

# TRANSFORMING LAND, TRANSFORMING LIVES

Greening Innovation and Urban Agriculture  
in the Context of Forced Displacement



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Cover image: A green oasis – a small refugee home garden in the middle of Azraq Camp, Jordan.

▲ Long view of Azraq Camp, Jordan. Located in a hot desert environment, Azraq has no electricity, and refugees have to walk long distances for water and food. Despite these limitations, Azraq has space and the potential for large-scale greening innovation and urban agriculture.

# FOREWORD

*There are more refugees in the world today than ever previously recorded. If the displaced were the population of one country, it would be the 24<sup>th</sup> largest in the world. In the face of this unprecedented challenge, the world is tasked with finding durable solutions that require common purpose. We need bold and inclusive leadership, deep understanding, and ambitious plans with decisive actions. Change calls for the innovation and agility more typical of lean start-ups. It calls for an approach rooted in a network of talented professionals who believe grassroots movements can change the world.*

*At Lemon Tree Trust, we believe that urban agriculture – the tangible manifestation of ecology, greening and cultivation – creates new and unrealised value to achieve dignity, empowerment and sovereignty for those living in under-resourced communities, such as refugee camps. A lemon tree serves not only as something physical to be nurtured, but also functions as a symbol for agricultural solutions for displaced persons – trees and gardens provide beauty, shelter, food and economic security. At Lemon Tree Trust, we envision refugee camps where residents are engaged in the design of sustainable and innovative urban agricultural practices while ensuring yields that benefit all.*

*This report details the vision, mission, strategies and tactics for how we will undertake this greening innovation in refugee camps. We invite you to join us in our effort to assist the globally displaced – one tree, one garden, one life at a time.*

*Sincerely,*

**Stephanie Hunt and Mikey Tomkins**

Co-Founders, Lemon Tree Trust



In the Dohuk Governorate of the Kurdistan Region, there are around 25 formal refugee and IDP camps with a combined population of 250,000 displaced people (2016 figures). A further 356,000 displaced people live in our towns and cities. In Dohuk Governorate, the pressure on our infrastructure and natural resources is immense.

That is why at the Board of Relief and Humanitarian Affairs, we look for innovative solutions to address these problems.

Greening refugee camps and urban agriculture – planting trees, turning wastes to resources, creating livelihoods, protecting the environment – is one innovative example that we strongly endorse.

We welcome the initiative of Lemon Tree Trust and urge other partners to embrace their visionary approach by making life for the displaced dignified and green for the benefit of all humanity.

**Laylan Mohamed Salih**

Program Manager of Refugees and IDPs, Board of Relief and Humanitarian Affairs,  
Dohuk Governorate, Kurdistan Regional Government



# SUMMARY

- Today, over 65 million people are living under conditions of forced displacement. In the face of this unprecedented challenge, we need bold, inclusive leadership, deep understanding, ambitious planning and decisive action to find sustainable solutions. Greening innovation and urban agriculture can be a key part of this.
- Greening innovation makes landscapes and living spaces ecologically resilient and sustainable. It uses environmentally friendly, climate-smart technologies and practices to grow food, plant trees, produce energy, and convert waste into resources using productive closed-loop systems that build rather than exploit their natural resource base.
- Urban agriculture – the growing of plants and raising of animals in and around cities and settlements – should be integrated into urban ecosystems, with food sovereignty as the goal.
- Together, greening innovation and urban agriculture can bring dignity, empowerment and food sovereignty to refugee communities. Simple technologies and waste recovery make these techniques cost effective and adaptable. Both should be central to designing, implementing and sustaining both refugee camps and overcrowded urban areas.
- This report examines current and potential use of greening innovation and urban agriculture in refugee camps and populations. Together, these examples demonstrate how the scaling up of greening innovation and urban agriculture could transform twenty-first century thinking around refugees with regard to food security, landscape ecology and waste recycling.

## PRACTICAL EXAMPLES

- **Iraq:** In Domiz Camp, by supporting home gardens, seed, tree and tool distribution, and running a garden competition, we are demonstrating how refugees use home gardening to create ownership of their immediate space, and how these gardens can make a vital contribution to food security. Infrastructure such as greenhouses or plant nurseries should be integrated in camp planning, as should strategies for resource recovery, and reuse of wastewater and organic solid wastes.
- **United States:** In Dallas, work with resettled refugees shows how urban agriculture can be a vital part of sustainable growth and community integration, helping to eradicate local food deserts and develop livelihoods in under-resourced communities. GIS Mapping has been used to identify unused land suitable for growing food.

## PARTNERSHIPS

- **In Uganda:** Working with Bondeko Refugee Livelihoods Centre has further demonstrated how growing food in refugee settlements is part of the solution to food insecurity and livelihoods. With support, women are developing small agri-businesses, improving their families' diet and income.
- **In Jordan:** In Azraq Refugee Camp, working with UNHCR on a needs assessment indicated opportunities for reusing water and planting trees, improving the environment of more than 20,000 people living in a desert area.
- **In Iraq and Syria:** Working with a partner NGO to distribute our garden kits to new camps or recently

liberated areas, we are enabling people to begin growing food at the earliest opportunity. This is providing jobs in Domiz as well as broadening our network and making seeds and tools available where they are most needed.

- **In Oxford, UK:** Funding support of research conducted by the Humanitarian Innovation Project, based at the Refugee Studies Centre at the University of Oxford. Work concerning refugee economies and innovation in practice has been undertaken in Kampala and Nakivale refugee camp (Uganda).

## MAINSTREAMING GREENING INNOVATION AND URBAN AGRICULTURE

- Greening innovation and urban agriculture can bring enormous benefits to refugees and host communities.
- However, existing guidelines, frameworks and research on integrating innovative natural resource-based sustainable livelihoods into refugee camp planning and design are seldom applied.
- Camps can no longer be planned around the unsustainable linear model of inputted resources and discharged waste.
- Significant change is needed before greening innovation and urban agriculture are adopted more widely as part of the solution to the forced displacement crisis. However, even where the permanence of refugee camps has not been conceded, the closed-loop model can still be developed, and greening innovation and small-scale food production can still be supported.

# DEFINITIONS

## GREENING INNOVATION

is change; a breathing, growing, living process that makes our landscapes and living spaces ecologically resilient and sustainable. It uses environmentally friendly, climate-smart technologies and practices to grow food, plant trees, and produce energy, and to convert our waste into resources using productive closed-loop systems that actually build rather than exploit their natural resource base.

## URBAN AGRICULTURE

is the growing of plants and the raising of animals within and around cities and other settlements. Its most striking feature is how the practice is integrated into the urban economy and fabric itself and thus embedded in – and interacting with – the urban ecosystem. In the context of forced displacement, urban agriculture has a clear role to play from the earliest stages of a crisis, through refugee camp and crisis-city settings, to resettlement or returnees. However, facilitating the transition from food insecurity to food security, then food sovereignty, is always the goal.

## FORCED DISPLACEMENT

refers to the situations of people who leave or flee their homes due to conflict, violence, persecution or human rights violations. Globally, there are now almost 20 million refugees and 40 million internally displaced persons (IDPs) – and most are hosted in developing countries. Many of these refugees and IDPs don't have access to land, property, housing, livelihoods, urban services and accountable and responsive governance. In this report we use the term.



▲ Walking around Azraq Camp, occasional gardens like these punctuate the otherwise endless sandy landscape.



"My motivation for starting gardening here is that it's living within me, moving in my blood. Wherever I go, I don't feel comfortable until I plant something and take care of it."

A gardener stands in a large garden in Za'atari Refugee Camp, Jordan. This garden, which grows everyday vegetables and herbs, is a collective space, open to all neighbours.

# INTRODUCTION



▲ Lemon trees in Domiz Camp, Iraq, ready for distribution to households.

