

KINGDOM OF CAMBODIA

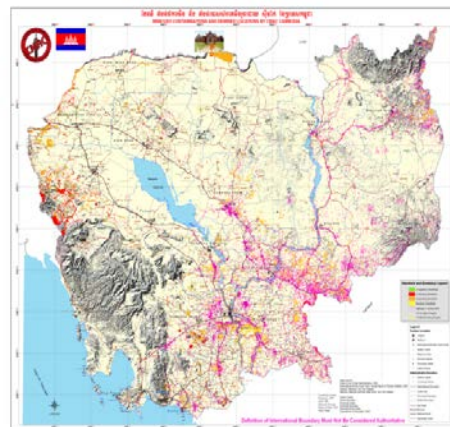
CAMBODIAN MINE ACTION CENTRE





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Cluster Munitions Remnants Survey In Cambodia

Fairmont Hotel, NW, Washington, DC., USA
07 June 2017



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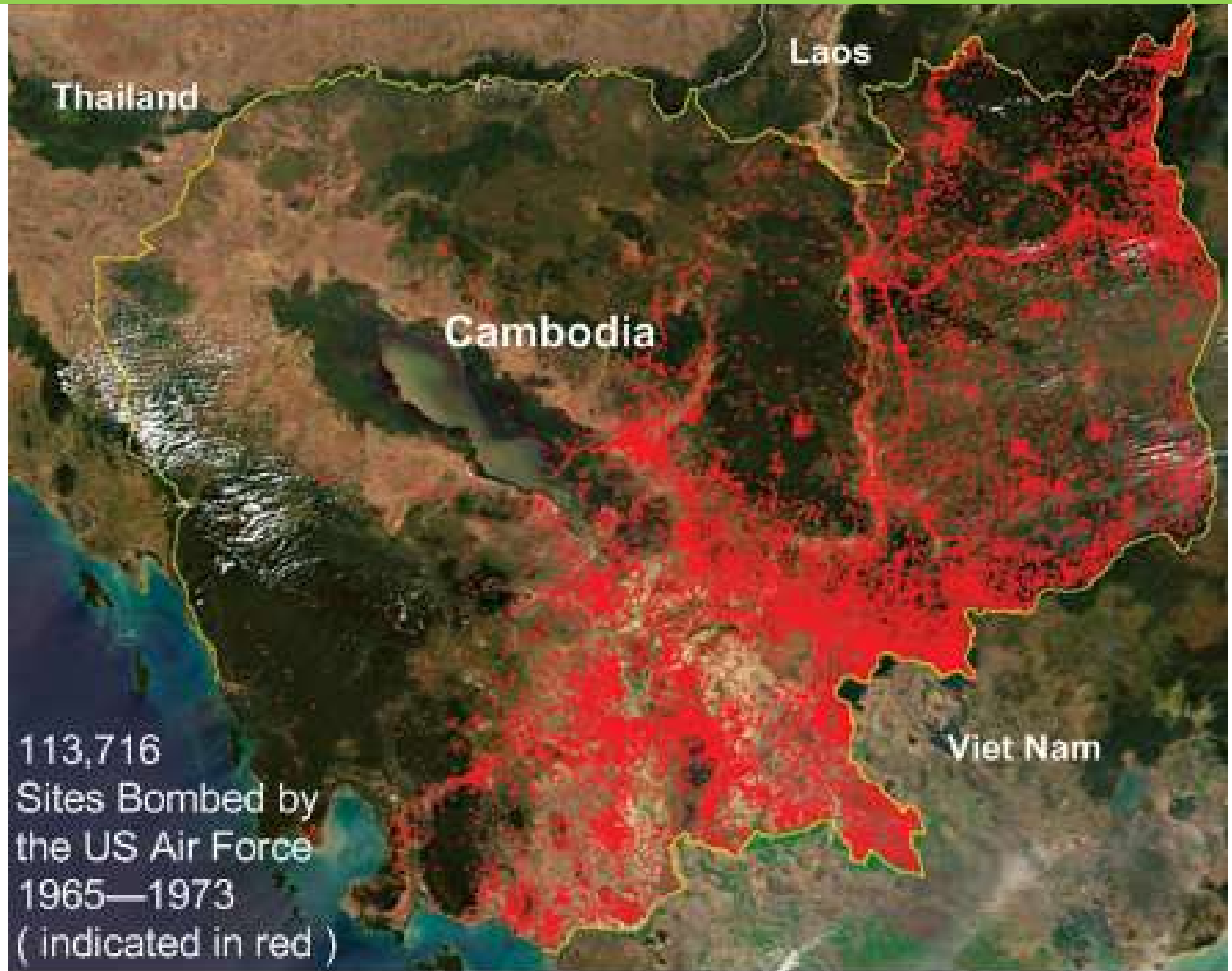
1. History of Mine/UXO problems
2. About CMAC
3. CMAC Survey background
4. Application of Survey Methodology
5. Application of Land Release
6. Application of Cluster Survey
7. Experience from Survey activities
8. Lesson Learned

1. History of Mine/UXO Problems

1940's	1950's	1960's	1970's	1980's	1990's
World War II Colonial rule and struggle for independence	Peace and independence	US-Indochina wars and heavy bombing started	Heavy bombing continued	Ground battles and use of Landmines	Limited ground battles and use of landmines
ERW		UXO (heavy) Some landmines	UXO (heavy) Some landmines	Heavy use of landmines Scattered UXO	Use of landmines Scattered UXO



