMT is by no means a default livelihood choice even to the poorest segment of the population. As the ordinary household has a greater security buffer against external vulnerabilities, it is economically more viable, thus making this risk taking activity unnecessary and potentially hazardous to the community as a whole. In this particular case, SMT is an activity within a wider range of livelihood alternatives that cannot be justified by its financial gains. If money does not represent the main motivation, its attractiveness would need to be found in less quantifiable reasons.

# Chapter 2. The structure and capacities of the UXO action programme

This chapter describes the evolution of the UXO action programme from its inception in the mid-1990s through to the current day. It outlines the more recent changes in the management of the programme, notably through the creation of the National Regulatory Authority (NRA), and summarises the extant management capacities both within the NRA and the main clearance operator, UXO Lao.

## 2.1 The UXO action programme

The international humanitarian response to the explosive threat in Lao PDR began formally in 1994 – more than 30 years after the bombing began – with Mines Advisory Group (MAG) which set up operations in Xieng Khaoung province. This was followed by the formation of UXO Lao in 1996 under the auspices of the Ministry of Labour and Social Welfare. Of course, the people of Lao PDR had been using their own resources to address the problem since the first day of bombing and developing their own survival strategies accordingly.

In the early days of the UXO Lao programme, many of the techniques used in demining programmes in other countries (including Cambodia) were imported into the methodology of clearance in Lao PDR. This meant that much of the work was based upon the slow meticulous techniques of demining in “high-risk” minefields rather than the perhaps more appropriate battle area clearance (BAC) techniques used elsewhere for clearing areas of ordnance rather than mines. This methodology is significantly faster.

At the same time as the clearance programme was developing, a significant Community Awareness (CA) programme was developed with an aim of educating the population of the risks of handling ERW and to provide alternative strategies to risk taking behaviours. As of 2006, UXO Lao was deployed in nine provinces<sup>12</sup> – all from the 10 “severely” contaminated provinces identified by the national survey in 1997 – which is clearly in need of an update.

---

<sup>12</sup> Attapeu, Champassak, Houaphan, Khammouane, Luang Prabang, Sekong, Saravane, Savannakhet and Xieng Khouang.

It is worth noting though that the 1997 survey found that 15 of the country's 18 provinces—all those it surveyed—had districts significantly or severely affected by UXO.<sup>13</sup>

## 2.2 Management of the UXO action programme

UXO Lao was set up in 1996 with an overarching advisory body – the National Steering Committee, which was intended to give the Government of Lao PDR oversight of the national UXO programme. There were some minor institutional changes in 2000 when a National Steering Committee Office (NSCO) was established with responsibility for coordination and development of fundraising strategies.

As a result of a report issued in 2002,<sup>14</sup> and the issuance of a national strategic plan in March 2004,<sup>15</sup> authority was given for the establishment of a National Regulatory Authority (NRA) to be responsible for the following:

- the review and implementation of the national strategic plan;
- the definition and provision of policy direction;
- the accreditation, licensing and oversight of all UXO/mine action operators;
- the management of the database and, as such, the prioritisations and related tasking of all UXO/mine action operators;
- the coordination of all UXO/mine action activities throughout the country;
- the external QA of all UXO/mine action activities; and
- the conduct of Post Clearance Impact Assessments, etc.<sup>16</sup>

In addition to these specific requirements, the NRA was also tasked by the government to work with the Ministry of Health (MoH) to develop a national UXO/mine victim database.<sup>17</sup>

The NRA did not, however, start to function until August 2005. In the second half of 2006, however, it began to operate as an effective coordination and management body. In addition, it is expected that a number of operators in Lao PDR that have been operating largely independently for some time will gradually come under the purview of the NRA. But the NRA faces a number of significant challenges over the coming years. In particular, the following points are pertinent for the purpose of this study.

### 2.2.1 Management of the national UXO action database

Probably one of the most important elements of a situational analysis in Lao PDR is to understand the degree of impact that UXO is having. Currently, the only UXO action and impact database in the country is owned and managed by UXO Lao. Data on victims is very limited and is available from only parts of nine of the 17 provinces in Lao PDR and the

<sup>13</sup> International Campaign to Ban Landmines, *Landmine Monitor Report 2006, Toward a Mine-Free World*, Mines Action Canada, Ottawa, August 2006.

<sup>14</sup> Keeley, R., Allcock, A., Singthilath, T., and Kongsaysy, M., *Mission to assess future sustainable options of the Lao UXO Trust Fund and the UXO Lao Mine Action Programme*, UNDP, Vientiane, 2002.

<sup>15</sup> Prime Minister's Office, Lao PDR, *"The Safe Path Forward"*, National Strategic Plan, Vientiane, 2004.

<sup>16</sup> Prime Minister's decree, 2004.

<sup>17</sup> *Ibid.*

quality of the data appears very poor. Moreover, this database is scattered and not effectively centralised.

It is therefore difficult at the headquarters level to get a clear understanding of the degree of remaining contamination and its impact as well as progress of ongoing and completed work in provinces. A reliable national database could and should be used to develop good measurement indicators for operational work in addition to being an invaluable tool for planning and tasking work in accordance with priorities. The NRA has now begun the integration of the multiple databases held by diverse agencies across the country; at national level, this could be brought to fruition using the IMSMA system.

### *2.2.2 Coordination of UXO action activities in Lao PDR*

There is currently little coordination of UXO action activities; indeed, it is difficult to get a clear picture of what activities are being undertaken throughout the country. It is important to develop this coordination in a pragmatic way to ensure that overcomplicated structures do not evolve, as well as to link in with existing structures. There are regional and national structures already in place and these should be considered in detail before the development of any further ones. NRA should be developing clear and specific priorities at the national level and providing approval and monitoring of workplans. The strategy should cover gaps in UXO clearance needs and set priorities for filling those needs.

The indications received by the study team were very positive that the operators in country were ready to become part of a national mechanism with regards to reporting, be subject to monitoring by NRA and become involved in the development of national prioritisation and tasking mechanisms.

### *2.2.3 National UXO action standards*

Despite the UXO action sector being 12 years old, there are still no national standards in place, although a process began late in 2006 with an advisor from the Swiss Foundation for Mine Action (FSD) drafting standards on behalf of the NRA, with funding from the Australian Government. Today, operators are under no obligation to pursue any specific set of standards and the Government of Lao PDR is simply not aware of the quality of clearance land that is being conducted. This situation will continue unless some form of quality assurance and/or sampling is put in place.

### *2.2.4 Licensing and accreditation*

The Government of Lao PDR currently has no formal control over any of the operators that operate in the UXO action sector in the country in terms of technical UXO clearance work but a formal accreditation process will be commenced by the NRA as part of the process of development of National Standards

While there *is* currently a requirement that commercial companies be registered with the Committee for Planning and Investment (CPI) and NGOs to be registered with the Ministry of Foreign Affairs, there is no requirement that they be subject to any standardisation for

operating within the UXO sector. With the initiation of the drafting of national standards for UXO action, the process of licensing and accreditation has begun – a very positive step forward and a prerequisite for the full effective implementation of a risk management/mitigation model.

### **2.2.5 Human Resources**

The human factor is vital in all of the areas discussed in this section. While effective and expensive software, hardware and geographic information system (GIS) equipment will all support the development of the programme, the key is the human capital invested in the national effort.

The NRA is establishing itself slowly but surely, and is to be commended on its direction. In terms of national capacity, it is worth noting that the national staff within the programme, whilst directly employed by the NRA (and similarly the UXO Lao staff), are funded through the UNDP administered Trust Fund rather than through a government funding line.. For its part, UXO Lao has established a solid basis on which to work, but appears to have some problems at the middle manager level with a relatively rapid turnover of government appointed provincial managers in some areas (*see further Section 2.4.1 below*).

### **2.2.6 Monitoring and evaluation**

As with any development activity, work in the UXO action sector must be monitored and evaluated systematically. An effective monitoring and evaluation system requires clear and meaningful objectives and SMART indicators. That means they should be:

**Specific**  
**Measurable**  
**Achievable**  
**Realistic; and**  
**Time-related**

Such a system should be established within the NRA in accordance with the International Mine Action Standards (IMAS). Based on current capacities, however, the NRA does not seem to be currently resourced for such monitoring.

## **2.3 Priorities for clearance**

In the early days of clearance, the focus was on clearing (or reducing the risk in) areas perceived to be important to the development of the country such as schoolyards, hospitals, and so on. This may or may not have been the most effective use of resources at the time but it was a very clear statement with regards to the will of the government of Lao PDR to deal with the problem.

Time has moved on and the focus has shifted toward the clearance of agricultural land. Clearly, in a country with such reliance on agriculture (which represents 53 per cent of GDP

and 80 per cent of the labour force and 5 per cent of the land mass of Lao PDR<sup>18</sup>), this is a significant statement but the general approach of prioritisation of all agricultural land may have indirectly led to less than satisfactory targeting of resources.

The 2004 national strategic plan classed the nation's priorities for UXO clearance as follows:<sup>19</sup>

**High:** agricultural tasks; roving services; public service utilities; and educational facilities;

**Medium:** grazing land and forested areas; communal facilities; government facilities and offices; and

**Low:** public infrastructure work; communal “profit-making” areas; tourism sites; and commercial/private business sites.

But criteria need to be made much more specific in order to focus resources in a more effective manner. This requirement applies equally to operators that are sub-contracted by other humanitarian and development agencies as part of broader projects,<sup>20</sup> as it does to those engaged directly in the UXO action programme. For in the past, the targeting of resources has resulted in a situation whereby “a large portion of the land cleared by UXO Lao proved not to be contaminated in the first place”.<sup>21</sup> Furthermore, operations should be combined with a rigorous reporting and monitoring mechanism to ensure that priority land, as it is determined, is being cleared. This is true at all levels.

Moreover, no comprehensive survey has been conducted since the Handicap International 1997 national impact survey, which is now out of date. The 2004 national strategic plan emphasised the need for “stepped-up technical surveys” at village level, to be conducted by four to eight survey teams for each of the nine UXO Lao provinces.<sup>22</sup>

## 2.4 Key operators and their achievements

Since the beginnings of formal clearance operations in 1994, the following UXO have been removed or destroyed (by UXO Lao and a number of other demining operators), thus reducing the immediate risk to those exposed to those particular munitions:

- 5,000 large bombs;
- 340,000 bombies;
- 5,700 mines; and
- 373,000 other items of UXO (including small arms ammunition and Land Service Ammunition).

<sup>18</sup> United Nations Common Country Assessment, Lao PDR, June 2006, p. 16.

<sup>19</sup> Government of Lao PDR, “Resolutions of the Lao PDR Government on National Strategic Plan,” Vientiane, 2004.

<sup>20</sup> As an example of this, FSD are subcontracted by WFP to support their operations.

<sup>21</sup> RFP, UNDP 2006

<sup>22</sup> Government of Lao PDR, “Resolutions of the Lao PDR Government on National Strategic Plan,” Vientiane, 2004, pp. 3, 6.

It is also recorded that through to the end of 2005 more than 74 square kilometres of land has been cleared (representing a total of 0.031 per cent of the total land area of Lao PDR and 1. per cent of the agricultural land in Lao PDR). Moreover, by the end of 2006, UXO Lao expects to have cleared over 1,500 hectares of land, an annual increase of nearly 100 per cent in the last three years. Other pilot initiatives currently underway, such as testing the introduction of new technologies and methodologies, should generate yet greater productivity increases from the second half of 2006.

What has become clear over recent years, however, is that the correlation between the amount of land being cleared and the number of casualties being recorded (noting the earlier concerns expressed with regard to the quality of data being collected) do not demonstrate the effectiveness of current processes in reducing casualties in Lao PDR.

### 2.4.1 UXO Lao

By far the largest clearance operator in Lao PDR is UXO Lao. The UXO Lao office is equipped with outdated computers and GIS software, resulting in long processing time and inefficiency. Satellite imagery is not available and the office does not have proper software to deal with this type of data. It is surprising to find a programme with such a degree of maturity without a reliable and relatively widespread internet and local area network. In sum, the management of UXO Lao – particularly in the field – is outdated and appears unable to cope with complicated decision making processes.

In terms of data, the office of UXO Lao remains, until the NRA fully establishes itself, in *de facto* charge of the national UXO action database. It operates in four major areas:

#### 1. Maintaining the database with data from field operations

This includes data on CA activities, survey teams, roving tasks and clearance operations. The UXO/mine victim database, which is not in GIS format but can be geo-referenced by village name, is also updated with dates of any accident, the name of the village, and the names, age, gender, etc. of the victims. The office then merges this data with bombing data simply in terms of location (a dot on the map), but without any other form of in-depth analysis.<sup>23</sup>

The team noted that perimeters of cleared areas often overlap due to errors in the coordinates of the perimeters due to datum uncertainties and the relative poor quality of the map base used (the scale is 1:100,000). Maps of 1:50,000 scale exist but there is a conflict of datum that makes them quite confusing to use.

#### 2. Follow-up of activities in the field leads to workplan schedule compliance checks

Causes of non-compliance have to be indicated: generally the cause stems out of the density of vegetation. Plans are conceived accounting for wet/dry season differences but it is possible,

---

<sup>23</sup> For example, differentiation between *release* points for B-52 mission as opposite to *target* points for other sorties. Confidence in the bombing data is compromised as there is often little correlation between the data and actual UXO locations.

with some planning, to know what the density of vegetation is likely to be before deploying to a site. Operations activities are audited annually by KPMG for UNDP.

### **3. Maintaining of work-plans**

UXO Lao collects work-plans from the nine provinces of operations, inputs the data and then prepares plans that can be submitted for official approval. The provincial plan is then printed and given back to provinces.

### **4. Provision of data to field operations**

This data includes UXO impact, bombing data and, with the limitations noted above, topographic maps.

While the capabilities above are carried out reasonably well, some of the fundamental problems relate to poor prioritisation at the national level, poor coordination at provincial and district levels, lack of effective survey, poor work-planning, poor approval and control mechanisms, as well as a lack of analytical capacity within UXO Lao – and indeed within the UXO action sector in Lao PDR.

It is also worth noting that there are many other items of data that could be used in the definition of priorities that could be taken into account. For example, the GICHD/UNDP publication, *A study of socio-economic approaches to mine action*,<sup>24</sup> discussed the point at which it ceased to become economically viable to clear land. While the present study does not endorse any particular approach, this kind of cost-benefit analysis is one example of how other factors could assist with effective national prioritisation.

---

<sup>24</sup> GICHD, *A study of socio-economic approaches to mine action*, GICHD/UNDP, Geneva, 2001, p. 52.

# Chapter 3. Key challenges for the UXO action programme

This chapter identifies the main challenges that must be faced by the UXO action programme as it evolves and in a changing environment. The study team contends that the threats from UXO in Lao PDR should be broken into two levels of analysis: national and operational. This begins with an assessment of some of the strategic challenges for the UXO programme. These include improving the effectiveness of resource allocation and reviewing methodologies for survey, clearance and UXO risk education. It then looks at the operational challenges to be faced at local level, including the structure of UXO Lao at provincial level and more systematic reporting of clearance by operators.

## 3.1 National strategic challenges for the UXO programme

### *3.1.1 Resource allocation*

There is no doubt that the complexities at all levels from political to operational of the UXO action sector in Lao PDR are significant. Political and operational difficulties have resulted in an environment where resource allocation is less than fully structured and often with less rationale than desirable. For example, beyond the fact that 10 years ago the national survey by Handicap International identified 10 of the most affected provinces and, as a result of this, UXO Lao deployed into nine of those 10 provinces, there appears to have been no analysis as to the strategic direction of the programme since then. A number of evaluations and assessments of the UXO sector in Lao PDR have been undertaken over recent years but the current *modus operandi* of the UXO action sector in Lao PDR appears to be based on its historic development.

In terms of priority-setting, the National Strategic Plan accords high priority to the clearance of agricultural land. But given that much of land in Lao PDR is agricultural this criterion is not specific enough to assist in task selection. Moreover, in practice, it also appears that clearance assets have been deployed in communities and on land where the level of risk is relatively low. Clearance also tends to take place in those areas where access is relatively easy – clearly an understandable decision to make from a management perspective, but this may well not be addressing the needs of the most affected communities. These resource

allocation issues must all be addressed if clearance is to become more effective in reducing risk.

### *3.1.2 Clearance methodology*

In a clearance system study completed in 2006, Dehondt & Kaminski pointed out an apparent paradox in some long-established UXO Lao procedures. When formal work started in 1994, international technical advisors provided oversight for the setting up of systems in the country. At the operational level, many of the advisors had experience of mine action programmes and programmes were often based around a “mine clearance” scenario. Recently, this approach has been considered less appropriate in the Lao PDR environment and little clearance work is now done in this manner.

So what began as essentially mine clearance procedures have over time evolved to cope with UXO to the point that they would generally be unsafe in addressing the threat of mines. This trend has resulted in greater areas of land being released as can be seen in Figure 2, which shows the continual upward trend in productivity within UXO Lao compared to a rough calculation of the cost per hectare (in terms of the stated annual expenditure of UXO Lao against the stated cleared land output of UXO Lao).

Although these figures appear positive, this does not reflect the risk reduction potential of the work. Even if these trends continue, there is little benefit to be gained if this land is not posing a significant threat to the population. Indeed, what has become clear over recent years is that the correlation between the amount of land being cleared and the number of casualties that are being recorded (although note the earlier concerns noted with regards to data collection) do not demonstrate the effectiveness of current processes in reducing casualties in Lao PDR. It may be, therefore, that roving teams with targeted responses would offer a better outcome, even though their outputs would appear less impressive if depicted on Figure 2. Perhaps targeting results towards the needs of the population would be more appropriate than targeting towards the production of impressive statistics.

