



# TESTING REGENERATIVE DESIGN GUIDELINES FOR REFUGEE CAMPS AND SETTLEMENTS

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Department of  
**International  
Development**



re-alliance

## ABOUT THE REPORT

This report was produced for Re-Alliance by students at the London School of Economics and Political Science as part of their Master programs.

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## ABBREVIATIONS

**CEAP** - Community-based Environmental Action Plan

**CMT** - Camp Management Toolkit

**FRAME** - UNHCR Framework for Responding, Assessing, Monitoring and Evaluating the environment in refugee-related operations

**IDP** - Internally Displaced Person

**INGO** - International Non-Governmental Organisation

**LSE** - The London School of Economics and Political Science

**NEAT+** - Nexus Environmental Assessment Tool  
**OCHA** - United Nations Office for the Coordination of Humanitarian Affairs  
**NGO** - Non-Governmental Organisation  
**SDG** - Sustainable Development Goals  
**UDDT** - Urine Dry Diversion Toilets  
**UN** - United Nations  
**UNEP** - United Nations Environment Programme  
**UNHCR** - United Nations High Commissioner for Refugees  
**WASH** - Water, Sanitation, and Hygiene  
**WH** - Water Harvesting

## GLOSSARY

**Agroforestry** - the “growing of trees and crops, and sometimes animals, in interacting combinations” (Jørgensen, Fath, 2008).

**Circular economy** - “A circular economy decouples economic activity from the consumption of finite resources” (Ellen MacArthur Foundation).

**Ecological sanitation** - “closing the loop between sanitation and agriculture without compromising health. The characteristics of a closed loop system are that human excreta, grey water and solid waste is treated as a resource and not as a waste product” (WHO, 2009)

**Ecosystem** - “consists of a biological community, its physical and chemical environment, and the dynamic interactions that link them” (Jørgensen, Fath 2008).

**Disaster risk reduction** - “This is defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events” (Sphere, 2018).

**Greywater** - “untreated household wastewater, which has not been contaminated by toilet waste. It includes the water from bathtubs, showers, hand basins, laundry tubs, and floor wastes” (WHO, 2006).

**Internally Displaced Persons** - “persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized state border” (UN Guiding Principles on Internal Displacement, 2004).

**Permaculture** - "The conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems" (Mollison, 1988).

**Regeneration** - "Reversing the degradation of the planet's living systems and seeking to restore a healthy relationship between humans and other life" (Re-Alliance).

**Resilience** - "the ability of individuals, households, communities, national institutions and systems to prevent, absorb and recover from shocks, while continuing to function and adapt in a way that supports long-term prospects for sustainable development, peace and security, and the attainment of human rights" (UNHCR, 2017).

**Self-reliance** - "the ability of individuals, households or communities to meet their essential needs and enjoy their human rights in a sustainable manner and to live with dignity." (UNHCR, 2017).

**Sustainability** - "The reconciliation of environmental, social, and economic demands. Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their needs" (World Commission on Environment and Development, 1987).

**Swale** - "a long level excavation across a slope with an even ridge of top soil running along a lower edge. It is designed to intercept overland flow and encourage infiltration, rather than runoff, of surface water" (SAFIRE, 2001).

**Treebog** - Composting toilets comprising a platform-mounted toilet seat or squatting platform that is positioned over a compost heap. Rather than waste dropping into a pit, the compost heap sits on the surface of the soil. Trees are then planted adjacent to the compost pile, absorbing the nutrients through their roots. They are powered via photosynthesis to create biomass and symbiotically support plant nutrients (Biologic Design).

**Urine Dry Diversion Toilets** - Separates human urine before it mixes with the faeces, meaning they can be handled separately. The urine can be diluted for use in gardening. Materials such as ash are added to the faeces to accelerate the drying process and prevent odours and insects. The excreta can be reused in horticulture as fertiliser. They can be designed to accommodate cultural preferences for anal cleansing (Forster, 2009).

# EXECUTIVE SUMMARY

With displacement increasing across the world, humanitarian organisations will not cope alone with the scale of response needed. Increasingly, communities and local authorities will themselves be assembling informal settlements for those displaced within their regions. As a result, Re-Alliance is currently assembling a series of guidelines to support local organisations in establishing regenerative settlements that promote resilience and restore the environment. The aim of this report is to pilot and test regenerative practices in existing settlements across different locations, to support Re-Alliance in the design and assembly of future guidelines for the setting up of informal camps and settlements.

A literature analysis has been conducted to examine the extent to which existing guidelines on camp management offer a regenerative approach in four areas: settlement design, shelter design, food growing and water and WASH. Also, a survey and semi-structured interviews have been conducted with practitioners to discuss existing regenerative methods and identify the main challenges and opportunities.

The research findings indicate that, overall, existing guidelines do not encourage regenerative practices or are vague on how strategies should be implemented. While some sector-specific manuals do offer a regenerative design, no guidelines introduce this

approach in all four sections analysed. In practice, establishing regenerative settlements has also been challenging. Government restrictions, lack of resources and limited space were common themes amongst practitioners. Nevertheless, evidence from existing settings shows that there are some windows for regeneration, with refugees reusing plastic waste for construction, setting up micro-gardens at the shelter level or using water retention techniques.

This report suggests that Re-Alliance should detail best practices in both rural and urban settings. In settlement designs, it should consider strategies on community building, production systems that use space and water efficiently and how to confront environmental issues. Re-Alliance should also identify methods to continuously retrofit shelters through participatory measures, innovative ways to reuse materials, and strategies for expanding solar projects to be accessible for all. On food growing, guidelines should offer alternative composting and water harvesting techniques depending on resources available, with clear instructions on set-up, as well as tips on seed growing and storage. Moreover, case studies should be included with different types of ecological sanitation, solid waste management schemes, and hygiene promotion. Finally, guidelines should define roles and responsibilities for each of these sections.

# 1. INTRODUCTION

As the world incessantly reels from the atrocities of on-going wars, natural hazards, and the ever-growing threat of climate change, the refugee situation deteriorates. It is estimated that more than one billion people live in unhealthy and unsafe conditions, of which millions reside in refugee camps and informal settlements (WHO, 2018:3). Originally intended as 'temporary' solutions, camps and settlements running today were designed to meet emergency needs with little or no consideration of their environmental impact. Instances of inappropriate siting have led to mass deforestation, and poorly managed water facilities have caused groundwater pollution, facilitating the transmission of disease. However, in the last decade, humanitarian organisations have realised the deleterious impact of certain interventions, and a paradigm shift towards promoting sustainable practices within camps and settlements has taken place. In 2015, the Sustainable Development Goals (SDGs) included the objective to 'protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'. Sphere (2018:19) echoed this sentiment, stating 'environmental sustainability is an important component of a good quality humanitarian response.' Yet, in practice, sustainability continues to be considered a 'second tier' concern within the humanitarian realm.

Nevertheless, there is a growing number of humanitarian actors pursuing a regenerative approach which transcends the lens of simply sustaining populations and environmental conditions, and seeks to foster interventions that promote the recovery, restoration, and rejuvenation of the earth's local resources; in-turn, this enhances community resilience, self-reliance, and overall well-being. Yet, regenerative design is still very much relegated to the spheres of a handful of grassroots organisations and local agencies.

This report explores to what extent available guidelines go beyond addressing sustainable solutions for the areas of shelter and settlement design, community participation, food growing, and water, sanitation, and hygiene (WASH), and present guidance for ecological interventions that promote regeneration in camps and informal settlements. It aims to shed light on the following questions: how effective are existing guidelines in supporting humanitarian practitioners in regenerative practices? What strategies are currently in place or being trialled? What challenges and opportunities exist in introducing and retrofitting alternative regenerative solutions? After outlining the methodology, the next section will analyse existing guidelines' regenerative approach. Then, current regenerative practices will be assessed to identify constraints and opportunities. Finally, survey results and recommendations for future guidelines will be outlined.

## 2. METHODOLOGY

The methodology for this research consists of three key components. These all contributed to the identification of existing guidelines on environmental practices, gaps in the literature, and challenges and opportunities within the field.

- ✚ **Desk-Based Research:** A review of official reports on best practices in camps and settlements was conducted, mainly consisting of existing guidelines from international organisations. In addition, academic and grey literature was analysed to compile innovative regenerative practices.
- ✚ **Semi-structured interviews:** Primary data was collected through semi-structured interviews with 8 key stakeholders from the Re-Alliance network. Interviews were conducted remotely between January and February 2022, covering an overview of current practice, as well as opportunities and challenges. The interview questions can be read in full in the appendix.
- ✚ **Survey:** A survey was prepared and distributed through the Re-Alliance network. The survey focused on the gaps in existing manuals to identify how practitioners' needs can be addressed in Re-Alliance's future guidelines. The survey can be viewed in full in the appendix.

*All research was conducted in accordance with LSE's Research Ethics Policy and Code of Research Conduct.*

### 3. LITERATURE REVIEW



## 3.1 SETTLEMENT DESIGN

### Settlement Layout

#### **Sphere Handbook, 2018.**

The guidelines encourage:

- Developing a participatory planning process
- Designing settlement layout around physical, social, environmental and economic considerations
- Leaving the settlement site in a better condition than before, upon closure

However, the guidelines are not prescriptive on how stakeholders can regenerate the environmental landscape of a settlement.

