

# Using Geographic Information System in Measuring Mine Action Sustainable Development Outcomes

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## Abstract:

Iraq is one of the most heavily contaminated countries by explosive ordnances in the world<sup>1</sup>. The Iran-Iraq War (1980-1988), the Gulf War (1991), the 2003 invasion, and subsequent internal conflicts have left Iraq littered with millions of explosive ordnance devices. Iraq is one of the four most contaminated states by cluster munitions, which are mostly concentrated in southern Iraq, while conventional landmines are found primarily along the Iran border. The 2014-2017 conflict with the Islamic State of Iraq and the Levant (ISIL) further exacerbated the situation, leaving large amounts of improvised explosive devices (IEDs) and other remnants of war, particularly in northern and central Iraq.

Mine action plays a crucial role in reducing the threat of explosive devices, enhancing community safety and stability, and restoring development activities. Mine action activities include collecting historical maps and data, mapping hazardous areas, marking, surveying, clearance, victim assistance and explosive ordnance risk education, and other supporting activities. Using maps is essential to plan and implement mine action projects taking into consideration the safety of clearance teams while conducting operations. The Geographic Information System (GIS), developed and managed by the United Nations Office for Project Services (UNOPS), is integrated into the mine action information management system which supports analysis and presentation tasks and produces maps that meet operational requirements.

This article explores the role of maps in one of the key monitoring and evaluation processes, namely the Post Activity Impact Assessment (PAIA). During PAIA, a team assesses the use of lands within a year after explosive ordnance clearance operations are completed. The assessment aims to measure the impact of clearance on the sustainable development of the communities previously affected by explosive remnants of war.

Since 2021, United Nations Mine Action Service (UNMAS) Iraq has conducted PAIA on an annual basis. UNMAS team use ArcGIS survey 1232 to evaluate if safe access to lands previously contaminated was restored by clearance operations. The ArcGIS Survey123 is an affordable and straightforward tool for data collecting, solution, and evaluation. The survey is conducted using a digital application on a portable device including mobile phone or tablets by interviewing beneficiaries in the areas released through clearance.

During the PAIA, the mapping is used for

- locate and draw the polygons of the cleared hazardous areas
- select samples of sites to be visited by the evaluation team
- plan site visits to meet with beneficiaries
- collect and analyze data
- present findings

In 2024 PAIA, UNMAS Iraq assessed 20 sample sites out of 60 hazardous areas where clearance was completed between 1 January to 31 December 2023 in Ninewa and Basara governorates.



Figure 1: Governorates covered in the PAIA in 2024

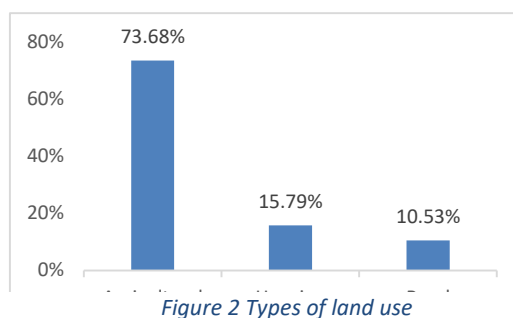
<sup>1</sup> Ministry of Environment, Directorate for Mine Action <https://dma.gov.iq/> and Iraqi Kurdistan Mine Action Agency, <https://gov.krd/maa-en/activities/>

<sup>2</sup> ArcGIS Survey 123 <https://survey123.arcgis.com/>

The findings showed that explosive ordnance clearance has enabled access to lands in 97 percent of the locations. The use of the lands was restored to facilitate agricultural activities in 74 percent of the lands, 16 percent for housing, and 10 percent for road construction in four districts.

The intended use of the PAIA will inform future planning and implementation of activities, particularly for prioritization of locations, coordination with local communities, and enhancement of quality management systems.

Mine action in Iraq directly contributes to several Sustainable Development Goals, including reducing all forms of violence, ensuring access to safe and affordable housing, and supporting economic development and human well-being<sup>3</sup>.



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<sup>3</sup> The Sustainable Development Outcomes of Mine Action in Iraq, GICHD <https://www.gichd.org/publications-resources/publications/the-sustainable-development-outcomes-of-mine-action-in-iraq/#:~:text=This%20publication%20sheds%20light%20on,asylum%20seekers%20among%20other%20outcomes.>