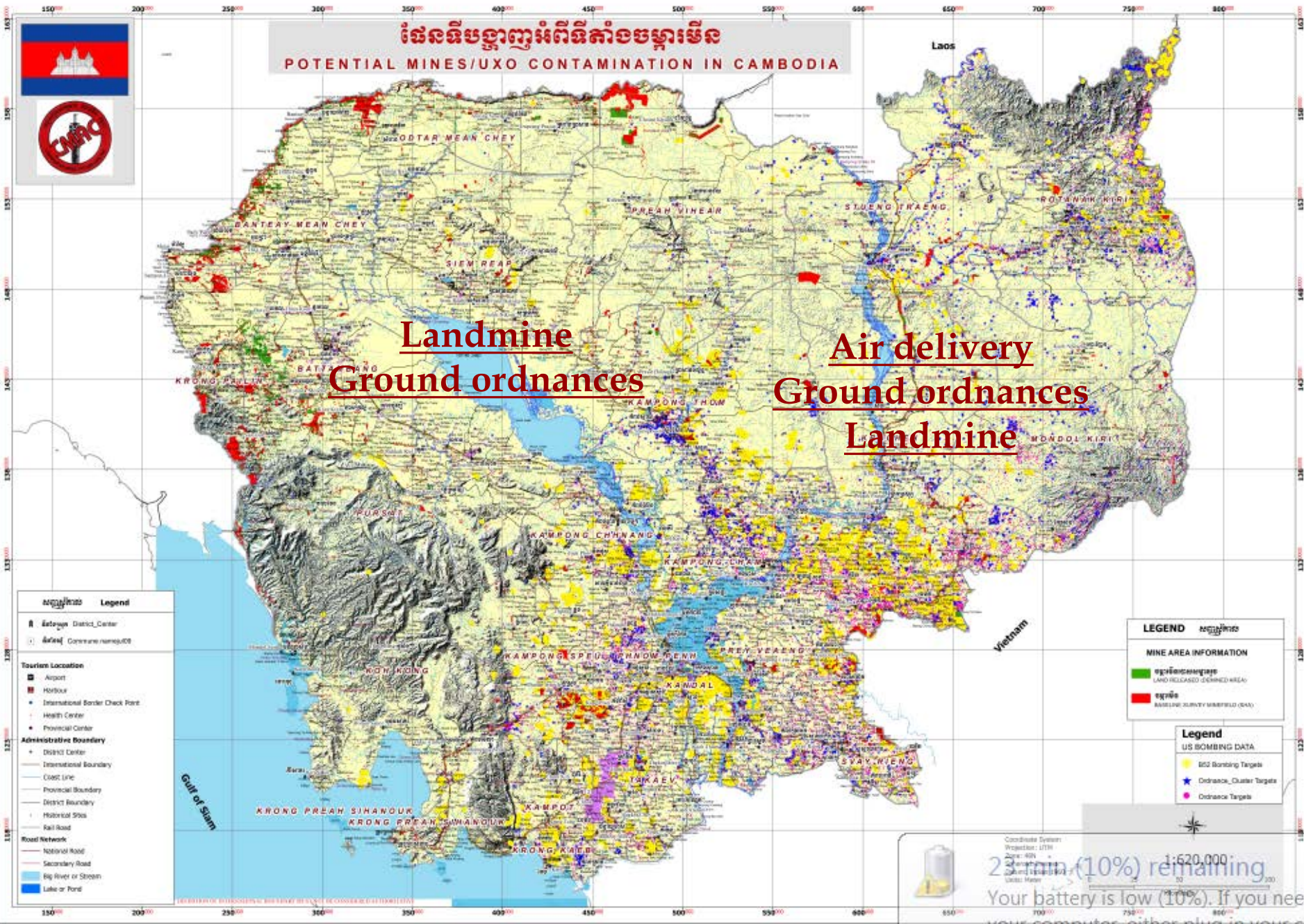
1. History of Mine/UXO Problems



Bombing
Map



ផែនទីបង្ហាញអំពីទីតាំងម្សៅមីន
POTENTIAL MINES/UXO CONTAMINATION IN CAMBODIA



Landmine
Ground ordnances

Air delivery
Ground ordnances
Landmine

Legend

- ⬛ District Center
- ⬜ Commune name/ID

Tourists Location

- ✈ Airport
- ⚓ Harbour
- 🛂 International Border Check Point
- 🏥 Health Center
- 🏠 Provincial Center

Administrative Boundary

- ⬛ District Center
- International Boundary
- Coast Line
- Provincial Boundary
- District Boundary
- Historical Sites
- Rail Road

Road Network

- National Road
- Secondary Road
- Big River or Stream
- Lake or Pond

LEGEND

MINE AREA INFORMATION

- 🟢 ម្សៅមីនស្រាយ (LAND RELEASED / DENSED AREA)
- 🔴 ម្សៅ (BASELINE SURVEY MINFIELD (BMS))

Legend

US BOMBING DATA

- 🟡 B52 Bombing Targets
- ★ Ordnance Cluster Targets
- 🟠 Ordnance Targets

Coordinate System: UTM
 Projection: UTM
 Zone: 49N
 Datum: Everest
 Spheroid: Everest
 Units: Meter

Scale: 1:620,000

20% (10%) remaining
 Your battery is low (10%). If you need your computer, either plug in your computer or use a power source.

1. History of Mine/UXO Problems

This kingdom faces with four major landmine/ERW problems:

1. Explosive Remnants of War (ERW): unexploded ordnance (UXO) and abandoned unexploded ordnance (AXO)
2. Cluster munitions: (late 1960s-1975 and 2008)
3. Chemical and IED Devices
4. Landmines: AT mines and AP Mines

Landmine/ERW Affects:

- 1- On the ground
- 2- In the ground
- 3- Underwater, and
- 4- Caches/ Stockpiles underground and underwater

2. About CMAC

CMAC'S MISSION STATEMENT

“Saving lives and supporting development of Cambodia”

Some facts:

- Year of establishment: 1992
- Number of staff: 1,600

CMAC'S CORE ACTIVITIES:

- Minefield survey and information
- Mine/UXO risk education
- Mine/UXO clearance and disposal
- Training in mine action



3. CMAC's survey background

- **1992-1993: “Reconnaissance Survey”** Cambodia Mines Action Center (CMAC) conducted reconnaissance survey in all areas that were occupied by fighting factions (CPAF, KPNLAF, ANKI, NADK).
- **1994-1997 :“Verification Survey and Marking”** to verify the information that have been collected from **Reconnaissance Survey** to be more precise information.
- **Early 2000-February 2002: “National Level One Survey”** to collect and register information about mines/UXO effected area into the national database. The purpose was to support national fund raising, planning prioritization and mine clearance.

4. Application of Survey Methodology

The application of CMAC survey methodology were developed base on practical experience, IMAS and CMAS as national standard.

CMAC defined three survey methodologies:

- Baseline Survey
- Non-Technical Survey
- Technical Survey

4. Application of Survey Methodology (Cont.)

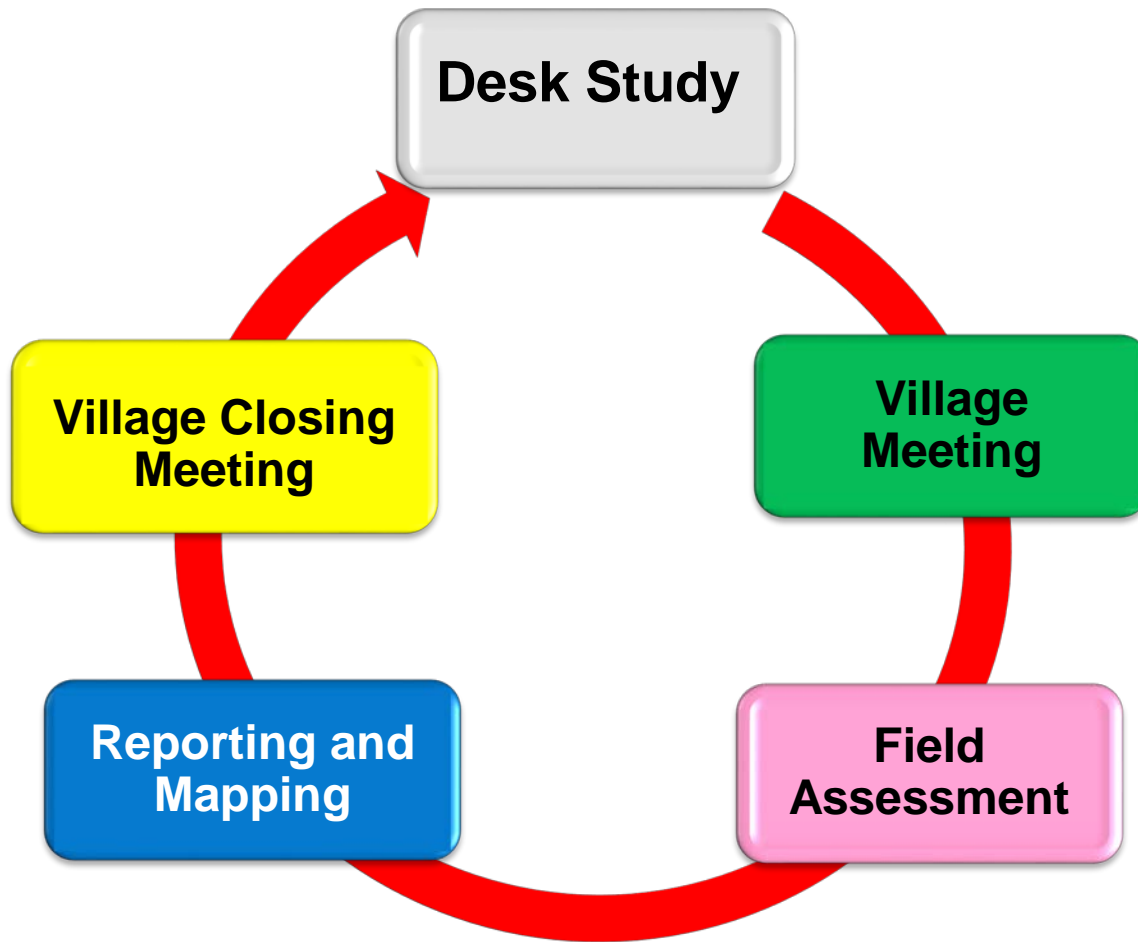
Baseline Survey

- **Baseline Survey** describes a survey activities undertaken to:
 - collect and analyses data, about the presence, type, of mine/ERW contamination,
 - Define better where mine/ERW contamination is present, and where it is not, and to support planning, prioritization and decision-making processes.
- Baseline Survey in Cambodia is a stage that be used to maintain the most up to date understanding of the state of contamination of hazard areas. NTS follow BLS

4. Application of Survey Methodology (Cont.)

Cycle of Baseline Survey Processes

Baseline Survey Processes



4. Application of Survey Methodology (Cont.)

Baseline Survey Team Structure



4. Application of Survey Methodology (Cont.)

Non-Technical Survey.