Moreover, alternative solutions to the standard methodology of clearance could be adopted for certain types of land or UXO contamination. In extreme cases, this could lead to a decision to abandon or fence off parcels of land that present a specified combination of parameters, such as high contamination, but low population and low agricultural potential. Or, at the other end of the spectrum, it could lead to a decision to release parcels of land after a strategic level assessment because they are considered safe enough without any further action. Thus, for example, national standards as currently drafted propose the principle that land that is being cultivated be removed from any clearance plan within the country. This is an excellent example of how decisions may be made at the strategic level that impact on the programme significantly as the resources would then be targeted towards areas where land is blocked for the populations.

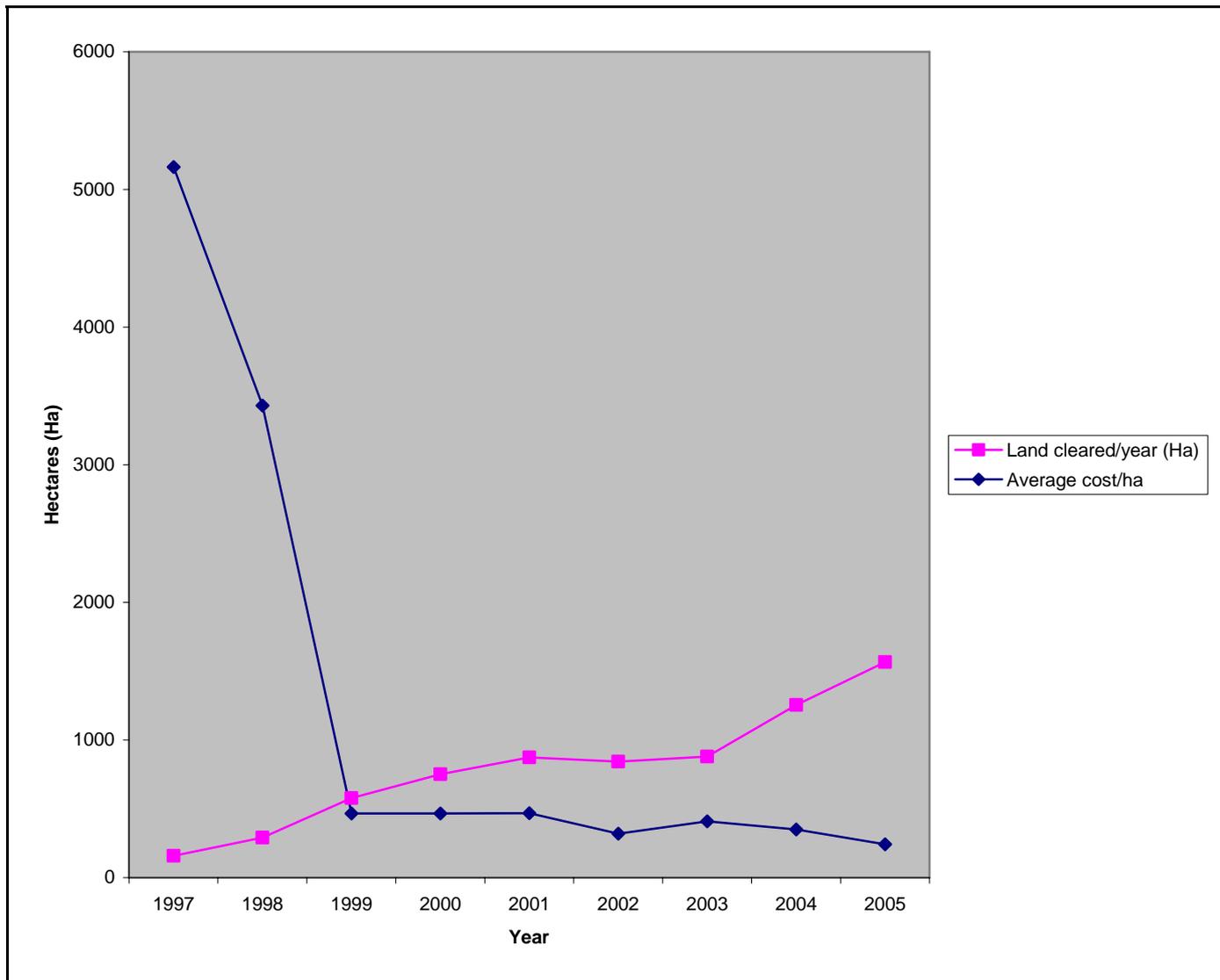


Figure 2. Land cleared compared with average cost per hectare

### *3.1.3 Data analysis and planning*

Despite the challenges, Lao PDR represents an almost unique situation due to the existence of detailed bombing data from the US Government which will allow, if properly validated, analysed and utilised, an innovative way of addressing prioritisation and performing survey. There appears to have been very little use made of this data by clearance and planning organisations to date. The potential for its use, however, is significant, and priority setting and tasking could potentially be enhanced significantly, especially when combined with other clearance, roving and accident data. In addition, other recently obtained data (e.g. bomb damage assessments, land use data, land cover, socio-economic data and population density data) should also be carefully integrated into the Lao information management system.

The NRA should undoubtedly be the focal point of the information management effort, but for the moment it lacks software, hardware and human resources to perform its tasks,

although this situation is changing rapidly. Continuing the development of the NRA as the national data and information analysis manager and broadcaster is key and will allow Lao PDR to take advantage of extant data and recently accessible data for the benefit of the population.

Databases *are* used by UXO Lao, which has – in relative terms – the greater information management capability at this time, but they appear to be used largely as record-keeping, rather than analytical tools. While this is not unusual in the mine action community, it is apparent that the potential offered is being significantly underused.

There is currently no national database of victims, despite clear recommendations to establish one made in several evaluations since 2000. The most current data available is located within UXO Lao and represents a limited sample from nine of the 17 provinces in the country. It is critical that the range and quality of data in terms of victims is improved. An excellent model could be the Cambodian Mine Victim Information System (CMVIS), managed by the Cambodian Red Cross, which is able to identify much more accurately what activity the victim was undertaking at the time of the accident as well as substantially more geographical data and a systematised methodology for data collection.

### *3.1.4 Survey methodology*

There needs to be a very strong link between technical survey and the detection/clearance phase,<sup>25</sup> certainly much stronger than the one that generally exists in Lao PDR (although such a methodology has been successfully applied by an operator in Sekong province). Examples exist where companies (e.g. Saricon in The Netherlands) have developed this concept to the point where they are really more in the safety and risk business than in the UXO removal/disposal industry. This type of organisation evaluates and weighs the risk of UXO contamination and acts accordingly, rather than simply proceeding to clear suspected land. With a thorough and robust methodology in place, an auditable decision-making process would allow similar decisions to be undertaken in Lao PDR without the risk of liability being laid at the feet of an individual.

### *3.1.5 Targeting of UXO risk education*

From the very limited data available, it appears that the majority of UXO-related incidents stem from either “tampering” or “playing” and are suffered mainly among young adolescent males, with a smaller percentage of incidents being caused during farming. The CA programmes in place appear often to be poorly targeted<sup>26</sup> – possibly because of a lack of data, possibly because of deeper underlying problems. Although CA is now a little more broadly directed, there appears to be little strategic focus in the overall approach.

An in-depth study of two villages undertaken as part of this project though, concluded that CA had been effective in passing on theoretical messages and teaching farmers how to use their agricultural tools more carefully. It is impossible know how many accidents have been prevented as a result. The problem remains as to how to systematically transform safety

<sup>25</sup> See, for example, the Dehondt & Kaminski study referred to above as well as Section 3.2.3 below.

<sup>26</sup> GICHD, *An evaluation of UNICEF-supported UXO Risk Education Projects in the Lao PDR*, 2005.

knowledge into safe behaviours especially for young scrap metal collectors. This conclusion is underscored by the recent study<sup>27</sup> identifying a very high level of awareness and understanding of UXO with 82 per cent of adults and 99.6 per cent of children considering UXO to be dangerous.

Apart from CA activities conducted by UXO Lao, the two main activities for UXO risk education since 2002 have been extra-curricular activities within the primary school system and “Sport in a Box” safe play activities implemented by the Lao Youth Union. These activities were targeted at the villages/areas identified in the HI survey of 1997, but appeared to take no account of changes in circumstances. “Sport in a Box” activities are no longer undertaken.

### *3.1.6 The increasing scrap metal market*

Virtually every report on UXO action in Lao PDR over the last five years refers to the significance that the collection of UXO for its scrap metal value is having on the population of the country and the resulting casualty rates. From an outside perspective, this is not surprising given the widespread poverty of the rural population and the relative ease of earning money by the collection of scrap metal in certain areas of the country. Thus, at the strategic level belong choices that could modify behavioural patterns of exposed population, notably with respect to the scrap metal trade.

This section considers the mass of metal distributed over the country and balance against the risk presented by it and suggests that a different perspective to that currently in place be considered. If the current figures are to be believed, the majority of casualties are caused by tampering or “playing” with UXO – “voluntary” contact with UXO. Conversely, looking at the allocation of resources in Lao PDR, the majority of resources used in the sector relate to clearance (because of the priority system) of agricultural areas, in which a minority of casualties occur. While this may be a simplistic statement, it is clear to the team that a fundamental shift in perspective needs to occur in the UXO sector in Lao PDR. But identifying exactly which path should be taken will require more data on risk-taking and corresponding analysis.

Given the prevailing context in Lao PDR, the study team finds it unrealistic even to seek to eliminate the trade in war scrap metal. But within the framework of a risk mitigation approach, controlling who engages in that trade is likely to prove more rewarding. For on the basis of what we think we know – that children are the majority of UXO victims and that work-related victims are less than a third of all cases – this leads us to focus on increasing parental responsibility to keep children away from scrap metal collection. This should provide an important role for UNICEF and its partners, while making enforcement of provincial decrees more attainable, through advocacy and dialogue both with the local executive authorities and the scrap metal dealers and foundries. In a broader term, those provincial decrees themselves should be reconsidered and developed into more pragmatic and useful documents.

---

<sup>27</sup> MAG and the Lao Youth Union, UXO Risk Education Needs Assessment, UNICEF, Vientiane, October 2006, p. 24.

Increasing the precision of tasking of agricultural land towards the poorest rural communities, especially in remote areas (where intentional risk-taking is likely to be more widespread and severe) would be the second arm to this revised approach. Indeed, the analysis of scrap metal prevalence with a poverty overlay on GIS could prove an important tool in this priority-setting process. There would, of course, need to be a corresponding strengthening of linkages between UXO action and the agricultural development sector, to ensure that inputs (seeds, tools, fertiliser, etc.) were available as soon as land was released to the affected communities.

## 3.2 Operational challenges for the UXO action programme

This section turns to more operational issues that affect UXO action at local (provincial and community) level. This includes both management and technical approaches.

### *3.2.1 The operational structure of UXO Lao at provincial level*

The team studied the provincial structures of UXO Lao during the team's field trips to Luang Prabang and Sekong. Where the provincial annual work-plan is used as a task priority-setting and decision-making tool, it is important that UXO Lao's set-up and management matches the requirements determined in the work-plan. The operational side of UXO Lao has four normally distinct branches, each of which conducts specialised tasks:

- Community Awareness;
- Survey;
- Clearance; and
- Roving operations.

In Luang Prabang, the organisation shows some flexibility by being able to deploy multi-task teams – for example, when necessary, the clearance teams are sometimes deployed as a roving team.

The provincial annual work-plan lays down a detailed list of visits for the different branches to the various UXO-impacted communities. A community will typically be visited first by a CA team, followed by a survey team the following week. The work-plan then has clearance or roving tasks programmed as subsequent follow-up in the third or fourth week. This presumptive planning for the allocation of resources is wasteful and inflexible and needs to be reconsidered.

A restructuring of the operational branches could assist in increased efficiency and better targeting of the various affected groups in the impacted communities. In most provinces where UXO Lao is operating, the structure of the provincial organisations has remained unchanged since the start of operations ten years ago. Most communities have been visited several times – and it seems that those communities that are relatively easily accessible have been visited more often. A change in approach to communication with the UXO-impacted communities needs to be considered.

Integrating elements from three of the four branches into one Community Response (CR) team, which could deal with UXO risk education and survey as well as spot EOD tasks, could provide an effective measure. The direct responses to such teams should generate more information about UXO locations from the community in question. Experience from other mine action programmes (e.g. MAG in northern Iraq) shows that it is possible to gain great advantages in both effectiveness and efficiency by combining mine risk education (and presumably, therefore, also UXO risk education) activities with survey and EOD teams.

By simply reorganising existing resources, a CA team assisted by a surveyor, medic and EOD operator could fulfil the annual work-plan as a roving CR team. Such an arrangement would release resources for clearance and roving operations and make the UXO clearance process faster and more cost-effective.

### *3.2.2 Operational reporting*

With the establishment of the NRA there is a need to standardise a reporting format for UXO clearance in Lao PDR. Currently, UXO Lao, commercial companies and independent operators all report their activities in different formats – and some simply do not report. After discussions with representatives of these different stakeholders it is concluded that they are all willing to share all clearance related data with the NRA.

In designing a national reporting system for UXO clearance in Lao PDR, it is, however, important that the system be compatible with the reporting formats already in use. It is also of great importance that the calibration of the detection tools used in the clearance process is clearly defined in the reporting process.

In tandem with the introduction of a bombing database in the NRA, proper reporting will assist in keeping an overview on past and ongoing clearance projects as well as providing the mechanism for monitoring work-plans.

### *3.2.3 Better targeted response*

In Lao PDR, both NPA/UXO Lao in Sekong Province and FSD have looked at ways of better targeting their clearance resources by undertaking technical survey of suspected hazardous areas prior to deploying clearance teams on the land in question. Such a process has been included in the national standards currently under development. Both organisations have used a risk matrix to assist the operations manager to determine what specific actions will make the risk acceptable for the subsequent projected use of the land.

NPA is using magnetometers for the initial survey, while FSD is using a sampling system to establish the probability for UXO contamination of the land. Both organisations have designed their approach along with a survey template that takes current and future land use into consideration.

The two organisations have also incorporated systems to guarantee that land cleared for agricultural purposes will be used by farmers immediately after clearance. Studies of the

effectiveness of both organisations have demonstrated that the effective overall clearance rate has increased by 50 per cent, which substantially benefits all concerned in the process.<sup>28</sup>

### 3.2.4 Clearance standards and risk management

In the current situation where there is an absence of national standards in Lao PDR “the presence of BLU26 at 30cm depth” or “a 20mm AA grenade at 20cm” had effectively become the *de facto* standards. While not written explicitly as a risk threshold definition, essentially these *de facto* standards had become Lao PDR’s **acceptable risk threshold**.

The current process of writing National Standards has defined the national clearance requirement to be half a BLU26 at 25cm, which has been defined as the **tolerable level of risk** for the population of Lao PDR. These standards are completed and have been handed over to the NRA but are not yet formally approved and implemented.

Of course, if the BLU26 and 20mm AA grenade<sup>29</sup> are located in well-used areas then the expected number of victims would likely be higher than in less frequented areas. But the chances of accidental detonation also decrease if the ground is not tilled and the surface contamination has already been taken care of by the clearance programme.

The IMAS define risk as a “combination of the probability of occurrence of harm and the severity of that harm”. What this means is that if, for example, we were to compare a large bomb with a BLU26, we could say that while the severity of harm from the explosion of a large bomb would be very significant, the probability of occurrence of harm (i.e. initiation) is relatively low. In contrast, although a BLU26 has a much less potential significant level of severity of harm, it is much more likely (because of its sensitivity) to initiate and therefore it should be concluded that the BLU26 poses a much higher risk to the population of Lao PDR than a large bomb. Added to that equation is the likelihood of potential victims being in proximity to the threat. In this respect, the decision in the earlier years of the programme to clear schoolyards as a priority represents an excellent risk reduction strategy on the part of the government of Lao PDR.

As Lao PDR has basically one land use – agriculture – it may not be appropriate, or even desirable, to undertake sophisticated modelling and prioritisation processes. This will be discussed further in Chapter 4. But it is clear that national standards will have to be flexible enough to allow for risk management decisions to be taken at local level, while maintaining an overall coherence nationally.

<sup>28</sup> See, for example, the 2006 Dohondt & Kaminski study.

<sup>29</sup> The 20mm AA grenade does not have as sensitive a fuze system as the BLU26 but in terms of metallic content, related to depth, gives effectively the same level of detectability.

# Chapter 4. Risk Management

**Risk management** is the process of optimising the use of scarce resources to reduce the risk that a person or community faces from a hazard. In terms of UXO clearance, the hazard is the presence, or suspected presence, of UXO. Such hazards pose physical risks to local populations, such as the possibility of death or injury, and can result in areas of land which people are unwilling to use.

**Risk mitigation** is the process of actually using those resources in an effective way to reduce the physical risk to the population. This process is intended to shift those areas of land that are above the level of tolerable risk to a level of risk that is ultimately tolerable by the population.