*"I dream that I will be able to go back to my country but while I am living here I want to improve my situation, especially by growing plants because plants are alive for everybody."*

**By the time they reach a refugee camp, or find a new home in a city, most refugees have experienced substantial suffering and subsequently developed considerable resilience. For many, however, this is only the start, as they try to rebuild their lives in cramped shelters, often in harsh, unforgiving environments, with poor sanitation, poor quality food and few opportunities to earn a living.**

The reality is that one-third of refugees – over 20 million – live in protracted refugee situations in 30 countries. These situations present some of today's most compelling humanitarian challenges as refugees find themselves in long-lasting, intractable states of limbo for often indefinite periods. With restricted movement or confinement in camps, refugees often cannot build livelihoods or achieve self-reliance. The struggle to fulfil basic needs – food, shelter, education, health care – is a daily one.

At Lemon Tree Trust, we consider greening innovation and urban agriculture to be key to making refugee camps healthier, greener and more productive. Rather than viewing camps only as spaces that confine and control, we believe they can become spaces of hope and reconstitution. From years of working with refugees across the world, we know that camp greening and supporting refugees to produce food works. Even in crisis, refugees often improve their homes and livelihoods through gardening or agriculture, from home gardens and composting to keeping rabbits or chickens.

At the moment, greening innovation and urban agriculture are often the work of individuals, unsupported by UN agencies, NGOs or government bodies, or, at worst, discouraged and eradicated because they contradict water use or land planning

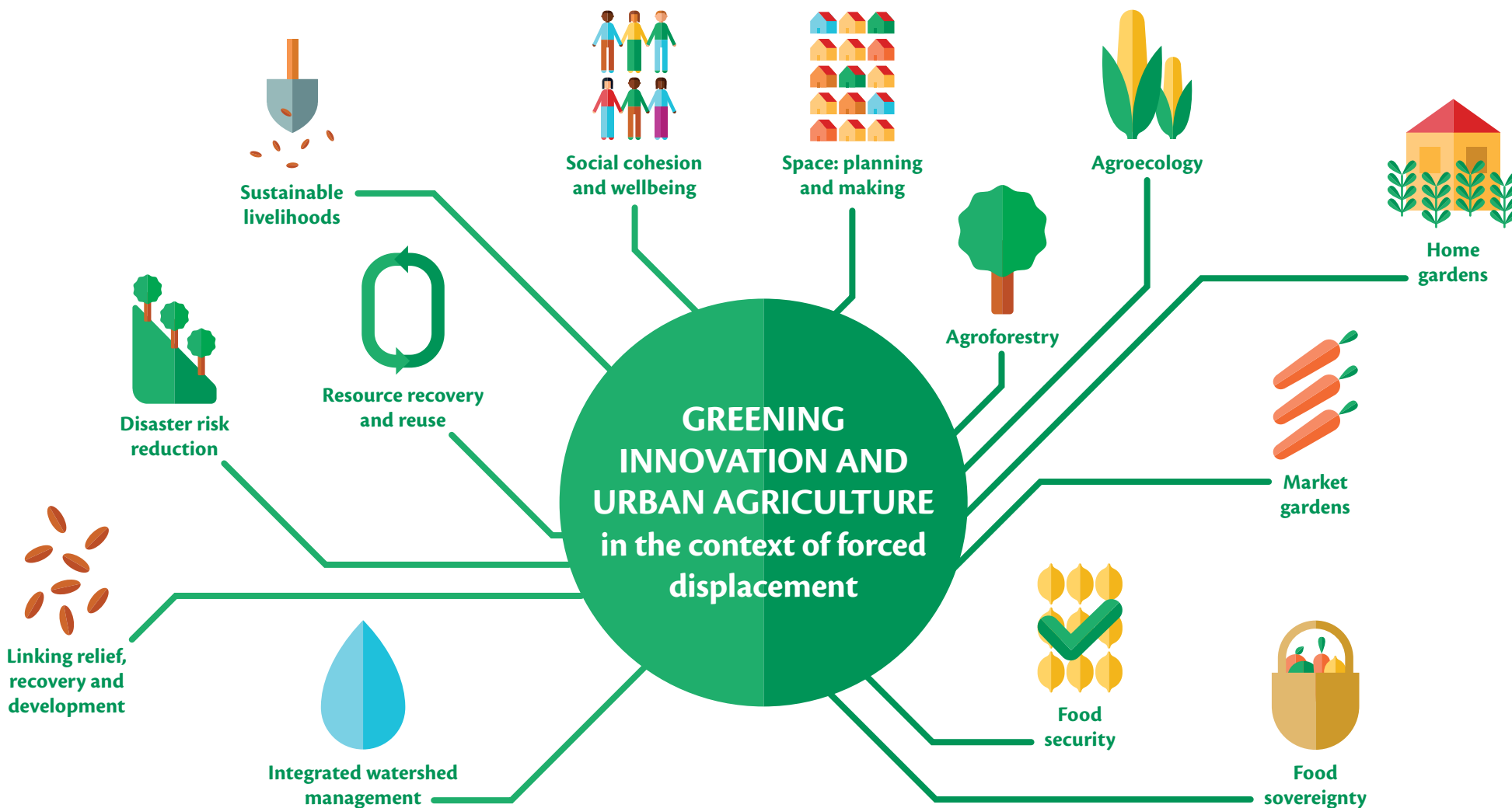
policies. We need to challenge this as greening innovation and urban agriculture should be central to designing, implementing and sustaining the accidental city that is the refugee camp or tomorrow's overcrowded urban area.

Simple technology and waste recovery make greening innovation and urban agriculture cost effective and easily adapted to different settings, meaning they are key to a sustainable response to the refugee crisis. On a human level, they represent much of what's important in all our lives: an attractive, clean environment; fresh, nutritious food; the chance to become self-reliant; and a place we can call home.

This 'call to arms' illustrates clearly the steps needed to make the scaling up of innovation and urban agriculture a reality, as we aim to transform twenty-first century thinking around refugees with regard to food security, landscape ecology, waste recycling, and greening innovation. We also give an insight into the lives of some of those who are making these accidental cities their home, providing a platform for their stories in order to share their dreams of transforming their immediate localities. We hope we can do them justice. Every day, refugees use ingenuity, creativity and determination to rebuild their lives and define their futures. We want to be part of this – we hope that you will too.

# GREENING INNOVATION EXPLAINED

Over these two pages, we will look at some of the concepts, institutions, processes and practices which make up greening innovation, many of which we are piloting in our projects in Iraq, Uganda and the USA.



## CONCEPTS BEHIND GREENING INNOVATION



**Integrated watershed management (IWM)** covers a defined area within which water flows to a common point. Refugee camps can have both positive and negative effects on the watershed, so there is a need for an integrated approach which tackles water-related issues and reduces flooding risks, while conserving groundwater and protecting the watershed from pollutants.



**Linking relief, recovery and development (LRRD)** builds stronger links between emergency relief and longer-term development. In the refugee context, LRRD looks beyond food security towards food sovereignty, ensuring that refugees have greater political engagement in food, land, seed and water issues.



**Disaster risk reduction (DRR)** is a policy, planning and practical tool to address vulnerability while building capacity and resilience to natural and human-induced disasters. Greening innovation and urban agriculture can be used for zoning fragile areas like steep slopes and flood plains next to refugee camps, while contributing to food security and environmental protection and sanitation.



**Resource recovery and reuse (RRR)** is the change from seeing waste as a linear problem that needs disposal, to recognising it as a valuable resource that can produce energy or fertilisers, thus closing the nutrient loop. Closing the loop benefits farmers, generates income, creates sustainable livelihoods, and contributes to food security and environmental sanitation.