#### **GEN EmerGENcies Manual!**

This manual recommends that:

- Settlements should be planned in harmony with nature and humans
- Land use should be prioritised to minimise environmental destruction and facilitate disaster protection

#### **UNHCR Handbook for Emergencies**

Alongside providing technical requirements, these guidelines include regenerative layout design ideas:

- The settlement should be designed around the family unit, community, and other social groups, reflecting social patterns
- High density, large camps should be avoided
- Each community should be planned to include its own services, which will promote ownership
- Settlements should resemble an H-shape, to facilitate community interaction.
- Community living arrangements should be encouraged

### Designing for Community

#### **Sphere Handbook, 2018.**

Sphere advocates for an inclusive community in the development of a settlement. Settlement design should support existing social networks and facilitate new social networks. However, the guidelines neglect to describe the public spaces and programs that could facilitate social networks.

## **GEN EmerGENcies Manual!**

Significant regenerative information related to building healthy communities is provided here, including:

- Ensuring an inclusive and consultative decision-making process is necessary.
- Emphasising cultural preservation, while incorporating trauma informed practice.
- Setting up community organisations is important in maintaining social networks and building resiliency.
- Promoting self-organisation, such as sociocracy, participative leadership, ritual and celebration.
- Community centres are essential.

## **Camp Management Toolkit (CMT)**

The CMT dedicates an entire chapter to community participation. Relevant highlights are:

- Camp management should gain in-depth knowledge of the local context and existing participatory methods, and should support these structures over the long term.
- All groups should have the ability to participate, including host communities.
- Community-based Environmental Action Plan (CEAP) that identifies key environmental, livelihood and social issues should be implemented.
- Environmental Committees should be established to ensure existing environmental guidelines are being followed.

## **UNHCR Handbook for Emergencies**

This handbook also emphasises participation, featuring a chapter on Community Based Approach and Community Services. Key points are:

- The operations plan should be based on a participatory assessment with refugees
- Refugees should be equal partners in designing, implementing and evaluating humanitarian responses.

## **Designing around Land Flows**

### **Sphere Handbook, 2018**

During site selection, the handbook recommends assessing local topography, ground conditions, and groundwater and surface water to make sustainable technical choices. This should also involve assessing seasonal constraints, hazards, and local natural resources. It promotes gravity-flow supplies and groundwater sources from springs as preferable to surface water sources, as they do not require pumping (Sphere, 2018:106). The handbook (2018:271) falls short of promoting regeneration, recommending that the “removal of natural vegetation and the disruption of natural drainage” be kept at a minimum.

Overall, it recommends:

- Using natural land contours for road, pathways, and drainage networks to minimise flooding and soil erosion
- Retaining trees and other vegetation to stabilise soil and maximise shade

### **UNHCR Environmental Guidelines**

These guidelines identify the need to design interventions in keeping with the region’s geology, hydrology, vegetation and forest cover, and proximity of sites to protected or fragile areas. Though it encourages “locally appropriate soil and water conservation practices”, such guidance is limited to the phases of long-term settlement and following repatriation.

### **Nexus Environmental Assessment Tool (NEAT+) 2020**

The environmental screening tool NEAT+ enables practitioners to identify key issues of ecological concern in emergency contexts, and thus inform suitable recovery project designs. It was created in response to the fact that other assessment tools assume the practitioner has environmental expertise.

This tool aids in the identification of areas of concern in relation to the exploitation of natural resources. Its handbook provides case studies of where NEAT+ has been used to design risk resilient projects around land flows, such as wetlands and forests. For example, in the case of Bidbidi camp in Uganda (see Appendix 6, Table 3), it identified that Zone 5 of the camp was more waterlogged than other areas. The tool recommended that a swamp within Zone 5 be mapped and monitored to understand flood behaviour and inform future interventions (UNEP/OCHA, 2019).

### **UNHCR Framework for Responding, Assessing, Monitoring and Evaluating the environment in refugee-related operations (FRAME) Toolkit**

This toolkit acknowledges how, due to the pressure to provide refugees with immediate needs, environmental assessments rarely occur before a settlement is created or even enlarged. It usefully details which environmental indicators should be assessed - such as changes in vegetation cover - and identifies what steps might help mitigate these impacts, including increasing refugee involvement in managing tree nurseries and setting aside land for ‘fallow or regeneration’ (Guideline M7:71).

## **Designing in Gardens**

### **UNHCR Handbook on Livelihood Options**

This guide promotes sound agricultural practices in refugee situations. It offers intuitive guidance on agricultural designs and highlights the benefits of key approaches to crop husbandry.

It provides descriptions of various techniques, including what inputs might be needed and environmental implications. Moreover, it outlines the general applicability of the techniques to different stages of a refugee operation.

Among some of the techniques described:

- Multi-Storey gardens: Useful in situations where land availability is limited and communities anticipate a longer-term presence.
- Container gardens: appropriate in almost any emergency situation and useful when land is not available or cultivation is unlikely.
- Alley cropping: Highly suited to most settings, where refugee populations are expected to remain for long periods.

### **UNHCR Handbook on Permaculture for Refugees**

These guidelines offer an accurate description of different designs in gardens, such as how to set up different shapes of growing beds, depending on the climate and growing area. Additional guidelines are given on keyhole beds and on container gardens, such as gardens in sacks and tyre ponds.

The handbook also focuses on companion planting, listing vegetables that will show increased yields when planted together, and those combinations that should be avoided.

## **3.2 SHELTER DESIGN**

### **Designing for Resilience**

#### **Sphere Handbook, 2018**

The Sphere guidelines provide advice for increasing resiliency:

- Choose fire-resistant household items and construction materials.
- In locations vulnerable to recurring or seasonal crises, working with technical specialists and local experts experienced with regional-based solutions.
- Build and repair public buildings so that they are safe and disaster-resilient.

#### **Camp Management Toolkit (CMT)**

The CMT outlines ways shelters should be renovated or retrofitted to last longer, including:

- Sealing off and insulating buildings
- Providing repairs and progressively upgrading each shelter
- Protecting buildings and individuals by reducing fire risk

#### **USAID Sector Environmental Guidelines: Housing**

These guidelines focus on housing reconstruction following a natural disaster. They promote designing new housing that can withstand changes in climate and extreme weather events (see Appendix 6, Table 2).

### **UNHCR Handbook for Emergencies**

These guidelines discuss the factors affecting the lifespans of erected canvas tents. Where tents are used for long durations, provisions for repair materials should be considered.

## **Designing for Reuse of Materials**

### **Sphere Handbook, 2018**

Key points from these guidelines include:

- Promote reuse of quality and accessible materials where possible
- A rapid market assessment and analysis and an environmental impact assessment should be performed on the impact of materials.
- Use the most sustainable materials and techniques available. Reuse, recycle or repurpose available materials, including debris from a disaster.
- Promoting use of multiple material sources so that no one material goes into scarcity.
- Promote reforestation as a path to creating sustainable building materials.

### **GEN EmerGENcies Manual!**

This set of guidelines does not go into much depth about shelter design; however, they do provide a few regenerative ideas.

- Temporary shelters should be sustainable, based on the recycling and use of natural materials suitable for each environmental and socio-cultural settlement context.
- Discusses the development of 'ecovillages', arguing that their construction should empower economic and social opportunities. The guidelines also contain several examples of best practices.

### **NEAT+**

This module focuses on identifying environmental issues associated with shelter designs and includes potential mitigation measures. Most relevantly, it argues that material lifecycles should be considered, and that initial design should promote future recycling, reusing, and repurposing.

## **Sources of Energy**

### **Camp Management Toolkit**

The toolkit discusses the overconsumption of firewood as fuel and highlights some responses for achieving more sustainable behaviour:

- Using the least quantity of natural resources when preparing food should be encouraged.
- Promoting the use of fuel-efficient stoves
- Encouraging people to use practices that speed up cooking time and allow natural resources to last longer (ex. soaking beans before cooking, drying and splitting wood before use).

### **Sphere Handbook, 2018**

Sphere provides advice on actions to reduce the overconsumption of natural resources for fuel:

- Consider local cooking and heating practices.
- Promote energy-efficient cooking practices.
- Consult stakeholders about the manner and location of collecting fuel to address issues of safety and environment.
- The use of energy-efficient or renewable sources should be prioritised.
- Affordable environmentally sustainable energy supply systems should be created and promoted.
- Shelter design should reduce household energy needs through energy efficient measures.

### **USAID Sector Environmental Guidelines: Energy**

An array of renewable energy sources is examined, including solar power, small hydropower, wind power, geothermal energy, and bioenergy. The guidelines provide helpful charts to analyse the risks and impacts associated with each, as well as their costs (see Appendix 6, Table 2). The guidelines are not specifically focused on refugee and IDP settlements, however, are still relevant.

### **USAID Sector Environmental Guidelines: Housing**

These guidelines discuss strategies to construct and retrofit houses to be energy efficient following natural disasters. The regenerative ideas are highlighted below:

- Green building design
- Installing heat reflective walls and roofs and insulating homes
- Using improved cooking stoves
- Retrofitting already existing buildings to be more efficient

### **UNHCR Handbook for Emergencies**

Similar to the other guidelines, the overconsumption of wood for fuel is addressed with potential solutions:

- Refugees should be encouraged not to take natural resources from the immediate surroundings of the settlement, and a system to manage the use of natural resources should be implemented.
- Shelter design should save energy by incorporating effective insulation.
- Fuel-saving stoves, fuel efficient cooking techniques and supply of key energy saving devices should be promoted

## 3.3 FOOD GROWING

### Compost

#### Camp Management Toolkit

The CMT insists on the need to avoid chemicals and encourage composting with organic household waste to maintain soil fertility. However, it simply identifies difficulties around composting and do not specify any technique.