It should be noted, however, that although the requirement of the study was to develop a risk management/mitigation model for the NRA, several fundamental elements need to be in place before any such system can become effective. These elements include the following:

- Specific and transparent priorities that focus assets on addressing the needs of the population of Lao PDR;
- A clear process for work-plan approval and strict rules governing any changes;
- Independent monitoring of tasks on the ground by or on behalf of the NRA and through reporting by operators; and
- Post-clearance assessments.

## 4.1 What is risk management?

**Risk management** is the process of optimising the use of scarce resources to reduce the risk that a person or community faces from a hazard. In terms of UXO clearance, the hazard is the presence, or suspected presence, of UXO. Such hazards pose physical risks to local populations, such as the possibility of death or injury, and can result in areas of land which people are unwilling to use.

“Risk” (R) can be defined as the combination of the likelihood (pH) of a specified hazard (H) being realised (i.e. a person initiating a bombie), and the consequences of the event (harm and/or damage): (CH). In many instances, if the probability and the consequences are defined numerically, the combination takes the form of a multiplication, leading to an estimation of the risk level:

$$R = pH \times CH$$

Equation 1 - Risk

The process is defined in more detail in book four of the GICHD publication, *A Study of Manual Mine Clearance*.<sup>30</sup>

## 4.2 What is risk mitigation?

**Risk mitigation** is the process of actually using those resources in an effective way to reduce the physical risk to the population. This process is intended to shift those areas of land that are above the level of tolerable risk to a level of risk that is ultimately tolerable by the population.

## 4.2 Methodology

The proposed methodology uses field as well as “office” data to deliver a ranking that will guide the choice between cancelling or releasing land, roving tasks, clearing using Battle Area Clearance (BAC) techniques, clearing using “traditional” manual mine clearance techniques, and/or splitting the job into various sub-tasks. The concept is briefly explained here, but a full description can be found in the following chapter. The model is augmented by a software tool to allow the process to be undertaken in the most effective manner.

While it is understood that there is a presence of landmines in Lao PDR (and mines have been consistently found and dealt with since the start of operations), it appears that the problem is below the level at which it would be significant enough to take into account in the development of a model (there have been 5,700 mines dealt with since 1996 as opposed to 718,000 other items of ordnance dealt with – less than 1 per cent of all items cleared). These mines are also commonly found in distinct discrete locations where boundaries are delineated relatively clearly.

In a simplistic manner, Figure 2 shows the process of application of a risk management policy.

---

<sup>30</sup> GICHD, *A Study of Manual Mine Clearance*, GICHD, Geneva, 2005.

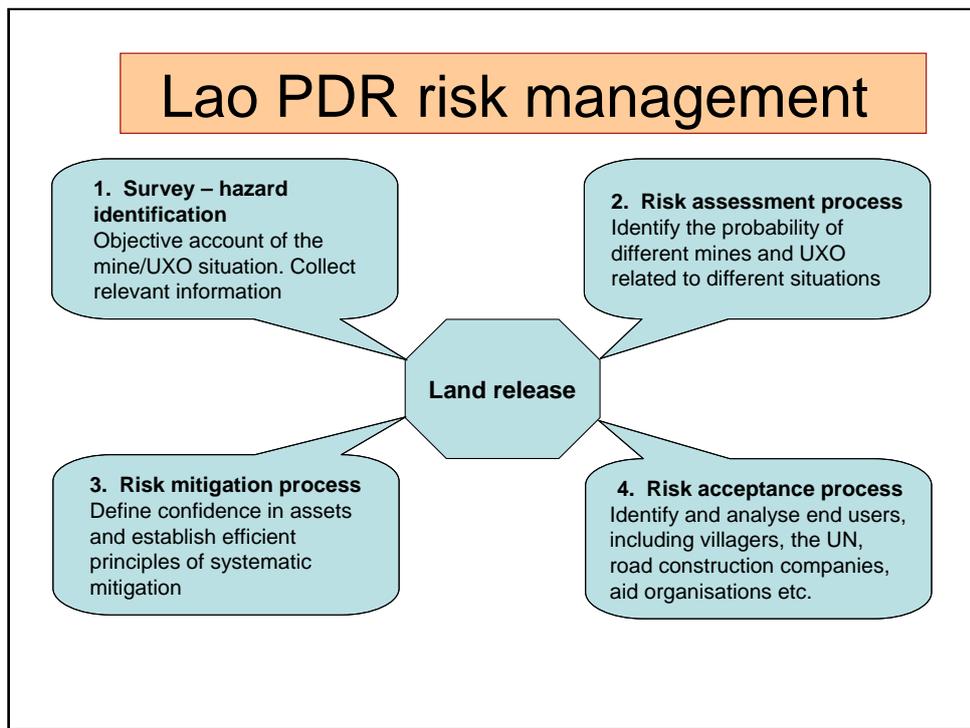


Figure 2. Risk management model

	Stage of RM process	Strategic model	Operational model
1	<b>Survey – hazard identification</b>	Analysis of extant GIS data to develop national risk map	Gather data at operational level – including community perspective – to focus local tasking
2	<b>Risk assessment process</b>	Analysis of risk map to consider where highest risk populations live	Analyse and utilise that data to focus team tasking
3	<b>Risk mitigation process</b>	National plan focussing on highest risk areas	Process ground in one of a number of methods – full clearance, quick search, sampling or releasing
4	<b>Risk acceptance process</b>	Working with operators to monitor, and provide QM on all operations	Liaison and discussion with local communities on handover of land

Table 1 – Risk management model

### 4.3 Risk management at the strategic level

At the strategic level, risk management means the development of a process of identification of those areas and those populations that are exposed to a greater level of risk than others. By this process, a strategic perspective can be obtained to give a clearer perspective on the needs of the country.

In Lao PDR, the process of hazard identification is currently being undertaken by a number of methodologies and at several levels to a greater or lesser degree. At the strategic level, an

opportunity is lost to give a clearer view on the scale of the problem by the limited amount of analysis of the substantial amount of data available. To supplement the data already available, roving and CA teams are regularly visiting communities. These visits could be the source of significant additional data which would form part of the hazard identification. Other factors that could potentially be used include:

- bombing data records;
- type of ammunition;
- historical dud rates (i.e. sensitivity of item);
- theoretical density of UXO from records;
- quality of information from population; and
- the potential use of land.

Once all these data have been collected, the analysis process is able to be undertaken thoroughly. It is proposed that the NRA take the responsibility for this analysis in order to be able to focus resources in a more effective manner. A model is provided to undertake this process, which is explained in more detail in the following chapter, but essentially it consists of undertaking a detailed consideration of all data provided and ranking it based on what the data says and the quality of it. From this, it is possible to define what the theoretical probability of UXO presence is and to evaluate the risks present.

Throughout this process, the vulnerability of the population can be calculated to provide an overall magnitude of hazard map to allow more effective prioritisation to be undertaken. This will provide the *strategic* direction required for the programme to better focus its resources.

#### 4.4 Risk management at the community level

Once strategic priorities have been set, the *operational* processes can be undertaken on those geographical areas where work would be more effective. Whether this is ‘ground processing’ (which may or may not be actual clearance) or the implementation of a sampling regimen, is a decision that will be guided by the model. Outside of the model, there are considerations that should be taken into account, such as the implementation of a more focused UXO risk education process.

A decision-support tool is provided in Chapter 6 to assist with the analysis of “how” affected a community is based on data available from the national database level. But it is noted that the processes of analysis developed recently by Norwegian People’s Aid within UXO Lao and by FSD are already well advanced and the benefits from these methodologies are commended by this team. We recommend that these principles be more widely accepted – particularly within UXO Lao.

Key to the whole process is that of end-user “buy-in”. Populations, aid organisations and other key stakeholders need to fully understand and be part of the process of acceptance. It is unlikely that there will ever be “zero risk” achieved due to the nature of the problem and the resources available to mitigate this. The final acceptance process must still include some form of education to ensure that the exposed are aware of the latent risks in their environment.

Figure 3 shows a summary of how the process may be seen to be applied at community level. This is a simplistic demonstration and Chapter 5 explains in detail the algorithms behind the model.

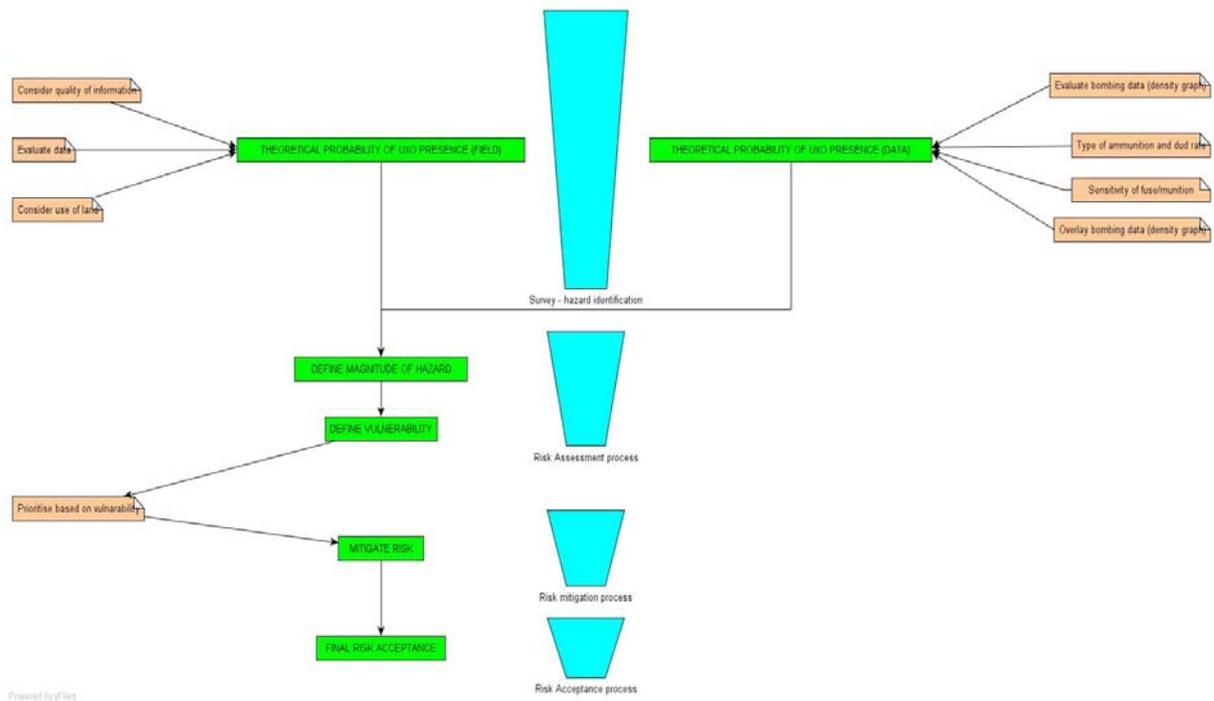


Figure 3. Risk flow model at community level

# Chapter 5. National risk management decision-support tool

This chapter outlines the proposed national risk management model, in the form of a ‘decision-support tool.’ Chapter 6 then sets out the corresponding community-level decision-support tool. It is important to note from the outset that neither of these tools is intended to lead directly to the final tasks – it is always expected that human analysis will remain significant in the decision-making process. It is also not the intention that the tools should be used to override field-level decisions, which will be guided by the relevant national standards currently under development.

## 5.1 The use of UXO Lao data

The NRA GIS system currently being developed has recently integrated UXO Lao data, which will enable the NRA to undertake further analysis on it. Some 650 UXO Lao clearance polygons have now been inputted from a total of 6,500 available on paper records. The other operators will also have data that will be fed into the system in due course.

There are problems with the current UXO Lao data. The polygons often overlap, probably because of datum mistakes and other approximations. Also, the reliability of clearing is not known or is impossible to tell from the records<sup>31</sup>. Nevertheless, even if the total amount of UXO Lao polygons only amounts to 0.031 per cent of the country’s surface, they could be seen collectively as a “sampling exercise” which gives for all those locations a more precise image of what is to be found than the one delivered by the raw bombing data.

In other words, it is possible to compare recorded clearance data with bombing data and then look at the margin of errors found and then probabilistically adjust the data to develop a strategic risk map of the country. The adjusted bombing data would be an enhanced basis for the development of both national and community-level risk maps.

---

<sup>31</sup> In other words, has the area been subject to full clearance procedures, battle area clearance procedures, visual search or what other process?

It is suggested that the NRA either hires an appropriate profile person (Geo-statistics with exploration experience) or outsources to a competent specialised company the task of having the bombing data corrected via probabilistic approaches (geo-statistics, Bayesian probabilities), using the UXO Lao polygons and data as a sampling set. This will result in a statistically corrected set of bombing data allowing a shift or intensity correction if the data demonstrate that this is required.

It should be noted, though, that no data is available either for other air forces (e.g. Thai or Lao) or for Land Service Ammunition, which means that the adjusted bombing data risk map will remain only a first approximation.

### 5.2 Background to the decision-support tools

Two decision-support tools have been developed for this study: one at national level, the other at community level. The two models use the same probabilistic logic and have been designed to be consistent in guiding end users towards a better allocation of resources and more efficient targeting of high-risk areas. The two models use partly different data and obtain results of the risk that are comparable, but never identical.

The tools define risk exposure (of the population):

- in a cell of pre-defined surface (for example 1 square kilometre), when looking at the national/strategic level in the GIS future application described in this chapter; and
- in a specific location (a parcel of land) when looking at the community level.

#### 5.2.1 Available Data

In Table 2, the data available to build the models is summarised, including remarks on the sources/ways of gathering these data at national and community level.

**Table 2. Available data for input into the decision-support tools**

Type of data	National	Community	Comments and warnings
Population	Population/km <sup>2</sup> from 2005 census	Village population	On site check requires tact and cultural sensitivity
Land use	Available from national statistics office.	Check on site	
Accidents	1997 data and more recent data from UXO Lao	Check on site	
Sorties	Number of sorties and their position	Use GIS data	GIS data may be censored and biased both in quantity and position
Intensity of bombing	For each sortie number of explosive units		
Type of bombing	Known per explosive unit		
Land service ammunition	No data	Check on site, records, literature	Approximate data! Based on assumptions ,literature and expert opinion
Rate of duds	Based on literature for a simplified list of ammunitions		
Propensity to detonate	Based on literature for a simplified list of ammunitions		
Rate of fatality as a function of distance to	Based on literature, for general purpose bombs only		

detonation		
Clearance	Partial records (approx. 10%) of UXO Lao polygons	Check on site

### 5.2.2 The logic of the decision-support tools

The decision-support tools use the data described in Table 2 above as “symptoms” of the possible existence of a UXO at a given location (either the 1 square kilometre cell in the case of the national tool or the “location” in the community tool). The symptoms (which are merely indications, not certainties) are combined by using reliability techniques (reliability of information) to determine the probability of a UXO of a given type at a location. This takes into account rates of duds and the propensity to detonate.

In the specific case of GP Bombs, the reduction of the fatality rate the further the victim is away from them, and a maximum number of casualties, are both used to assess the potential number of victims. Subjective probabilities are used throughout the model for which calibration is needed – this is standard practice in a risk model where data are uncertain.

Every effort has been made to keep the analysis as simple as possible and yet capture, for example, human intelligence uncertainties whenever possible.

In the community application, three types of ammunitions are considered: cluster bombs, GP Bombs and Land Service Ammunition, whereas, for obvious reasons (a lack of data) the national GIS application considers only the first two.

The applications take into account for each ammunition type:

- the propensity to detonate accidentally;
- the estimated rate of duds;
- the estimated number of potential victims; and
- for GP Bombs only, the ‘fatality rate decay with distance from detonation’.

The two decision-support tools evaluate risks expressed as the probability of a (first) accident and its consequence in terms of potential casualties. This definition of risk is compliant with world-wide industry definitions. The risks are then compared to the Whitman<sup>32</sup> societal tolerability levels (see Figure 4 overleaf and reference). Whitman defined two tolerability levels, one as “marginally accepted”, the other as “accepted” by surveying public reactions to accidents in various industries. The curves are drafted in a probability-casualty per accident plot, compatible with the definition of risk defined above. Note that in 1997, Whitman set a US\$1 million cost for a life, but that cost is not taken into account in the models.

<sup>32</sup> Whitman, R.V., “Acceptable Risk and Decision-Making Criteria”, *Proceedings of the International Workshop on Risk-based Dam Safety Evaluation*, Trondheim, Norway, 1997.

Of course, the relevant literature defines many possible tolerability levels, and the one defined by Whitman should be examined by key stakeholders in Lao PDR and either accepted or rejected. Should it be rejected, it will be necessary to perform a study on other possible tolerability criteria until one is deemed suitable by key stakeholders and authorities.