**Sustainable livelihoods** in the greening innovation and urban agriculture context occur when growers have the technical capacity, access to land and farm inputs, and social resources to make a living from growing food. This becomes sustainable when it has a degree of resilience, and can cope with, and recover from, stresses and shocks, and maintain or enhance its systems without undermining its natural resources.



**Social cohesion and wellbeing** exists when all members of a society work together to eradicate exclusion and marginalisation and create a sense of community and belonging, building trust and offering creative, productive and sustainable livelihood opportunities for all. By bringing together refugees, IDPs and host communities, urban agriculture promotes social inclusion.



**Space – planning and making:** following a crisis, camp infrastructure (shelters, water and sanitation facilities, health centres, schools, roads) is implemented for immediate protection. Often this does not take into account the innovative place-making process from refugees themselves. Greening innovation and urban agriculture integrate these everyday practices with conventional top-down planning.

## PROCESSES AND PRACTICES IN GREENING INNOVATION



**Agroforestry** is the integration of trees or shrubs with crops or pasturelands to create more resilient farming systems, while increasing biodiversity and improving soil and water conservation. In refugee camps, trees are aesthetically pleasing but also provide construction materials, energy, foodstuffs, timber, and protection (as shade or windbreaks).



**Agroecology** builds sustainable agro-ecosystems based on ecological and socio-economic perspectives that encompass the whole food system. In both refugee camps and urban settings, it allows IDPs, refugees and host communities to grow food using safe organic methods.



**Home gardens** – or backyard or kitchen gardens – are small plots of land close to homes, and are traditionally used to grow herbs, fruits, and vegetables for home consumption. They are frequently characterised by use of vertical spaces, high biodiversity and use of domestic wastewater for irrigation and organic kitchen waste for compost.



**Market gardens** are small-scale food production enterprises intensively managed to produce herbs, ornamental flowers, fruits and vegetables from small urban and peri-urban plots ranging from a half to five acres. Market gardens produce for local markets and often use a high degree of organic inputs to maintain soil fertility and structure, thus conserving soil moisture and irrigation water.



**Food security** exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences. Greening innovation and urban agriculture contribute to food security through improved access to fresh foodstuffs, income generation and increased food supply for local markets.



**Food sovereignty** in a refugee camp recognises food as a basic human right rather than as a commodity for distribution to dependent refugees. This requires the reforming of 'food relief', for example by integrating food provision within city-region food systems that allow refugees to grow food while protecting the natural resource base.

# URBAN AGRICULTURE EXPLAINED

Here, we outline some of the key components of urban agriculture, and explain why these are ideally suited to helping to develop sustainable livelihoods in refugee camps.



▲ Transferring seedlings in a polytunnel at Domiz camp

## ECONOMIES

Beyond family food provision, urban agriculture can create economies through selling crops direct, developing supporting industries of food processing to add value, or supplying compost, seeds and tools. All of this begins to create a viable food production chain adding to employment or entrepreneurial opportunities available. In refugee settings, urban agriculture practices have a local customer base, meaning culturally appropriate food can be grown, drawing on the collective knowledge of refugee communities. Market gardens, close to customers and local markets, enable home carers to be economically active, taking part in selling produce or growing vegetables.



▲ Small home livestock in Domiz camp

## SMALL LIVESTOCK

There are numerous examples of refugees raising small livestock like chickens, rabbits, goats, sheep and pigeons. Eating mainly waste material, these birds and animals are excellent feed-to-meat converters. Rabbits in particular take up small domestic spaces, like courtyards and the under-space of raised prefabricated housing units. They don't need extensive infrastructure, breed easily, and grow quickly. Larger spaces can be used for goats or sheep, building resilience through diversity. Glassed over spaces can also accommodate aquaculture or hydroponics (or a combination known as aquaponics) providing fish and salad leaves.



▲ Seedlings are prepared for planting in Domiz Camp

## VEGETABLES

Vegetable growing is the mainstay of urban agriculture. Any small patch of earth or container can become a food-producing space. Simple inputs like seeds and compost bins can accelerate the adoption of food gardening to complement food aid. Food production also aids home making and creates a sense of dignity through autonomy, allowing refugees to draw on their existing knowledge and life stories. As vegetables start to grow, refugees transform themselves from passive recipients of aid to active producers of food and agents of landscape change.



▲ Domiz Camp, Iraq

## FIELD CROPS

Within refugee camps there are often large areas suitable for field-scale growing. With water availability often an issue, choice of site is critical: next to run-off greywater, or close to standpipes, is ideal. Field crops draw on traditional knowledge and can employ large numbers of people. Urban agriculture can add intensity through intercropping, giving farmers greater resilience if one crop fails. Crops should also be planned in and around dwellings to reduce transportation requirements and enable farmers to use domestic waste streams. Fields can be bordered with orchards to produce fruit for local consumption.



▲ Domiz Camp, Iraq

## TREES


Trees can transform urban areas from bleak desolate spaces into productive microclimates offering respite from urban sprawl. While the combined effect of trees can reduce the urban heat island effect, even planting single trees in a home garden, allotment plot or hedgerow brings additional benefits to the food and timber they produce. Trees also provide modified microclimates, a reduction in stagnant surface waters, soil and slope stabilisation, nitrogen fixation, livestock fodder production, and an increase in biodiversity that benefits wider urban ecosystems. Even if camps are temporary they improve the environment for the longer term.



▲ Domiz Camp, Iraq

## POLYTUNNELS

Polytunnels extend the growing season, increasing production through a second or third harvest, and allowing a competitive edge. Marketing an early harvest while crop prices are still high provides economic advantage and contributes to local food security. Polytunnels provide growers with a closed-space microclimate, enhancing plant growth and food production. Initial outlay is relatively low considering the potential high returns from growing lucrative crops. However, they require good management and growing practices based on sustainable irrigation and fertilisation and integrated pest management.

A photograph of a refugee camp. In the foreground, a dirt path leads through the camp. On the left, there are several makeshift tents made of white and blue tarpaulin. Two women are standing near one of the tents; one is wearing a colorful patterned dress and a red headscarf, and the other is wearing a purple patterned dress. A third person is sitting on the ground near them. To the right, there is a large, circular concrete structure, possibly a well or a water storage tank, surrounded by debris and a small stream of water. In the background, more tents and a flag are visible under a clear blue sky.

**In the following section, we will explore how water, soil, seeds and space are crucial to developing sustainable livelihoods, and look at how, through greening innovation and urban agriculture, these can become central to the lives of refugees living in difficult circumstances.**

*"Using grey water kills two birds with one stone: I heard the detergent we use to wash our clothes is also good for my plants."*

**In Domiz Camp, one gardener used greywater to such an extent that no wastewater streams ever left her plot. She planted extensive sunflowers outside her dwelling, so her plot was kept clean and dry, and as a result her garden had fantastic sunflowers and luscious vegetables. The garden won third prize in Domiz Camp's Garden Competition in 2016.**

Greywater flowing in Domiz Camp, Iraq. Concrete drainage channels are built but where these end, wastewater pools. These pools are typical of wasted resources which greening innovation seeks to capture as inputs for food and trees.

# WATER

**Water is the essence of life, and a vital, life-sustaining component of any humanitarian response, whether in a refugee camp, a settlement or an urban area.**

According to an internationally agreed minimum, every refugee must be provided with 15 litres of water each day. In practice this figure is much higher and is likely to reach a few hundred litres per day per family, particularly in hotter climates.

However, despite the clear water supply guidelines, refugee camp planners constantly underestimate the amount of wastewater a camp produces once it is fully populated and receiving its daily supply of potable water. This supply leads to very high volumes of wastewater in a relatively small surface area due to high population densities, and results in overload on surrounding fragile eco-systems. During heavy rains, camps can quickly become quagmires, adding to the dire environmental conditions, and it is not uncommon to see children playing in wastewater streams. Refugee camps do not yet use the principles of sustainable urban drainage systems (SuDS), which offer safer, more appropriate solutions to the drainage issues found in many rapidly expanding refugee camps.