#### UNHCR Handbook on Livelihood Options

This guide offers an adequate approach on different plant nutrient management systems, highlighting the importance of composting with plants, animal droppings and household/organic waste. It also draws considerations on green manuring and liquid manure and identifies the benefits of the latter, as it is not time-consuming, involves minimal resources and can be undertaken in any emergency. However, it does not offer a detailed explanation of composting techniques or how to create and manage manure.

#### UNHCR Handbook on Permaculture for Refugees

These are the most detailed guidelines on plant nutrient management systems. They give a detailed overview of the different organic materials that can be used to make good compost and outline the required steps in compost making. They portray a variety of suitable mulch materials and guide on how to mulch the soil, timings to consider and watering requirements. Similarly, the handbook instructs on liquid manure and green manure, inputs needed, timing, benefits, etc.

### Seed Saving

#### Camp Management Toolkit

- While the toolkit does not offer guidance on seeds, it has an agricultural section where it outlines the following:
- Teach methods for a more environmentally friendly farming (demonstrations plots)
- Encourage tree planting to grow fruits, supporting native tree species
- When rehabilitating the area, plant nurseries and tree plantations for the host communities.
- Provide gardening sets including seeds, spaces, watering cans, etc.

#### UNHCR Handbook on Livelihood Options

The handbook encourages the use of a variety of seeds that can be saved or multiplied for replanting. Hybrid varieties should be excluded as the seeds saved from hybrid crops decline rapidly. Also, seeds should be collected from the most vigorous plants, ideally those in the middle of the planting area. The handbook also offers insights on seed storage and protection.

## **UNHCR Handbook on Permaculture for Refugees**

These guidelines give an accurate overview of how to set up and manage seedling beds. They advise on the site selection and soil treatment. For instance, it should be well drained and rich in nutrients, properly mixed and used to fill seedling containers. The handbook also suggests different types of containers to grow and how they should be watered.

## **Water Harvesting (WH):**

### **Sphere Handbook, 2018**

The handbook focuses on water access, quantity and quality. It encourages a sustainable approach, but limits to the following:

- When identifying water sources, environmental impacts must be taken into account.
- Water should be reused for vegetable gardens, brick making or irrigation.

### **Camp Management Toolkit**

These guidelines take a similar approach to that of Sphere. The toolkit offers some considerations on water scarcity, but with no elaboration:

- Reduce water consumption.
- Restore natural water cycles.
- Harvest rainwater.
- Recycle water using household waste water for irrigation.

### **UNHCR Handbook on Livelihood Options**

These guidelines consider different WH systems, analysing the inputs needed, usefulness, and environmental considerations. While the explanations are not detailed, they offer a useful overview of viable techniques:

WH methods:

- Road-water harvesting
- Roof-water harvesting

Wastewater using systems:

- Greywater use
- Tap-stand gardens
- Trapeoidal bunds/ half-moon catchments

### **WOCAT - Water harvesting: guidelines to good practice**

The guidelines portray different WH methods, assessing their applicability and the most common technologies:

- Rooftop and courtyard water harvesting: the guide weighs the benefits and disadvantages of different materials for the catchment area, conveyance system, filtering and storage.

- Microcatchment harvesting: best techniques to collect surface and run-off water through small catchments.

## 3.4 WASH

### Excreta management

#### Sphere Handbook, 2018

It informs practitioners that a “risk assessment of potential contamination of any nearby surface water or groundwater source” is essential before undertaking sanitation interventions (Sphere, 2018:114). Yet, it focuses solely on facilities such as pit latrines. The chapter does, however, identify excreta as a potential resource:

- as biogas or combustible bricks
- as soil conditioner or fertiliser for household gardens

However, it fails to consider other options for toilet facilities besides pit latrines.

#### UN Emergency Handbook

This set of guidelines is structured according to the UN Cluster Approach, with the WASH cluster being approached entirely separately to the SHELTER or FOOD chapters. This may lead to the implementation of WASH technologies and practices that do not work holistically with the camp layout, topography, or shelter.

Whilst the handbook emphasises the importance of mitigating contamination of water sources through excreta containment systems such as pits, tanks, and properly designed drainage systems, the only reference to regenerative practices is the suggestion of reusing runoff water for gardening purposes. No ecological toilets are suggested.

#### UNHCR WASH MANUAL Practical Guidance for Refugee Settings

This manual is formed as a set of key documents providing technical guidance for sustainable practice throughout the entire sanitation chain, from groundwater use to disposal of faecal sludge. It identifies three phases of camp evolution: the emergency, transition, and post-emergency. It calls for clear strategies to be developed from the start that enable transitions to more efficient and sustainable WASH. It mentions specifically the use of Urine Dry Diversion Toilets (see glossary).

#### UNHCR Environmental Guidelines

‘Alternative technologies’ are recommended in the treatment of excreta for biogas generation and fertiliser, and also drainage systems that enable greywater to be captured and recycled for use in vegetable gardens.

#### GEN emerGENcies manual!

These guidelines offer explicitly regenerative, self-reliant, and holistic WASH solutions for displaced populations. They suggest that, where possible, refuse from

collapsed former structures can be re-used in building WASH facilities. This is demonstrated in an example of a evapotranspiration bed - an ecological sanitation technology used in Rambuche permaculture community, Ecuador, (see Excrete Management).

## Solid waste management

### Sphere Handbook, 2018

Reuse, recycling, and repurposing practices are encouraged, with recommendations for community training in composting biodegradable waste. However, no external resources that would aid in applying these methods in practice are given.

### UN Emergency Handbook

There is some consideration of ecological protection: “when planning distributions and kit items make every effort to reduce the use of packaging and non-biodegradable materials.”

### UNHCR Environmental Guidelines

They emphasise that the ‘3-Rs’ (reduce, reuse, and recycle) are a major part of all waste management plans; however, no guidance is offered in implementing related schemes.

### Camp Management Toolkit

These guidelines fall short of promoting regenerative practices. Rather than discouraging the use of packaging, it simply recommends the separation of biodegradable and non-biodegradable waste. However, the CMT encourages the implementation of recycling schemes and the composting of food waste for use in horticulture.

## Water infrastructure

### UNHCR WASH MANUAL Practical Guidance for Refugee Settings

The following interventions are suggested:

- Rainwater harvesting (see *FOOD GROWING, Water Harvesting*)
- Spring captures
- Gravity-flow roughing filtration
- Greywater reuse in hygiene practices

### WaterAid Integrating climate resilience with WASH system strengthening

The guidelines are structured as questions for analysing how to build new, or adapt existing, climate resilient WASH infrastructure. Regarding environmentally friendly initiatives, it asks: “To what extent are users/communities practising and enforcing

the behaviours that ensure climate resilience/water resource sustainability?" (Water For Women Fund, WaterAid 2021: 9).

Strong government leadership and performance monitoring is identified as crucial for ensuring sustainable WASH is prioritised for investment. Though it takes a top-down approach, it emphasises the importance of involving local stakeholders and community-based institutions when identifying areas in WASH for improvement.

### **NEAT+**

The tool stresses that it should be used to identify potential vulnerabilities and risks before implementing recovery projects. However, it may also be used to revise existing WASH activities. The various recommendations to ameliorate the WASH chain include:

- Introduction of greywater capture, particularly during dry seasons
- Promotion of ground cover vegetation to improve infiltration and mitigate surface runoff

### **GEN EmerGENcies Manual!**

Technologies that enable water harvesting, recycling, and treatment for handwashing and bathing are generally promoted; however, there are no logistical examples of such systems.

## **Community hygiene**

### **Sphere Handbook, 2018**

The promotion of soap use through hygiene campaigns is included. Thought is also given to menstrual hygiene management. It encourages the provision of appropriate materials, yet fails to recommend specific sustainable materials.

### **UNHCR WASH MANUAL Practical Guidance for Refugee Settings**

Community participatory processes are encouraged; it suggests "wherever possible refugees should be involved in the design and construction of their own WASH facilities" (2019:21)

## 4. REGENERATIVE PRACTICES



## 4.1 SETTLEMENT DESIGN

### Settlement Layout

Two key issues are lack of space and continuous population growth within camps (Kennedy, 2005), which have been poorly addressed across existing guidelines. Below are current practices and challenges:

**Settlement layout based on public infrastructure:** Refugees whose shelters are further away from social and administrative spaces can feel excluded, whereas those with shelters closer to these spaces can feel a lack of privacy and safety (Kennedy, 2005). Human needs should be prioritised in the camp design.

**Retrofitting layout:** Filippos Polatsidis described how camp layouts can alter over time, discussing how in Greece, once densely populated camps are now spacious with more social infrastructure. Contrastingly, Magnus Wolfe articulated that Cox's Bazar remains densely packed, and refugees are resistant to a layout change for fear of losing their shelter.

Future Re-Alliance guidelines should advocate for holistic, human-centred layout designs in settlements. Moreover, the guidelines should be realistic about the rate of settlement growth and lack of space and should explore solutions for addressing these issues.

### Designing for Community

Several research participants discussed social programming and spaces that have been cut to meet emergency needs. External organisations may lack long term funding and macro-level capabilities to address these needs, thus research participants advocated for increased government funding. Below are current best practices:

**Meaningful participation:** In Ecuador, Piedad Viteri discussed how communities were involved in building their own social spaces, empowering them to self-organise. Also discussed was the importance of refugee self-governance. This is exemplified in Turkey's Kilis settlement, where each section has its own elected leader who work directly with the camp management (McClelland, 2014).

