CONTENTS OF PRESENTATION

- History of Landmine/UXO problems in Cambodia
- Mine Ban Convention Achievements
- Progress and Path Ahead
- Technologies Deployed
- Lessons Learnt and Experiences
Background of Landmine/ERW Problems

- WORLD WAR II
- FRENCH INDOCHINA WARS
- VIETNAM WAR
  - 1979 – 1998: Guerrilla war throughout Cambodia

- Four warring factions involved in intense fighting from 1979 to 1993. Heavy use of landmines during this period.
CAMBODIA’S UXO PROBLEM
1970-1975

Est. 2.7 million tons dropped during 1965-1973

CAMBODIA’S LANDMINE PROBLEM
1970-1998

Est. 4-6 Millions landmines
Est. 4,466 km² (L1S)
Mine/ERW Survey

National Level One Survey as at June 2002.

• Number of villages contaminated 6,422 (46%)
• Number of areas contaminated 3,037
• Area of land suspected to be contaminated 4,466 Km²
• Number of Population being at risk 5,186,771 (45.3%)
• 11,429 EOD tasks identified

LANDMINE/ERW CASUALTIES

(Source: CMVIS Report by Cambodian Red Cross)
Compliance with the Mine Ban Convention

- Law on Prohibition of the Use of Anti-Personnel Mines (ratified by the Assembly on 28 April 1999)
- Sub-Decree on the Management and Control of Import, Production, Sales, Trade, Distribution and Use of all Types of Weapons and Ammunitions (30 April 1999)
- Law on the Control of Weapons, Explosives and Ammunitions (01 June 2005)
- Sub-Decree on Socio-Economic Management of Mine Clearance Operations (20 October 2004)
Main Players for Mine Action in Cambodia

• All Government Authorities from Centre Government to Village Levels
• Coordination Body: Cambodian Mine Action Authority (CMAA)
• Demining Operators, Namely:
  • The Cambodian Mine Action Centre (CMAC)
  • The Halo Trust
  • Mine Advisory Group (MAG)
  • The Royal Cambodian Armed Forces (RCAF)
  • Japan Mine Action Service (JMAS), and
  • Private Demining Companies
• Development Partners:
  • Auscare, Care International, World Vision, EC, HIB, NPA, Adopt-A-MineField, other NGOs
  • UN Corps: UNDP, UNICEF, UNHCR, UNMAS, UNOPS
  • GICHD, ITEP, and
  • Others
• Donor Community: Australia, Belgium, Canada, EC, Germany, Japan, Norway, Sweden, Spain, USA, UK

Activities Related to Mine Ban Convention

• Article 5 (Destruction of AP mines in mined areas):
  • Extension request is being prepared and will be submitted in April this year for an extension of 10 years.

• Article 7 (Transparency Measures):
  • Cambodia submits transparency reports on a regular basis in accordance with the Convention requirements
Mine Risk/ERW Education

Community-Based Focal Points for Mines and UXO:
To establish an effective and sustainable community-based mine risk reduction network at district, commune & village levels.

- 26 x Districts of Community-Based Mine Risk Reduction (CBMRR)
- 37 x Districts of Community-Based UXO Risk Reduction (CBURR)
- Volunteer Network Villagers: 434 in 139 villages

Mine/UXO Risk Education and Reduction Teams

quick response multi-skill mine risk education and reduction team which is deployed to prevent mine and UXO accidents and to alleviate risk to the affected community through:

- Mine/UXO risk education
- Battlefield clearance
- UXO disposal

- Very effective quick response
- Very mobile
- High demand
- Suitable for small and medium tasks
- Very effective UXO risk reduction
- Work closely with CBURR

Mine/UXO risk education
- Liaison with the local authorities
- Information collection and update
- CMAC’s focal point for District
- Close collaboration with Mine Action Teams
- Village map update
- Mine action planning
- Community development planning
Land Release (Non-Technical Survey)
Site Sketch of Pailin City

- 14 Landmine Detection Dog Teams
- 04 UXO Detection Dog Teams (deep search)
- Total: 87 Dogs