However, the continuous availability of wastewater in refugee camps is itself a golden opportunity if an RRR approach is applied. Collecting it safely can maximise the greening infrastructure of refugee camps by reusing it to irrigate crops and trees in nurseries, agroforestry (windbreaks/

shelter belts/orchards) and home and market gardens. Agroforestry can also be used in the design of disaster risk reduction (DRR) by using vegetation to control flood waters and stabilise fragile slopes.

Greywater is domestic wastewater that has not been contaminated with faecal matter. If water becomes contaminated or is mixed with human waste then it is known as blackwater, and requires treatment, depending on its intended use. Even blackwater, or dried faecal sludge, can play a role in a well-designed and implemented RRR project, for example for the irrigation of (non-edible) fuel-wood trees or in the production of energy briquettes or pellets, respectively. Applying an integrated watershed management (IWM) approach to refugee camp management would not only save lives through flood prevention, but also ensure surface and groundwater is conserved within a watershed, and protected and sustainably managed.

Greywater can safely be used by households to water trees or home gardens. The amount that an average family produces per day is enough to supply a home garden, particularly if washing and bathing water is diverted for this purpose. Lemon Tree Trust is advocating these techniques and teaching people to use them in our demonstration garden in Domiz Camp in Iraq.

# SOIL

**In urban areas the availability of good agricultural soil should never be a prerequisite for starting an urban agriculture project. In fact, lack of fertile soil should rather serve as motivation to put in place RRR techniques to produce compost from organic urban wastes.**

This same principle can be applied to refugee camps and settlements, with the tonnes of solid organic waste produced each day diverted into compost production, thus harvesting valuable nutrients. Compost also contributes to the physical structure of soil, increasing its water holding capacity and water conservation. In refugee camps, RRR strategies are ideal as the basis of a 'greening the camp' programme. Organic solid waste is decomposed to create compost, which is used as a growing medium for tree nurseries, transplanting of tree seedlings, home gardens and market gardens, for example. You can never apply too much compost so projects should aim for full organic waste recovery from the flow of solid organic waste.

In our demonstration garden in Domiz, for example, this would also reduce the landfill tariffs that are to be introduced by the local authorities. The added advantage is that wet organic waste is the heaviest component in domestic solid waste, and so implementing simple organic waste composting plants would substantially reduce the total weight of solid waste sent to open waste dumps or to landfill. A simple composting plant requires low investment and uses relevant and economically feasible technologies. Organic waste separation occurs at the household level, allowing collection teams to collect waste and deliver it to the plant. The plant consists of a roofed compost production area where waste can be sorted, shredded and formed into windrows for decomposition, before quality

checking and, if required, bagging into sealed plastic sacks for transportation or even selling to outside markets.

At Lemon Tree Trust we see soil as the foundation for any greening innovation and urban agriculture project; moreover, we see the production of compost through RRR as the most appropriate model for refugee camps and urban areas in general. By creating livelihoods and generating income from what is traditionally perceived as waste, these greening innovations benefit both refugee and host communities, contributing to social cohesion.



▲ Small scale compost production in Za'atari Refugee Camp, Jordan.

*"I used to live in another section of the camp, and here I planted tree seedlings in old cans. When I got this plot I moved them across and developed my garden. I was worried the camp would not allow it, but saw other gardens growing up, and this gave me the confidence to continue."*

In Za'atari Refugee Camp, Jordan, a disused WASH block has been turned into a walled community garden by NGO ACTED.





# SEEDS

"My garden is like my children: I care for my garden every day. I sit here also with my friends – it's shady and cool when there is no electricity."

**In even the bleakest environments, refugees use what little space they have to nurture plants. Diyar, a young Yazidi boy, lives in the sprawling Khanke IDP camp in north Iraq. He showed us his brother's well-kept onion patch, right beside the family tent, protected by a string fence.**

**In other cases, families use seeds they rescued as they fled their homes. Some buy coriander or sunflower seeds from spice stalls and plant those. Once families have access to seeds, many start seed saving and distribution, creating the basis of a vital, sustainable, local food sovereignty network.**

**If soil is the critical layer on which food gardening rests, then seeds are the building blocks from which it emerges. Specifically, the use of local or saved seeds offers affordable, appropriate and local crops for farmers.**

This builds in greater food sovereignty for growers, outside of the commercial seed market, while also reducing their costs. It also embeds knowledge at a community level, and helps to create independence.

At Lemon Tree Trust we argue that seeds, as part of a food sovereignty approach, should be seen as an essential part of food aid and offered to all who seek them. This builds a stronger link between food security and the transition to food sovereignty.

Between 2015 and 2017 we have distributed thousands of seeds to refugees in Domiz Camp using a network of refugee-supported assistance. These seeds were then used at the household level to turn often barren areas of land around individual shelters into vibrant, productive home gardens. Such practices on their own do not have a major impact on food security, but they help develop the idea that with a small amount of appropriate support, refugees can regain their dignity and create their own solutions that benefit themselves and their communities.

"To enhance the environment here in Domiz Camp, more seeds should be distributed so that we can grow more plants."

Planting vegetable seeds, Domiz Camp, Iraq. As seeds were not readily available in the camp, we initiated a seed distribution network. However, local seed saving is the preferred option and should be encouraged.



▲ Regardless of the plot size, growing food, such as these onions outside Diyar's tent, brings normality, itself a form of social and horticultural therapy.

# SPACE

**Food growing requires space, yet in the accidental city of the refugee camp, planned top down as an emergency response, vital infrastructure – water, roads, power – takes precedence. These large-scale technical and planning strategies are rightly dealt with as priorities, around which dwellings are placed.**

However, this means that residents often feel excluded or inhibited in using space beyond their dwellings, stifling the potential use of space to meet family needs, food or otherwise. In Domiz Camp, residents sometimes move their tent to be near family or friends, meaning that they themselves are creating meaningful spatial arrangements. By contrast, in Azraq Camp, dwellings are cemented to the ground and aligned in identical rows, meaning that residents cannot 'make their own city'. Gardening and food growing, even if it is only one tree, provide a duty of care for refugees within the camp landscape, a place where the top-down planning can mingle with everyday needs and aesthetics.

Greening innovation enables us to focus on this often neglected area of research and practice. For example, understanding the impulse to plant and grow plants comes firstly from a desire to beautify and create meaningful landscapes, and secondly to benefit from eating fresh produce. A stewardship approach to refugee camps

and settlements means empowering refugees through 'spatial sovereignty' as a crucial part of food sovereignty. This approach would build multiple linkages like the composting of domestic organic waste for soil production and the recycling of greywater for irrigating crops, thus lifting a responsibility from camp management and in the process empowering refugees themselves.

An understanding of greening innovation, urban agriculture and place making applies within all the spatial settings where displaced people live. While we have often highlighted the isolated refugee camp in this report as one example, this understanding also applies to peri-urban refugee camps, urban refugees, integrated refugee/host community camps and returnees. Within our Dallas work, we aim to help resettled refugees, developing urban agriculture amongst the apartment blocks, empty lots, and green spaces of the city's refugee population (see Dallas, pages 34/35). In Iraq we also aim to work with refugees in temporary accommodation in host communities.

A young girl watering one of the winning home gardens in the Lemon Tree Trust's garden competition in Domiz Camp, Iraq. Families take great pride in such spaces, providing beauty, food, and a space to relax in.

Why did you decide to make a garden at your home?