**Utilising Community Architects:** Community architects aim to create holistic socio-spatial transformations within settlements by "providing technical assistance to communities, leading participatory processes and co-translating the needs and wishes of the refugee camp community into productive structural and

social infrastructure" (De Becker, 2021). In Cox's Bazar, Magnus Wolfe discussed an architect who designed a greenspace for residents.

## Designing in Gardens

Design around gardens depended on the following aspects:

**Government mandate:** In Greece and Cox's Bazar, government restrictions on any recreational activity limit the possibility of engaging in any gardening practice. On the other hand, the Ugandan government provides a piece of land to refugees and is increasingly engaging with permaculture methodology.

**Land and resources available:** Given the lack of green spaces, gardening was very limited in Greece and Cox's Bazar, the latter also constrained by a lack of seeds and water. In Ecuador and Uganda, access to land enabled more sophisticated gardening practices, although access to gardening tools was still a major challenge.

**Refugee and local willingness:** One problem was combatting the use of chemicals. Also, some refugees were simply not interested in engaging in any communal activity. Finally, according to Noah Ssempijja, there have been conflicts with the local communities, which resented the refugees taking their lands.

Future guidelines should therefore consider the following:

### 1. Promote production systems that save space and use water efficiently:

Where space and resources are limited, practitioners promoted planting in tins or pots, vertical gardens and sack planting, which require low input and can be watered with grey water (Merrey, Langan, 2014). In bigger settings, designs also included keyhole gardens, which also require less water and effort. When possible, gardens should face the street as this can encourage neighbours to follow suit (Tomkins et al., 2019).

### 2. Promote demonstration sites:

For Piedad Viteri, sites were crucial for social convergence and building agency and because "if you set an example, then they will reproduce it in their homes". Ideally, program designs should include local communities, to avoid any possible disputes and spread regenerative practices.

### 3. Tree planting considerations:

As tree planting can face resistance, guidelines should promote planting fruitful, fast-growing trees with short-term benefits. Species should be considered depending on the local conditions, as well as cultural aspects: in some communities, planting a tree is a sign of land ownership.



Figure 1. Vertical gardens in Cox Bazar. Source: Magnus Wolfe.

## Designing around land flows

As regenerative solutions are context specific, non-local agencies need to have a thorough understanding of the landscape before undertaking interventions. One participant's organisation struggled to find information about which tree species to plant in South Sudan for coppicing, due to the lack of previous environmental assessments in the area. Practitioners should also identify how water moves across the land, find ways to slow, spread, and sink the water into the earth, and locate water run-off potential from compacted zones such as roads, pathways, and rocky outcrops (Topa, Brush 2022).

Future guidelines could include prompt questions, such as whether the land slopes face the sun.

### Water Management:

The following interventions retrofitting existing water drainage, retention, and treatment systems using regenerative designs have been used by Re-Alliance partners:

- 1. Contours and Ridges:** Natural or artificial ridges and contours slow down the speed of surface water runoff, thus minimising soil erosion and encouraging infiltration (SAFIRE, 2001). This water retention technique is being implemented in Bukompee refugee settlement by Noah Ssempijja to enhance crop cultivation.
- 2. Constructed wetland ecosystems:** Such as hand-dug earthen dams and ponds. They are self-sustaining, low-cost, and can be crafted using locally available natural materials (Topa, Brush, 2021:34). Wastewater and stormwater run-off can be channelled to wetlands or gardens by artificial swales (sloped banks) which delay water surface runoff to increase water retention, and act as a natural bio-filter (NEAT+; Topa, Brush, 2021:34). This provides fertile soil for flora, trees, crops as well as a wildlife habitat. They can provide food and wood for construction (Ajibade, Tota-Maharaj, 2018) (see Excreta Management).

One interviewee saw the wetland and swale system as a way of taking the problematised waste stream industry and making it “the solution”. Several others appeared to be positive about the possibility of implementing constructed wetlands in refugee camps, with one calling it a “sound way for regeneration”.

- 3. Vetiver grass farming:** Vetiver grass acts as a soil stabiliser, and can be used as animal fodder, and as natural protection against weeds and pests (SAFIRE, 2001).

Practitioners have, nevertheless, faced the following constraints:

**Lack of Expertise:** One interview revealed that some communities have started to integrate contours and slope stabilisation within the settlements; however, they are feeding the soils only with ordinary rainwater, and not making use of wastewater. Moreover, grassroots organisations seeking to implement wetland construction projects will first require training and supervision from a specialist. However, following the initial creation of a wetland or swale, the skills and knowledge can be easily shared within the community.

**Retrofitting water management:** Challenges associated with retrofitting wetland ecosystems include a lack of refugee land ownership. Even with the support of grassroots organisations, the decisive power may still lie with local authorities, landowners, and NGOs. Communities should be consulted about what systems they want, to ensure they will be properly maintained in the future.

**"I would make water the basis of the whole design.** So instead of just having a whole bunch of tents as a block with grid-like streets, we would look at the shape of the land... everything would follow contours. If it rained, we would have contour tree planting and swales to absorb that rain and lead it to places where it can be managed." (Anonymous).

**Land quality:** Though mobility is restricted in camps, in household zones such as gardens and forests there are ecological considerations to include. For example, fodder plants could be placed along paths to animal enclosures and harvested and watered along the way to save time and energy (SAFIRE 2001:20). Topa and Brush (2021:46) recommend Farmer-Managed Natural Regeneration (FMNR) to restore vegetation cover.

Further consideration about diversion channels for greywater (from baths and kitchens) to the garden/wetland should be tackled in future guidelines. They could also highlight that regenerative water management is perhaps the most primary consideration during the initial setting-up of a camp.

## 4.2 SHELTER DESIGN

### Designing for Resilience

Resilient design strategies are not prominent across existing research. However, below were some key themes:

**Continuous shelter upgrading:** In Ecuador, the focus is first on early recovery emergency measures, and then shifts to resilient redesign, without following a linear process. Similarly, in Uganda, short-term, medium-term, and long-term refugees all design their houses differently, and the transitions are made over time.

**Participatory Shelter Design:** Community participation is beneficial in creating resilient shelters. Relevant literature proposes diverse innovative shelter prototypes, however there has been criticism that refugees do not need *more* design solutions, which can be costly, impractical, unsustainable, and culturally irrelevant (Apel, 2019). Rather, a socio-structural transformation around the way that shelters are designed should be prioritised (Apel, 2019).

**Lack of Funding for Shelter Retrofitting:** Several practitioners mentioned that the ability to adapt a shelter to be resilient depended on access to funding which is very unequal between groups, thus many shelters become more vulnerable to degradation than others. Moreover, according to Magnus Wolfe, governments are unwilling to pay for upgrades.

Future Re-Alliance guidelines should incorporate processes and strategies to continuously retrofit shelters through participatory measures, and should provide specific directives for various climates and financial contexts.

## Designing for Reuse of Materials

While current practice highlights that materials are being used somewhat innovatively, there is still significant room for growth in the area of material reuse in refugee shelter design. Below are key themes:

**Innovating with plastic:** Magnus Wolfe noted that plastic waste has been converted into useful items such as alphabet letters for children in Cox's Bazar. In Uganda, plastic bottles are being explored as materials for shelters and community infrastructure. Refugees in Haiti are using the plastic sheets distributed by aid agencies to create unique storefronts for their resurrected businesses (Betts, 2012).

**(Over)using local natural materials:** While the use of local natural materials minimises the amount of waste, practitioners noted that the reliance on trees and bamboo in construction is resulting in their overconsumption, making it difficult for new refugees to construct shelters and for resources to regenerate. As such, materials such as mud bricks and cow dung could be preferable, which is already occurring within refugee settlements in Uganda according to Noah Ssempijja.

**Utilising damaged structures for new shelter:** In Ecuador, Piedad Viteri described that displaced people may build their shelters with pieces of houses that have been damaged due to natural disaster etc. This could be an effective regenerative practice in urban refugee contexts.

**Adopting a circular economy approach:** Many participants mentioned the importance of utilising local materials and labour in shelter construction, and emphasised the need for durable solutions. Reflecting this, Levinton et. al (2021), focus on designing through a circular economy approach in line with the 2030 agenda.

Future Re-Alliance guidelines should share best practices and case studies of innovative reuse of materials. They should also incorporate strategies for maintaining finite natural resources, and should promote a circular economy approach in all stages of settlement design.

## Sources of Energy

Current energy practices vary greatly across settlement contexts. A common problem is the overconsumption of trees for firewood. Charcoal and gas are also prominent sources, and small sections of some camps have access to electricity. Solar energy is emerging as a popular renewable energy source.

**Solar Power Access:** Many of the research participants mentioned some form of solar energy being used, whether that was donated on a small-scale individual level, provided widely through an agency or private company using payment plans.

**Anaerobic Digestion:** This method of producing biogas was recommended as it is a method of composting and producing clean fuel simultaneously. Though currently not in practice in refugee camps, it would be a low cost, regenerative form of energy production worth promoting.

**Participation in energy-related projects:** Lack of meaningful participation for refugees in innovation is common, which can lead to costly flaws and oversights on the part of the designers (Kaurin, 2021). A case study is MIT's Development Research Lab that created Lorena-style cookstoves, fully designed in collaboration with refugees. These stoves are made out of local materials, fulfil cultural expectations, and provide jobs for the refugees who will build and maintain them. These stoves have maintained a comparatively high adoption rate and highlight the power of meaningful participation (Kaurin, 2021).

Future Re-Alliance guidelines should advocate for a participatory model when pursuing energy-related projects. They should also explore different methods of expanding solar projects to be accessible for all. Moreover, the potential for anaerobic digestion as an energy source should be considered.