Its purpose is to:

- Confirm whether or not there is evidence of a hazard,
- Identify the type and extent of any hazard within the area,
- Define, as far as possible, the perimeter of the actual hazardous areas, without physical intervention or use of clearance asset.

CMAC has defined Non-Technical Survey into two processes:

- 1) Non-Technical Survey to comply with CMAS-15 land reclamations and land cancelation guideline.
- 2) Non-Technical Survey Pre-Clearance Assessments to support land release application.

4. Application of Survey Methodology (Cont.)

1) Cycle of Non-Technical Survey Processes

The process of NTS is similar to the BLS. CMAC define five processes in the Non-Technical Survey procedure:

- a) Desk Study
- b) Village meeting
- c) Field assessment
- d) Reporting and mapping
- e) Village closing meeting

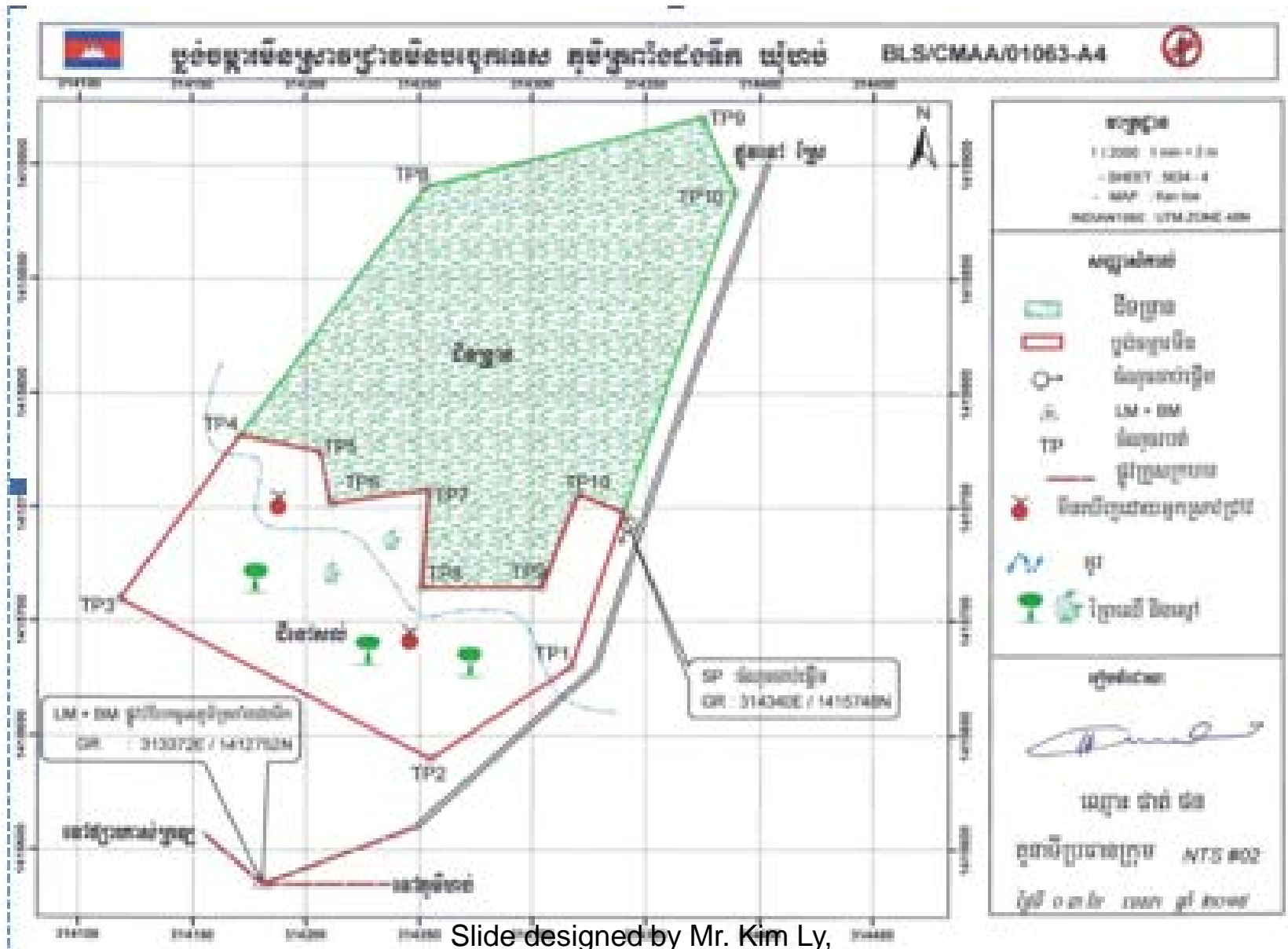
b) Village Meeting



c) Field Assessment, Data Collection



d) Reporting and Mapping



Slide designed by Mr. Kim Ly,
 Deputy Director of Operation

e) Village Closing Meeting



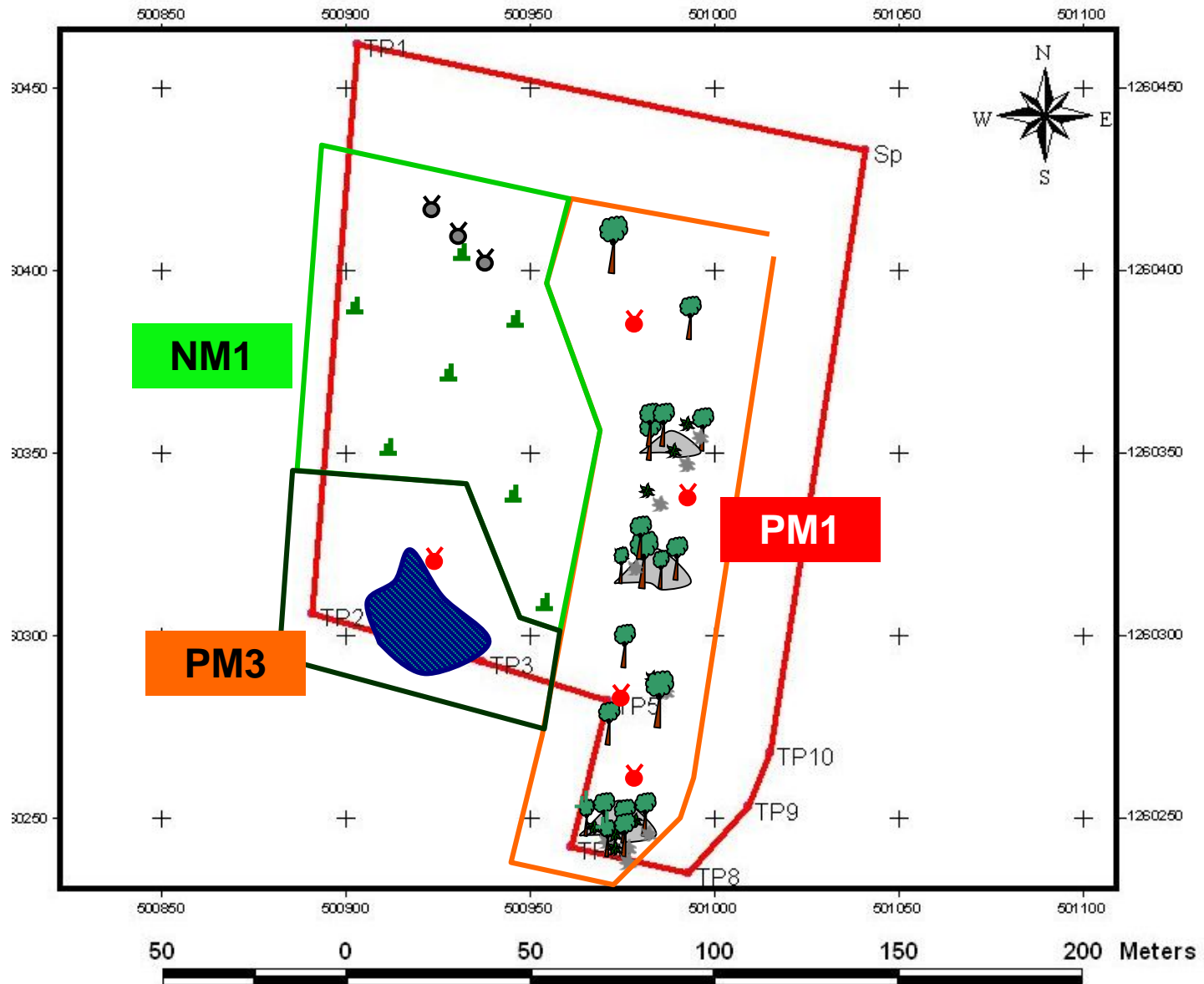
4. Application of Survey Methodology (Cont.)