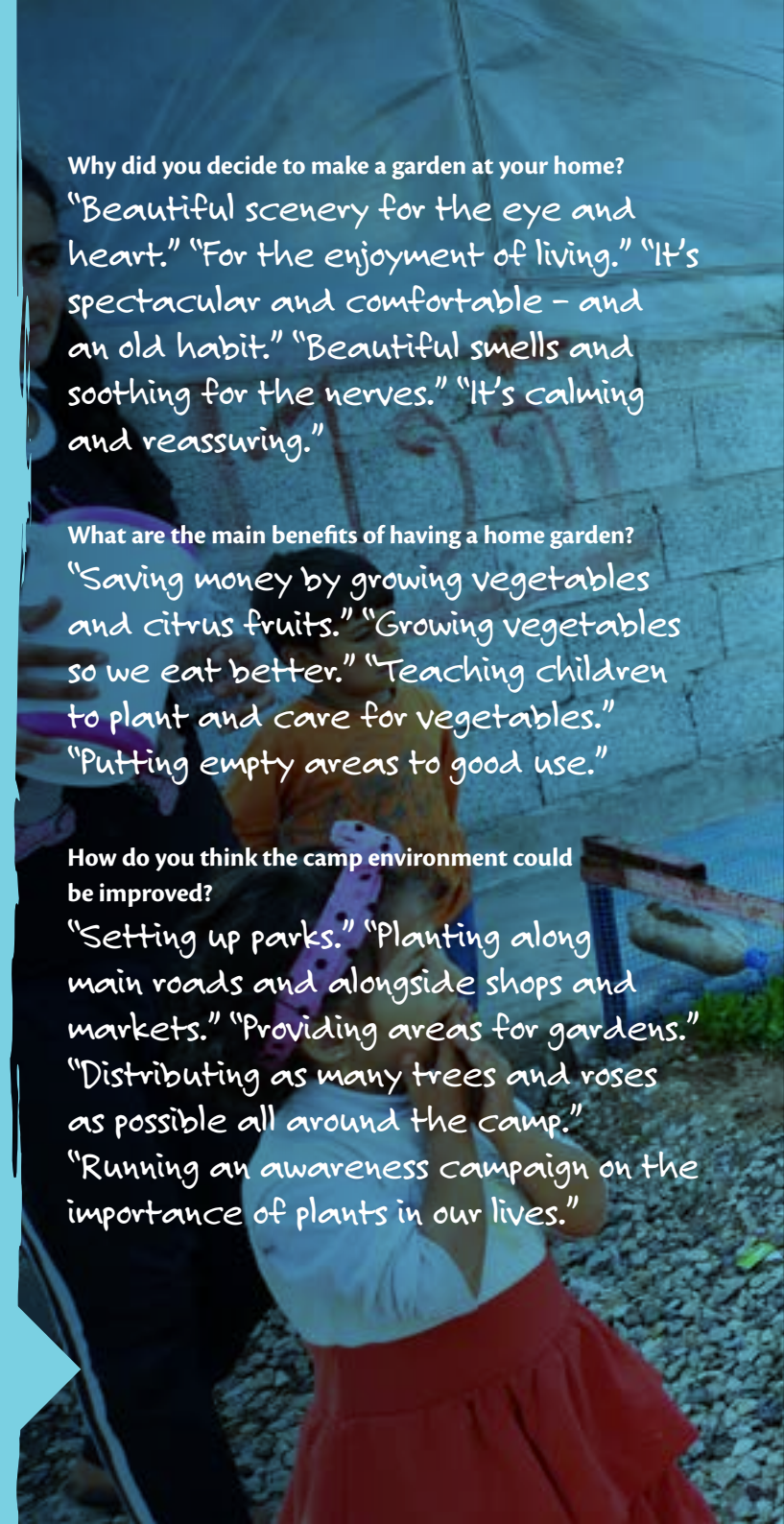
"Beautiful scenery for the eye and heart." "For the enjoyment of living." "It's spectacular and comfortable – and an old habit." "Beautiful smells and soothing for the nerves." "It's calming and reassuring."

What are the main benefits of having a home garden?

"Saving money by growing vegetables and citrus fruits." "Growing vegetables so we eat better." "Teaching children to plant and care for vegetables." "Putting empty areas to good use."

How do you think the camp environment could be improved?

"Setting up parks." "Planting along main roads and alongside shops and markets." "Providing areas for gardens." "Distributing as many trees and roses as possible all around the camp." "Running an awareness campaign on the importance of plants in our lives."







"My plants are more important to me than my friends and probably know more about me than they do themselves."

Khalid, winner of 2017 Garden competition, Domiz

# VOICES FROM DOMIZ CAMP, IRAQ

The stories below show how the issues of water, soil, seeds and space impact refugees' everyday lives, and touch on some of the creative ways many try to find solutions and transform the world around them. All of those featured below live in Domiz Camp; all have had to leave behind their homes in Syria to seek refuge here.

As they try to build new lives, greening innovation and urban agriculture can make an enormous difference. These stories highlight the importance of many simple but crucial things we take for granted. From the water that sustains us all, to soil and seeds to grow food and feed our family, and a space to call our own, these things are fundamental to life.

## "My garden helps me forget I am a refugee"

"My name is Khalid and I come from Syria. In 1989 at the age of 16 I joined the Peshmerga army as a Kurdish freedom fighter, fighting Saddam Hussein. When I returned to Syria, my involvement made it dangerous for me to stay and I left for Lebanon where I got a job as a gardener for a wealthy family and built bird cages in my spare time. I was saving money to move to Europe but lost my money to smugglers and returned to Damascus to work as a carpenter. I married, we had two children, and our house was always surrounded by gardens and by birds.

'After 24 years there, the Syrian uprising made it dangerous again for us to stay so I decided to leave with my family for Iraq. When I first arrived I was shocked at the harsh conditions under which people were living. Had I been fitter, I might have left and tried for Europe again, but we had no option but to try and improve the life we had been

offered here. In an attempt to recreate the life we had in Syria, I began to gather birds and plants around the house. In order to raise some extra money I went back to what I knew, building bird cages to sell and raising birds for money. The money has helped us use our tent space and build a small house, and to get our kids into school. But the quality of education is not great here, so my wife is now teaching them at home.

'Now, three years later, a number of people living here have left to go back; others are unable to leave and have, like us, upgraded their tents into houses and begun to develop gardens. Some houses have also been sold and people have moved into them, coming later from elsewhere. For me, feeding my birds and tending my garden makes me happy and helps me to forget that I am a refugee. On a good day I feel I hold the world in the palm of my hand.'



▲ Khalid created an aviary in his house in Domiz.



"The greenery is changing the way I feel for the better. So I would like to show people by example that they should start planting, so life will be green."

Aveen, our field coordinator in Domiz, with innovative use of recycled wellington boots.

# "A DREAM COME TRUE"

'My name is Aveen, and I come from a village outside Damascus. The Assad regime entered our village; there were many people they wanted and some were my relatives; some of them were killed. We were afraid for our lives and decided to leave. We went by bus from Damascus to Al Qamishli and walked until we crossed the border to Iraq. We arrived in November 2012. We came to Domiz, and there was nothing, no water, no sewage, no facilities, only tents. I live here with my family: my husband and my three children. My husband was working in oil. He joined the Peshmerga army a year ago, to fight Daesh in Iraq.

'My father worked in a nursery and in the fields and he was very happy, so I get this interest in green things from him. In our house in Damascus we had a small garden with olives and vegetables. As I've stayed here for a long time, I want to help people to plant things, because it looks like we live in a desert. The other thing that encouraged me to plant is when I found you walking between the houses asking people if they were interested in planting lemon trees. This seemed like a dream come true! So I caught you and brought you to my small garden. And when you saw my small garden you were excited, it helped me feel confident through this support.

'This project to plant trees, flower and vegetables gives people so much support and encouragement. Before you came here, there were only a few families planting gardens. But now, with the competition, and the lemon tree gifts, people are thinking: "Why don't I make my garden better? Plant more flowers? Tidy up and enter the competition, make myself proud and make the space around the house much nicer?" Your work is encouraging many, many families to do



▲ Aveen calling door to door to talk to families about the benefits of home gardens.

greening in and around their homes. Also, many people are asking to be volunteers for Lemon Tree Trust. If you can get trees, they will plant these in roads, paths and empty spaces.