- MDD sniffs for explosives
- Area Reductions
- Hard Ground and heavy fragmentations
Land Release Through Full Clearance (by Mine Detection Dog Teams)

Mine Detection Dogs
MDD: Breeding Program
Mine/UXO Clearance
Manual Clearance Teams CMAC, RCAF, Halo Trust and MAG: Approx 5,000 deminers
Mine/UXO Clearance

Manual Clearance Teams CMAC, RCAF, Halo Trust and MAG: Approx 5,000 deminers
Mine/UXO Clearance Toolboxes –
(Full Clearance and Technical Survey (Mechanical Systems))

Full Clearance and Technical Survey conducted by demining Operators
UXO Clearance By Cambodia EOD TEAM CMAC, RCAF, Halo Trust and MAG

- Collected Information related to UXO
- Destruction all types of UXOs
**** Explosive Harvesting Programme
UXO Clearance By Cambodia EOD TEAM CMAC, RCAF, Halo Trust and MAG

- CMAC has more than 800 strong men for this field
- Quick response to ERW including cluster munitions
- Collect information on UXO
  - UXO collection and disposal
  - Terrorist IED response

Mine/UXO Clearance and Disposal (continued)
CMAC’s Mine/UXO Clearance Achievement (1992- Feb 2009)

- Area Cleared (Minefields & UXO Fields) : 233 km²
- Anti-Personnel Mines Found : 408,816
- Anti-Tank Mines Found : 7,845
- UXO Found : 1,397,045
- EOD Tasks Responded (2006-2008) : 29,981 tasks

Total mines/UXO destroyed by CMAC = 1,813,706 landmine/UXOs

Nationwide Mine/UXO Clearance Achievement (1992- Feb 2009)

- Area Cleared (Minefields & UXO Fields) : > 500 km²
- Anti-Personnel Mines Found/Destroyed : 820,911
- Anti-Tank Mines Found/Destroyed : 19,196
- ERW Found/Destroyed : 1,756,914

Total mines/UXO Destroyed nationwide :

2,597,021 landmine/UXOs

PATH AHEAD (THE FUTURE)
Domestic Policy framework:

- The Millennium Development Goals (UN and Cambodia-specific)
  - Goal 1: Eradicate extreme poverty and hunger
  - Goal 2: Achieve universal primary education
  - Goal 3: Promote gender equality and empower women
  - Goal 4: Reduce child mortality
  - Goal 5: Improve material health
  - Goal 6: Combat HIV/AIDS, malaria and other diseases
  - Goal 7: Ensure environmental sustainability
  - Goal 8: Develop a global partnership for development
  - Goal 9: De-mining, UXO and victim assistance (Cambodia-specific)
National Strategic Plan for Landmine/ERW

The Kingdom of Cambodia:
- signed the Mine Ban Treaty on 3 December 1997,
- ratified on 28 July 1999, and
- the treaty entered into force on 01 January 2000

Article 5

Destruction of anti-personnel mines in mined areas

1. Each State Party undertakes to destroy or ensure the destruction of all anti-personnel mines in mined areas under its jurisdiction or control, as soon as possible but not later than ten years after the entry into force of this Convention for that State Party.

Cambodia’s deadline: 01 January 2010

National Strategic Plan for Landmine/ERW

To address the problem, Cambodia is preparing to submit a Request for Extension of the life of Ottawa Mine Ban Treaty for another ten years: 2010 – 2020.

Article 5

Each State Party...

- “shall make every effort to identify all areas under its jurisdiction or control in which anti-personnel mines are known or suspected to be emplaced.”

- “shall as soon as possible ensure that these mined areas “are perimeter marked, monitored and protected by fencing or other means, to ensure the effective exclusion of civilians, until all anti-personnel mines contained therein have been destroyed.”

- “undertakes to destroy or ensure the destruction of all anti-personnel mines in mined areas under its jurisdiction or control, as soon as possible but not later than ten years after the entry into force of this Convention for that State Party.”

