Environmental impact of Shelter/NFI in a protracted crisis
The Rohingya crisis enters its fifth year.

899,239 refugees are living in 33 camps located in a hilly terrain.
Shelters are exposed to cyclic monsoons and face risk of floods, landslides, fire and cyclones.
Temporary materials such as bamboo and tarpaulin have a limited capacity to resist weather impacts, and thus require regular repairs and replacement. Use of limited number of materials have an impact on the environment.
Mitigation

Betterment

Do no harm
Species and numbers of Bamboo used by different sectors in the Rohingya Camps starting from 2017 up to December 2021

Source: UNHCR, Cox’s Bazar, 2022.
BAMBOO

Annual Demand for bamboo in Rohingya Refugee Camps

<table>
<thead>
<tr>
<th>Source</th>
<th>Total (Nos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGOs/iNGOs /UN</td>
<td>15,016,027</td>
</tr>
<tr>
<td>Self-sourced by the Rohingya families</td>
<td>4,489,973</td>
</tr>
<tr>
<td>Grand Total</td>
<td>19,506,000 (19.5 M)</td>
</tr>
</tbody>
</table>


Source: UNHCR, Cox’s Bazar, 2022
Bamboo, in its natural state, is not a durable material. It is easily attacked by insects and fungi due to the presence of starch and sugar in the culms.

With the increasing demand, traditional harvesting knowledge and practices are lost.

Preservation treatment is essential to enhance durability of culms during storage and of finished products.
Mitigation – efforts to reduce impact on the environment

Bamboo treatment

- 5 Bamboo Treatment Facilities run by UN, INGO, NGO
- 2 Bamboo Treatment Facilities run by the local vendor
- Total capacity for treatment: 1,200,000 bamboo culms per year
- Used chemical solution: Borax and Boric Acid
- Time of culms immersion: 7-14 days
- Treatment can extend bamboo lifespan for 3-5 years

Source: IOM, Cox’s Bazar
Mitigation – efforts to reduce impact on the environment

Isolation of bamboo from the ground

- The footing is used to provide proper support for the structure, to make the post strong enough to resist wind pressure.
- Footing isolates the bamboo posts from the ground, so bamboo is less affected by water and infestation.
- It can also be uninstalled easily if it needs to be changed.

Use of metal/RCC footing for bamboo posts improves longevity of bamboo and therefore reduce impact on Bangladeshi bamboo reserves.
Mitigation – efforts to reduce impact on the environment

BAMBOO CONNECTIONS

- Open holes in bamboo allow moisture to get inside the bamboo, increasing risk of deterioration and infestation.
- Similarly, rope absorbs moisture and when looped through holes in the bamboo introduces moisture inside the bamboo.
- Use of metal allow for tightening of joints and are more durable than dowels.

Source: SNFI Sector
Mitigation – efforts to reduce impact on the environment

Design solutions

The most external material deteriorates first.

- Use tarpaulin on the inside and bamboo mat on the outside.

- Add tarpaulin or other waterproof materials to the lower part of the wall on the outside to prevent seepage of water inside the shelter. Bamboo garenja on top of tarpaulin

Site planning for appropriate orientation of shelters
Mitigation – efforts to reduce impact on the environment

Alternative materials

- Double storey steel-framed shelters - more durable and reducing bamboo dependence; approvals on hold
- Earth shelters (existing in the camps) - limitation of sourcing earth and providing repair packages
- Jutin sheet - Jute compressed with resin; pilots and research ongoing

Source: SNFI Sector

Left: Double storey steel-framed structure; earth shelter; Jutin shelter

Source: SNFI Sector

Source: CRS/Caritas
Mitigation – efforts to reduce impact on the environment

Community engagement, local knowledge

- Capacity building
- Use of local knowledge
- IEC

Source: SNFI Sector
Mitigation

Betterment

Do no harm
NATURE BASED SOLUTIONS

- Rohingya Refugees camps are situated in hilly areas and some locations need to be reinforced to avoid landslides.
- Plantations as slope stabilization
- It provides small garden space for vegetables
- Watershed management projects: Reduce disaster risks and pollution by improving water flow, manage solid waste and introduce nature-based solutions
- Create a riparian vegetation, increase tree density and biodiversity in the watershed
- Improve social cohesion between refugees and host communities
Provision of LPG ensures access to sustainable cleaner cooking energy for Rohingya refugees.

This solution is essential to mitigate protection risks associated with food security and nutrition, sexual and gender-based violence (SGBV) (women and children going alone collecting wood), health (air quality), environmental degradation and climate change.

It is also a solution to reduce tensions between refugees and host communities over common natural resources.
Mitigation | Betterment | Do no harm
DO NO HARM

Supplier’s perceived stock of bamboo in Cox’s Bazar

Change in the demand of bamboo due to the Rohingya influx

Bamboo in Cox's Bazar
- Moderately available
- Scarce
- Sufficiently available
- Very scarce

Changing trend in supply
- Decreasing
- Increasing

Deforestation in Cox's Bazar District

Deforestation Area (sq. km)
LONGER TERM IMPACT:

Bamboo treatment, proper design and site planning could reduce frequency of bamboo replacement from every year to every 5 years or longer.

Distribution of clean cooking energy is estimated to prevent extraction of over 533,000 tonnes per year of firewood from the mixed hilly forest area in Cox’s Bazar.

Use of LPG for cooking reduces firewood demand by 50 percent in the host community and 80 percent in the camps.
How to ensure environmentally sustainable measures with reduced funding?
How to convince the government to approve and upscale those solutions?
How to involve the community for longer term sustainability?