'Many people are saying they want a nursery to help create communal and community gardens for households to work together. Vegetables are not as important as flowers in this sense to create something beautiful.

'If I have the chance, I will go back to Syria, back to my village. But if the situation doesn't improve, I would prefer to stay here. I don't want to go to Europe. I will improve things here, wait for the war to end – then I can go back home.'

## Aveen, Domiz Camp



▲ Aveen talking to a group of school children about local plants in Domiz Camp, Iraq. Aveen, alongside Jeena, works as a pathway facilitator raising awareness of camp greening and food growing.



"The greening has helped people feel happy, to see greenery near their home - they love it."



Sayed outside his nursery. He sells a variety of seeds, plants, and vegetables, as well as providing a hub for distributing lemon trees and seeds for our project.

# 'GREENING BRINGS POSITIVE FEELINGS, NOTHING NEGATIVE'

'We were living in Syria where I worked as a construction contractor. Because of security problems, there was less work in 2011 – all the government contracts stopped. I decided to leave because of the violence, and brought my whole family.

'In the beginning I worked out of the camp here, doing tiling, but after Daesh started fighting in Iraq, that work stopped. I decided to create work for myself inside the camp. The nursery doesn't require large capital to start up, that's why I chose it. But it was difficult to promote the business. Then when Lemon Tree Trust came with the project for planting trees and vegetables and improving gardening opportunities, you helped me to promote my business. People came here to collect seeds and plants and this has really helped me.

'Greening helps sick people to get better. And people here would like more agriculture. Lemon Tree Trust's garden competition has encouraged people to plant. Once people heard about it, lots more – maybe two or three times as many – came to ask for plants. Many hesitate though,

because of lack of space, but also because of the economic situation. People are cutting back a lot, and a reduced income makes people think twice. Or they decide they need the money for food.

'So, first of all, if there is a chance to get plants cheaper, this will really help people to plant. Secondly, we need job opportunities. Thirdly, if we have larger plots we could build greenhouses and encourage people to grow their own food, or something that's useful for them.

'As for the future, the big problem is limited land to plant. I can't employ more people because my plot is small. So to develop the project we need bigger land or spaces, and to make bigger greenhouses. We need to create more productive spaces so that people can get food from their own labour. People will grow vegetables if there is an income for them from it.'

## Sayed, Domiz Camp



▲ Sayed outside his small greenhouse, built with Lemon Tree Trust funds.



▲ Basil seedlings ready for sale.



"The newly established training and demonstration garden inside Domiz camp includes a space for community garden plots. This enhanced community space provides an outlet for socializing and a safe area for children to play and engage with agriculture."

Women's quarter in the demonstration garden in Domiz camp Iraq.



# DOMIZ CAMP, IRAQ: CORE PRINCIPLES IN PRACTICE

**Much of our innovative work has been carried out in Domiz Camp, Northern Iraq, home to 40,000 Syrian refugees. Here we have had the space and the opportunity to develop and test new approaches to working holistically. Starting with the distribution of trees, we have moved on to develop community and demonstration gardens as well as to support the development of small businesses. Over the period we have worked together, it has become apparent that the creation of flower gardens and green spaces is as important to people as growing food.**

Domiz Refugee Camp is situated in the north of the Kurdistan Region of Iraq, between Mosul and Dohuk. It was opened in 2012 to accommodate approximately 29,800 Syrian refugees. In 2015 it was home to 40,167 refugees.<sup>1</sup>

Lemon Tree Trust was invited to work in Domiz by the camp manager, who was particularly open to ideas around tree planting, gardening, agriculture, and landscape improvement through camp greening. We noticed early on that many refugees had planted home gardens, sometimes hidden away in small courtyards, other times spilling over into public spaces. There was a nascent plant and seed nursery along the main camp high street, alongside the many market stalls and shops. Overall there was an acceptance that the camp was a city in the making, an evolving urban entity that would be home to thousands of refugees for much of their lives.

Our approach here was a street-by-street familiarisation with people and their environment. If a garden was visible from the street, we would ask permission from its owners to visit, and they would then in turn lead us to other residents' or friends' gardens. What emerged was a quiet and gentle practice of home gardening with food and ornamental flowers. Refugees described this as coming from a desire 'to beautify the house', or to create 'beautiful scenery for the camp'. In refugees' hands, home gardening becomes a decisive tool to create ownership of their immediate space. As one refugee said, camp management should 'allow families to contribute to the environment in planting the gardens'.

Using what we have learned from existing refugee practices, we set about encouraging and developing gardening from the ground up, rather than imposing a master plan. For

example, although there was limited access to seeds, trees and tools in the camp, we worked through an already established small nursery, providing capital to expand the range of trees, seeds, and seedlings it provided. In exchange, the owner distributed seeds and trees to households, and acted as a focal point for our greening and urban agriculture project. From our previous door-to-door research we also recruited two women as 'pathway facilitators' to distribute seeds and encourage home gardening.

This engagement within residents' everyday life at a household level was complemented by a more strategic approach at the level of camp management, involving other NGOs. This involved drawing on the mainstream humanitarian sectors already set up, such as the water, sanitation and hygiene (WASH) programme run by the French Red Cross.

<sup>1</sup> Domiz 1 Camp Profile December 2015. Available at <http://data.unhcr.org/syrianrefugees/region.php?id=63&country=103>

# DOMIZ CAMP, IRAQ: URBAN AGRICULTURE IN PRACTICE

**The lemon tree became a symbol for our movement because it has particular importance for Syrians. Lemon trees are not just a food item but create a sense of remembrance for the home gardens that many refugees have lost through the war, and represent the hope that they may one day return home. Because of their importance, we distributed hundreds of lemon trees to households throughout the camp to raise awareness about the benefits of gardening.**

These trees became a visible symbol of home and place making. We were supported by a refugee from Damascus, Dr Sami Youssef PhD, who had handed out over 2,000 shade trees here, independent of any institutional support. Our combined efforts, while making some impact on the camp skyline, really serve to show that these accidental urban spaces need tens of thousands – if not millions – of trees to make a significant impact and bring the full benefits that could be gleaned from greening a refugee camp.

The home garden support we provided in Domiz Camp focused on seed and seedling distribution. Seedlings – ornamental flowers, and vegetables such as spinach, cucumber, peppers, and salad leaves – were raised in two greenhouses designed and built by two families with a small grant from Lemon Tree Trust. These greenhouses demonstrate that a camp the size of Domiz (1.143km<sup>2</sup>)<sup>2</sup> could support as many as 24 small greenhouses dedicated to seedling and plant production.

The conclusion of this project was our first ‘Best Refugee Garden’ competition in April 2016. We spent several months advertising the competition door to door, offering three main cash prizes, which grew to 22 cash prizes in different

categories for the most outstanding examples of home gardens. These prizes highlighted, for example, the best use of greywater, tree planting, recycled material, or limited space, all of which sit at the core of greening innovation and urban agriculture. We gave very few guidelines, leaving families themselves to create their own spaces. The outcome was a myriad of garden spaces that were implicitly innovative. The final awards event, shown on Kurdish TV and attended by camp and government officials, validated the efforts of refugee families, giving them respect within their own communities (see page 28 for more about the garden competition).

At Lemon Tree Trust we argue that home gardens, for those that want them, should be seen as a vital contribution to food security. Having seen the benefits, even early on after an emergency, we have developed a ‘crisis response garden kit’ approach to disaster response (see pages 32/33). This provides the basics for a garden during the initial response stage – tools, seeds, water can – and local gardening, soil and climate information. Following on from this, other infrastructure such as greenhouses or plant nurseries should be integrated in the camp master plan, as should strategies that integrate organic liquid and solid wastes through RRR. In

other words, seeing urban agriculture not as an afterthought or retro fit, but embedded as a core strategy, alongside shelter, energy, food and water, sanitation and hygiene.