## 4.3 FOOD GROWING

### Compost

Composting practices vary depending on the setting, yet the following constraints were common themes among practitioners:

**Lack of resources:** while some pointed out the lack of space, others considered the lack of materials. Future guidelines should promote different nutrient management systems to allow practitioners to better adapt to their local circumstances.

**Local resistance:** Many communities have traditionally used chemical fertilisers and can be reluctant to change. Also, some refugees simply do not see their value. Magnus Wolfe recalls: "I don't think they need to change their ways, so it's unlikely that [composting] will work". Again, these could be overcome by promoting demonstration sites.

All the practitioners insisted on the benefits of the following methods:

- 1. Natural liquid fertilizers:** Practitioners worked with both compost teas and organic bio fertilizers. These can be created with organic materials such as seaweed, leaves, and weeds and do not require more than a bucket and water. This process is cheap and easy and appears to be suitable where space is constrained to manage any composting system.
- 2. Compost bins:** these are ideal for use at camp level to compost kitchen waste. They can easily be constructed by using bamboo or wood to form a slatted box container to enable air circulation. This is crucial to keep the composting process aerobic, which speeds the process and reduces odours to a minimum. Ideally, they should also be covered with a lid to avoid vermin (OXFAM, 2018). Again, this is a suitable option where there is limited space.
- 3. Vermicomposting:** vermicomposting turns waste into rich, good quality compost in around three months (SAFIRE, 2001). The worm farm can be set up in an improvised container such as an old metal drum and given that it is enclosed it is protected from rats.
- 4. Manure:** In Bukompee refugee settlement and neighbouring communities, rabbits have been introduced as they are a profitable livelihood, whose manure is considered "the best fertiliser you can put on your crops" (Noah Ssempijja).

In future guidelines, Re-Alliance should clearly detail the materials needed for the recommended methods, as well as specific steps as to how to proceed, as existing literature is fairly vague on this matter.

## Seed Saving

Seed saving appears to be a challenging practice in camps and settlements. In many cases seeds are not being provided or resources are minimal. Organic seeds are difficult to find, as those available in local markets are usually hybrid. Also, nurseries require space and resources, with the lack of containers being a major issue. Finally, in Greece, seeds were being provided but no training was offered to refugees, which may be due to a lack of knowledge among present NGOs.

Future guidelines should thus assist on:

- 1. Knowing what to grow:** are the selected seeds from annual, biennial or perennial plants? Do these plants give the highest yield? In any case, it is important to acknowledge that “the connection with food should never be lost” (Piedad Viteri), and practitioners should contemplate what refugees grew traditionally or even if certain foods are culturally inappropriate.
- 2. Planning for seed saving:** The guidelines could offer insight on best companion planting and requirements in terms of space and maturity. For instance, while tomato seeds are ready as soon as the fruits are ripe, others need to be harvested past the eating stage (Real Seeds, 2021). Finally, what is the water needed? Does it match water availability?
- 3. Storage:** Practitioners recalled that as long as they were dried and kept in a well-ventilated place, protected from the rain and direct sunlight, seeds do not need to be kept in a dark and cold place, as traditionally stated. Given the constraints in terms of containers, the manual could propose different improvised, locally available options: milk packs, clay pots, etc.



Figure 2. Ecovillages - Improvised nursery.

Future guidelines could also include instructions for specific vegetables or medicinal plants, as practitioners recalled the importance of planting the latter.

## Water Harvesting

Microcatchment techniques were barely in place across camps:

**Running tap water:** In many camps running water is available, so no WH methods are being promoted. In some settlements refugees are used to getting tap water so rooftop rainwater is only collected in a few bigger buildings and it is not used for any agricultural purpose. Yet, practitioners from Cox's Bazar state that there is not enough water for cultivation, which opens a door for reinforcing the existing WH techniques.

**Lack of space:** In Cox's Bazar, Magnus Wolfe saw no opportunity for rooftop water harvesting given the lack of space and resources. In Uganda, those with limited land also refused to give up a piece to set up a pond.

Nevertheless, these challenges do not necessarily constrain the use of water harvesting techniques. Boniface S. Gomes believed that in spite of the limitations, there were opportunities for water harvesting in Cox Bazar. Moreover, in camps where agricultural practices were taking place, landscapes were designed around water conservation (see *Design around land flows*). Future guidelines should therefore:

- 1. Promote different storage systems according to space and resources:**  
**Where** space is limited, water could be stored in oil drums, which are cheap and appropriate in size. Low-cost tanks can also be constructed underground, whose size can also be adjusted (Studer, Liniger, 2018). Water can be stored directly in the soil through swales or raingardens.
- 2. Identify different catchment areas:** Practitioners might believe that there is no capacity at the shelter level to engage in these practices. However, rain can be collected from very different types of roofs (bamboo, tiles and slates). Moreover, it can be collected from roads or courtyards in community areas, from ground surfaces that can be paved, compacted or laid out with plastic sheeting (Studer, Liniger, 2018).

## 4.4 WASH

### Integrating regenerative solutions in wash: the challenges

#### 1. Centralised Sanitation System

*“Everything is taken care of by the **central sanitation system**... It's always there in your tap.” (Filippos Polatsidis, Greece)*

2. **Inadequate support** from local authorities, NGOs, and INGOs to proceed beyond minimum standards
3. **Lack of space or reluctance** from authorities to allocate space for new facilities
4. **Lack of resources** (financial and technical) to construct new facilities

*“People need to have their latrine dug. But **materials are numbered**.” (Bemeriki Bisimwa, Rwamwanja Rural Foundation)*

1. **Lack of awareness** among policymakers and communities
2. **Misunderstandings and cultural barriers** regarding how excreta can be a resource

*“It would make total sense to combine the dried faecal stuff with the compost, but it's generally not been done because people **misunderstand**... they think there's still a risk.” (Magnus Wolfe, Cox's Bazar).*

### Excreta management

**Excreta as a resource:** Human excreta could become a crucial energy source for camp residents through being converted into biogas or combustible bricks or, after treatment, being incorporated into organic waste for use as compost (Sphere, 2018). Bemeriki Bisimwa expressed interest in creating an eco sanitation system for biogas production.

According to our research participants, in most camps and settlements, sanitation and hygiene practices are limited to basic pit latrines and pour-flush toilets connected to a centralised piped sewer system. However, several Re-Alliance partners are using alternative solutions:

## Evapotranspiration (ET) beds

The toilet (Fig. 3), which has been constructed from repurposed material from collapsed housing, is connected to an Evapotranspiration (ET) bed (GEN, 2018). In this model, human waste is removed from the wastewater by a septic tank and the fluid is then channelled through a tunnel made of used tires into a sand bed in which banana trees have been planted. The trees are fed by wastewater nutrients.

ET beds are suitable for rocky soils, where wastewater cannot be treated before it reaches the groundwater, or in clay soils, which inhibit wastewater percolation.



Figure 3. Rambuche permaculture community, Ecuador. SOURCE: Piedad Viteri.

Guidelines should emphasise how ecological sanitation can be linked with other programmes, such as creating compost fertiliser.

## Treebogs

**Using local resources:** Treebogs (see Figure 4) are easy to build using local materials (such as wood coppiced from wetland systems) and simple hand-tools. They are also low-cost in the long-term, cutting out the time and expense of waste treatment and transportation. The trees grown provide food, shade, animal fodder, as well as wood for coppicing (Biologic Design).

**Community involvement:** They can be self-built by trained carpenters, local craftspeople, or untrained locals in the community with supervision (Biologic

Design). This offers an opportunity for developing permaculture skills that enhance self-reliance, and for knowledge sharing, such as which tree species are geologically appropriate.

**Challenges:** Due to the challenges discussed, their implementation is so far limited to bottom-up approaches through permaculture grassroot networks. Magnus Wolfe particularly emphasised that compost toilets may be rejected due to a lack of space. Our interviewees also identified that planting trees is seen in some communities as a 'cultural statement of land ownership', and there may be reluctance to integrate this.



Figure 4. Treebog in Palestine designed by Biologic Design. SOURCE: Biologic Design.

## Hygiene

**Community training:** Bemeriki Bisimwa said that because sanitation is generally very poor, he includes discussions about hygiene when teaching permaculture workshops. This involves talking about cleaning fresh produce in filtered water.

**Water sources:** Regenerative methods for purifying water will be context specific. For example, the Rwamwanja Rural settlement is located near swampland. The swamp water is filtered using Moringa tree seeds, and then used to wash dishes and laundry.

## Solid waste management

In most camps, there are no solid waste management schemes, and the few in existence are often too expensive. Interviews with practitioners in camps in Greece, Bangladesh, and Uganda yielded criticisms concerning the lack of such systems.

**Economic opportunity:** Local organisations sorting and organising solid waste, such as plastic bags and bottles, have provided refugees with employment and also income opportunities through selling the waste at markets. However, this does not present a circular economy as a great deal of waste still ends up in landfills.

**Aiming for households:** Our interviewees emphasised that recycling and re-use will be best promoted at a household-level. Bemeriki Bisimwa, for example, sought to implement recycling schemes in Rwamwanja settlement; however, he did not know where to begin.

There are numerous ways in which to reuse and recycle solid materials. For example, plastic bottles can be reused to make ecobricks. These use locally sourced materials, preserve natural resources, and are cheap and easy to create (Haque, Islam, 2021). They have been used to build shelter, water tanks, and flower trellises (FIG?), and the mortar covering provides greater resilience than bamboo or plastic sheeting (Haque, Islam, 2021).