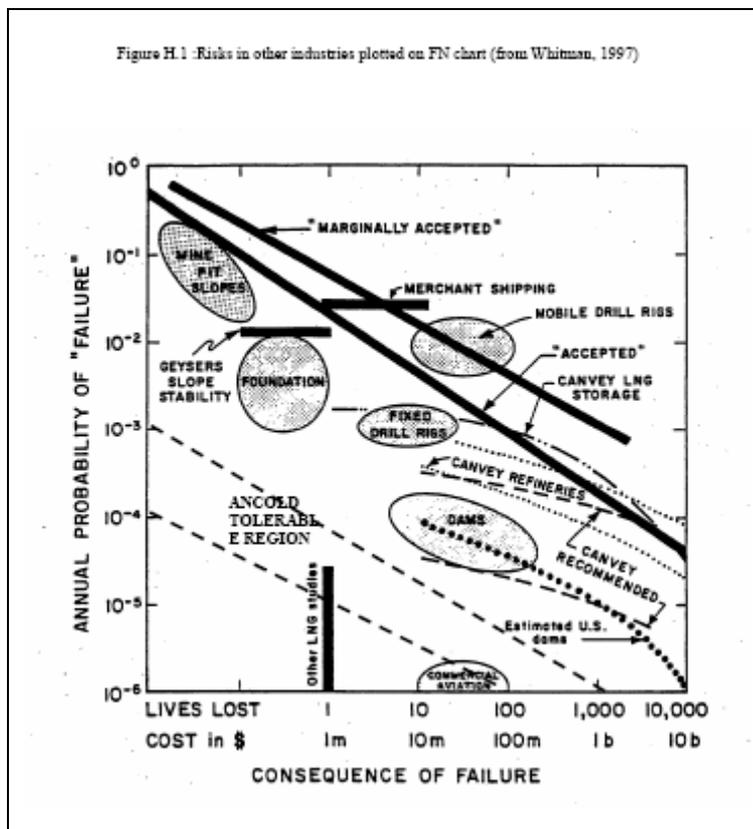


Figure 4. A comparison of risks in hazardous industries

In both tools, risk is evaluated at the present moment in time, in compliance with worldwide risk mapping practices. Indeed, it is important to understand that a risk map constitutes a snapshot of a current situation at a given time: it encompasses uncertainties on the present state and thus it would be inappropriate to built into a risk map a scenario about a hypothetical future. However, since the Lao PDR situation has evolved rapidly and given that some stakeholders have expressed concerns over this rapid evolution, the study team suggests the following techniques to cope with any need for “what if” scenarios and “future land use”:

1. Run the application with present data, and then run it again with any desired future scenario; compare results and then take the most pertinent course of action.
2. Keep in mind that future land use may alter decisions at field level, and use the recommendations within the national standards.

The reasons for adopting this approach are two-fold:

1. A map based on any future population scenario may be totally wrong because of mass movement of population, especially as population displacement may be used as *ad interim* risk mitigation technique.

2. Future land use significantly alters decisions on how to perform a clearance (for example, fish ponds and construction sites require deeper clearing), thus it impacts mitigation, rather than risk evaluation.

### 5.2.3 Updates and Knowledge Base Improvement

A risk assessment or a risk map is not a static document, as hazard information (UXO contamination levels), consequence information (population and land use) and overall uncertainties vary with time. General worldwide practice requires pertinent data to be gathered as soon as the first risk map/assessment is produced in order to ensure an enhancement of the results of the cyclic updates.

There are no fixed rules as per the frequency of updates. However, as soon as the system changes significantly, an update should be performed. Provided all estimates are based on sound probabilistic approaches, it will be possible to integrate any future data by performing scientifically based updates which involve the prior estimates as well as the information that has become available in the interim period.

## 5.3 The national decision-support tool

The national model is undoubtedly a coarser instrument, defining the broad “national risk map”. It delivers risks for the geographic cells ranked in five classes of risk (of first initiation/accident), which are:

- Low,
- Medium,
- Moderate,
- High, and
- Very High.

These classes are not paired with any specific guidelines on action. It is, though, expected that low risk areas may be cancelled after due verification and calibration of the model programming. The scale will have to be calibrated through a process of analysing the results of the preliminary trials of the model.

In Table 3, the data available to build the model is summarised, together with a brief explanation of the significance.

**Table 3. Strategic data use in the national decision-support tool**

Type of data	Definition	What it means	Comments and recommendations
Population	Population/km <sup>2</sup> from 2005 census	Higher population means more probability of encountering a UXO, and more victims from a GP Bomb	Calibrate the model constants
Land use	Available from national statistics office	More active use means less uncertainty as to the possibility of UXO	Use no more than three and develop a “weighted average use” as suggested

		presence	in the application example
Accidents	1997 data and more recent data from UXO Lao	Use accidents in the cell	This data could be interpreted with excessive optimism: data set is incomplete and biased
Sorties	Number of sorties and their position	Can be counted on each cell	Could be totally erroneous because the position corresponds to release and not to terrain impact position
Intensity of bombing	For each sortie number of explosive units	For each sortie explosive items can be added up	
Type of bombing	Known per explosive unit	Detailed data exists	
Land service ammunition	No data	No data available in the GIS	N/A
Rate of duds	Based on literature for a simplified list of ammunitions	Use per type of ammunition, i.e. GP Bombs and CB	Approximate at best
Propensity to detonate	Based on literature for a simplified list of ammunitions		
Rate of fatality as a function of distance to detonation	Based on literature, for general purpose bombs only		
Clearance	Partial records (approx. 10%) of UXO Lao polygons	These areas are cleared to various levels of accuracy	To be used within the model with a "safety factor", and only as a cell area reduction factor

### 5.3.1 Comments on the national decision-support tool

Many particular scenarios will arise during the detailed programming of the national model. The paragraphs below summarise several that have already come to the attention of the study team.

- A village had two accidents many years ago and land has been used continuously with the same type of land use since then, with no accident: it may be considered in this case that there were no accidents if experience with the model (testing during detailed programming) confirms the validity of this assumption.
- It has been suggested by some stakeholders that villages already cleared or which have had repeated roving team interventions should be lowered in their risk ranking in the future map. In the model, the presence of a “cleared polygon” is treated as an area reduction factor, after a reasonable “residual risk factor” has been introduced.

There is a current discussion and proposal within Lao PDR to define land currently being used for agriculture as “low risk” and thereby to remove it from any prioritisation list. We make no recommendations here but suggest that this may be a very good way of focusing resources better.

### 5.3.2 Testing & Development of the Model

The development of the national level tool is behind schedule, because, as noted earlier, the NRA has only recently hired a GIS operator, and it will be necessary for this person (or by

outsourcing) to program the GIS application. Moreover, during the detailed programming of the application it will be necessary to discuss and define the most useful cell size (suggested at this time as 1 square kilometre), and it is acceptable to wonder if the bombing data adjustment using UXO Lao data (geo-statistics approach) should not be performed prior to any attempt to produce the “Lao PDR risk map”.

Another important item to discuss and define is how to deal with imprecise data such as accidents: they are reported at “village centre” location, not at their real location. One possibility is to “spread them” over a certain number of cells, but there are other interesting solutions that should be studied.

# Chapter 6. Community risk management decision-support tool

This chapter sets out the corresponding community-level decision-support tool. It is intended for use at the operational level to establish the base levels of acceptability at national level.

The concept of deployment is based around the tight integration of the tool into the operators' *modus operandi* in the field. Each operator, when deploying to a task, will undertake their normal survey process, while concurrently entering the data into the community-level decision-support tool. The outputs from the tool will allow the operational organisation to undertake further action on the surveyed land with support from the NRA.

The community-level tool classes the risks into three categories together with national guidance on action to be undertaken:

- **Cancel (green scenario)** for the areas posing the lowest level of risk...
- **Sample (orange scenario)**
- **Clear (red scenario)** for the areas posing the highest level of risk....

It is suggested that the NRA shall make the following definitions for the guidance of operators when the following results are obtained when using the model:

- **Cancel (green scenario).** “The operator **MAY** release/cancel the land that is shown to be in the green category”
- **Sample (orange scenario).** “The operator **SHALL** undertake a process of further investigation on the land. Sampling is an acceptable way for the operator to define the level of risk on the land and as a means of identifying further actions required”
- **Clear (red scenario).** “The operator **SHALL** undertake full clearance of the land identified as being in this category”

## 6.1 The community-level tool

The community-level tool requires the data described in Table 4. This table could also be the basis for a data acquisition form that could be added to other forms to be used in the field. The form of a Palm-based application could be run by CA or risk education teams.

**Table 4. Data required on site in the community decision-support tool**

Field Questions	Possible Replies (cross one)			
<b>Question 1</b>				
a) Did you see/hear of UXO presence on site?	Y <sup>33</sup>	MB	N	
b) If "maybe" by whom?	FM-N <sup>34</sup>	ST-R		
c) If "yes" or "maybe" what type of UXO; If "no" what type of suspected UXO?	CB <sup>35</sup>	GPB	LSA	
d) How far is the item from the community?	0-1 km	1-1.5 km	1.5-2 km	>2 km
<b>Question 2</b>				
a) Was there ever an accident on site?	Y	MB	N	
b) If "maybe" by whom?	FM-N	ST-R		
c) If "yes" or "maybe", what type of UXO; If "no" what type of suspected UXO?	CB	GPB	LSA	
<b>Question 3</b>				
See Land Use Table Codes				
What has the land been used for?	1	2	3	4
(NB: carefully reply to this question if sampling is performed)	5	6	7	8
	9			
<b>Office questions</b>				
<b>Question 4</b>				
Does bombing data indicate targets in a 2 km radius from site? <sup>36</sup> (NB: requires judgment based on bombing maps (dot analysis only))	Y	MB	N	
<b>Question 5</b>				
a) Was the bombing heavy?	Y	MB	N	
b) What type of ordnance is predominantly recorded as dropped in the area?	CB	GPB	LSA	

**Land use table**

Land Use	Code
abandoned because of rotation	1
abandoned during conflict	2
active agricultural/rice paddy	3
bad land	4
hospital	5
light agricultural	6
never cultivated	7
sampling(no UXO found)	8
school	9

NB: Because the data in the GIS were not yet packaged in a pertinent way questions #4,5 remain rather vague at this time. When the GIS will display the proper data and during the trial period these questions will be made more "precise". Question 4 will be linked to the number of sorties targeting the neighbourhood of the studied area, whereas Question 5 will be linked to the number of explosive items in that same area.

**6.1.1 Comments on the Community Level Model**

A field mission to Luang Prabang was undertaken at the end of January 2007 to study the application of the model.

The team consisted of:

<sup>33</sup> Y = Yes, MB = Maybe, N = No

<sup>34</sup> FM-N = Family Members, Neighbours, ST-R = Strangers-Rumours

<sup>35</sup> CB = Cluster Bombs, GPB = General Purpose Bombs, LSA = Land Service Ammunition

<sup>36</sup> Yes = More than 10 dots in 2 km radius  
Maybe = Five to 10 dots in 2 km radius

No = Less than 5 dots in 2 km radius

- Tim Lardner GICHD
- Tim Horner, NRA/UNDP
- Stefan de Coninck, FSD
- Steffen Peter, UXO Lao
- Thongphone, NRA
- Kamakhuene, NRA

Some time was spent discussing the concepts and visiting a number of sites that had previously been cleared and comparing the outputs from the model with the actual results from the clearance. A desktop exercise was also conducted in the UXO Lao regional office with all concerned staff to gain a broader understanding of the issues and the concepts.

Agreement was achieved and acceptance of the principles was given by all involved, including NRA, UXO Lao and FSD. Agreement was reached between all operators as to the way ahead and the future implementation.

### *6.1.2 Testing and development of the tool*

There was agreement that for a trial period in early 2007, a number of operators (NRA, FSD & possibly MAG – to be confirmed) will continue to use their standard survey methodologies, but, at the same time, will undertake to use the model on the sites at the same time. This will be recorded over a period of 3 – 4 months. At the end of the period, the results will be analysed and recommendations drawn from the results.

The basic principle of this is that for each site visited, the organisation shall undertake its normal survey routine and subsequent processes. At the same time, the questions required by the concept model shall be entered into the model. The data from the bombing records shall be obtained from the database and entered. If data are not available at the regional level, a request shall be made to the NRA database for the information.

If the calibration on the model is suitable and fits well with the trials, the model will be adopted by the NRA and included in national legislation as the national requirements for actions to be undertaken as part of the survey.

If the calibration is found to be in need of adjustment, this will either be made by GICHD or NRA depending on how immediate development of the model develops.

# Chapter 7. Study conclusions, findings and recommendations

## 7.1 The evolution of UXO action in Lao PDR

In 2005–2006, the UXO action sector in Lao PDR underwent significant change. In 2005, the Government of Lao PDR established a new body, the National Regulatory Authority, to manage UXO action in the country. After a difficult start, the NRA is growing rapidly in both capacity and influence. This welcome development has proved to be a catalyst for other important – and positive – changes in the sector, in particular in evolving techniques for technical survey and clearance methodology.

## 7.2 Key challenges for the UXO action sector

In particular, it has been observed that although significant areas of land were being cleared by UXO Lao and other operators, casualties still continued to occur – and beginning in 2004, actually started to rise significantly. Despite this fact, overall, clearance processes and methodologies have changed little in the last 10 years. Moreover, there is little evident logic both as to *where* clearance teams have been deployed and the *way* those teams have operated. For example, it appears that the majority of clearance resources have been allocated to areas where the degree of risk to the population was much lower.

## 7.3 Information management

The key to better UXO action, including the successful implementation of any risk management model, is better information. Based on existing databases and information technology deployed within the sector, it is difficult at national level to get a clear understanding of the degree of remaining contamination and its impact as well as progress of ongoing and completed work in provinces. A reliable national database could and should be used to develop good measurement indicators for operational work in addition to being an invaluable tool for planning and tasking work in accordance with priorities. A visit by the IMSMA section of GICHD in January 2007 confirmed the implementation of IMSMA version 4 in Laos, to be installed and initiated in June 2007.

Furthermore, there is currently no national database of victims, despite clear recommendations to establish one made in several evaluations since 2000. The most current data available are located within UXO Lao and represent a limited sample from parts of nine of the 17 provinces in the country. It is critical that the range and quality of data in terms of victims is improved. An excellent model could be the Cambodian Mine Victim Information System (CIMVIS), which is able to identify much more accurately what activity the victim was undertaking at the time of the accident as well as substantially more geographical data and a systematised methodology for data collection. As of the beginning of 2007, the NRA is initiating a project to develop and populate a national database of victims. This is a welcome step forward.

The NRA should undoubtedly be the focal point of the information management effort, but for the moment it lacks software, hardware and human resources to perform its tasks, although this situation is changing rapidly. Continuing the development of the NRA as the national data and information analysis manager and broadcaster is key and will allow Lao PDR to take advantage of extant data and recently accessible data for the benefit of the population.

## 7.4 Areas of deployment of clearance teams

In terms of where clearance teams have been deployed, analysis of extant data has been inadequate. This must be rectified as a matter of urgency. Lao PDR represents a rare situation due to the existence of detailed bombing data by the US Government which will allow, if properly validated, analysed and utilised, an innovative way of addressing prioritisation and performing survey.

This process of validation, analysis and use means that recorded clearance data should be compared with US bombing data to determine the margin of error. This will enable a probabilistic adjustment of the data to develop a strategic risk map of the country. It is recommended that the NRA either hires the appropriate profile person (Geo-statistics with exploration experience) or outsources to a competent specialised company the task of having the bombing data corrected via probabilistic approaches (geo-statistics, Bayesian probabilities), using the UXO Lao polygons and data as a sampling set.

The adjusted bombing data would be an enhanced basis for the development of both national and community-level risk maps, especially when combined with other recently obtained data, such as bomb damage assessments, land use data, land cover, socio-economic data and population density data. Moreover, to supplement the data already available, roving and CA teams, which are regularly visiting communities, could generate significant additional data which would contribute to hazard identification.

## 7.5 Operational structure and methodology

In terms of the way clearance teams have operated, there is also potential for improvement. Within UXO Lao, integrating elements from three of the four branches into one Community

Response team (CR), which could deal with the UXO risk education, survey and spot EOD tasks, could provide an effective measure. By simply reorganising existing resources, a CA team assisted by a surveyor, medic and EOD operator could fulfil the annual work-plan as a roving CR team. Such an arrangement would release resources for clearance and roving operations and make the UXO clearance process faster and more cost-effective. The large, relatively inflexible teams of UXO Lao would therefore be more effectively employed, giving a far more effective use of resources and reducing difficulties in work planning.

In addition, there needs to be a very strong link between technical survey and the detection/clearance phase, certainly much stronger than the one that generally exists in Lao PDR. Moreover, alternative solutions to the standard methodology of clearance could be adopted for certain types of land or UXO contamination. In extreme cases, this could lead to a decision to abandon or fence off parcels of land that present a specified combination of parameters: for example, high contamination, but low population and low agricultural potential. Or, at the other end of the spectrum, it could lead to a decision to release areas of land after a strategic level assessment because they are considered safe enough without any further action.

Thus, for example, national standards as currently being drafted propose the principle that land that is being cultivated be removed from any clearance plan within the country. This is an excellent example of how decisions may be made at the strategic level that impact on the programme significantly as the resources would then be targeted towards areas where land is blocked for the populations.

With respect to UXO risk education, it was found that although the majority of recorded casualties appear to be the result of accidents when victims were *knowingly* carrying out hazardous activities, Community Awareness seemed largely to target unintentional risk-taking and not necessarily among the highest risk groups. The needs assessment conducted for UNICEF by Mines Advisory Group is a positive step forward and has provided the opportunity for a fundamental rethink of approach and structure.

Within the framework of a risk mitigation approach, controlling who engages in the SMT is likely to prove rewarding. On the basis of what we think we know – that children are the majority of UXO victims and that work-related victims are less than a third of all cases – this leads us to focus on increasing parental responsibility to keep children away from scrap metal collection.

## 7.6 The proposed decision-support tools

The two tools proposed by the study team – in support of national and community level decision-making – evaluate risks expressed as the probability of a (first) accident and its consequence in terms of potential casualties. This definition of risk is compliant with world-wide industry definitions. The risks are then compared to the ‘Whitman’ societal tolerability levels. Whitman defined two tolerability levels, one as “marginally accepted”, the other as “accepted” by surveying public reactions to accidents in various industries.