In any refugee camp, if you look long enough, you will inevitably find some form of food growing. By necessity, refugees are innovative and productive, and will often find their own solutions to improve their food security, with growing food one such strategy. Refugees also bring invaluable knowledge and experience covering agriculture, aquaculture, horticulture and livestock. Some even bring their own seed stocks, contributing to seed security during times of conflict and devastation. Assessing the ‘gardening capacity’ of a camp and its residents can be an immensely useful resource when designing and planning a greening innovation project. Running a gardening competition can quickly identify the level of expertise, potential demonstration sites, and trainers and future pathway leaders. It also helps create public awareness about the benefits of gardening and the role that refugees can have in improving their immediate environments through greening innovation. We have now run two garden competitions in Domiz and are moving next year to a garden festival that will be managed entirely by refugee staff within the camp.

<sup>2</sup> 1,142,500 m<sup>2</sup> – Domiz 1 Camp Profile May 2016, p2. Available at <http://data.unhcr.org/syrianrefugees/region.php?id=63&country=103>

"The garden competition makes people feel excited. They go to the nursery and buy flowers, and are looking forward to winning."

"We Syrians really love green things. And in Kurdistan they understand this, and they give money to support this. We like Kurdistan because of this. We feel more like we are back in my country, rather than a refugee."

Small scale garden with plants, shrubs and trees, a winner in the 2017 competition.



# OUR CORE PROJECTS

## ESTABLISHMENT OF HOME GARDENS AND TREE PLANTING

We encourage the development of home gardens and tree planting, provide individuals with advice on using grey water, and gift vegetable and flower seeds. Distributing fruit trees gives us a way to open up conversations about the importance of trees and gardens in people's lives, and enables us to identify local workers, experts and enthusiasts. We have distributed thousands of fruit tree seedlings – lemon, fig, grape, apricot, pomegranate, and olive – as well as trees for shade, and flowering bushes. Planted in large numbers, these trees quickly soften the harsh environment of a camp.



▲ A seedling that became a tree in just 3 years.

## COMMUNITY GARDENS

By offering tools and financial support to schools, neighbourhood areas and community groups, we contribute to social cohesion, larger-scale food production and the development of spaces and activities that enable trauma recovery. We support gardens in women's and children's centres, creating safe havens where children can play amid the often hectic environment of the camp, and we have opened up communal spaces where neighbours can meet and spend time together. Community events like our popular garden competitions also help build relationships among displaced communities.



▲ Women planting in the demonstration garden.

## SMALL COMMERCIAL FARMS

Through the establishment of small commercial farms within the camp, we are uniquely placed to expand the agricultural reach of our work both environmentally and economically. We have secured larger spaces within Domiz Camp and established community farms, which use wastewater runoff and are developed as commercial businesses. It is this continuum of home and community gardens and small and medium-scale farms that make up the practice of urban agriculture.



▲ Adnan working with small scale field crops.

## THE DEVELOPMENT OF SMALL BUSINESSES

By employing refugees in all of these areas and encouraging entrepreneurship, we have supported new agri-businesses and provided work, training and economic benefits to displaced people. For example, we have supported and developed three refugee-owned nurseries in Domiz Camp. By encouraging residents to develop gardens, and distributing vouchers which enabled people to buy seeds, seedlings and tools at these nurseries, we helped them become viable businesses. We plan to set up a seed fund to further support refugees in sustainable micro enterprises that may eventually support their transition home.



▲ Preparing wheel barrows for Crisis Response Garden kits.

# LIBERATION GARDEN: DEMONSTRATING BEST PRACTICE

**By creating areas dedicated to training and demonstration, we can innovate and educate, while empowering those who emerge as leaders in agriculture. In Domiz Camp we have been allocated a 3,000-square metre plot to develop as an urban agriculture demonstration area. The plot is divided into four equal quarters, containing greenhouses, raised beds, orchards, and livestock. There are also separate garden spaces for men and women.**

The name of the plot, in the Azadi quarter of the camp, means 'liberation' and the garden is intended to show residents how to cultivate vegetables and small livestock within the constraints of a camp environment. We have refurbished a bore-well that was already on the site, and we provide training here in recycling grey water, composting, planting in small spaces, breeding rabbits and chickens for meat, and growing in polytunnels. The garden is run by refugees with expertise in agriculture and is funded on a decreasing subsidy basis, where workers are able to sell fresh food grown under plastic to recoup their part of their salaries. Our intention is for the Liberation Garden to become self-financing within three years. During the development of the garden, we gained attention from the international NGO Mercy Hands, who have subsequently become a partner at the demonstration site, and supported the construction of two additional greenhouses.

## **One of our main employees, Adnan, tells his own story:**

'I came from Al Qamishli, in northern Syria. I came here to be secure and to feed my family. By September 2012 the situation in Syria was too bad, it was unsafe and we couldn't stay there any more. Before, I was working as a painter and decorator and nurseryman for people from the Gulf who owned a big villa, so I have practical skills and gardening skills.

'I am Volunteer Mayor for one section of the camp. Since I became a mayor, I've been trying to improve people's understanding of greening and food growing – kids especially.

'I dream that I will be able to go back to my country but while I am living here I want to improve my situation, especially by growing plants because plants are alive for everybody. If you find green things you will have positive feelings... if it is desert, you have negative feelings. So if Domiz Camp is greener it will be a positive life even if it is temporary.

'My idea was always that if we set up a greenhouse we could create jobs for many people. If it is shared between many people it will produce food for many of the families here. Also, planting gives hope to the people who live here. A successful project would be a greenhouse for home use and to sell the food. If there is a piece of land, we can make a greenhouse on it: there is much empty space in the camp we can use.'



▲ Food harvested and ready for distribution, Domiz.



Distributing salad leaves to women in the demonstration garden.

"Gardening is in my blood. When I arrive somewhere, I don't feel comfortable until I am able to plant something."



▲ A Crisis Response Garden community kit.

## CRISIS RESPONSE GARDEN KITS

**A crisis response garden kit is a concept we have developed to provide agricultural and gardening equipment to newly displaced families within the first days of crisis and beyond. The kits range from a small cloth bag of seeds and hand tools to crates containing enough seeds and tools and other equipment for communal field cultivation. With funding from Lush, a UK ethical cosmetics company, we are supporting refugees in Domiz to source and assemble these kits and these are being distributed by a partner organisation, Mercy Hands, working in Syria and the newly taken areas of North Iraq.**

Kits are assembled in three sizes. Some, for individual families, are in handmade bags, produced by women in Domiz Camp from the unused linings of tents and temporary shelters. These bags contain hand tools, seeds, gardening twine and information on grey water recycling. Other kits, for neighbourhood gardens, are assembled in wheelbarrows, and contain larger tools, a hosepipe, string, pegs and sufficient seeds for six gardens or one large strip. The largest kit is assembled in a crate, which can itself later be used as a raised bed in a community garden. These kits are being distributed to schools or community centres. By initiating this project, we are aiming to fulfil our desire to see agriculture and gardening as part of a front-line response to crisis, alongside medical teams, shelter and food security.

The kits are being assembled by a team of refugees in Domiz Camp, Iraq, and distributed to Syria and other areas in Northern Iraq by Mercyhands, a partner NGO. We have costed each kit to include the materials it contains, the time taken to source and assemble it, and the cost of distribution. The use of the kits is being closely evaluated to assess their impact on people's ability to settle, even

temporarily, and start growing food. If they prove to be value and cost effective, we plan to promote them more widely to organisations working in different crisis areas who will be able to purchase them directly from the refugee team in Iraq. The team are able to advise on content, drawing on their own experience and needs, and with sufficient demand this could prove to be a viable business for a group of Domiz residents in the future. At the same time it is able to provide us with empirical research on what people want to grow, and to lobby more widely for the inclusion of green spaces in newly constructed refugee camps across the region.