Future guidelines should include a step-by-step guide to implementing household waste disposal schemes, such as how to communicate information on waste separation.



Figure 5. This PET bottle water tank was built by the Vianney Trust using the ECOTEC technique. SOURCE: Eco Tecnologia <https://www.eco-tecnologia.com/>.

## 5. SURVEY RESULTS & RECOMMENDATIONS

A survey was conducted to learn about what guidelines Re-Alliance's partners use in relation to regenerative practice and the management of settlements more broadly. To view the full survey and responses, please see Appendix 4.

**Current Guidelines Usage:** Currently, the main guidelines that survey respondents are aware of are the Sphere Handbook, UNHCR Emergency Handbook, the Camp Management Toolkit, and the 12 Permaculture Principles, though these are not the only ones being used. 71% of respondents use guidelines as a guide for overall good ethics, and 43% use them as a guide for minimum standards.

In relation to regenerative practice, 71% of respondents referred to guidelines for settlement design, WASH, food growing and composting respectively. 57% referred to guidelines for shelter design, and 43% for community building and engagement. One respondent said they use guidelines “every day and everywhere”. Overall, 4 respondents find guidelines to be *extremely useful*, 2 find them *useful*, and 1 finds them *somewhat useful*. This is a positive indication that a guideline framework is an effective approach for future regenerative recommendations.

On information sharing, 100% of respondents said that information is currently shared within their organisation, among workers and camp residents in a digital format. 71% of participants also get information through person-led instructions and workshops, and 29% additionally receive information in printed format.

**Desired Content for Future Guidelines:** 71% of respondents said that community building and engagement were important to include in future guidelines, closely followed by settlement design with 57% of respondents. 100% of participants would like guidelines to define roles and responsibilities in camp management. Increased inclusion of Bill Mollison’s permaculture design principles was mentioned multiple times throughout various question sets.

**Desired Format for Future Guidelines:** Answers varied greatly for desired guideline format, so it is recommended that they take multiple formats. 71% of people want online/digital guidelines and specific case studies respectively, while 43% want a PDF or book. 29% want step-by-step instructions. One individual suggested “simple flyers/videos for ordinary people that can be translated into local languages”.

*In addition to the suggestions made in the survey for future guidelines, a compilation of recommendations made throughout this report are included in the Appendix 3.*

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# 7. APPENDICES

## APPENDIX 1: TERMS OF REFERENCE

<b>LSE/ID Project Proposal Template</b>	
<b>Organization and Department</b>	Re-Alliance ( <a href="http://www.re-alliance.org">www.re-alliance.org</a> )
<b>Project Working Title</b>	Piloting and testing regenerative design guidelines for informal displacement camps and settlements.
<b>Background:</b> Two short paragraphs. In the first, please provide a brief description of your organisation and its objectives. In the second, please provide a brief introduction to the topic to be addressed by the project. Why is the organisation interested? Why is the subject itself interesting?	<p>Re-Alliance is a small, UK based NGO working to support regenerative approaches to disaster, displacement and development. We are now into our third year of operation and worked with LSE students last year very successfully (their report is on our website <a href="http://www.re-alliance.org/post/_met">www.re-alliance.org/post/_met</a>). We are a membership and knowledge brokering organisation, building connections for support in the Global South and working to influence policy and practice in the Global North.</p> <p>We are currently assembling a series of guidelines to support regenerative practice in the setting up of informal camps and settlements. With displacement increasing across the world and set to increase further with climate change, disaster relief from large scale humanitarian organisations will not cope alone with the scale of response needed. Increasingly communities and local authorities will themselves be rapidly</p>

	<p>assembling informal settlements for those displaced within their regions. Much of the work of our members relates to small, local technologies which, if introduced during set up can make a significant difference to the immediate environment, to people's lives and to their ability to recover and rebuild. We would like to work with students to support the design and assembly of these and to test them in different locations by working remotely with some of our members. We hope they will then contribute to the design and content of the final product.</p>
<p><b>Question:</b> (One or two sentences. What is the motivating question? What is it, specifically, that your organisation would like to know?)</p>	<p>How can we best support local and informal organisations in establishing regenerative IDP and refugee settlements that are best placed to promote resilience and recovery and restore environment?</p>
<p><b>Objective:</b> (Short paragraph that explains what you hope to get out of the answer and how you may use the students' work to advance organizational objectives.)</p>	<p>We hope students' work will make a significant contribution to the final product outlined above, ensuring the content, design, language and format best meets the needs of those involved in first hand response.</p>

<p><b>Methodology:</b> How the students are expected to answer the question. E.g. desk research, interviews, survey, review of internal documents, etc. If you wish the students to define the methodology please say so.</p>	<p>Methodology will involve a mixture of surveys and online interviews with Re-Alliance members based in different parts of the world. This will be followed by desk research to fill any gaps in content and redesign, rewriting and re-testing in line with findings.</p>
<p><b>Contact:</b> The name and contact information (email address) of the person within your organisation who will be responsible for liaising with the students.</p>	<p>juliet@re-alliance.org</p>

## APPENDIX 2: CLIENT- REQUESTED FOCUS AREAS & NEXT STEPS

*Next Steps for Re-Alliance/LSE Consultancy were provided by Re-Alliance in January 2022 outlining report focus areas and questions to guide our research as additional clarity to the original Terms of Reference.*

### Report Focus Areas

- Camp Layout
- Shelter Design
- Food and Food Production
- WASH

### Overarching Questions:

#### 1. How effective are existing guidelines in supporting communities and humanitarian responders in each of these areas?

- What guidelines exist?
- What guidelines are people aware of?
- How do they differ?
- How do they use them?

#### 2. What strategies do partners use for addressing some of the issues highlighted in presentation 1 under each of these areas?

- How do they resolve some of these issues for themselves?
- Are there additional issues they face?
- What support/information/guidelines would help them to use and share regenerative practices?

- How do they or might they communicate these to others?
- What format should guidelines/support be in to be most useful?

### 3. How do camps and informal settlements develop?

- What order do things happen in?
- What are the spaces where it is possible to intervene?
- What difficulties have people experienced in trying to retrofit regenerative solutions?
- What are the biggest challenges to introducing alternative solutions and practices? (e.g. lack of knowledge, lack of time, lack of resources or local restrictions?)

## APPENDIX 3: COMPILED RECOMMENDATIONS

Section	Recommendations
Layout design	<ul style="list-style-type: none"> <li>• Advocate for holistic, human-centred layout designs in settlements.</li> <li>• Guidelines should be realistic about the rate of settlement growth and lack of space, and should explore solutions for addressing these issues.</li> </ul>
Design for community	<ul style="list-style-type: none"> <li>• Promote participatory design of community spaces, refugee self-governance, and partnerships with community architects.</li> </ul>
Design around gardens	<ul style="list-style-type: none"> <li>• Promote production systems that save space and use water efficiently, which will best adapt to urban settings.</li> <li>• Encourage micro gardens that face the street.</li> <li>• Promote community gardens when space is available.</li> <li>• Specify inputs and watering requirements for each system.</li> <li>• Encourage planting fruitful/medicinal fast growing trees.</li> <li>• Recommend crops for each design and climate.</li> <li>• Promote demonstration sites for refugees, local population and humanitarian practitioners.</li> </ul>
Design around land flows	<ul style="list-style-type: none"> <li>• Include examples of environment indicators to help practitioners assess how water moves across the land, where natural or artificial contours and ridges could be implemented, and where there is potential for intervention.</li> <li>• Encourage community feedback before undertaking projects to ensure they will be used and maintained.</li> <li>• Emphasise the construction of wetlands and swales.</li> </ul>

Designing for resilience	<ul style="list-style-type: none"> <li>• Incorporate processes and strategies to continuously retrofit shelters through participatory measures, and should provide specific directives for various climates and financial contexts.</li> </ul>
Reuse of materials	<ul style="list-style-type: none"> <li>• Share best practices and case studies of innovative reuse of materials.</li> <li>• Incorporate strategies for maintaining finite natural resources, and should promote a circular economy approach in all stages of settlement design.</li> </ul>
Sources of energy	<ul style="list-style-type: none"> <li>• Advocate for a participatory model when pursuing energy-related projects.</li> <li>• Explore different methods of expanding solar projects to be accessible for all.</li> <li>• Consider the potential for anaerobic digestion as an energy source.</li> </ul>
Compost	<ul style="list-style-type: none"> <li>• Recommend different composting methods to allow practitioners to adapt to their local circumstances. For constrained/urban settings, promote smaller systems such as compost bins or compost teas.</li> <li>• Encourage use of aerobic methods that do not produce greenhouse gases.</li> <li>• Clearly detail the materials needed and specific steps on how to proceed.</li> </ul>
Seed Saving	<ul style="list-style-type: none"> <li>• Give insight on what to grow, how to plan, and how to harvest and store: examples of plants with highest yield, best companion planting, watering requirements.</li> <li>• Provide examples of the whole process for common seeds that can be saved (tomatoes, beans...).</li> </ul>
Water harvesting	<ul style="list-style-type: none"> <li>• Promote a range of WH systems: rooftop, courtyards, rain gardens.</li> <li>• Identify appropriate materials for the catchment area, conveyance system, filtering and storage.</li> <li>• Identify the advantages and disadvantages of each method.</li> <li>• Consider lack of space and recommend storage systems that adapt to these constraints.</li> </ul>
Excreta management	<ul style="list-style-type: none"> <li>• Examples and case studies of composting and urine diversion toilets should be provided.</li> <li>• Incorporate how facilities can be adapted for particular social groups to enhance inclusivity, and prevent poor design.</li> </ul>