The national model is undoubtedly a coarser instrument, defining the broad “national risk map”. It delivers risks for the geographic cells ranked in five classes of risk (of first initiation/accident), which are:

- Low,
- Medium,
- Moderate,
- High, and
- Very High.

These classes are not paired with any specific guidelines on action. It is, though, expected that low risk areas may be cancelled after due verification and calibration of the model programming. The scale will need to be calibrated after analysis of results against the situation on the ground following preliminary trials of the model.

The community-level tool classes the risks in three categories and gives national requirements on actions to be taken:

- **Cancel (green scenario)** for the areas posing the lowest level of risk.
- **Sample**
- **Clear (red scenario)** for the areas posing the highest level of risk.

It should be noted, however, that although the requirement of the study was to develop a risk management/mitigation model for the NRA, several fundamental elements need to be in place before any such system can become effective. These elements include the following:

- Specific and transparent priorities that focus assets on addressing the development needs of the people of Lao PDR;
- A clear process for work-plan approval and strict rules governing any changes;
- Independent monitoring of tasks on the ground by or on behalf of the NRA and through reporting by operators; and
- Post-clearance assessments.

## 7.7 Monitoring of progress

Finally, in order to monitor progress, operations should be combined with a rigorous reporting and monitoring mechanism to ensure that priority land, as it is determined, is being cleared. A monitoring system should be established within the NRA in accordance with the International Mine Action Standards.

# Bibliography

- Dohondt & Kaminski, “Clearance Systems Study”, Norwegian People’s Aid, 2006.
- GICHD, *A Study of Manual Mine Clearance*, GICHD, Geneva, 2005.
- GICHD, *An evaluation of UNICEF-supported UXO Risk Education Projects in the Lao PDR*, GICHD, Geneva, 2005.
- GICHD/UNDP, *A Study of Socio-Economic Approaches to Mine Action*, GICHD/UNDP, Geneva, 2001.
- Government of Lao PDR, “Resolutions of the Lao PDR Government on National Strategic Plan,” Vientiane, 2004.
- Handicap International, *Living with UXO: National Survey on the Socio-Economic impact of UXO in Lao PDR*, Vientiane, 1997.
- International Campaign to Ban Landmines, *Landmine Monitor Report 2006, Toward a Mine-Free World*, Mines Action Canada, Ottawa, August 2006.
- \_\_\_\_\_, *Landmine Monitor Report 2005, Toward a Mine-Free World*, Mines Action Canada, Ottawa, September 2005, p. 789.
- Keeley, R., Allcock, A., Singthilath, T., and Kongsaysy, M., *Mission to assess future sustainable options of the Lao UXO Trust Fund and the UXO Lao Mine Action Programme*, UNDP, Vientiane, 2002.
- Prime Minister’s Office, Lao PDR, “The Safe Path Forward”, National Strategic Plan, Vientiane, 2004.
- United Nations Common Country Assessment, Lao PDR, June 2006.
- UNICEF, UXO Risk Education Needs Assessment, Vientiane, October 2006.
- Whitman, R.V., “Acceptable Risk and Decision-Making Criteria”, *Proceedings of the International Workshop on Risk-based Dam Safety Evaluation*, Trondheim, Norway, 1997.

# Glossary of abbreviations and acronyms

AIDS	Acquired Immune Deficiency Syndrome
AXO	abandoned explosive ordnance
BAC	battlefield area clearance
CB	cluster bomb (bombie)
CBU	cluster bomb unit
CIMVIS	Cambodian Mine Victim Information System
FSD	Fondation Suisse de Déminage (Swiss Foundation for Mine Action)
GICHD	Geneva International Centre for Humanitarian Demining
GIS	Geographic Information System
GPS	global positioning system
HI	Handicap International
ICBL	International Campaign to Ban Landmines
IMAS	International Mine Action Standards
IMSMA	Information Management System for Mine Action
Lao PDR	Lao People's Democratic Republic
MAC	Mine Action Centre
MAG	Mines Advisory Group
NGO	non-governmental organisation
NRA	National Regulatory Authority
RFP	Request for Proposals
SOP	Standing Operating Procedure
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
US	United States of America
UXO	unexploded ordnance
UXO Lao	Lao National Unexploded Ordnance Programme

# Annexes

## **Annex A. Major evaluations and assessments in Lao PDR since 2000**

**Living with UXO, Final Report, National Survey on the Socio-Economic Impact of UXO in Lao PDR, 1997, Report by Handicap International**

**Mission to assess future sustainable options of the Lao UXO Trust Fund and the UXO Lao mine action programme; Draft, Mission Report; Keeley & Al., September 2002.**

**Life after the bomb: a psychosocial study of child survivors of UXO accidents in Lao PDR, Handicap International, Unicef, Lao Youth Union, Vientiane 2004**

**Victims and Survivor Assistance Study, Lao PDR, April 2006, Handicap International, Department of International Development, Unicef**

**GICHD, An Evaluation of UNICEF-Supported UXO Risk Education Projects in the Lao People's Democratic Republic, Geneva, October 2005:**

**GICHD, A Study of Scrap Metal Collection in Lao PDR, Geneva, September 2005:**

**MAG and the Lao Youth Union, UXO Risk Education Needs Assessment, UNICEF, Vientiane, October 2006,**

## **Annex B. Local perspectives on living with UXO - A study of two Lao villages**

**Prepared by Krisna Uk  
for the Geneva International Centre for Humanitarian Demining  
Acknowledgements**

First I would like to thank the Lao National Regulatory Authority for facilitating this research as well as both Mr. Bounpheng Sisawath and Mr. Khamphet Fonglamay for being my translators during this two week period of fieldwork. I am also grateful to the UXO Lao provincial offices of Xieng Khouang and Savannakhet for their effective support and collaboration. I would also like to thank UNDP, MAG and FSD for their cooperation. Finally I wish to express my gratitude to the villagers of Ban Nong Tang and Ban Phalou for their generous hospitality as well as their patience in making this study possible.

### Methodology

**This paper draws on primary data collected in Lao PDR in September 2006. A week was spent in Vientiane to interview and liaise with clearance agencies, identify the villages and collect relevant data. Two weeks were spent in the provinces of Savannakhet and Xieng Khouang where our three person research team lived in the selected villages.**

**The team interviewed thirty households in the village of Ban Phalou in Savannakhet and forty households in Ban Nong Tang in Xieng Khouang. Qualitative data were gathered using a questionnaire, semi-structured interviews, informal group discussions and participant observation techniques. The target group included local farmers, young and adult individuals involved in the war scrap metal trade, as well as the chiefs of both villages. All interviews were conducted in Lao Loum with some exceptions in Ban Phalou for which an additional translator helped communicate with interviewees in mankone, an ethnic minority language.**

The team encountered a few constraints in carrying out the research: general issues of translations, sensitivity of the questions related to illegal activities, the respondents' fear of being either blamed or reported (especially in the case of children), the responses being partially influenced by the presence of the National Regulatory Authority (NRA) and the national clearance agency (UXO Lao) as well as the lack of accurate data on UXO accidents and the dynamics of the provincial war scrap metal trade.

## Table of Contents

Acknowledgements .....	47
Methodology.....	48
Case study I: Ban Phalou, Phine district, Savannakhet province. ....	51
<b>I. Village Overview .....</b>	<b>51</b>
<b>II. Village Political System.....</b>	<b>6</b>
<b>III. UXO Contamination Problem.....</b>	<b>52</b>
<b>IV. Household Economy .....</b>	<b>53</b>
<b>V. Scrap Metal Trade.....</b>	<b>54</b>
V. A. Opportunistic Trade.....	8
V. B. Pre-meditated Trade.....	55
<b>VI. Young Scrap Metal Collectors.....</b>	<b>56</b>
<b>VII. The Scrap Metal Trade Chain .....</b>	<b>58</b>
<b>VIII. Village Risk Ranking.....</b>	<b>59</b>
<b>IX. Community Awareness.....</b>	<b>60</b>
<b>X. Village Summary .....</b>	<b>60</b>
Case study II: Ban Nong Tang, Phoukoud district, Xieng Khouang province. .	62
<b>I. Village Overview .....</b>	<b>62</b>
<b>II. Village Political System.....</b>	<b>62</b>
<b>III. UXO Contamination Problem.....</b>	<b>62</b>
<b>IV. Household Status and Economy .....</b>	<b>64</b>
<b>V. Scrap Metal Trade.....</b>	<b>65</b>
V. A. Adult Male Collector .....	66
V. B. Adult Female Collector.....	67
V.C. Young Scrap Metal Collector .....	67
V. D. Parents' Attitudes and Discourses.....	69
<b>VI. Local Perceptions on SMT People.....</b>	<b>71</b>
<b>VII. The Scrap Metal Trade Chain .....</b>	<b>71</b>
<b>VIII. Village Risk Ranking.....</b>	<b>72</b>
<b>IX. Community Awareness.....</b>	<b>73</b>
<b>X. The Role of the Local School.....</b>	<b>73</b>
<b>XI. Village Summary.....</b>	<b>75</b>
Conclusion .....	76
Bibliography .....	31
Annex.....	33



**Local perspectives on living with UXO  
A study of two Lao villages**

**Case study I:  
Ban Phalou, Phine district, Savannakhet province.**

**I. Village Overview**

Ban Phalou is a small village enclosed by dense forest in Phine district in the southern province of Savannakhet. The village is located on the Ho Chi Minh trail and in the 1970s its inhabitants had to abandon their homes in the face of heavy bombing by the Americans, who were trying to curtail North Vietnamese supplies into South Vietnam. When the conflicts were over, villagers returned to find their village littered with unexploded ordnance and it was not until 1999 that UXO Lao came to undertake professional clearance. Meanwhile people had to adjust to this hazardous environment as they sought to rebuild their livelihoods.

In 1982 eight families decided to resettle in their original village. Today there are 36 families derived from the same bloodlines which are divided in 30 households. Villagers build kinship by blood or marriage so that when one child gets married he or she will depart from the family home to build a new house and raise children nearby. These family ties naturally entail social and economic inter-dependency, encouraging people to help each other in times of scarcity. Villagers hence benefit from a reciprocity system based on the sharing of food, money, shelter and child care.

There are 195 people living in the village of whom 52 are children who do not attend school because of the current lack of teachers. Some villagers are from the Mankone ethnic group, while others have come from neighbouring districts attracted by the availability of land. Villagers of Ban Phalou are Buddhist or animist and sometimes both. These religious beliefs craft their perception of life and influence their daily approach to survival.

## **II. Village Political System**

Ban Phalou has a village and a deputy village chief who are nominated by the local authorities. Both of them are responsible for ensuring the general order and management of all issues pertaining to the life of the community. In addition two senior advisors who are member of the party fulfil a liaison role with the district Labour and Social Welfare authorities, thus complementing the responsibilities of the village chief and his deputy. The functions of the local advisors are to ensure that the village remains safe and that monthly communication between neighbouring villages and the district authority is well maintained. Only senior men can be nominated for these positions. In case an issue cannot be solved at the community level, the matter is brought to the attention of the district authorities.

There are two or three advisors in each of the four villages in the locality. Communities are grouped in sets of four villages and their chiefs meet every 22nd of the month to discuss matters related to general social issues and local safety. Ban Phalou itself is divided into two units with each unit comprising 15 households. Each of them has a nominated head of unit who assumes a coordinating role.

Safety is a recurrent issue in the daily life of Ban Phalou and its neighbouring villages.<sup>37</sup> In addition to the present political apparatus expanding throughout the local and district level, Ban Phalou has seven "village guards" who are specifically tasked with maintaining the villagers' security. The village chief selects the village guards and nominates a leader amongst them. Each selected member is then provided with a rifle for patrols around the village. The guards are mobilised in response to specific threats, for example when the district military signals that thieves are operating in the area.

## **III. UXO Contamination Problem**

UXO Lao has classified Ban Phalou as a "high impact" or heavily contaminated village in reference to the amount of ordnance dropped during the American bombing. As such the main source of contamination in the area derives from large bombs and Blu 26 (bombie type). According to local people, no UXO-related accidents have been recorded since 2003.

Anecdotal accounts indicate that at the time of the villagers' resettlement UXO related accidents were very high. However villagers were not able to provide estimations of how many people may have fallen victim to a UXO since the early 1980s.<sup>38</sup> Nevertheless villagers claimed that since the commencement of UXO Lao activities the number of

---

<sup>37</sup> Advanced collaboration at both the district governor level and the village level had to be established before the team could stay in the village to conduct this study.

<sup>38</sup> Responses vary from one person to another on the subject.

accidents has significantly dropped. In 1999 UXO Lao sent its roving teams to dispose of items that were found on farming land.<sup>39</sup>

According to the village chief, local people do not feel completely safe since they believe a large amount of UXO is still buried underneath their village. As a result people are cautious each time they dig the ground in order to build a house or cultivate their land. The last accident recalled by local inhabitants occurred in 2003 when a farmer was preparing the land for slash and burn. The man died from a Blu 26 explosion and his wife who was working beside him was injured in the chest and arms. Now a widow, she is left to provide for nine children.

#### **IV. Household Economy**

Ban Phalou is a very poor village and is located far from the provincial road linking Phine to Xepon district. It is the furthest upstream of four villages located beside a small river that runs from the mountains. The three downstream villages, which are located closer to the main road, have a primary school and a health centre. However the isolation of Ban Phalou is such that, apart from the village chief, residents' travel to other localities is limited to medical visits only. The village lacks electricity, food for people to live through the dry season, a school teacher and a proper road. The present population consists of 30 families who live in wooden or bamboo thatched houses on stilts. Villagers are all subsistence farmers who grow rice, fruits and vegetables, raise chicken and pigs, go hunting and fishing, collect non-timber forest products and undertake slash and burn. The main source of staple food comes from their rice farming activities. All cultivated crops are used for family consumption only. The household revenue is either supplemented by logging or war scrap metal sale.

Ban Phalou is a malaria affected community and as a result families incur regular expenses in the purchase of medicines from the local health centre. In addition villagers are subject to annual provincial taxes on land, which include both housing plots and rice fields. Rates vary from area to area according to the size of the property. As a general rule, villagers pay 40,000 kip (USD 4) for 1 hectare of rice field and 2000 kip (20 cents) for a small housing plot. Annual taxes are fixed regardless of whether the land is affected by the presence of UXO or not.

Villagers own a minimum of half an hectare of rice field. Most of the families cannot own a larger piece of land because they lack mechanical tools or have lost their buffalos to local epidemics. Consequently farmers have recourse to slash and burn, animal raising, fishing or game hunting. Moreover food production in Ban Phalou is limited all year due

---

<sup>39</sup> According to the villagers, the first UXO Lao visit dates back to 1997. Yet present UXO Lao records show that activities only commenced in 1999 with the deployment of the CA teams who have since visited the village three times. The last roving team visit was scheduled in May 2003 when 7 bombs, 18 bombies and 68 other UXO types were removed.

to the absence of an irrigation system and the general lack of farming equipment. The village has no local markets where people can buy, sell or exchange goods. The production of food relies on the weather conditions; on average one hectare of land yields one ton of rice under normal climatic conditions. Agricultural fields are located outside the village centre at a distance of 200m to a few kilometres according to the villagers' own estimations. Children work together with their parents in the fields, take care of their younger siblings, fish in the river, look after animal husbandry, perform house chores or collect war scrap metal. Following the rice harvest, villagers make offerings to the local deities or phi to prolong their protection of their house and crops. Cultivated crops often last for three months after which family members need to look for alternative ways to supplement the household economy either with cash or food.

The villagers are vulnerable to variations in the local climate and drought constitutes a substantial risk to their livelihood. In times of food shortage people sell their cows and buffalos or undertake logging. From January to April a few villagers work for a Lao timber company located in Phine district, which pays them to cut trees and carry them out of the forest. The timber is then sent to a local sawmill and eventually finds its way to Vietnam. The company has provided the village with a timber truck and a chainsaw. A full truck load may contain up to four large logs and is worth USD 42. Villagers select their trees in areas where they believe that logging is likely not to disrupt the local water cycle. Yet according to them the money is not enough.

### **V. Scrap Metal Trade**

Scrap metal trade (SMT) is a profitable business in the region. A few dealers are located along the provincial road leading to the Vietnamese border, where people can purchase metal detectors for USD 35 or less. According to the village chief, 30 out of the 195 people living in Ban Phalou are involved in the scrap metal trade.<sup>40</sup> However most of the 30 households interviewed claimed they do not touch or collect metal and systematically report explosive items to their local authorities. The following section deliberately separates out villagers who claim they sell scrap metal on an ad hoc basis from those who acknowledge their more pre-meditated involvement.

#### **V. A. Opportunistic Trade**

When asked about their exposure to and general reactions towards UXO, respondents unflinchingly claim they never touch unexploded items and report them to the village chief so that the professional teams will come and remove them.

A substantial amount of households cannot farm their rice field due to lack of farming tools or adverse weather conditions. People habitually carry out slash and burn on a small

---

<sup>40</sup> This study only looks at metal derived from ordnance or "war scrap" as opposed to other ferrous sources of scrap e.g. cars etc.

portion of uncultivated land. Villagers undertake this type of farming activity with their entire family and start burning after an appropriate ceremony devoted to the local spirits is performed. The whole family then returns to the village leaving the fire to burn and eventually detonate unexploded ordnances.