2) Non-Technical Survey Pre-clearance Assessment

The NTS procedure is defined to analyse the current up to date information on the status of BLS polygons.

- Confirm a SHA (or a sector within it) is either 'Mined' or 'Not Mined'.
- The level of confidence will determine if it can be released or if further technical survey is required.
- If an area has classified as 'Mined', this requires technical survey or clearance.

Land Classification



4. Application of Survey Methodology (Cont.)

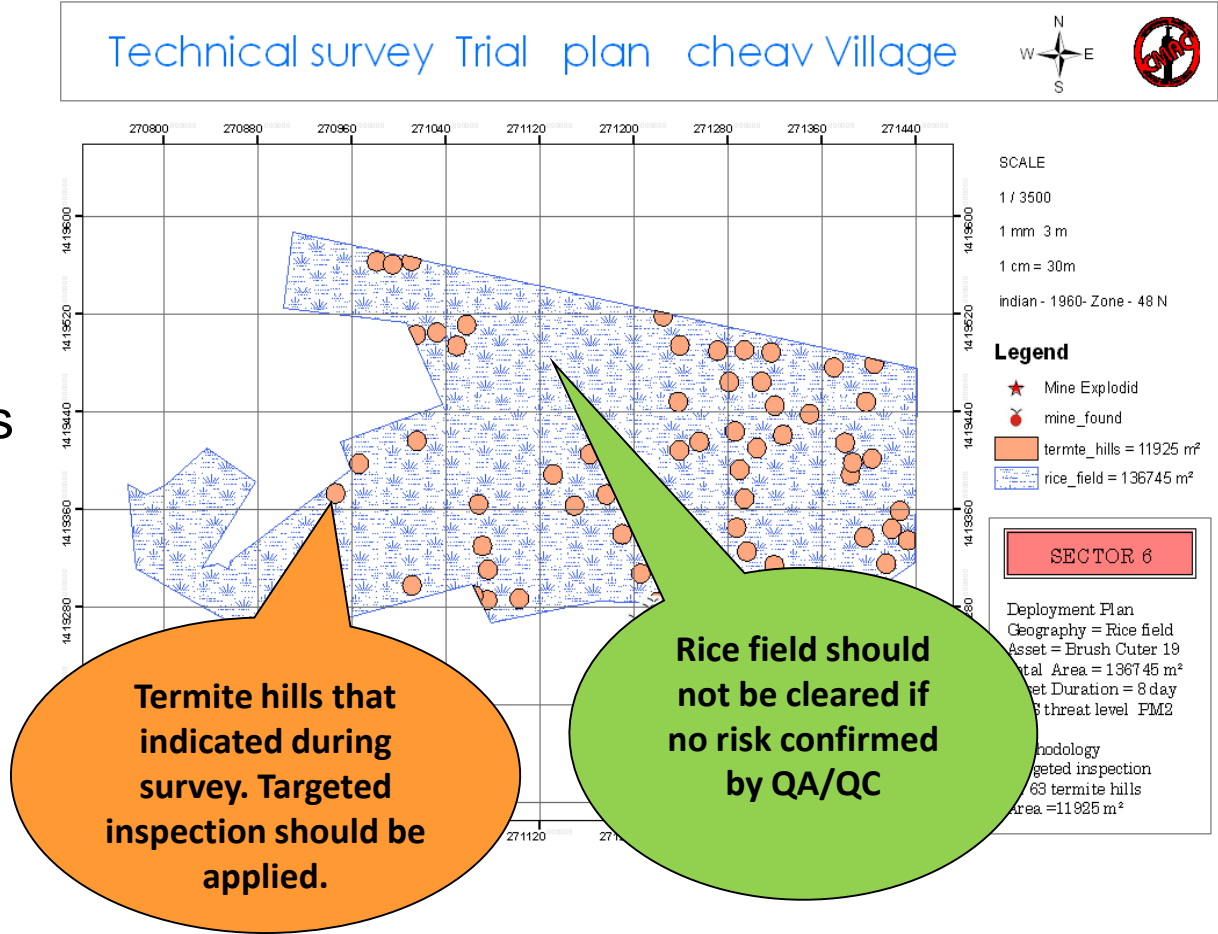
Technical Survey

CMAC has defined five processes of technical survey investigation:

- 1) Targeted Inspection
- 2) Systematic Investigation
- 3) Full Coverage Inspection
- 4) Visual Inspection
- 5) Sampling Check

Targeted Inspection

- This method is applicable to the areas where there are more likely to contain mines than other.
- Targeted inspection is conducted on the place where we have evidence of mine or people reported



CMAC Technical Survey Methodology (cont.)

Targeted Inspection

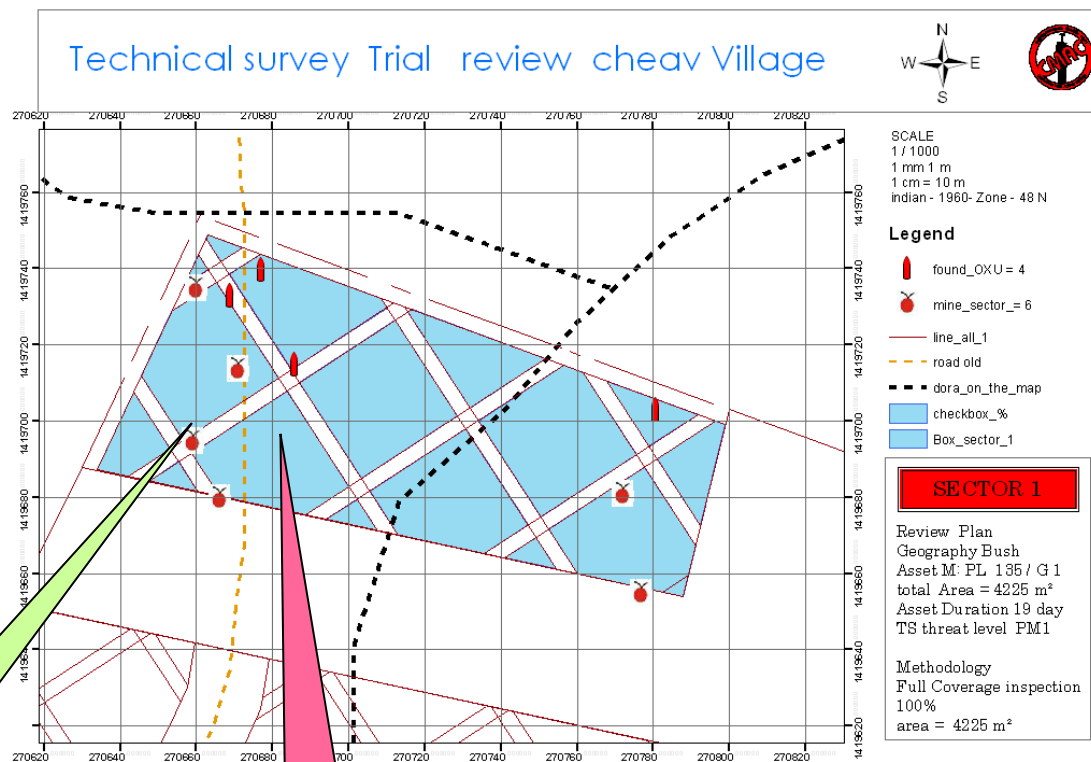


Systematic Investigation

- The systematic investigation is apply on areas where there is no efficient information about mines/ERW ,and
- on areas are more likely to contain mines /ERW, than others.

Organize boxes and inspect the boxes where mine should be laid.

All boxes must be cleared if more evidence found during systematic implementing.



Full Coverage inspection

- Applicable to areas that have been ploughed by cattle/light tractors or by heavy tractors less than 3 times.
- It is applicable to apply on the SHA; A1, A2, A4 and B2 areas to build confidence.