Each State Party may...

- If it believes that it will be unable to destroy or ensure the destruction of all anti-personnel mines in ten years, submit a request for an extension of the deadline for completing the destruction of such AP mines, for a period of up to ten years.
National Strategic Plan for Landmine/ERW

Article 5: Extensions request calendar

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<tr>
<td>Opportunity to prepare the request.</td>
<td>Ninth Meeting of the States Parties: Opportunity to provide an update on “work in progress.”</td>
<td>Request submitted (nine months prior to the last Meeting prior Cambodia’s deadline for completing implementation of Article 5).</td>
<td>Request formally considered (Likely timing for the last Meeting prior to the deadline for Cambodia to complete implementation of Article 5).</td>
<td>Deadline for Cambodia to implement Article 5</td>
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</table>

National Strategic Plan for Landmine/ERW

<table>
<thead>
<tr>
<th>Remaining problem:</th>
<th>Size (km²)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remaining problem based on Level 1 Survey</td>
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<td></td>
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<tr>
<td>Original problem</td>
<td>4.466</td>
<td>L1S</td>
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<tr>
<td>Progress</td>
<td>500</td>
<td>All operators</td>
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<td>Remaining</td>
<td>3,966</td>
<td></td>
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<td>2. Classification of remaining problem based on calculated estimation</td>
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<tr>
<td>Confirmed</td>
<td>685</td>
<td>For full clearance</td>
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<tr>
<td>Suspected + residual</td>
<td>1,806</td>
<td>For further technical survey and NTS</td>
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<tr>
<td>3. Ways of addressing the remaining problem</td>
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<tr>
<td>LR (full clearance)</td>
<td>956</td>
<td>Confirmed +15% of Suspected &amp; Residual areas</td>
</tr>
<tr>
<td>LR (TS+NTS)</td>
<td>1,535</td>
<td>15% goes to full clearance</td>
</tr>
<tr>
<td>LR (GS)</td>
<td>1,475</td>
<td>Cancelling L1S from database</td>
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<td>Total:</td>
<td>3,966</td>
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<tr>
<td>4. Cost of addressing the remaining the remaining problem</td>
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<td></td>
</tr>
<tr>
<td>Description</td>
<td>Outputs (m²)</td>
<td>Total Cost ($)</td>
</tr>
<tr>
<td>Full Clearance</td>
<td>959,790,000</td>
<td>479,895,000</td>
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<tr>
<td>Survey</td>
<td>3,010,100,000</td>
<td>17,760,000</td>
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<tr>
<td>Equipment</td>
<td>99,531,000</td>
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<tr>
<td>Management</td>
<td>39,812,400</td>
<td></td>
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<tr>
<td>TOTAL:</td>
<td>3,969,890,000</td>
<td>636,998,400</td>
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</table>
The Land Release Concept and Process and how this can relate to the Baseline Survey Concept – a Perspective:

**Definition**

- **Classification A**
  - **Mined Area**: ground that presents compelling evidence of protective, defensive, or denial mine laying

- **Classification B**
  - **Residual Threat**: land presenting an indeterminate or scattered presence only of mines and UXO

- **Classification C**
  - **End State Land**: impact free ground on which deployment of demining resources is no longer considered necessary or economically viable

**Process**

1. **Technical survey**
2. **Non-technical survey**
3. **Assessment of land use**
4. **Analysis of existing survey data**
5. **Full Clearance**
6. **Released land**

**Diagram**

- **Full Clearance**
- **Overlapping area**
- **Non-technical survey**
- **Technical survey**
- **Definition**
- **Classification A**
- **Classification B**
- **Classification C**
### National Strategic Plan: Future Land Classification After Baseline Survey