Villagers claimed they often see UXO when performing slash and burn and after the burning process is completed they collect them for sale. Nevertheless people insisted that their main subsistence occupation was farming and that the collection of metal only constitutes an occasional, supplementary activity. Very few villagers admitted they intentionally look for metal to make a living.<sup>41</sup>

It is not unusual for the villagers to find buried items of UXO when farming. Whether the land has been farmed for a few years or ploughed recently, respondents unanimously declared they are not sure they are absolutely safe. UXO that appear damaged are displaced in order to continue farming, they are either placed in a corner of the field or sometimes thrown in a nearby stream. At other times villagers mark the location of an item they know they cannot handle and resume farming around it.<sup>42</sup>

Villagers claimed they can find up to 30 kg worth of metal a year just by undertaking their regular farming activities. In this area a kilogramme of metal is worth 1000 kip (US 10 cents). Heavier types of metal retrieved from large bombs can fetch up to 1500 kip, which theoretically makes it a more profitable business. Nevertheless all the interviewees declared they have never intentionally touched, burnt or dismantled a whole live explosive item on the basis that they are too afraid.

### **V. B. Pre-Meditated Trade**

Searching for scrap metal is mainly a dry season activity spanning from January to June following rice harvest time. Local people know where and how to look for metal. For the regular metal collectors the best place to find metal is in the eastern part of the village. The shape of the landscape is the prime indicator of heavy bombings and villagers select their digging sites in large bomb craters. Adults and young people (mostly male) do not use metal detectors but farming spades. By digging the soil up to a meter depth they can usually find 50 kg worth of metal. A local trader from Xetamouak village along the main provincial road comes two or three times a month and pays them 1000 kip/ kg. This is the beginning of a new life cycle for these unexploded ordnances along a recycling chain.

By way of example, one villager described collecting a dispenser for cluster ammunitions while hunting in the forest. According to him there is a former French military base on the mountain where people can find plenty of metal. The villager found the dispenser

---

<sup>41</sup> Only two out of thirty head of households plainly admitted their regular involvement in the local scrap metal trade.

<sup>42</sup> Local villagers are reluctant to handle bombies for instance.

lying on the ground and, having examined and weighted it, decided it was safe. He said that if there are no holes in the tubes and if it is filled or still heavy it means it is unsafe. The dispenser weights 20 kg and the villager estimated he could earn 30,000 kip (3 USD) by selling it. However he decided to wait for the price of the metal to rise further before parting with it. In this case hoarding of metal can become a short-term investment or a form of financial saving. On the other hand, villagers keep large metal items they find such as cluster ammunition canisters for house stilts, flower pots or washing basin as an effective substitute for daily home utensils. Ultimately UXO get fully appropriated by the local communities and incorporated into their daily routine.

Both frequent and irregular metal collectors pointed out that it is getting more and more difficult to find metal in the area. If someone wanted to be sure to find war remnants he/she would have to walk increasingly long distances into the jungle or in the mountains. But for the ordinary metal hunters, scrap metal collection remains a useful means to supplement family income, especially at times when farming yields are poor. The price of metal being relatively stable they are sure to get a minimum of 1000 kip per kilo collected. These particular villagers are comfortable with their foraging activity, claiming they are used to searching for the metal in a "safe" and methodical manner. The few families who search for metal regularly say that they only collect metal fragments rather than intact items of ordnance. Like opportunistic traders, none of the respondents admitted having deliberately manipulated large bombs or whole live items. With immediate returns that can sometimes fetch 300,000 kip (USD 30), these self-confessed metal hunters said they will continue their activity because it is good money even though their wives are concerned about their safety.

Adult males who are actively involved in the collection of scrap metal attend UXO Lao community awareness sessions. They claimed that if they had enough food, farming equipment and means of transportation they would stop being involved in the trade. Villagers who collect metal deliberately do not take their children along. They try to discourage their children to look for metal themselves. They acknowledge the fact that it may be dangerous and that children should not be involved in this type of activity because they are too young. However most of the children who actively seek out for metal have at least one parent involved in the local trade and by doing so, they spontaneously reproduce a family pattern of activities.

## **VI. Young Scrap Metal Collectors**

In Ban Phalou the youngest segment of the population is the most exposed to the risk of UXO. This is due to the fact that young people cannot go to school and that they systematically look for metal when sent to the family rice field. Young metal collectors disobey their parents and seldom listen to the safety recommendations of the village chief. It seems that for the most persistent, metal hunting has grown into a habit even if they sometimes get punished by their parents. According to the village chief, children's

participation is often spontaneous and does not follow any sort of routine in terms of when, where and with whom they go metal hunting. Children get generally curious when someone interacts with a UXO and tend to follow other young people who are deemed to be more daring with the ordnances they find. Villagers however identified a core group of three male adolescents ranging from the age of 10 to 15, who have developed their own methodical approach to metal hunting.

Thon is 10 and is the elder son of a family of 5 children.<sup>43</sup> He always participates in UXO Lao Community Awareness (CA) presentations and knows their safety messages very well. Because the village has no school teacher Thon helps his parents farming the family land and searches for scrap metal three times a week. He goes in a group of two or three, which often involves his friends Chhay and Touy. Thon does not own a metal detector but uses a shovel to dig near the bomb craters along the jungle paths. He sometimes needs to dig quite deep to find large pieces of metal. He claimed he collects bomb fragments only and never touches large bombs or bombies that are lying intact. He says he never dismantles them nor burns them in order to get fragments.

Thon finds this activity exciting but said it is the money that drives him. He sells the metal to the local broker and earns 1000 kip for each kg of metal he finds. He likes to spend his money to buy cigarettes and food. His parents are aware of what he is doing and although they have told him to stop he disobeys them because he wants the money. Thon usually keeps some of what he earns for himself while giving the rest to his parents. Despite the potential risk incurred by his activity, Thon's parents seem happy to have the benefit of the extra income and are not angry with their son.

Chhay and Touy are both 15. They go metal hunting twice a week. Their own siblings choose not to accompany them, however if other children wanted to come along though they would not prevent them from joining. They attend community awareness sessions but cannot identify which items are safe and which ones are not. They admitted not knowing how to protect themselves in the event of an explosion. Some days they work in the rice field, some days they do not. During those "free" days they usually search for metal together.

According to Chhay and Touy, the best place to find metal is in an area around 2km northwest of the village. They leave together but search for metal fragments on separate trails. They typically find 5 kg each but Touy is generally more proficient and can fetch up to 10 kg per outing. They find fragments by digging the soil with their long farming spades. They claim that when they encounter intact bombs they do not touch them and instead report them to the village chief. They do not always tell their parents when they go metal hunting. The latter are sometimes angry, sometimes not. Chhay and Touy are motivated by the money only and use what they earn to buy themselves clothes and

---

<sup>43</sup> All the names used in this study have been deliberately modified in order to preserve the anonymity of the respondents.

cigarettes. When they get well paid they give a share of their earnings to their parents. Although Chhay and Touy's parents always urge them to stop, they are ultimately quite happy to receive the money.

### **VII. The Scrap Metal Trade Chain**

The metal collected by the villagers is an integral part of a wider business, which goes beyond the province of Savannakhet and reaches out to Vietnam and China. Ban Phalou constitutes the first link in the chain of metal recycling and trade. This initial stage of metal collection is followed by the initial sale to the local broker from Khamsay village, which is located a few kilometres south of Ban Phalou.

The broker is a skilled blacksmith and former pot maker, who re-uses ferrous material and transforms it into functional objects for everyday use. The local communities provide him with war scrap metal which he uses to make aluminium buckets, plates, spoons, trays and others household utensils. This transformation from remnants of war to kitchen items only requires a pair of scissors, a hammer and a metal saw. The blacksmith often sells these re-fashioned items to the same villagers who initially supplied him with the raw material. Prices vary from 3000 kip (US 30 cents) for a spoon to 250,000 kip (USD 25) for a bucket. According to the blacksmith, he can produce 5 trays or 3 buckets a day.

Although recycling war scrap metal supplements the blacksmith's family's income, it is not his main activity – he is also a farming entrepreneur who successfully cultivates and mills rice and raises cattle. Despite his relative prosperity, he nonetheless bemoans the apparent scarcity of the metal in the area as well as the increase in its price since he started recycling war remnants in 1976. At a time when metal was abundant he claims he used to make 30,000,000 kip (USD 3000) per year from recycling metal alone. Today he can only earn 2,000,000 kip a year (USD 200), which is a relatively small contribution to his present household revenue. He estimates that for the past few years the price per kilo of metal has steadily risen by 10% annually, making it an increasingly less profitable business for him. As a result, when a local villager finds a substantial amount of metal, he often cooperates with him to produce kitchen items and share the benefits. On one occasion he even trained a young apprentice from a neighbouring village who wanted to learn how to re-manufacture UXO items into household items. Although the apparent shortage of UXO in the vicinity is an issue, the scrap metal trade continues to attract new people.

When local villagers do not trade with the blacksmith they sell their metal to one of several scrap metal yards located along the provincial road connecting Savannakhet to the Vietnamese border. People from the local Xetamouak scrap yard regularly buy metal directly from Ban Phalou. The metal is then sold to larger Vietnamese scrap yards or to the provincial foundry. With the current demand for metal in the region, it is likely that more provincial foundries and neighbouring countries will carry on supplying themselves

with cheap metal collected by the villagers; hence further promoting risk prone behaviour on the part of UXO affected communities.

### **VIII. Village Risk Ranking**

With respect to identifying risk to their family livelihood, the majority of the interviewees reported UXO and illnesses as their two major sources of daily concern. The risk ranking for the villagers of Ban Phalou is as follows:

**1/ UXO**

**2/ Illnesses**

**3/ Environment**

**4/ Tigers and thunder**

73% of the respondents cited UXO as their first risk factor. It is important to bear in mind that the presence of UXO Lao staff among the research team is likely to have greatly influenced the interviewees' responses in identifying UXO as the most pressing source of risk. Although most respondents mentioned UXO as the major livelihood threat, both the village chief and the deputy village chief ranked illnesses as the first risk factor affecting their community. In addition villagers tended to differentiate between UXO that can be seen lying on the ground and UXO that are buried in the soil.<sup>44</sup> The former is considered by the villagers not to be of particular hazard because it is easy to avoid. Conversely, the latter is the main source of anxiety when farming and undertaking slash and burn in the forest.

The second source of risk relates to disease, which regularly disrupts human and animal lives. Some villagers cited bird flu as a source of risk while others mentioned different sorts of epidemic that kill their cattle and force them off their rice field. The loss of domestic animals often means that the family cannot farm anymore and they therefore need alternatives to rice cultivation such as game hunting, fishing or scrap metal collection.

Ban Phalou is chronically affected by malaria. Amongst the 30 households interviewed, 30% had at least one family member suffering from chronic fever, stomach aches, lung pains and frequent coughing. Villagers who had ailing relatives living at home with their families explicitly mentioned illnesses as a greater risk than UXO because of the lack of money to buy medicines. Although the local health centre allows villagers to pay for their medicines later, the frequency with which people (and children particularly) seem to fall sick weighs heavily on the household survival scale.<sup>45</sup> Despite the systematic

---

<sup>44</sup> A similar distinction was already recorded in the Handicap International's National Survey on the Socio-Economic Impact of UXO, 1997.

<sup>45</sup> In Ban Phalou children may start smoking before 2 years old. Sickness in general necessarily entails medical costs and the temporary loss of labour force.

identification of UXO as the major source of risk, the community's exposure to various diseases appear to be a more severe source of livelihood stress, which at present greatly affects human beings and domestic animals alike.

### **IX. Community Awareness**

Villagers claimed they know how to deal carefully with the presence of UXO. One of the main reasons is that UXO Lao community awareness programmes teach them how to avoid hitting the ground too hard when ploughing the land to plant crops or building garden fences. Villagers also stated that both adults and children had substantially reduced their collection of metal following the visits of the Community Awareness teams.<sup>46</sup> The respondents believed that children in general are less involved in the scrap metal trade than they used to be, especially since UXO Lao's first visit to the village. However villagers expressed their concern over the fact that if children had nothing to do, (because there is no school to attend or no rice to farm during the dry season) boys especially, are tempted to go metal hunting in order to earn pocket money.

Despite the local memorisation of the "don't touch" messages diffused by the CA teams, farmers often move explosive items around when they are in their way. The discrepancy between message assimilation and behavioural change opens up an empty space whereby although the individual knows what is appropriate and what is not, he/ she has difficulties translating knowledge into practice.

The same conclusion can be drawn from interviews with children and adolescents involved in scrap metal collection. It appears that young people know by heart the CA discourse as well as the steps they are supposed to take to ensure their personal safety: when an item is found they know they need to mark the location accurately and report it to the village chief who will in turn inform the UXO Lao roving teams. The problem remains closing the gap between discourse and action especially for the most persistent group of individuals who despite their high level of awareness pursue their activity deliberately.

On another hand none of the respondents admitted having purposely manipulated an intact explosive item. This statement whether accurate or not still places them in a virtually safer position without breaching the provincial decree on SMT.<sup>47</sup> According to the local discourse, the apparent self imposed limits is to collect items that are either fragmented or already empty of fuse and explosive.

### **X. Village Summary**

---

<sup>46</sup> The UXO Lao community awareness team last visited Ban Phalou in May 2006.

<sup>47</sup> See GICHD 2005b: 35 on provincial decrees of Savannakhet and Xieng Khouang.

This case study has identified two main local attitudes towards SMT: those carrying out opportunistic trade and those who are involved in a more pre-meditated way. This distinction is identified based on interviews with the villagers, bearing in mind that some of the respondents may be underestimating their involvement for fear of being reported or blamed. In Ban Phalou however living with UXO must have grown into a local habit given that more than 15 years elapsed between the time when people returned and the deployment of the first professional team. In light of this the border between the two categories becomes blurred.

Arguably these two categories are neither discrete nor impermeable. Indeed some people may be shifting from one category to another depending on time, location and the household exposure to external vulnerabilities. On the one hand an individual may be tempted to collect metal when coming across it by chance, on the other he or she may decide to look for bomb craters in times of food shortage or family illnesses. In a context of poverty and geographical isolation, the recourse to scrap metal trade is a safe activity in the sense that it systematically generates an extra income to complement subsistence farming.<sup>48</sup> It is in this shifting context that we may want to comprehend the parents' leniency towards their children when the latter bring back money to the household. In times of shortage any additional income is useful to strengthen the family survival buffer.

---

<sup>48</sup> See GICHD 2005b: 47 on the comparative advantages of doing SMT.

## **Case study II: Ban Nong Tang, Phoukoud district, Xieng Khouang province.**

### **I. Village Overview**

Ban Nong Tang is a Lao village located in Phoukoud district, in the northern province of Xieng Khouang. The area is both a former ground battle and a heavily bombed site.<sup>49</sup> As a result it has been classified as a "high impact" village. The village spreads over an area of 150 hectares where 457 people are divided into 84 households with an average of five children per household. Ban Nong Tang is an old rural community. A large number of its inhabitants were born there and have returned to rebuild their livelihoods after the war. Others have come from neighbouring districts in order to seek better living conditions. People are related by kinship therefore families weave a social network that effectively supports them in times of food shortage.

The village is located along the road linking the provincial capital of Phonsavanh to the capital city of Vientiane. It is on the way to major tourist sites and thus benefits from frequent traffic. Consequently two restaurants and tourist accommodations have opened up to service seasonal visitors. The rural population benefits from a local lake where they can go fishing, as well as the services of an agricultural bank, which lends money to farmers who want to undertake animal raising. A major market is situated 2 km away from its centre. The village has a school which teaches children living in the area through five different grades. Being endowed with various basic infrastructure and resources, Ban Nong Tang is a relatively wealthy community.

### **II. Village Political System**

Ban Nong Tang has a village chief who is nominated by the provincial authorities. The village's new infrastructure and its geographical location allow it to play a functional political role in the area whereby district meetings are organized in the main restaurant/gathering hall. Participants from neighbouring villages gather on a regular basis to take part in discussions regarding the social, political and economic life of their communities.

Ban Nong Tang is divided into several units, which are all ultimately administered by the village chief. If a new family decides to come and settle, the village chief facilitates its acquisition of land on which to build a house. However according to new re-settled families, the price of the land is increasing and villagers now have to farm their land some distance away from the centre. With the steady development of the area, it is likely that the price of land is going to rise further in the future.

### **III. UXO Contamination Problem**

---

<sup>49</sup> A former US airbase was located in the village where large planes could station and get supplies of ordnances including 500 and 750 lb bombs.

Present records show that on average 50 accidents occur every year causing approximately 20 deaths in the province. Amongst the victims, 70% are male and 40% are children. Most accidents occurred in the districts of Phoukoud, Kham and Pek and the main cause of such accidents is the burning of UXO for metal to sell.<sup>50</sup> People often use Vietnamese manufactured metal detectors to trace explosive remnants of war although the provincial authorities have now prohibited their ownership and utilisation in order to discourage people from pre-meditated scrap metal trade.

