Presentation to the MASG:
Study on Operational Efficiency in Mine Action
Background of the Study

- **Why**: At the request of the Chair of the MASG, Ambassador Yves Marek, funded by the Government of France.

- **Study objective**: identify and analyse how the performance of land release operations is measured with regards to efficiency and to provide MA stakeholders with examples of key performance indicators (KPIs) in different contexts.

- **Areas of focus**: the efficiency of land release operations.
Definitions

- **Efficiency in Mine Action**: measures how economically resources/inputs (funds, expertise, time, etc.) are converted to results (outputs and outcomes).

  In short, Efficiency = $\text{Input} / \text{Output}$ (e.g. cost / m²).

- **Effectiveness in Mine Action**: measures the extent to which the intervention’s objectives were achieved, or are expected to be achieved, taking into account their relative importance.
Efficiency = Input / Output (e.g. cost / m2).
The following KPIs will be used in the study:

1. Cost per m2 of land released
2. Cost per EO item found
3. Cleared versus released ratios
4. m2 / EO item
5. Asset time / EO item
6. m2 / asset / time (m2 / Deminer / day)
Desk review – open source secondary data
15 mine action programmes as a sample to generate research questions

- Afghanistan
- Angola
- Bosnia and Herzegovina
- Cambodia
- Colombia
- Croatia
- Iraq
- Lao PDR
- Lebanon
- Serbia
- South Sudan
- Sudan
- Tajikistan
- Thailand
- Vietnam
Challenges

- **Data accuracy and validation** (variance between sources)
- **Like for Like KPIs** - Consistency of unit measurement (e.g. NMAAs or MAOs do not always separate annual cost data for CM vs AP/AV clearance in their external reports)
- **Access to data** (data privacy, commercial data, information on cost)

Challenges will be addressed during the next steps, data collection from NMAAs, MAOs and donors, triangulation, verification and validation of various sources.
KPI 1: Cost per m2 of land released

Note: Full analysis has not yet been completed and these preliminary results are mainly originating from open-source data, the KPIs should be interpreted strictly in context. Taken in isolation they can give rise to misleading or invalid conclusions.
Average cost ($) per m² released, 2015-2019

Outliers

Average $4.66

Thailand  Cambodia  Angola  South Sudan  Croatia  Vietnam  Iraq  Lao PDR  Afghanistan  Tajikistan  Sudan  Serbia  Lebanon  Colombia

USD per m²

Average cost ($) per m² released, 2015-2019
Average cost ($) per m² released, 2015-2019

- Cost driven by completion deadlines?
- Cost driven by difficult terrain?
- Cost driven by competition?

Average $1.55

USD per m²

Cambodia: 0.22
South Sudan: 0.37
Vietnam: 0.65
Iraq: 0.81
Angola: 0.94
Lao PDR: 0.98
Croatia: 0.99
Afghanistan: 1.08
Tajikistan: 1.24
Sudan: 1.29
Serbia: 1.58
Lebanon: 1.64

8.34
KPI 2: Cost per EO found
- Cost driven by geography?
- Cost driven by completion deadlines?
- Cost driven by threat type (e.g. Afghan random AT mines)?
- Cost driven by density of contamination?
Does Geography matter?

- Cost driven by governance (structures, standards, policies)?
- Costs driven by indirect cost (support, QM, etc)?
- Costs driven by cost of living, GDP, HDI, etc?

### Average of $per m2 (released)

- **8.34**

### Countries and Costs

<table>
<thead>
<tr>
<th>Country</th>
<th>$per m2 released</th>
<th>$per m2 cleared</th>
<th>$per EO</th>
</tr>
</thead>
<tbody>
<tr>
<td>BiH</td>
<td>0.94</td>
<td>16.10</td>
<td>6,367</td>
</tr>
<tr>
<td>Croatia</td>
<td>1.08</td>
<td>1.31</td>
<td>4,611</td>
</tr>
<tr>
<td>Serbia</td>
<td>1.64</td>
<td>3.62</td>
<td>37,481</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>1.24</td>
<td>1.34</td>
<td>3,021</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>1.29</td>
<td>2.99</td>
<td>1,497</td>
</tr>
<tr>
<td>South Sudan</td>
<td>0.37</td>
<td>1.08</td>
<td>972</td>
</tr>
<tr>
<td>Sudan</td>
<td>1.58</td>
<td>2.38</td>
<td>23,492</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.02</td>
<td>2.25</td>
<td>281</td>
</tr>
<tr>
<td>Cambodia</td>
<td>0.22</td>
<td>0.46</td>
<td>856</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.65</td>
<td>0.65</td>
<td>500</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>0.99</td>
<td>0.99</td>
<td>356</td>
</tr>
</tbody>
</table>
GDP and HDI (Preliminary)

$per\ m^2\ released\ vs\ GDP\ per\ capita$

$R^2 = 0.0513$

$per\ m^2\ cleared\ vs\ GDP\ per\ capita$

$R^2 = 0.0054$

$per\ m^2\ released\ vs\ HDI\ 2019$

$R^2 = 0.0407$

$per\ m^2\ cleared\ vs\ HDI\ 2019$

$R^2 = 0.0079$
KPI 3: Cleared land / Released land
### KPI 3: Cleared versus released ratios