Visual inspection

A visual inspection is applicable to apply during or after technical survey work.

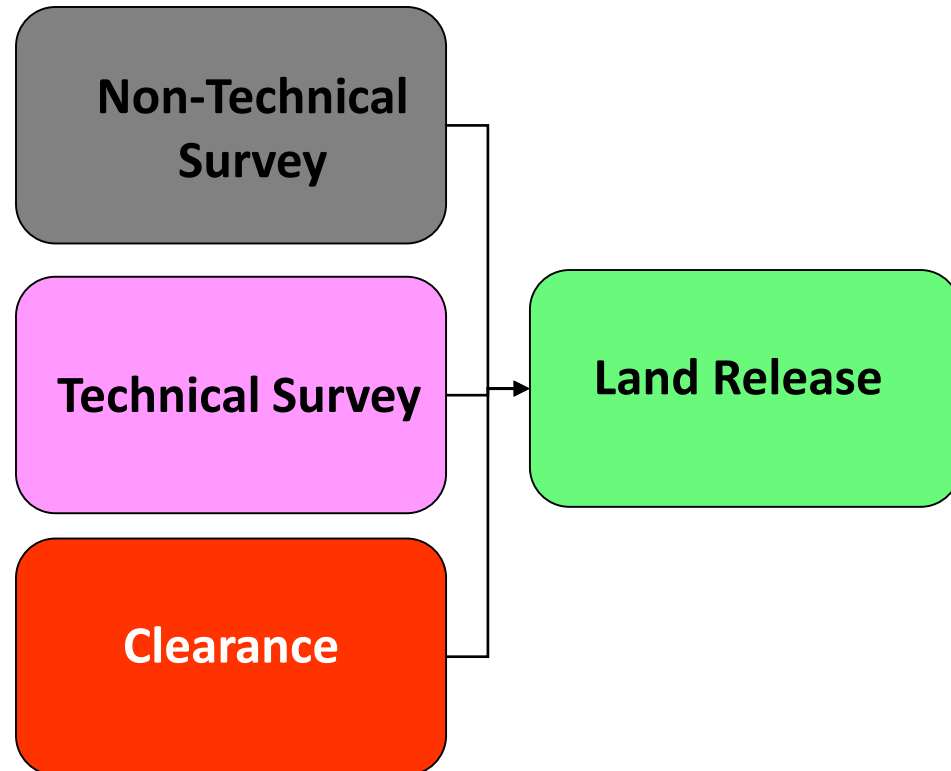
This methodology is used to support other technical survey processes to gain more info about the evidence of hazard.



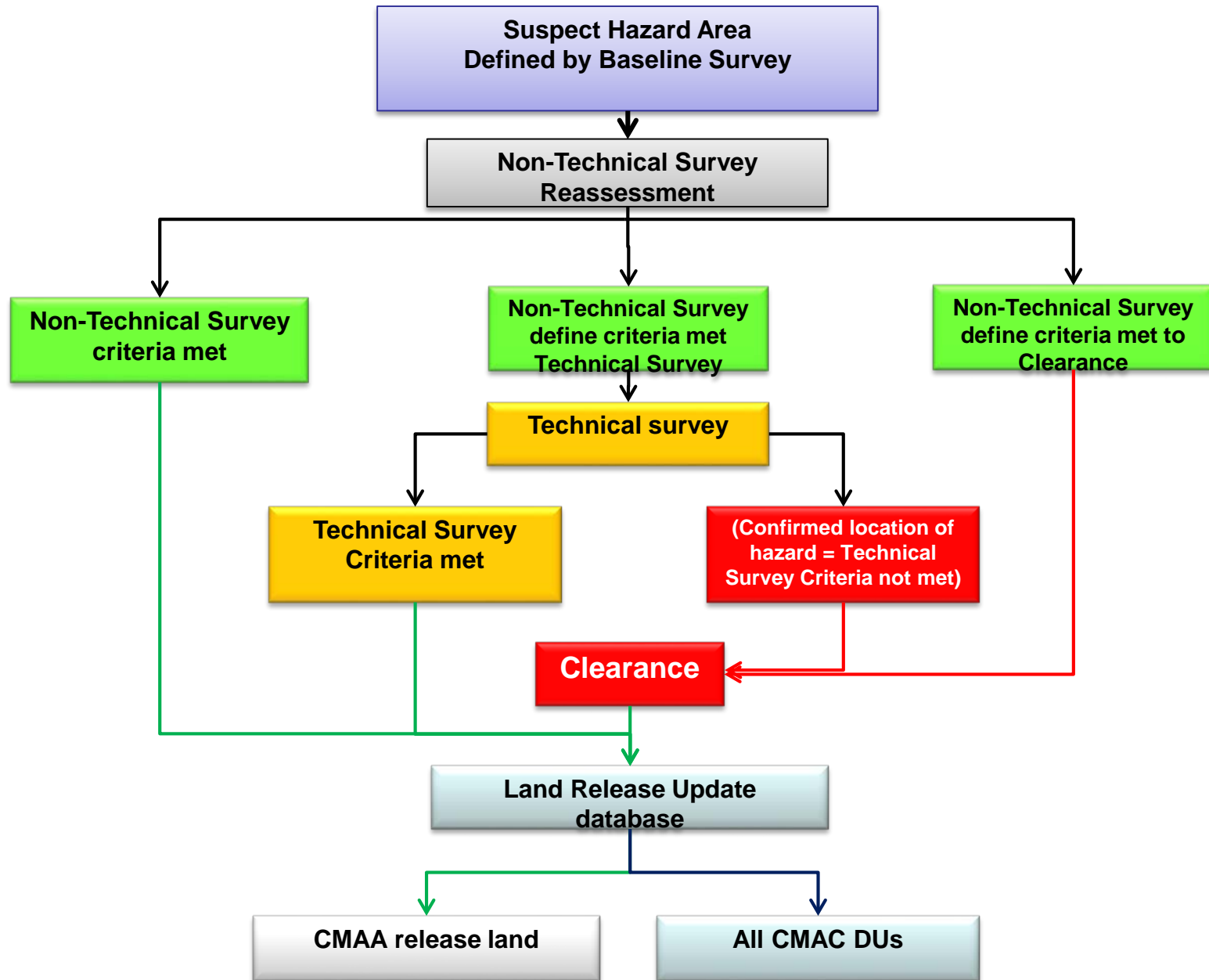
5. Application of Land Release

CMAC developing Land Release Protocol in 2008 partnership with **NPA and GICHD**, which includes:

1. Non-Technical Survey SOP
2. Technical Survey SOP based on CMAC's technical Survey experience and Area Reduction SOP's .



CMAC Land Release Process



6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY



6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY

Cluster Munitions Technical Survey (CMTS)

- CMT Survey methodology is apply on the areas where baseline survey has defined as suspicion of cluster munitions contaminated (B1.2).
- The result of CMTS:
 - Confirmed Hazard Area (CHA) of cluster munitions.
 - Reclassify BSL polygon or part of the polygon.
 - Released BLS polygon from suspicious.