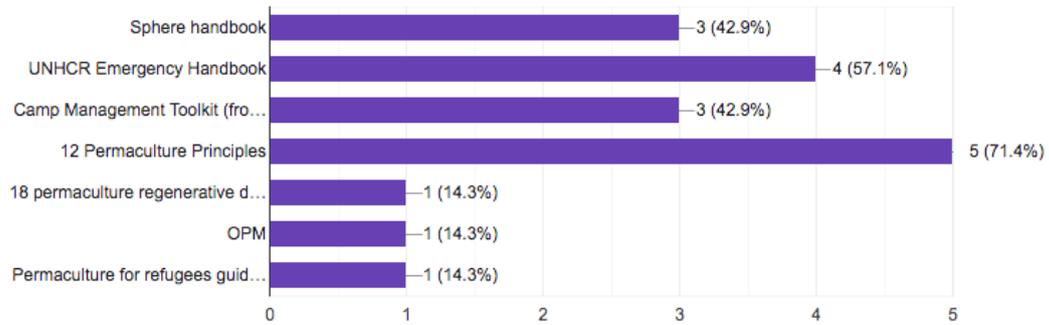
	<ul style="list-style-type: none"> <li>• Detail the many benefits of ecological sanitation to overcome cultural barriers.</li> <li>• Consider the lack of space and resources. Ecosan facilities may not be feasible in large camps.</li> </ul>
Hygiene	<ul style="list-style-type: none"> <li>• Incorporate hand and produce washing practices into all permaculture and construction training.</li> <li>• Water filtration methods should be outlined, with examples from different contexts.</li> </ul>
Solid waste management	<ul style="list-style-type: none"> <li>• Include literature, resources, and step-by-step guidelines on how recycling, reuse, and repurposing schemes can be implemented at a household level e.g. demonstrate waste separation during permaculture workshops.</li> <li>• Offer examples of easy ways communities can reuse glass, paper, in construction and gardening.</li> </ul>
Vector and pest control	<ul style="list-style-type: none"> <li>• Offer examples of natural pesticides and which plants they can be used on/what pests they deter.</li> </ul>

## APPENDIX 4: SURVEY AND RESPONSES

What guidelines are you aware of?

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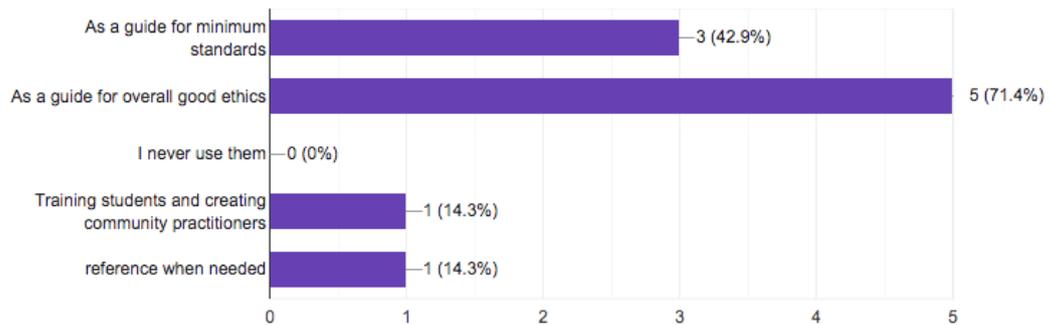
7 responses



How do you use them to inform your practices?

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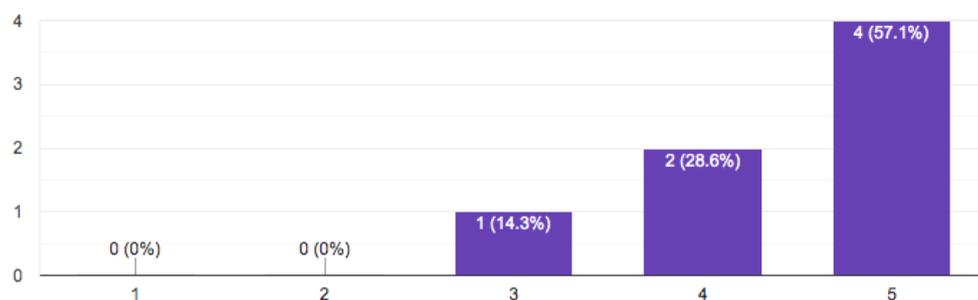
7 responses



How useful do you find them?

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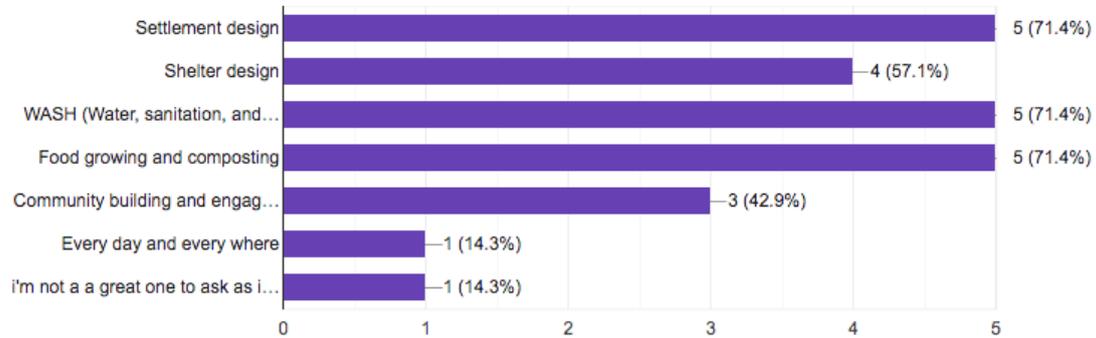
7 responses



In which areas of regenerative practice do you refer to guidelines?

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7 responses



Please specify which guidelines are referred to for each regenerative practice focal area (Settlement Design, Shelter Design, WASH, Food Growing and Composting, and Community Building and Engagement).

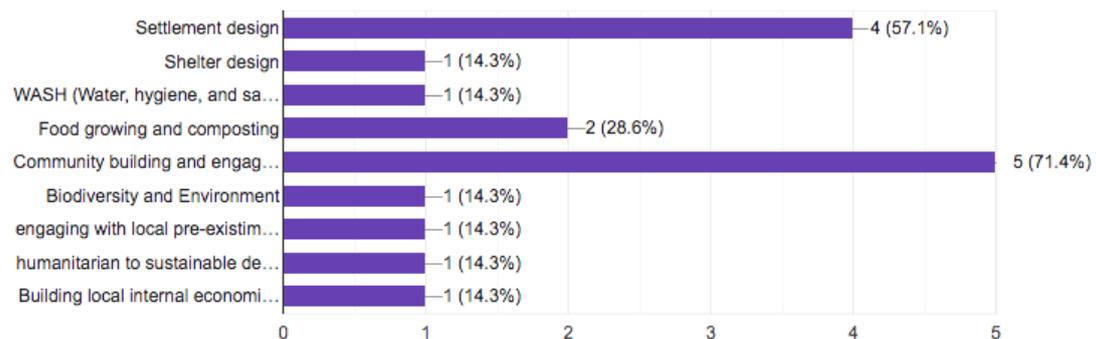
7 responses

- Permaculture
- The guidelines shared (SPHERE, UNCHR, etc.) do not have much guidance on regenerative practice.
- All 18 Original Bill Mollison Permaculture Regenerative Principles of Mass Regeneration
- food crowing,water saninitation and hygiene
- Permaculture design is valiud for all areas
- sphere, UNHCR - nutrition and WASH; permaculture principles - everything
- UNHCR and Camp Management toolkit

Which areas of regenerative practice do you think are important to include in new guidelines that may be getting excluded from the existing guidelines?

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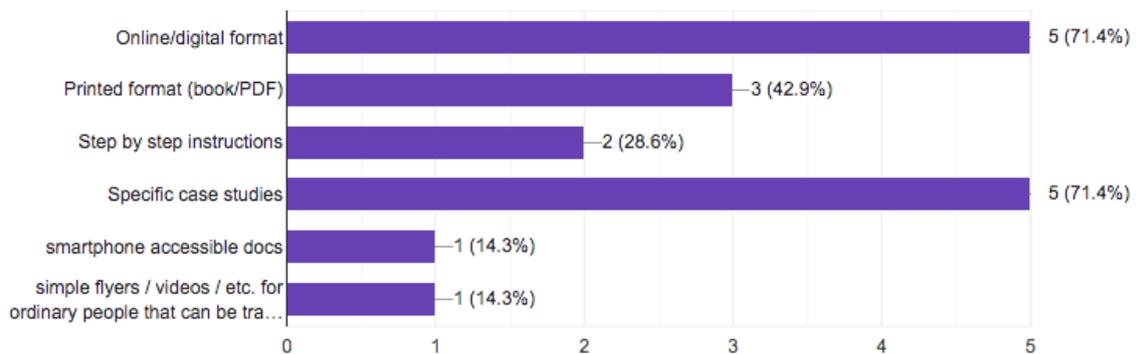
7 responses



What format should our new guidelines take? Please specific in 'Other' why you think so.

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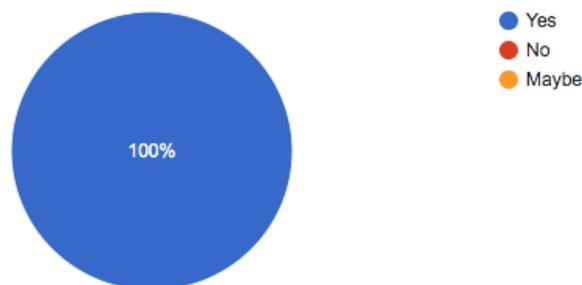
7 responses



Some guidelines also define roles and responsibilities in camp management, would that be useful?