Ban Nong Tang has 18 recorded accidents since 1986. Three accidents occurred between 2000 and 2006 in which 5 children died following the explosion of a Blu 26. The UXO Lao survey team has visited the village 11 times and found 1560 items, which were destroyed by the roving teams.<sup>51</sup> The clearance teams have been deployed in three different sites and a public meeting hall, a tourist area (including restaurant, bungalow) and a school have then been built on the cleared land.<sup>52</sup>

When families returned following the war, the village had already been completely burnt down and was severely affected by unexploded ordnances. According to anecdotal accounts, people first did not realise how hazardous these items were as they bundled sub-ammunitions in their clothes on their way home. With an estimated 1 bombie per m<sup>2</sup>,<sup>53</sup> accidents were very high as villagers removed items to gain access to farming land and used them to build stilts, staircases and fences for their house. A farmer estimated that despite high casualty rates, all UXO lying on the ground of the village was collected in the space of 2 to 3 years.

Following the end of the war, the first twenty families who re-settled in Ban Nong Tang have been involved in the handling, transport, use and recycling of unexploded ordnance in some ways or another. Today villagers claim they can still find UXO when tilling their land even if the soil has already been cultivated for years. People are thus generally careful when farming and make sure they do not hit the soil too hard in case a bombie remains deeply buried underneath the surface. The majority of the interviewees said they felt partially safe in using their land.<sup>54</sup> Only one interviewee said that professional clearance would be unnecessary for the land on which she was living, as she had been there for 30 years. She added, however, that she would request clearance if she moved to another location.

---

<sup>50</sup> Data provided by UXO Lao, Xieng Khouang provincial office. See Annex.

<sup>51</sup> These include: 2 large bombs, 566 bombies, 2 Anti-personnel mines (APM types: 14; 16; 18), 450 "others" such as mortars, grenades etc.

<sup>52</sup> According to UXO Lao source more than 1250 people directly benefited from the above constructions clearing ca. 25,000 m<sup>2</sup> of land.

<sup>53</sup> Figures quoted from separate interviews with a village elder and the local school teacher.

<sup>54</sup> Respondents claimed their land (both housing and farming) is between 30% to 50% safe.

The last UXO related accident occurred in November 2003 when a villager was building a fence along the main road to prevent the intrusion of stray cows into his land. This man hit a Blu 26 when digging the soil and subsequently died. His widow reported that although their housing plot had already been subject to UXO Lao clearance, the item had remained buried 25 cm below the soil surface. The widow did not hold anyone responsible for her husband's death and said that this type of accident is common in the area. Since then, however, she has been too afraid to expand the size of her plot of land despite the pressure of having seven people living in the house. Villagers who have already been directly affected by a UXO accident are reluctant to further expose their family to risk by expanding their cultivation land. In spite of the family needs and the intention that the children will take over cultivation of the fields from their parents, they genuinely feel it is a risk not worth taking. Others manage to reclaim the land progressively either by requesting professional clearance or using basic farming tools (shovel, spade, etc.), carefully digging the soil when preparing the field and planting their crops.

#### **IV. Household Status and Economy**

Villagers are relatively affluent in Ban Nong Tang where rows of wooden and concrete houses are interspaced with abundant rice fields. The village is located on high hills and appears well-suited for farming. With a local micro-climate favourable to rice cultivation, most families own both a rice field and a home garden where they cultivate a large variety of crops. The latter include: banana, chili, cassava, potatoes, corn, peanuts and garlic. Garlic and peanuts are commonly sold to the local market for up to USD 50 a year.

An ordinary household owns between half an hectare to one hectare of rice field. A hectare of land yielding between 1.5 and two tons of rice per year under normal growing conditions and up to five tons when using fertilisers purchased from Vietnam. This high productivity is a combined result of natural rain cycle, the existence of an irrigation system, the ownership of cows and buffalos and the local access to modern means of production (tractors and chemicals).

According to the interviewees, the rice produced is mainly for household consumption, with one harvest often lasting for an entire year. However one ton of rice sold in the local market is a substantial source of additional income worth USD150-140 annually. Moreover households raise domestic animals such as chicken, ducks, goats and pigs they can sell to the local market. People also successfully diversify from their farming activities by fishing in the local lake, hunting and cutting wood in the mountains, sewing and cotton weaving, or making rice alcohol and local sausages for sale.

For the few who do not own farming land, the livelihood alternatives are still numerous and villagers claim they can either borrow from relatives or sell their labour force in times of food and money scarcity. In this present social and economic context, war scrap

metal trade is by no means the only survival strategy that is accessible to local families, even the poorest.

The level of education amongst the children is also an indicator of how well the household is doing in terms of maintaining a sustainable livelihood. Each household interviewed had children attending school five days a week. The latter either study in the local or district establishments, while a few wealthier families managed to send their elder child to schools and university in Vientiane. Furthermore medical care was accessible to every respondent owing to their ability to afford medical costs and various individual and public means of transportation to the provincial hospital.

According to the local school teacher, Ban Nong Tang is involved in an informal competition with other villages in the district. Apparently villagers heavily invest in physical assets in order to display their social and economic status (e.g. purchase of a satellite, motorcycle for the children etc.) This in turn conceals the fact that little cash is available all year round as the household revenue is directly invested into goods and commodities. In other districts like Pek, villagers are said to have smaller houses and fewer assets on display albeit more money saved.

### **V. Scrap Metal Trade**

According to the village chief, scrap metal trade is a significant problem in the area and ten percent of households are deliberately involved in the trade.<sup>55</sup> The main parties involved are adults and a small group of male children. However children's activities have apparently decreased for the past few years following greater awareness and the introduction of practical safety teachings into the school curriculum.

Village volunteers have recently been chosen by UXO Lao to help mitigate the adverse impact of the SMT. In case this solution does not prove effective, the village chief claimed he would refer to the district governor for further powers to enforce the law and to punish.<sup>56</sup> Villagers collect metal from the mountains where American planes dropped a substantial amount of bombs and sub-ammunitions. The local metal buyer comes regularly depending on the seasons offering 1300 kip/ kg (13 cents). As most villagers in Ban Nong Tang are farmers, metal trade is limited during the rice planting and harvesting seasons. The village chief commented that villagers who are mostly farmers normally have no time to venture into the mountains searching for metal but if the local buyer comes everyday, it is a clear indication that some of them have metal to sell.

---

<sup>55</sup> The village chief estimated that ten households were proactively seeking to profit from the local metal trading. The village chief moreover is well aware of the identity of those involved.

<sup>56</sup> The village volunteers system being recently implemented it is not quite clear what the punishment will be if persistent metal collector decided to pursue their activities in the face of legal, moral and social discouragements.

He added that a few individuals own a metal detector, which they have purchased from Vietnam. Following the recent provincial decree these people have been hiding their equipment to avoid paying the USD 50 fine. The village chief concluded that villagers already actively involved in the trade are likely to carry on; adding that metal collection has increasingly become a nocturnal activity as metal hunters seek to reduce the risk of being found out.

### **V. A. Adult Male Collector**

Mr. Xe has been collecting metal on an opportunistic basis since he returned to his native village in 1975. At 70 years old he claimed he was not interested in the money but wanted to use mortar shells and bomb casings to build his house. Today collecting metal proves to be more and more difficult as UXO items need to be searched for in increasingly remote locations. In the meantime Mr. Xe has stored war scrap metal in his backyard so as to build a fence around his rice field. The making of the fence has been delayed for a while because his own metal supply is frequently being looted by fellow villagers who in turn sell the items to the local broker.

Mr. Yan has no rice field; when he finds himself without enough to live on he goes fishing in the lake and sells his catch to the local restaurant. Sometimes his sister gives him money and rice in exchange of his working in her land. Alternatively Mr. Yan collects scrap metal. The approach involves carefully digging in bomb craters up to a depth of 2 metres because quite often the same craters have already been searched by previous collectors. Upon finding intact items, he claims he leaves the location and moves to another one. He admitted though, that on occasions when metal fragments are difficult to find, and when he does not feel too tired, he goes back to these intact UXO. On these occasions he burns whole live items and collects their fragments. His wife tries to discourage him but if he goes two or three days without finding something productive to do, he resumes metal hunting. For him SMT is just one activity he can choose from many others. It is not quite clear why SMT would be more attractive than others, especially when other activities may prove to be safer and sometimes more profitable (e.g. a kg of fish is worth more than its equivalent in metal). Mr. Yan simply does metal collection without thinking of the potential loss his activity may generate. He worries though that his own children may be tempted to go metal hunting for cash and is concerned that his activity may be perceived negatively in the village and that he might be punished in the future.

Mr. Pek collects 4-5 kg of metal a day. He goes metal hunting regularly during the week, but because today is a rainy day he has decided to stay home. He conceded that although he is putting himself and his family at risk and that the money is not much (a maximum of 7000 kip or US 70 cents) it is still enough to buy cigarettes and salt. Farming, sewing and weaving are the main economic activities of this household of six people. As such scrap metal is only a minor activity, which does not contribute to the family income significantly.

The last two cases reveal that it is difficult to assess why an individual chooses the danger of searching for metal while there are other more profitable activities to hand. For those individuals, metal collection is a "safe" activity if one is cautious and experienced. At the same time, it guarantees immediate cash returns. From this perspective scrap metal collection compares with other types of occupations in the livelihood scale. It becomes an ordinary activity in which the potential risk factor is either discarded (people have been living in this hazardous environment for more than 30 years) or put into new perspectives (on average people are most likely to die from other causes). In a place where farmers undertake a wide range of activities, scrap metal trade does not stand out as an essential component of the household survival strategy.

### **V. B. Adult Female Collector**

In Ban Nong Tang women also collect scrap metal, albeit to a lesser extent.<sup>57</sup> Some of them feel it is the only activity they can perform or they are relatively good at. As Lao households are often composed of numerous relatives, searching for metal collection can help a woman contribute to the household economy. Fellow villagers often try to persuade them to stop, but they argue that if they collect metal for sale it is out of social and economic necessity.

As soon as they have "free time" female collectors go metal hunting together. Women usually go in pairs. They claim they do not go everyday and only recover fragments as they would never dare touch an intact item. They look for pieces of metal lying on the ground and start digging the soil carefully using their shovel. Sometimes they only return with a kilo of metal and their return on a day's searching is no more than 1,300 kip. When being asked if this is really worth taking the risk, one of them argued that as a widow and a mother of four she is compelled to participate actively in the household since she lives with her family in law. She argued that even if SMT is often considered a male activity she thought she was not good at other occupations like weaving, which substantially limits her options. In this context, metal collection allows women to be an active part of the household economy even if small amounts are earned. Although they recognised that their contribution can sometimes be limited, what is more important is the sense that they are being productive and useful. In a sense SMT brings them self-esteem and helps them preserve their status within the family structure.

### **V.C. Young Scrap Metal Collector**

A core group of male adolescents participates in the metal trade on a regular basis. Here again the money appears to be the main incentive and outweighs the risk of an accident. The following paragraphs profile three of them.

---

<sup>57</sup> A female respondent stated that they were 2 or 3 in the village regularly searching for metal.

Keo is 11 and studies in 3rd grade. He has three brothers and sisters who are enrolled in the local school. He regularly goes metal hunting with his friends and his younger brother, on average 2-3 times a week and mostly during week-end. He claimed not to be the group leader; his friend Long is the one who takes decisions for the whole group on when to go and when to return. Metal hunting is a group activity with individual financial rewards. Children leave the village together but search on separate tracks. Keo claimed he does not go for the fun or to be in competition with others. He only collects fragments of metal, so upon finding intact items he usually leaves and tells others to do likewise. Keo collects up to 2-3 kg of metal and the money he earns serves to buy himself some tee-shirts. Despite his parents' anger, Keo said he will carry on his activity for the sake of the money and will also continue to attend CA presentations.

Long is 14 and has 10 brothers and sisters. He goes metal hunting 2-3 times a week with his brothers and friends in group of four or five during week-ends. Only boys go together and most of them study in 4th and 3rd grade at the same school. Long has been collecting metal for the past three years and knows where to search in the hills and the mountains. He uses his shovel and often finds 2-3 kg of scrap metal. The money is then used to buy school materials and candies. It is neither shared with friends nor given to his parents. This money is his pocket money. His parents and school teacher always tell him to stop but he nonetheless disobeys them. He is not afraid and claimed he will continue. Long always attend CA sessions but admitted he cannot discriminate between safe and unsafe items but said he knows what bombies look like. He claimed he stops searching for metal as soon as he encounters a bombie. He then either continues in another direction or returns to the village. Long denied being the group leader and said Keo is the one taking the lead.

Say is 11 and collects metal with his younger brother who is nine. He admitted being afraid but claimed he only collects fragments for sale. He searches for metal in the mountains and digs the earth with a shovel. With two to three kg of metal he can earn 40 cents. Although his father has told him to stop several times, he still wants to earn pocket money. Upon his return his father often gets angry but as he never gets punished, Say has made metal collection his regular activity. The money is then used to buy candies, shirts and shoes and is never given (in part or full) to his parents. This money is for individual and personal uses only. Although Say always attends CA sessions and knows the message by heart, he still continues to collect metal with his brother and schoolmates.

The poverty factor falls short in explaining why male adolescents search for metal while other activities are available for them to earn better pocket money. As shown from the perspectives of the parents, metal hunting is a group activity that may forge bonding and create excitement that fishing may lack. These children moreover are not from the poorest segment of the population and interviews with their families reveal that their households do reasonably well in both social and economical terms. The root causes for such a risk prone behaviour therefore lies beyond the mere financial gains.

### **V. D. Parents' Attitudes and Discourse**

Mrs. Kham has 11 children and farms everyday with her husband and children. She owns 9000 m<sup>2</sup> of rice field, which produces four tons annually. She also owns a home garden where she grows garlic, corn and banana essentially for household consumption. Four of her children ranging from the age of nine to 14 (including the aforementioned Long) look for scrap metal on a regular basis. She claimed that her children follow the example of other villagers and are most interested in the money. Her children never give her any of the money they earn from the SMT. She is not sure whether it is the excitement factor or the money factor that acts as the major incentive. As a result she is afraid they might want to hit live bombs or made them explode. She admitted having tried to stop them but does not know when they go. Equally she claimed she cannot punish them because they run too fast. Her children usually get 4000 – 5000 kip from the local buyer. Since the money is low, she declared she would rather have them fish in the lake since it is safer and is often more profitable than selling metal. But as her children continually disobey her, she feels she cannot do anything to stop them.

The UXO Lao teams have already exposed the dangers related to remnants of war. She understands the risk and knows that some items may contain chemicals, of which she is particularly afraid. She believes that as a parent she is responsible for her children but she expects the village chief and other members of the community to help control them. She stated that the metal buyer should equally be held accountable for her children's behaviour since if there was no money to earn, they would probably lose interest in SMT.

Some parents admitted that in the past their children have been collecting metal on an ad hoc basis but have since stopped. Most of these parents are afraid to become extremely poor in case an accident happens. In fact they admitted that they would not have enough money to pay for the medical costs. Others claimed their children have never been involved because they are too afraid and too busy. These parents surmised that it is out of boredom that other children are easily tempted to go metal hunting. They said that concerned parents make sure their children are working outside of school hours to prevent them from joining other children in risky activities. Parents keep their children busy during week-ends by giving them household chores or farming duties to fulfil such as looking after the cows, helping to make sausages or rice alcohol.

Mrs. Pet is a village metal broker who is also a mother of three. She has been buying metal for a few years and claimed villagers (adults and children) come to sell scrap metal directly into her house. According to her it is not always the same children who come and sell the metal. Others also come from neighbouring villages to trade their own supplies. As a local buyer and trader she does not feel responsible for the safety of those children. She admitted she hardly think about how dangerous this might be for those who occasionally come and sell her items. Yet she argued she would never allow her own children to be involved in the SMT based on the fact that it is too dangerous and that they lack experience. Mrs. Pet confessed that although she is worried about her own children,

her concern about their safety does not stretch to other people's children. This specific case shows how perception clearly shifts depending on whether the individual is placed in a neutral/business perspective (children selling metal are like any ordinary customers) or in a personal/family perspective (her own children cannot collect metal because it is unsafe).

## **VI. Local Perceptions on SMT People**

Interviews of people involved in the scrap metal collection often shed light on the inner motivations that drive them to undertake such an activity.<sup>58</sup> As shown above, the financial incentive and the belief that it is not so dangerous after all (at least for those who have gained years of experience) make metal hunting an attractive activity, which brings other sorts of added-value that cannot be easily quantified.<sup>59</sup>

On the other hand, the perception of fellow villagers who are not involved in the scrap metal business gives an indication of the moral and cultural setting where this illegal activity is being undertaken. Respondents are divided between those who somehow sympathise and those who condemn fellow villagers involved.<sup>60</sup> Half of the households interviewed justified the activity on the basis that families are poor and often short of food. Less than half regard these risk takers as thoughtless and wanting to die, however the rest blame it on the fact that people have "free time" or nothing else to do. Their perceptions on children in particular reflect the view that parents are primarily responsible for their education, and if these children and adolescents have become risk takers it is because they follow bad examples and want to earn money.

Although 50% of the interviewees feel they understand why people hunt for and trade metal, most of them claimed they would never do it even if their own family was starving. They argued they could easily find other ways to survive (selling one's labour, asking relatives for help etc.) As one of them said: "To be poor is OK but I am afraid of dying". Others believe that those involved in the business are unconscious of their life and oblivious to their family obligations. As a result their behaviour should not be excused because they could undoubtedly take on a more profitable and safer activity.