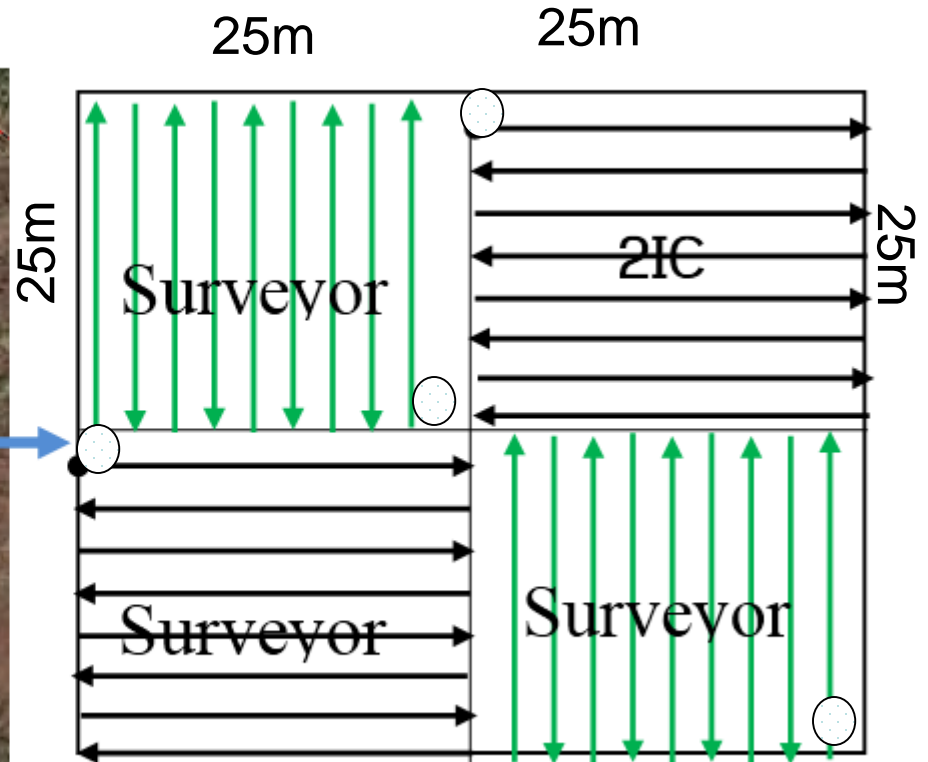
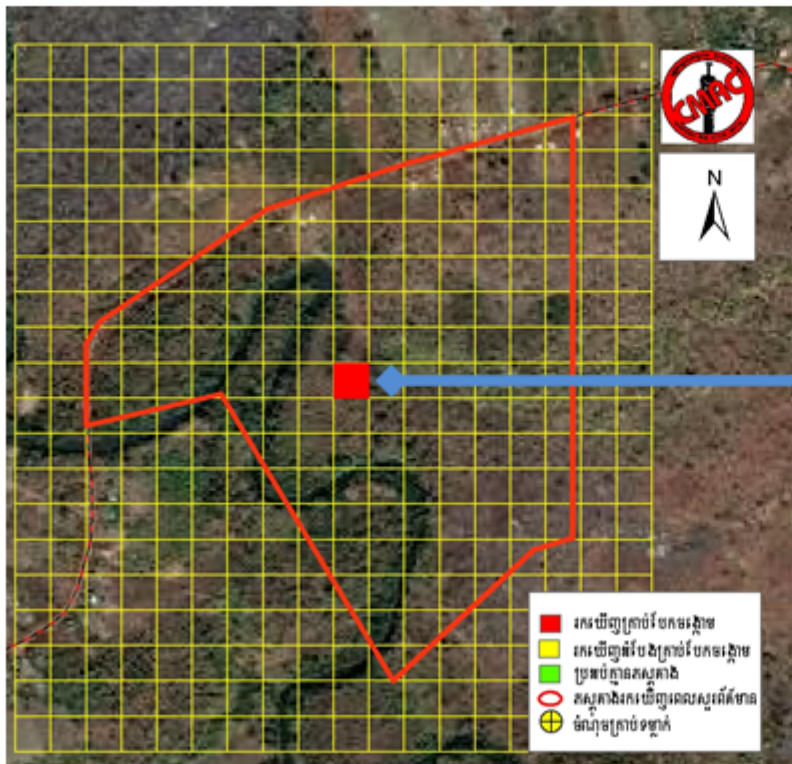
6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY (Cont.)

CMAC defined two processes of survey methodology:

- Survey from the evidence fade-out
- Survey from the start of the BLS boundary into the polygon.

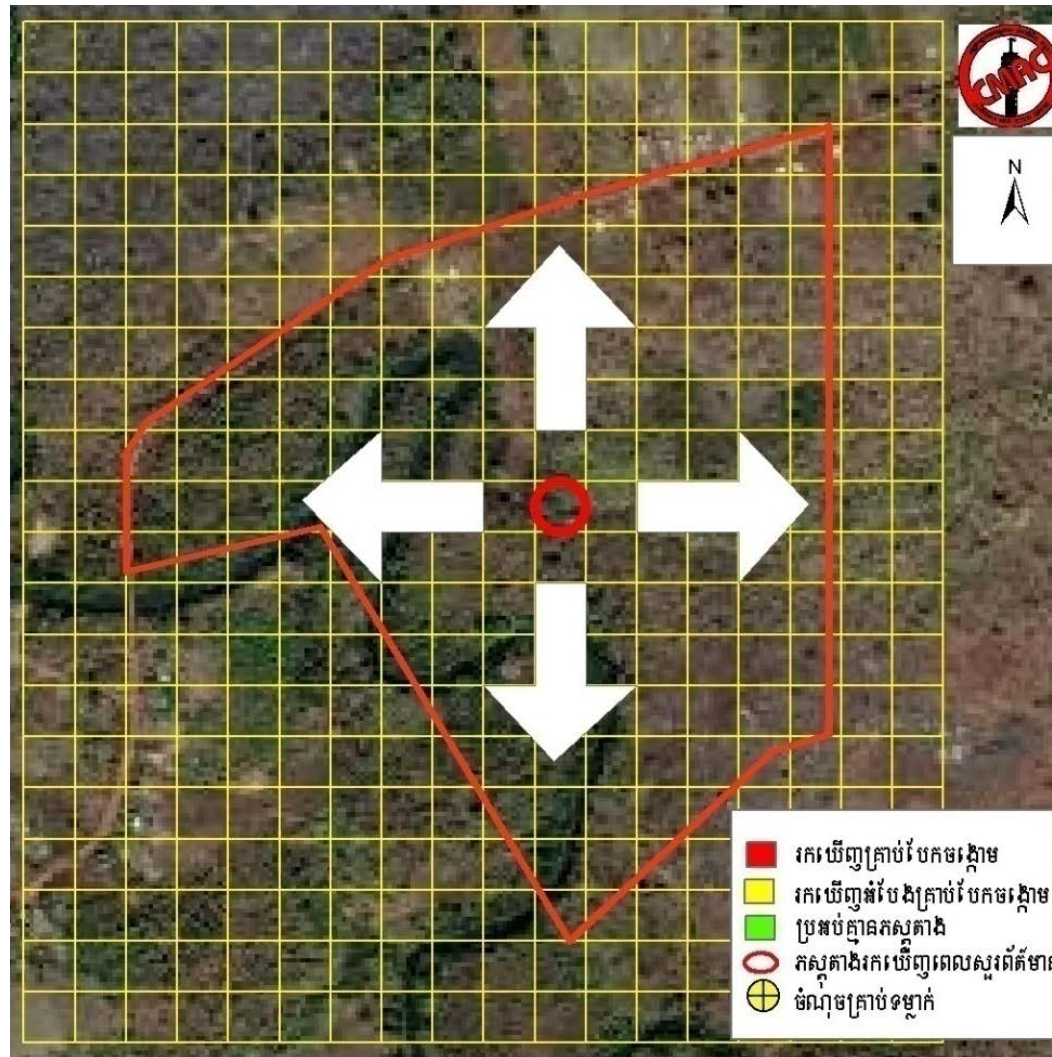
6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY (Con.t)