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7 responses



Do you have any other advice or comments to provide in relation to the development and sharing of guidelines for regenerative practice? If so, please comment.

6 responses

Help very poor to be connected to international information and rights

These should be introduced at the Global meetings of the Camp Coordination and Camp Management Cluster, the Food Security Cluster and Shelter Cluster. And at the regional meetings and workshops of these fora.

The world should move from 12 to All 18 Original Bill Mollison Permaculture Regenerative Principles of Mass Regeneration

NO

Try to have a holistic approach and address all stakeholders + the land

Make education for life the focus of all camps and settlements

## APPENDIX 5: INTERVIEW QUESTIONS

### CURRENT PRACTICE

- Which food growing/WASH/permaculture gardening practices were in place when you began your work? How have these changed or been adapted?
- How do camps and informal settlements develop? What are the spaces where it is possible to intervene?
- What are the biggest challenges to introducing alternative solutions and practices? How do you face them?

### SETTLEMENT DESIGN

#### Designing for Community

- What social/community spaces & programs exist and what was the logic behind their design?
- What social/community spaces and programs do you think the camp should integrate in the future?
- What are the biggest challenges/opportunities for community spaces & activities within a camp setting?

#### Settlement Layout:

- What is the general settlement layout like? Has this been fixed from the beginning or is it evolving?
- Do you think adjusting the camp layout would improve life in the camp? Is it possible to expand or resize?
- What are the biggest challenges in designing a settlement layout? How do you face these challenges?

#### Designing around land flows/for resilience:

- What challenges are posed by the landscape? How do you overcome these?
- How have you designed shelter and WASH infrastructure to minimise or prevent negative environmental impact?
- How have you designed to prepare for disasters?

#### Designing around gardens:

- Is it complex to promote gardening in camps?
- What type of microgardens are more efficient/commonly used?
- How difficult is it to plant trees around camps? Any local/ refugee resistance?

### WASH

- Is there a clear WASH strategy in place?
- How has sustainable water, hygiene, and sanitation been integrated into the camps? How have toilet, bathing, and handwashing facilities evolved?

#### Toilets:

- What toilets were in place when you began your work and what kinds of toilets are now in use (composting loos and tree bogs) or are being piloted?
- What are the costs of running these facilities? How easy/expensive is it to source the necessary materials?
- What are the main challenges?

#### Handwashing technologies and practice:

- Handwashing stations: how many do you aim to have per person or family?
- Where do you position these stations to promote good hygiene?

#### Access to hygiene items:

- What soap/laundry detergents are in use? Is there a need for more environmentally sustainable material?

#### Solid waste management:

- How is solid waste managed in order to ensure there is minimal impact on the environment?
- How can solid waste be used? Is it recycled/repurposed or used for compost?

### FOOD PRODUCTION

#### Composting:

- What composting systems do you use?
- How do you create compost/ natural fertilisers?
- What challenges do you face? How do you resolve these issues?

#### Seed saving:

- Do you promote seed saving? What seeds do you save?
- Seeds need to be stored in a dark cold place, how do you achieve this in a camp?
- What other challenges do you face?

#### Water harvesting:

- What are the techniques you commonly use?
- What challenges do you face? Opportunities?

### SHELTER DESIGN

- What types of shelters are being used?
- What are the challenges associated with these shelters, and how are you facing them? (for ex. heating/cooling, cooking, space).
- Do you foresee any opportunity to upgrade the shelters going forward?
- What sources of energy are being used in the camps, and what opportunities are there to upgrade these?

- What are the challenges to delivering clean energy within camps?

## GUIDELINES

- How effective are existing guidelines in supporting communities and humanitarian responders in each of these areas?
- What guidelines are you aware of?
- Which guidelines do you think better address the issues and challenges you mentioned in WASH, Compost...?
- Do they actually address regenerative approaches? Or are they vague and focus on minimum standards?
- How do you use them?
- What do you think is missing from existing guidelines and would be useful to include in future?

## APPENDIX 6: ILLUSTRATIONS FROM EXISTING GUIDELINES

**Table 1** UNHCR Handbook on Livelihood Options: *Growing techniques at various camp stages*

Techniques	Relevance at various stages of an operation		
	Emergency	Care and maintenance	Settlement, integration...
<b>Growing Plants</b>			
Alley cropping			✓
Double dug beds		✓	
Container gardens	✓		
Growing beds		✓	✓
Inter-cropping		✓	✓
Monocropping	✓		
Multi-storey gardens		✓	✓
Rotations		✓	✓
Row planting		✓	

**Table 2** USAID Environmental Sector Guidelines: Housing

Climate Change Effects	Impacts on Housing	Possible Adaptation Responses
<ul style="list-style-type: none"> <li>• Sea level rise</li> <li>• Stronger and/or more frequent storms</li> <li>• Increased frequency, intensity and duration of heat waves</li> <li>• More intense rainfall events</li> </ul>	<ul style="list-style-type: none"> <li>• Undermining the housing foundation and contaminating groundwater supplies</li> <li>• Building damage from strong winds and storm surge, and further rain penetration</li> <li>• Higher risk of fire, increased evaporation reducing water supplies, and higher costs for cooling</li> <li>• Flood damage to homes as well as roads /access routes</li> </ul>	<ul style="list-style-type: none"> <li>• Retreat from flood plains and coastal areas – choose less risky building sites</li> <li>• Use water resistant materials</li> <li>• Use wind and impact resistant materials</li> <li>• Use of external shading</li> <li>• Update drainage plans to ensure sufficient capacity</li> </ul>

**Table 3** Extract from an environmental analysis of Bidibidi camp in Uganda in 2019 using NEAT+. It identifies areas of concern to address (UNEP/OCHA, 2019).

Issues of High Concern	Issues of Medium Concern	Issues of Lower Concern
There is a high concentration and/or number of people. The potential environmental impact is greater.	The displaced population may be in a state of high uncertainty. There may be a lack of incentive to practice sustainable behavior.	The community may not be socially cohesive. This can prevent collective action and lead to social conflict.
The community may have low self-sufficiency. There may be a greater demand (and impact) on the local environment.	There may be a weakened or poor governance system. There may be low capacity for environmental management.	The environment has a low regenerative capacity. The effects of land and soil degradation are more significant.
The environment has high biodiversity value. Vulnerable and/or rare flora and fauna may be at risk.	The environment has fragile ecosystems. Loss of biodiversity may be an issue.	The water sources may be vulnerable to contamination. Water quality may be an issue.
The community may be close to a protected/conservation area. There may be legal/social implications.	Rates of deforestation may exceed regeneration capabilities. Deforestation may be a risk.	There is low capacity to manage solid waste. Environmental sanitation and disease transmission may be an issue.
There are areas of high cultural significance. This can threaten social cohesion.	The area may have poor slope stability. Landslides or mudslides may be a risk.	This area may be at risk of soil erosion from wind.
Indoor air pollution, caused by poor ventilation and cooking/heating, may be an issue.	Natural resources may be scarce and in high demand. This can lead to social conflict.	
There is low capacity to manage wastewater. Environmental sanitation and disease transmission may be an issue.	Natural resource availability/accessibility may be affected by changing climatic conditions.	

**Table 4** Example of an Environmental Impacts Table from USAID Environmental Sector Guidelines: Energy. This shows part of the impacts listed for wind power and mitigation techniques.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING MEASURES
<p><b>Avian Risk and Biodiversity Risks.</b> While small-scale wind turbines generally do not pose significant avian threat due to their low height and small rotor diameters, birds and bats may collide with operating turbines, or be injured during flight by air pressure fluctuations caused by the spinning blades. As with any construction project, land alteration may create competing land uses that have variable impacts on ecosystem services as well as on the habitats of sensitive flora and fauna..</p>	<ul style="list-style-type: none"> <li>• Conduct a predevelopment and/or an ESV assessment to ensure that biologically sensitive areas are avoided. (P&amp;D)</li> <li>• Avoid projects in areas with endangered bird and/or bat species when possible. (P&amp;D)</li> <li>• When project siting may affect endangered or threatened species, operation of wind turbines may be limited to prevent substantial impact (e.g. a study of bat behavior has shown they are more active during periods of lower wind speed). (O&amp;M)</li> </ul>	<ul style="list-style-type: none"> <li>• Tracking instances of injury to avian or bat species. (P&amp;D)</li> </ul>
<p><b>Land Disturbance.</b> For smaller scale wind turbines, land disturbance is generally not a significant environmental impact. Typically, less than 1 acre of land per MW is permanently disturbed from wind turbine operations and for small-scale wind towers. This means that overall land use is minimal, but consideration should still be given to ensure that valuable ecosystem services and sensitive habitats are unharmed.</p>	<ul style="list-style-type: none"> <li>• Where applicable, use the site of the wind turbine installation for alternative uses such as agricultural production or grazing for livestock, to minimize disruption on utilized land. (P&amp;D, O&amp;M)</li> <li>• Conduct a predevelopment assessment and/or an ESV to ensure that construction avoids biologically sensitive areas as well as areas critical to providing valuable ecosystem services.</li> </ul>	<ul style="list-style-type: none"> <li>• Engage the community with regards to project siting, design, and management prior to project implementation. (P&amp;D)</li> <li>• Interview community members prior to project implementation to ensure that land use is compatible with wind development. (P&amp;D)</li> </ul>