

3. ECOLOGY

SUSTAINABLE WASTE MANAGEMENT IN HUMANITARIAN CONTEXT

Koliada M. K.

*International Organization for Migration, Ukraine
National Programme Support Officer, Shelter & Non Food Items
mkoliada@iom.int*

The International Organization for Migration (IOM), established in 1951 and a UN-related agency since 2016, promotes safe, orderly, and regular migration globally. With 175 Member States and over 550 field offices, IOM provides services to governments and migrants. The Ukraine Mission, formalized in 2002, operates with 442 staff across eight sub-offices. Since February 2022, IOM has assisted 8.6 million war-affected individuals, leveraging national reach and local partnerships. It collaborates with the Government of Ukraine, the EU, and Member States to support humanitarian response, recovery, and reforms aligned with Ukraine's EU accession.

In humanitarian crises, emergency shelter kits (ESKs) are widely deployed to protect displaced populations. These kits include plastic tarpaulins and sheeting, delivered in large quantities which inadvertently generate significant plastic waste. Protracted refugee situations face environmental strain from accumulated plastic debris and often resort to burning waste due to the lack of formal waste management, exacerbating ecological impacts.

There is growing interest in exploring innovative products from recycled plastic sheeting, especially in protracted crises or transitioning to sustainable responses. Ukraine's humanitarian shelter operations have generated vast quantities of plastic. Table 1 summarises "estimated pollution" from tarpaulins distributed via emergency shelter support programs (primarily by agencies like IOM and partners):

Table 1. Estimated pollution in Ukraine

Year	Households Assisted (with ESK)	Tarpaulins Distributed (pcs)	Approx. Plastic Weight (tons)
2022	411,031	822,062	3,206
2023	184,231	368,462	1,437
2024	200,280	400,560	1,562
2025	75,648	151,296	590
Total	-	1,742,380	6,759

To address the challenge of plastic waste in humanitarian contexts, this review studies the recycling of used shelter plastics into durable construction materials. The project conducted by UNHCR in Lebanon [1] demonstrates the feasibility and benefits of repurposing old plastic sheets into shelter doors. Approximately 410,000 m² of discarded plastic sheeting can yield around 6,700 new doors, significantly reducing environmental waste. These recycled plastic doors exhibit enhanced cost-effectiveness and longevity – costing approximately 30% less (\$32 vs \$45) and lasting five times longer (≈10 years vs 2 years) than conventional timber-based doors. This initiative underscores the ecological and economic advantages of integrating sustainable waste management practices into relief operations. Furthermore, it highlights the importance of collaboration between international humanitarian agencies and local stakeholders, including municipal authorities, businesses, and research institutions, for implementing scalable recycling solutions.

The application of the tarp-to-door concept, or similar plastic repurposing strategies, in Ukraine appears highly feasible, contingent upon the establishment of appropriate conditions and partnerships. The tarpaulins distributed in Ukraine consist of woven HDPE or polypropylene scrims coated with LDPE, which are compatible with standard plastic recycling machinery. The Lebanon pilot employed extrusion combined with compression moulding to fabricate door components; Ukraine could adopt this method or explore alternatives such as injection molding to produce a variety of items, including doors, roofing tiles, and planks.

Even partial recovery of Ukraine's tarp waste presents substantial material potential. Based on the Lebanon conversion ratio (~3–4 tarps per door), the tarps distributed in 2022

alone could theoretically produce between 200,000 and 270,000 recycled doors. Although not all tarps would be collected or required for door production, this estimate illustrates the significant opportunity for generating useful outputs. Recycling just 10% of the 2022–2025 tarp waste (~680 tons) could yield approximately 50,000 door units, representing a considerable impact. Consequently, Ukraine’s humanitarian plastic waste stream is sufficiently large to warrant an industrial-scale recycling initiative, offering ample input material for pilot projects and future expansion.

Ukrainian universities and technical institutes can contribute to innovation and skills development. These institutions may support research on recycling processes (e.g., optimizing melting temperatures for specific tarp materials or incorporating fillers like sand for enhanced strength, as demonstrated in Chernihiv [2]), product design (engineering departments could assist in mold design for various items), and product testing (materials laboratories can evaluate physical-mechanical characteristics, and safety to ensure compliance with building codes and humanitarian standards).

A notable challenge in Ukraine is the retrieval of used tarps dispersed across a broad geographic area, primarily in the Central, Eastern, and Southern oblasts. Unlike camp settings, many tarpaulins in Ukraine were distributed to individual households for roof repairs or temporary shelters, complicating recollection efforts. Local authorities, or Hromadas, play a critical role in this context. They can organize collection drives or establish drop-off points at local waste management centers for residents to deposit used plastic sheeting. Additionally, communal service workers could be mobilized to collect damaged tarps following new distributions or reconstruction phases. With local leadership and community engagement, a consistent supply of used tarps can be redirected to recycling facilities rather than landfills.

A recycling initiative has the potential to stimulate local economies by creating employment opportunities—from collection crews (possibly within municipal services or through contracts) to factory workers and technicians operating recycling machinery. In Lebanon, refugees were employed in the recycling process; in Ukraine, this could translate into jobs for Internally Displaced Persons (IDPs) or local residents in affected communities, thereby supporting livelihood restoration. The project can also foster community involvement in environmental initiatives, with local volunteers or youth groups participating in collection efforts and promoting environmental awareness. Moreover, the initiative could expand to include other local plastic waste streams (e.g., greenhouse film, plastic packaging), potentially evolving into a small-scale social enterprise [2]. Such enterprises, if profitable or self-sustaining, may attract impact investment or continue operations beyond initial humanitarian funding.

Although not explicitly categorized among the “three” local actors, organizations such as IOM, UNHCR, and UNDP serve as enablers and connectors in this domain. These agencies can provide initial funding, technical guidance, and ensure alignment with humanitarian objectives. For instance, UNDP’s previous project [3] on plastics at the local level raised awareness and mapped recycling infrastructure in Ukraine, establishing a foundation for future initiatives. IOM has already supported recycling businesses as part of livelihood programs. These organizations can facilitate coordination among Hromadas, academic institutions, and businesses, aligning efforts with national and international goals and potentially formalizing partnerships through agreements such as memoranda of understanding.

REFERENCES

1. Farres Danielle (2024) Repurposing plastic sheets into doors – UNHCR, *Proceedings of the Global Shelter Cluster Annual Meeting 2024*. SESSION SUMMARIES.pptx - Google Slides
2. United Nations. (2025). *They know what to do with your plastic*. United Nations. <https://ukraine.un.org/en/234857-they-know-what-do-your-plastic>
3. United Nations Development Programme. (2021). *Plastic waste management at the local level*. <https://www.undp.org/ukraine/projects/plastic-waste-management-local-level>