<table>
<thead>
<tr>
<th>Definition</th>
<th>Criteria</th>
<th>Sub-Category</th>
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<tr>
<td><strong>Classification A</strong></td>
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<tr>
<td>Mined Area</td>
<td>Land that presents evidence of mines</td>
<td></td>
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<tr>
<td></td>
<td>• Presence of high density mine concentrations, lines, clusters (including but not restricted to border mine belts, mined defensive positions, mined road alignments)</td>
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<td></td>
<td>• Historical information of mine laying, ideally from multiple sources</td>
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<td></td>
<td>• Verifiable or confirmed incidence of casualties inside area</td>
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<td>• Any in-use or abandoned route alignment presenting a probable threat of anti-tank mines, regardless of density, and regardless of the presence or absence of anti-personal mines</td>
<td>A1, A2, A3, A4</td>
</tr>
<tr>
<td><strong>Classification B</strong></td>
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<tr>
<td>Residual Threat Land</td>
<td>Land that presents ERW or an indeterminate presence of mines</td>
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<td></td>
<td>• Possible or unconfirmed presence of mines</td>
<td>B1, B2</td>
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<td></td>
<td>• Confirmed presence of mines in low ‘nuisance’ densities only</td>
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<td>• Evidence of regular use of ground by local people, whether for transit, resource collection, livestock grazing or agriculture production, and where there are...</td>
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<td>• ...few, none or an unverifiable incidence of casualties in area</td>
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<td>• Presence of ERW possibly justifying formal BAC only</td>
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<tr>
<td><strong>Classification C</strong></td>
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<tr>
<td>End State Land</td>
<td>Land that presents no obvious threats</td>
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<tr>
<td></td>
<td>• Land formally cleared by accredited operators and handed back to local authorities</td>
<td>C1, C2, C3, C4</td>
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<td>• Land put back into productive use, where there has been no accident or evidence of mines in the past three years (as per CMAA Area Reduction Policy)</td>
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<td>• Land with no indication from communities or previous survey to have any mine threat</td>
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### Technology Employed

- Manual deminers with mine and UXO detectors
- Mine and UXO detection dogs
- Mechanical vegetation cutting machines (Brush Cutters)
- Landmine clearance machines (Demining machines)
- Integration of toolboxes:
  - Combination of MDD with manual deminers
  - Combination of mechanical systems with MDD
  - Combination of mechanical systems with manual deminers

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CMAC Research and Development Activities

- Development of Standard Operating Requirements (SOR)
- Development of Test and Evaluation Plan (Policy Approval)
- Performance, Survivability and Acceptance Tests
- Test Report
- Recommendations and Modifications
- Integration Trial

THE PROJECT FOR RESEARCH AND DEVELOPMENT OF MINE CLEARANCE RELATED EQUIPMENT
CMAC Research and Development Activities

Test Demining Machines from Japan 2007-late 2008

CMAC Research and Development Activities

Selection process
CMAC Research and Development Activities

MINE DETECTOR – ALIS
MINE DETECTOR - GRYPHON

- From Tokyo Institute of Technology
- Test Star 22.11.06
- Finish on 15.01.07
- Now test is in progress…

CEIA DETECTORS
CEIA DETECTORS TEST AND DEPLOYMENT
UXO Detection Dog (EDD)

Survivability Test – Push machine
Current Research & Development (With USA)

One USSR RPG-2 Anti-tank Grenade contains 535 grams of TG-50 (50% RDX)
Total 70 gram cast charges possible: 7 each

One USSR 152 mm OF-540 Projectile contains 6.0 kg of pressed TNT
Total 100 gram wedge charges possible: 60 each

One US 105 mm Comp B + Three US 105 mm TNT Projectiles creates 8.6 kg of sensitized explosive mix
Total 120 gram cast charges possible: 71 each

Charge Design: AP Mine Neutralization

• Smaller charge face, route initiation wave up through the center.
  – Consistent neutralization of PMN-2
Facilities Availability in Cambodia
For any R&D of Demining Technologies and its real applications

- Five different types of soil, 60+ mines per lane and plenty of natural "clutter".
- Flat and smooth; intended to test “Proof of Principle” against various backgrounds
- All mines and clutter is DGPS recorded to within 10cm of the exact location

Mine Detectors Test Sites
THANK YOU!

DO YOU HAVE ANY QUESTIONS?