## **VII. The Scrap Metal Trade Chain**

The SMT chain commences in the village and flows through Xieng Khouang province to reach out other Lao provinces and neighbouring countries. Adult and young metal scrap collectors either sell their metal to a local broker (based in the village) or to a roving collector who comes regularly from Lak Nong village located 35 km away. These collectors who previously bought the metal 1300 kip (13 cents) from the villagers in turn sell it for 1500 to 1700 kip (15 to 17 cents) to a Vietnamese scrap yard or to the

---

<sup>58</sup> Information may be limited however due to the illegal nature of the activity and the fear of being blamed, reported to the local authorities etc.

<sup>59</sup> SMT offers comparative advantages such as the thrill, the excitement or the adventurous feel...

<sup>60</sup> These particular views were gathered from 20 households who claimed they were not involved in the local metal trade.

provincial foundry.<sup>61</sup> Some admitted that the profits can be so small that they hardly cover the cost of the petrol used when transporting the metal for sale.

A large foundry is located in Pek district. It is located on top of low hills with a view over the provincial capital of Phonsavan. Once re-processed the foundry sells the metal to other provinces such as Luang Prabang and Vientiane, where it is used as construction material; while part of it is taken to Vietnam. The "Xieng Khouang Mining & Steel Modification Partnership Company" has been active since 2001 and seems to be the destination for all the war scrap metal collected in the region. The research team was able to visit the scrap yard but was not allowed within the factory building where the re-processing activities are undertaken. Several tons of unexploded ordnances are stored in the scrap yard with a minimum of organisation and very limited safety. Items are roughly separated by types e.g. large bombs are clustered together in one area and mortars in another. However they are cluttered all together regardless of them being live, fused or with high chemical content.<sup>62</sup>

UXO Lao does not collaborate with the foundry and it seems that the business has its own teams of experts to ensure its safety.<sup>63</sup> Since the commencement of its activities in 2001, the foundry has apparently acted as a powerful drive for SMT in the surrounding districts. Accident records though show that the casualty rate has suddenly and significantly decreased in the year 2001 (with a total of 24 against 51 the previous year) but has since been maintained at its yearly average rate of 50 accidents.<sup>64</sup>

### **VIII. Village Risk Ranking**

Ban Nong Tang is a village which has been totally rebuilt over the years since the resettlement of the first returning families. Despite the apparent monotony of the farmers' lives, villagers have ranked the various sources of risk they encounter as follows:

- 1/ UXO**
- 2/ Illnesses**
- 3/ Lack of money**
- 4/ Malevolent spirits**
- 5/ Lack of food**
- 6/ Lack of water; thieves**

---

<sup>61</sup> These figures are slightly lower than the ones quoted by Moyes in the GICHD 2005b study, which fluctuate between 1700 and 1800 kip at the broker level of the business chain.

<sup>62</sup> See the description of the same foundry in GICHD 2005b:22.

<sup>63</sup> According to a foundry staff,, experts have come from Vietnam to oversee the "modification" process of the material.

<sup>64</sup> This piece of information was provided by UXO Lao and will need to be further researched and analysed.

All the respondents identified UXO as a major source of risk, with 89% of the households interviewed ranking it number one. In comparison with the previous village, interviewees seemed to differentiate less between UXO items they could see and items buried in the soil.

A recurrent source of risk was the lack of money, which may be explained by the local culture of consumption or more simply by the need to give children access to school and higher education. Some families mentioned the shortage of money being a significant factor because of the medical costs generated by either old or chronically sick relatives. Other sources of risk such as the lack of water or thieves stealing rice and domestic animals, are intermittent and do not constitute a major threat to the survival of the local households. Malevolent spirits, on the other hand, rank higher than the lack of food and in some cases were considered an equal first with the risk of UXO accidents.

### **IX. Community Awareness**

The UXO Lao Community Awareness (CA) team has visited the village five times with their last visit on 26th of July 2006. A total of 3564 people were reached including 2052 children and 1512 adults. Ban Nong Tang has had three community awareness volunteers since December 2005, including one female member. There are ten villages in the vicinity and a total of 30 volunteers divided into five units. The volunteers are all village-based and it is their role to further the work of the CA team by organising follow up activities within their respective communities. In the last event organised by the village volunteers, 145 adults and 75 children attended.

It seems that knowledge of the UXO situation is uneven amongst these volunteers and that they would gain from liaising and sharing information with the village chief. At present none of them could identify clearly which families, adults and children were most at risk nor how the SMT is prominent and locally operational. Some volunteers have limited knowledge in terms of accidents and have shown uncertainty in remembering when the last accident occurred. Furthermore there seems to be much assumption about the fact that because Ban Nong Tang is classified as high impact its villagers are most at risk. On the other hand, more people seem to die from natural causes every year. This village risk ranking may thus be misleading as it is based on the shared view that people living in high impact areas are invariably exposed to UXO accidents.<sup>65</sup>

### **X. The Role of the Local School**

The village school teaches 220 students from 1st to 5th grade. The school gathers students from three villages and includes a CA section in its curriculum. As such the teacher organises an hour of UXO awareness every Wednesday afternoon providing

---

<sup>65</sup> Moreover the presence of an NRA and a UXO Lao CA staff within the team composition certainly had a bearing upon the answers given by the respondents.

practical advice such as how to remain safe while farming with one's parents. In addition CA teams organise "sport in the box" activities to further children's awareness.<sup>66</sup> The local school as both an academic and social institution is a significant means to channel safety messages and promote responsible behaviour.

According to the school teacher, parents are primarily responsible for the education of their children. The problem of living with UXO falls within this range of incumbent responsibilities and villagers agree that parents should be accountable for their children's level of awareness. The teacher's role is complementary and serves to further deepen the children's academic knowledge and foster societal behaviour in the framework of the school social life. The general belief is that children generally tend to obey their teachers more than their parents. In the case of SMT children, parents who feel they cannot restrain their children expect the school to take over the role of controlling their behaviour better.

The school teacher mentioned that if children misbehave they can be punished. However they are no clear rules on how to proceed in case a child does not apply safety messages. Children are apparently more afraid of being punished by the school teacher than by their parents; and those involved in the local SMT often lie to their teacher claiming they have already stopped. The local teacher claimed that children have a very good knowledge of all the CA messages but do not always behave accordingly.<sup>67</sup> As children do not only collect fragments he is worried they may be tempted to bring explosive items inside the village and thus hurt other members of the community.<sup>68</sup> For the school teacher money is the main driver as some children go metal hunting with their entire family. In light of this, if money was indeed the major incentive, withdrawing the financial factor from the equation would probably discourage children from searching for metal unless it is in fact the excitement and danger that constitute the main attractions.

There is a lack of clarity on who within the community should be responsible for at risk children once parents have lost total control over them. As a civic apparatus the local school can play a substantial role, however no rules have been clearly defined so that such issues can be dealt with. To this end, the school as a moral institution can eventually take over the family duty when parents have not fulfilled their role. Such a moral and educational process can be put in place using student volunteers to help better monitor children's dangerous activities. Student volunteers could directly report to their local teachers, village CA volunteers and village chief and help promote more accountable behaviour on the part of other children involved in the SMT. According to the village

---

<sup>66</sup> "Sport in the box" is a UNICEF supported initiative based on children's playful activities.

<sup>67</sup> UXO Lao have used pictures of UXO victims in the past as a component of their awareness materials. They claimed that it was very effective in making children feel more concerned about their own safety. Due to criticisms on the moral value of such an approach, the CA teams had to stop using the pictures and used drawing instead. The team admitted that it does not have the same effect on children especially the ones who are more risk prone.

<sup>68</sup> This particular case happened in the neighbouring village three years ago.

chief, children are the ones who regularly report UXO items. This system would thus be an extension of a safety practice already in place, which would give young individuals the opportunity to manage themselves. On the other hand this would promote civic duties from an early age and develop their sense of responsibility within the community.

In the same way parents should be accountable vis-à-vis other village members. Regular village meetings could be used as a collective means to raise parental awareness and help them better control their children. Therefore issues that cannot be solved within the private sphere can be handed over to a wider group in which fellow parents can actively support at risk families and thus help mitigate the risk exposure of the entire community.

### **XI. Village Summary**

Ban Nong Tang is a relatively safe farming village which, owing to its geographical location, promotes various types of business opportunities. Villagers have been living in the village since 1975 and for the past three decades two generations of villagers have already become accustomed to living with UXO. The mine action sector came late in this regard as UXO Lao has been created in 1997 with messages that directly censured what people had been more or less doing for the past thirty years. Local houses are built with UXO parts or complete items and although some families have genuinely stopped collecting metal, most people have been involved in touching, removing, dismantling, transporting, using, recycling or selling war scrap metal.

As a result various metal collectors believed that SMT does not constitute a particularly dangerous activity especially for those who have gained experience over the years. SMT is an activity like any others for those who remain careful and methodical. The puzzle remains as to why an individual chooses to go metal hunting when catching fish in the local lake is both safer and sometimes more profitable? Little rational explanation was provided in this regard and we may want to infer that SMT has an adventurous feel, which other activities lack. The latter point is particularly important to fully assess the motivations of children and adolescents.

If children are motivated by the money only (as they claimed they are) reducing their exposure to risk would need to be dealt with at a district or provincial level whereby scrap metal buyers are prevented from paying them. If money really is the only driver, young collectors may be discouraged from pursuing their activity. Should SMT further expand across the province, the finite nature of scrap metal may lead to increased risk exposure.<sup>69</sup>

The recent provincial ban on both SMT and metal detectors is a first step in a long-term effort to curb the adverse impact of the metal business. At the moment the police fines

---

<sup>69</sup> See Moyes comments on the finite nature of the business in GICHD 2005b: 19.

owners of metal detectors to a fixed amount of USD 50. Yet little is apparently done at the provincial foundry level, which gets its supply from local villages. More coordination between UXO Lao, the police and the district and village authorities would make the trade safer and better monitored. As such the provincial authority should collaborate with the owner(s) of the foundry in ensuring that their business activities do not constitute a potential hazard to the general safety of the provincial community through regular safety controls and audits.<sup>70</sup>

---

<sup>70</sup> Ibid. GICHD 2005b:44.

## Conclusion

Comparative table of the two villages:

	<b>Ban Phalou, Savannakhet province</b>	<b>Ban Nong Tang, Xieng Khouang province</b>
<b>Household (HH) income</b>	LOW	MODERATE-HIGH
<b>Village access to basic infrastructure</b>	LOW	HIGH
<b>HH exposure to external vulnerabilities</b>	HIGH	LOW
<b>HH exposure to UXO risk</b>	MODERATE	LOW-MODERATE
<b>UXO related accidents</b>	LOW	LOW
<b>SMT prevalence in the village economy*</b>	MODERATE	LOW-MODERATE
<b>SMT contribution to the HH budget</b>	MODERATE-HIGH	LOW
<b>UXO Community Awareness</b>	HIGH	HIGH
<b>Law enforcement (provincial decrees)</b>	LOW	MODERATE

\* meaning the overall economic value this activity has for the whole community.

Villagers living in Ban Phalou and Ban Nong Tang have identified UXO and illnesses as the main risk factors to their livelihood. Although the first identified sources of risk are the same, they nonetheless weigh differently on the household coping strategies. In terms of economic sustainability, villagers of Ban Phalou are extremely vulnerable to natural disasters and to human and animal diseases. In this sense scrap metal collection constitutes an activity which although supplementary to land cultivation, remains a contributor to the household income that may not be insignificant. As young metal collectors go metal hunting on a regular basis, the money they earn is often re-injected into the household economy. Children often give their share of the money to their parents so that they can buy food and other supplies for the benefit of the entire family.

The same is not applicable to Ban Nong Tang where children collect and sell metal for their own individual purposes. Yet the household level of income is to a large extent higher and economically more viable, thus making this risk taking activity unnecessary and potentially hazardous to the community as a whole. In this particular case, SMT is an activity within a wider range of livelihood alternatives, which is not justified by its financial gains. If money does not represent the main motivation, its attractiveness would need to be found in less quantifiable reasons.

In both villages however, most scrap metal collectors (both adults and children) pretended they only gather fragments and leave intact items untouched. In assuming that respondents have been genuinely truthful, the current situation in the two provinces show that metal (and metal parts) is getting more and more difficult to find so that villagers

have to venture into further areas to find explosive remnants of war. Furthermore if the availability of metal parts is generally getting scarce, collectors may become increasingly tempted to look for whole items so as to dismantle or turn them into fragments.

The two case studies show that the community awareness teams have largely been effective in increasing people's awareness of the danger of UXO. However this does not always translate into appropriate behavioural changes. Knowledge and behaviour are two separate human capabilities, which do not systematically feed into each other. The difficulty is to find how the link between the two can be achieved hence ensuring that knowledge about safety is automatically converted into behaving safely. It appears from both villages that children have fully memorised the messages and know the practical steps to ensuring personal safety when encountering a dangerous item. Assessing the real impact of the CA teams work is beyond present quantitative and qualitative means since we would hardly know how many accidents they have effectively prevented.

The number of UXO related accidents remains difficult to gauge because of the illegal nature of the activity and because of the general lack of accurate data. Meanwhile anecdotal accounts from the two villages respectively referred to their last accident as having occurred three years ago. This indicates that although both villages have been classified as "high impact" the corollary that their inhabitants may be most at risk does not necessarily hold true.

The next step would be for the National Regulatory Authority to set up a social and economic unit within its structure. This "think tank" in which data would be gathered, compiled and analysed for distribution at provincial and district levels could also be a main liaising component with other operators, NGOs, databases and relevant ministries. To this end the Ministry of Industry and Commerce should get involved in the sector in order to promote economic development and actively mitigate future UXO related accidents derived from the economic influence of provincial foundries.

## Bibliography

Bottomley, Ruth, 2003. *'Crossing the Divide: Landmines, Villagers and Organisations'*. Oslo, PRIO, International Peace Research Institute.

Caplan, Pat, 2000. *Risk Revisited*. London, Pluto Press.

Douglas, Mary, [1966] 2002. *Purity and Danger*. Oxon, Routledge & Kegan Paul.

Douglas, Mary and Aaron Wildavsky, 1983. *Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers*. University of California Press.

Douglas, Mary, 1992. *Risk and Blame: Essays in Cultural Theory*. London, Routledge.

Durham, Gillieatt, Sisavath, no date. *'Effective mine risk education – a shared responsibility'*.

GICHD, 2005a. *'An Evaluation of UNICEF-Supported UXO Risk Education Projects in the Lao People's Democratic Republic'*. Geneva.

\_\_\_\_\_, 2005b. *'A Study of Scrap Metal Trade Collection in Lao PDR'*. Geneva.

Handicap International, 1996. *'Victim and Survivor Assistance Study, Lao PDR'*. Vientiane, Lao PDR.

\_\_\_\_\_, 1997. *'Living with UXO. National Survey on the Socio-Economic Impact of UXO in Lao PDR 1997'*. Vientiane Lao PDR.

\_\_\_\_\_, 2004. *'Life after the Bomb. A psychosocial study of child survivors of UXO accidents in Lao PDR'*. Vientiane, Lao PDR.

Keeley, R. et. al. 2002. *'Mission to Assess Future Sustainable Options of the Lao UXO Trust Fund and the UXO Lao Mine Action Programme'*.

Landmine Action, 2002. *'Explosive Remnants of War. Unexploded ordnance and post-conflict communities'*. London, UK.

Moyes, Richard, 2004. *'Tampering: Deliberate Handling & Use of Live Ordnance in Cambodia'*. A report for Handicap International Belgium, Mines Advisory Group, Norwegian People's Aid. .

PRIO, 2004. *'Reclaiming the Fields of War: Mainstreaming Mine Action in Development'*. Oslo, International Peace Research Institute.

Scott, James C., 1976. *The Moral Economy of the Peasant: Subsistence and Rebellion in Southeast Asia*. New Haven, Yale University Press.

Scott, James C., 1985. *Weapons of the Weak: Everyday Forms of Peasant Resistance*. New Haven, Yale University Press.

UXO Lao, '*Annual Report 2001*'

\_\_\_\_\_, '*Annual Report 2002*'

\_\_\_\_\_, '*Annual Report 2003*'

\_\_\_\_\_, '*Annual Report 2004*'

\_\_\_\_\_, '*Annual Report 2005*'

\_\_\_\_\_, '*Work Plan 2006*'

## Appendix 1

### Summary of UXO related accidents 1973-2006 Xieng Khouang province

– Data provided by the UXO Lao provincial office –

YEAR	Children	Adults	Male	Female	Injuries	Deaths	Total (children + adults)
<b>1973-1993</b>	501	748	934	315	592	657	1249
<b>1994</b>	33	24	52	5	26	31	57
<b>1995</b>	36	30	51	15	51	15	66
<b>1996</b>	33	13	44	2	33	13	46
<b>1997</b>	19	22	35	6	32	9	41
<b>1998</b>	50	31	64	17	56	25	81
<b>1999</b>	29	20	37	12	41	8	49
<b>2000</b>	21	30	38	13	36	15	51
<b>2001</b>	11	13	19	5	17	7	24
<b>2002</b>	19	24	28	15	31	12	43
<b>2003</b>	19	31	39	11	39	11	50
<b>2004</b>	38	28	50	16	50	16	66
<b>2005</b>	31	23	44	10	46	8	54
<b>2006</b> (as of 31/08/06)	3	5	5	3	5	3	8
<b>TOTAL</b>	<b>843</b>	<b>1042</b>	<b>1440</b>	<b>445</b>	<b>1055</b>	<b>830</b>	<b>1885</b>

Total number of victims: 1885

Percentage of women: 23%

Percentage of children: 44%