Box: 50m x 50m



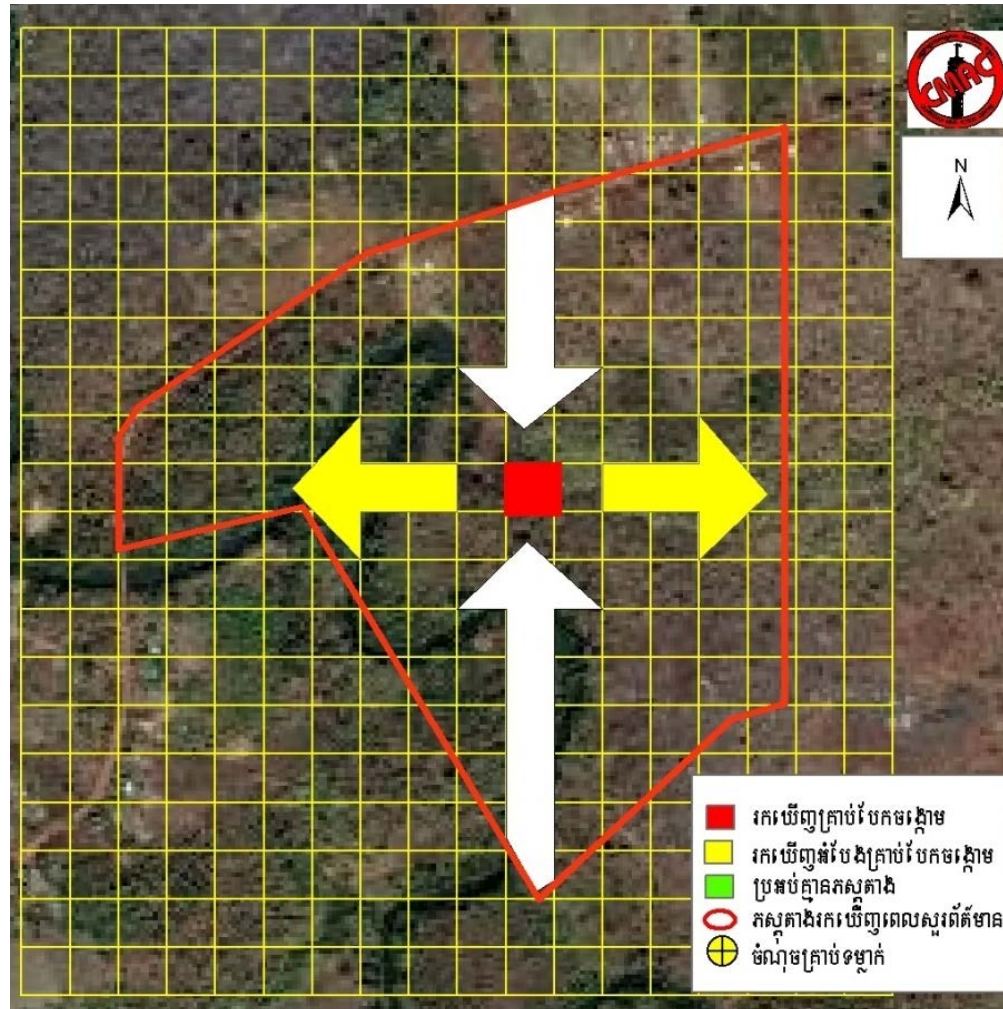
6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY (Cont.)

Methodology one: fadeout from the evidence



6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY (Cont.)

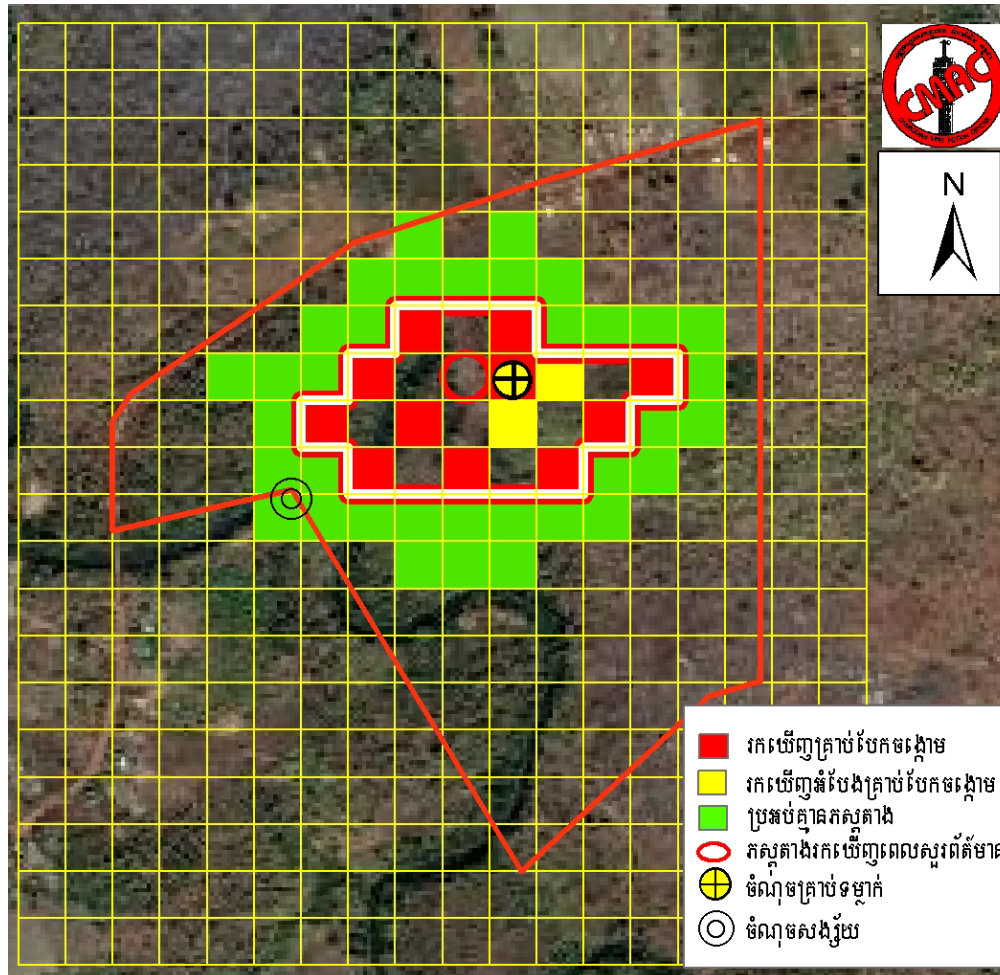
Methodology two: survey from edge of BLS inside the polygon and fade-out from evidence.



6. APPLICATION OF CLUSTER MUNITION REMANTS SURVEY METHODOLOGY (Cont.)

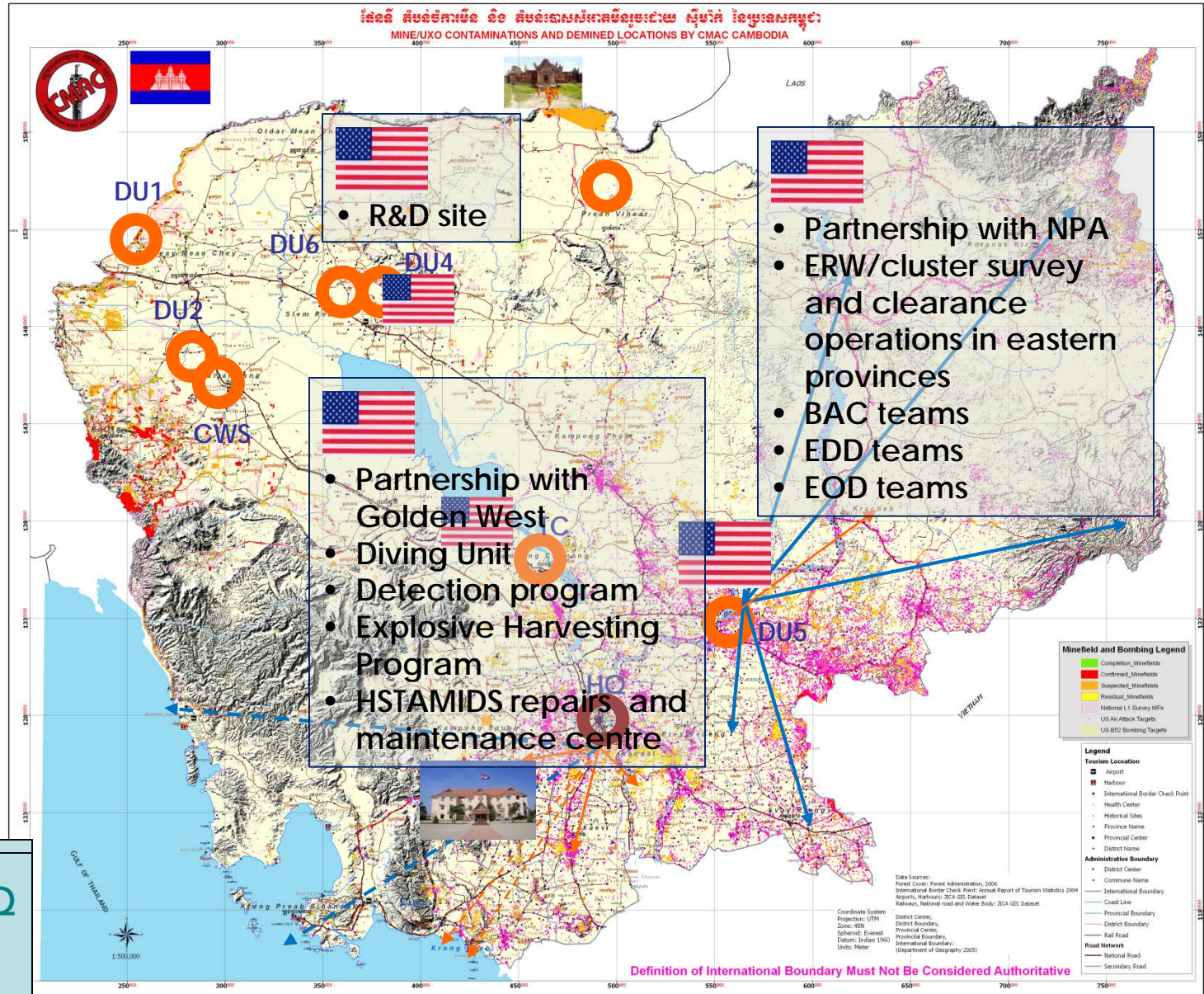
Cluster Munitions Technical Survey(CMTS)