<table>
<thead>
<tr>
<th>Country</th>
<th>Cleared vs Released</th>
<th>Average of $per m² (released)</th>
<th>Average of $per EO item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>2%</td>
<td>0.02</td>
<td>281</td>
</tr>
<tr>
<td>Angola</td>
<td>4%</td>
<td>0.98</td>
<td>1,815</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>6%</td>
<td>0.94</td>
<td>6,367</td>
</tr>
<tr>
<td>Iraq</td>
<td>37%</td>
<td>0.81</td>
<td>4,437</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>46%</td>
<td>1.29</td>
<td>1,497</td>
</tr>
<tr>
<td>South Sudan</td>
<td>47%</td>
<td>0.37</td>
<td>972</td>
</tr>
<tr>
<td>Cambodia</td>
<td>52%</td>
<td>0.22</td>
<td>856</td>
</tr>
<tr>
<td>Serbia</td>
<td>55%</td>
<td>1.64</td>
<td>37,481</td>
</tr>
<tr>
<td>Sudan</td>
<td>68%</td>
<td>1.58</td>
<td>23,492</td>
</tr>
<tr>
<td>Lebanon</td>
<td>74%</td>
<td>8.34</td>
<td>1,275</td>
</tr>
<tr>
<td>Croatia</td>
<td>81%</td>
<td>1.08</td>
<td>4,611</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>93%</td>
<td>1.24</td>
<td>3,021</td>
</tr>
<tr>
<td>Vietnam</td>
<td>100%</td>
<td>0.65</td>
<td>500</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>100%</td>
<td>0.99</td>
<td>356</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>40%</strong></td>
<td><strong>1.44</strong></td>
<td><strong>6,285</strong></td>
</tr>
</tbody>
</table>

Cost driven by Land release approach?

Do `Costs per m2` contracts promote efficiency?

Cost driven by Land release approach?

Do `Costs per m2` contracts promote efficiency?
KPI 4: Land released or cleared per EO item
<table>
<thead>
<tr>
<th>Country</th>
<th>Cleared vs Released</th>
<th>$per m2 (released)</th>
<th>$per EO item</th>
<th>m2 cleared/Item</th>
<th>m2 released/Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>2%</td>
<td>0.02</td>
<td>281</td>
<td>199</td>
<td>17,661</td>
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<tr>
<td>Angola</td>
<td>4%</td>
<td>0.98</td>
<td>1,815</td>
<td>385</td>
<td>15,773</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>6%</td>
<td>0.94</td>
<td>6,367</td>
<td>405</td>
<td>9,113</td>
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<tr>
<td>Iraq</td>
<td>37%</td>
<td>0.81</td>
<td>4,437</td>
<td>1,834</td>
<td>7,794</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>46%</td>
<td>1.29</td>
<td>1,497</td>
<td>399</td>
<td>988</td>
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<tr>
<td>South Sudan</td>
<td>47%</td>
<td>0.37</td>
<td>972</td>
<td>673</td>
<td>3,198</td>
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<tr>
<td>Cambodia</td>
<td>52%</td>
<td>0.22</td>
<td>856</td>
<td>1,908</td>
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<tr>
<td>Serbia</td>
<td>55%</td>
<td>1.64</td>
<td>37,481</td>
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<tr>
<td>Sudan</td>
<td>68%</td>
<td>1.58</td>
<td>23,492</td>
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<td>4,993</td>
</tr>
<tr>
<td>Lebanon</td>
<td>74%</td>
<td>8.34</td>
<td>1,275</td>
<td>253</td>
<td>307</td>
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<tr>
<td>Croatia</td>
<td>81%</td>
<td>1.08</td>
<td>4,611</td>
<td>4,283</td>
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<tr>
<td>Afghanistan</td>
<td>93%</td>
<td>1.24</td>
<td>3,021</td>
<td>2,094</td>
<td>2,253</td>
</tr>
<tr>
<td>Vietnam</td>
<td>100%</td>
<td>0.65</td>
<td>500</td>
<td>810</td>
<td>811</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>100%</td>
<td>0.99</td>
<td>356</td>
<td>394</td>
<td>394</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>40%</strong></td>
<td><strong>1.44</strong></td>
<td><strong>6,285</strong></td>
<td><strong>2,554</strong></td>
<td><strong>9,761</strong></td>
</tr>
</tbody>
</table>

Lebanon - Expensive metres, but very targeted (effective) clearance, (EO density, difficult terrain, local costs)?
Vs Serbia - Cheaper cost per metre, but lots of areas being released and cleared with little EO found?
Initial Hypotheses

Some of the initial hypotheses:

• Is cost driven by Land Release method (e.g. Thailand and Angola)?
• Is cost driven by competition (e.g. Cambodia, Croatia vs Afghanistan, Lebanon)?
• Is cost driven by difficulty of terrain (separate research)?
• Is cost driven by how close the country is to completion (Lebanon vs Croatia)?
• Is cost driven by local cost of living (GDP, HDI)
• Is cost driven by geographic location (South Sudan vs Sudan, Cambodia vs Laos, etc)?
• Are $ per m cleared contracts an efficient contracting modality?
• How does costs of potentially productive resources that were on site, but that were not being productive, affect efficiency?
• What is the impact of indirect / enabling costs (e.g. cost of training, insuring, maintaining and administration)?
• How do start-up costs affect efficiency?
• How does asset productivity affect cost efficiency?
• How does governance (structures, standards, policies) affect efficiency?
Initial conclusions

- Avoid committing to any specific costs analysis approaches until the availability and nature of data becomes clearer.
- Avoid becoming too bogged down in contextual factors (vegetation, soil, contamination levels, etc.), using ‘big data’ approach accept a spread of results for some indicators, reflecting variation from ‘hard’ to ‘easier’ sites.
- Look for opportunities to apply a ‘big data’ approach wherever possible.
- Focus on quantitative approach, but also use case studies to explain influencing factors and variances.
Next Steps

- Finalisation of desk review and research scope - 30 April 2022
- Primary data collection from NMAAs, MAOs and donors: May-August 2022
- Data analysis and report writing: - September 2022
- Presentation of Final Report at MASEG meeting – 20 October 2022
- Incorporation of inputs received during MASEG and finalization of report - November 2022