❖ CHA boundary defined by technical survey.



7. Experience from Survey activities

Landmine
and
ERW
Problem



○ Main HQ
 ○ Sub HQ

7. Experience from Survey activities (Cont.)

Methodology: survey define food print.



7. Experience from Survey activities (Cont.)

COLOR	DESCRIPTION
Red	CM Found
Yellow	CM Fragment
Blue	MK Fragment
Orange	Other ERW
Purple	Fragment of other ERW
Green	No Evident
White	Box Skip
Black	Obtrackle

7. Experience from Survey activities (Cont.)

	May 2014-Sep 2015	Oct 2015-Oct 2016	Nov 2016-Dec 2017	Total
LAND RELEASED	10,855,563	33,091,574	15,633,802	59,580,939
Other Area Clearance	479,481	270,087	49,518	799,086
AP Mines	140	44	24	208
AT Mines	1	29	0	30
Bomb	6	19	19	44
CM	3,255	4,434	2,558	10,247
Other ERW	5,951	7,325	6,384	19,660

7. Experience from Survey activities (Cont.)

Baseline Survey	May 2014-Sep 2015	Oct 2015-Oct 2016	Nov 2016-Dec 2017	Total
BLS Polygon	372	952	420	1,744
BLS Size(m2)	83,201,614	146,055,339	74,108,327	303,365,280

8. Lesson Learned: Case study of Baseline Survey



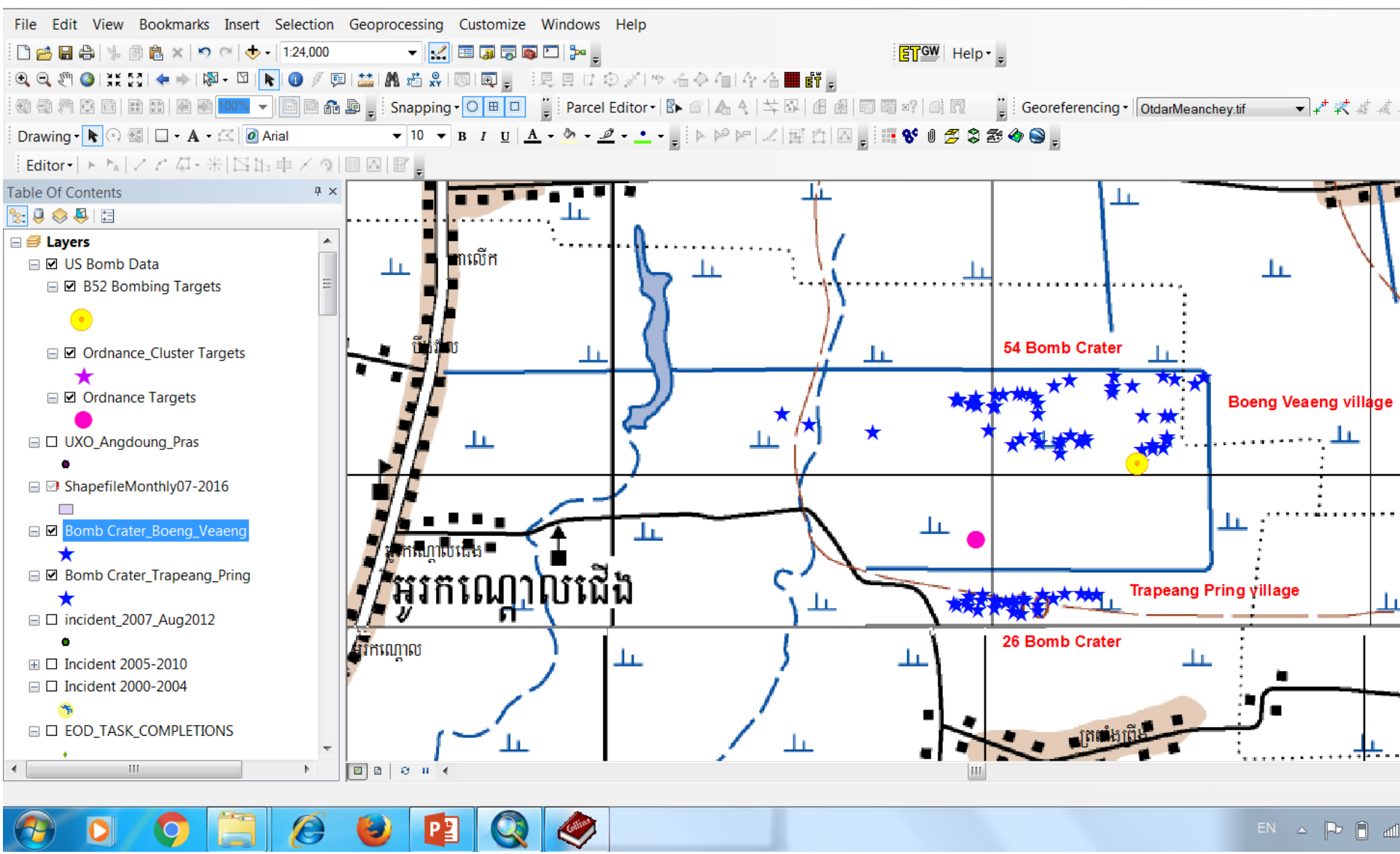
8. Lesson Learned: Case study of Baseline Survey

COLOR	DESCRIPTION
Red	CM Found
Yellow	CM Fragment
Blue	MK Fragment
Orange	Other ERW
Purple	Fragment of other ERW
Green	No Evident
White	Box Skip
Black	Obtrackle

Data included DDU = 527,701 UXO=11
Database_09 May 2016

8. Lesson Learned: Case study of Baseline Survey

- Many locations of CM and Bombing areas did not exist in



Lesson Learned: Case study of Baseline Survey

- Some evident of CM and Bombing were not exist in the database.
- Above ground CM were moved by villager/land owner from the original location to keep in the bush , this may cause of lost of evident.
- Some CM were found deeper than 20cm.
- CMAC SOP based on experience and field application, no NMAS guideline to assist.
- SOP need to be review to apply to real practical

Lesson Learned-best practices

The BLS and Land Release methodologies promotes good practice in ops planning and implementation that improved efficiency of operations:

1. To capture the total size of the remaining problem in the country for long-term strategic plan and implementation.
2. To conduct further BLS on remaining village and in the previously inaccessible areas to capture more information.
3. To conduct NTS on previous survey polygon to update the status of BLS polygon, to release reclaiming land and to capture new BLS polygon.
4. Give advance decision-making process based on an appropriate operational response in regard to the level of threat and resources' allocation.

Lesson Learned-best practices

5. Get best practice in regard to the information gathering, data management and operational planning and execution and the removal of a SHA from a database.
6. Establish an effective and sustainable community-based mine risk reduction network CMBRR & CMURR at district, commune & village levels:
 - Liaison with the local authorities
 - Information collection and update
 - Mine/UXO risk education
 - Close collaboration with Mine Action Teams
 - Village map update
 - Mine action planning
 - Community development planning.

Thank You for Your Attention!