▲ A Crisis Response Garden kit for an individual household.



▲ Team in Domiz camp assembling garden kits to be sent to Syria.

# DALLAS, USA: GREENING INNOVATION AND URBAN AGRICULTURE IN THE CITY

**In the unused alleys and vacant lots that dot the asphalt-laden urban landscape of Dallas, Texas, a quiet revolution is growing. Small-scale urban farming has begun to emerge as a vital part of sustainable growth in the city, bringing with it answers concerning how to eradicate local food deserts while also providing a much-needed solution to develop the economic livelihoods of Dallas' under-resourced communities.**

Since 1975, Dallas has resettled more than half a million refugees from all corners of the globe, many of whom now call Texas home. In recent years, refugees from Burma, Nepal, Bhutan, Iraq, Afghanistan, Syria, Sudan, Ethiopia, Eritrea and Somalia have all come to Dallas in the hopes of finding a life that will allow them to live in peace and, most importantly, dignity. It is within these communities that Dallas has seen some of the most creative and innovative uses of space to pursue urban agriculture.

Recognising the talent and entrepreneurial spirit encompassed in these communities of resettled refugees is

one of the key missions of Citizen D, a non-profit enterprise aimed at encouraging community development from a grassroots level. Citizen D, the sister project of Lemon Tree Trust, works to support those who have emerged as visionaries and community leaders in under-resourced neighbourhoods. By providing seed funding or physical space to grow food, Citizen D empowers economic sustainability through farming. Creating jobs that provide a living wage through food production benefits not only farmers themselves, but the wider Dallas community as well.

## DALLAS, USA: KEY BARRIERS TO URBAN AGRICULTURE

When Citizen D, Lemon Tree Trust's sister organisation, first began to undertake urban agriculture projects in Dallas in 2014, one of the key obstacles we found was a lack of accessible spatial data that could help us locate suitable land for growing food. In response, we began to map the city by looking for vacant lots, open green space, rooftops, and disused indoor space. We began this process in Vickery Meadow, an under-resourced neighbourhood in central Dallas, which is home to a significant proportion of the

city's resettled refugee population. Through our work in the Middle East, we have learned the inherent difficulties involved in maintaining maps that are both productive and current. Refugee camps by nature are rapidly evolving spaces. The constant movement of people and reimagining of space create a unique challenge to those trying to create meaningful infrastructure. In this way, we see a direct correlation between our work in camps and our work in urban centres such as Dallas. In neighbourhoods where space is limited and demographics continually shift, it is vital that infrastructure and strategic resources are planned with primary food production in mind so that, within the accidental city of the refugee, urban agriculture is not itself an accident but a deliberate and strategic practice aiming at recovery and development.

**Our work in Dallas continues to expand by incorporating additional layers into our mapping efforts, including neighbourhood demographics and land ownership. Additionally, we have started a one-acre urban farm in East Dallas, and maintain three separate community gardens throughout the city that support under-resourced communities.**

A gardener waters his plot at the Vickery Meadow Community Garden in Dallas.



# WORKING IN PARTNERSHIP

**Lemon Tree Trust is dedicated to working in partnership on the ground, such as our work with Mercy Hands, an NGO distributing our crisis response garden kits, and in the broader policy environment, such as our work with UNHCR, where we promote the importance of urban agriculture and greening innovation at an early stage in humanitarian response. Other partnerships include:**

## **BONDEKO REFUGEE LIVELIHOODS CENTRE, UGANDA: BUILDING LIVELIHOODS IN A RURAL ENVIRONMENT**

We are working in partnership with the Bondeko Refugee Livelihoods Centre in Uganda to establish small agricultural businesses with refugee women. The Bondeko Centre, on the outskirts of Kampala, is a community organisation, created and led by refugees. The centre started in 1997 as an emergency shelter for those fleeing violence and persecution in the Democratic Republic of Congo (DRC), Rwanda, and Burundi. Today, it has expanded its activities to include small enterprises and training: a women's micro-savings group, baking, tailoring, mushroom growing, and small-scale vegetable growing. It also continues to host an emergency shelter for newly arriving refugees, and an international volunteer programme.

Lemon Tree Trust has supported the Bondeko Centre to create its own small-scale urban garden through the provision of seeds, tools and initial training. The garden includes maize, beans, tomatoes, millet, and greens, and

their cultivation increases the food sovereignty of those living at Bondeko Centre, as well as enabling women to sell the surplus at markets. We have also financed the construction of pig and chicken pens and provided training courses in keeping and breeding. The projects are led by experienced farmers in the refugee community, and single mothers are prioritised on the training courses. Raising chickens provides a regular supply of eggs to the centre, with plenty over to sell, and constructing pig pens and raising pigs provides piglets for market. The project directly benefits 25 women living at and connected to Bondeko Centre and 75 children, who now have improved diets through increased vegetable consumption, and improved family resources through their mothers' increased incomes. All our joint projects are designed to be sustainable after six months, and we are in discussions with the centre about the construction of a hydroponics system.



▲ Watering in Bodeko Livelihood Centre.



Women harvesting crops, Bondeko.

# REFUGEE STUDIES CENTRE AND THE HUMANITARIAN INNOVATION PROJECT, UNIVERSITY OF OXFORD, UK:

**The Hunt Foundation, the primary sponsor of Lemon Tree Trust, also actively supports research undertaken by the Refugee Studies Centre and the Humanitarian Innovation Project (HIP), housed at the University of Oxford.**

Founded in 2012 by a donation from Stephanie and Hunter Hunt, the Humanitarian Innovation Project focuses on the role of innovation, technology, and the private sector in refugee assistance, through research in four main areas: refugee economies, bottom-up innovation, military-humanitarian innovation and governance innovation. The Hunt Foundation is proud to have been one of the most significant donors to this project over the past five years. This has resulted in numerous academic publications, coverage by the BBC, Reuters, and NPR. Its research has been presented at key policy meetings such as UN ECOSOC's humanitarian section, UNHCR's annual NGO consultations, the World Bank, the Danish Red Cross annual summit, and a joint UNHCR and RefugePoint meeting at Harvard University. HIP actively engages with practitioners from across government, international organisations, NGOs, business, and crisis-affected communities, and maintains strong partnerships with UNHCR and the World Humanitarian Summit. HIP now convenes the annual Humanitarian Innovation Conference.

The ground breaking research conducted by the HIP team in regards to Refugee Economies has been largely influential in positively impacting the discourse surrounding refugees from one reliance of to one of self-sufficiency.



# AZRAQ CAMP, JORDAN

**In 2015, through a coordinated effort between Ripple Effect Images, UNHCR and Lemon Tree Trust Co-Founder Stephanie Hunt, a project was launched that facilitated the creation and distribution of portrait photography for families living inside Azraq Refugee Camp.**

When refugees flee their homelands, they are often forced to abandon all possessions, including many treasured family photographs. Leaving these behind can exacerbate the feelings of intense loss that many experience. Photographs can provide an important marker to help us narrate our personal histories. Family photographs provide a sense of who we are and where we come from, and a tangible representation of the hope we place in our children for the future. They can complement our memories and reinforce our lived experiences, often giving meaning to the lives we lead. When these are lost in tragic circumstances, the feelings of detachment and loss can become overwhelming.

During an initial visit to Jordan in 2014 by Lemon Tree Trust Co-Founder Stephanie Hunt, this loss became apparent in a conversation with a woman from Syria, who had

fled in a hurry and had to leave everything behind. She confided that she was left without a single photograph of her children. This inspired Stephanie to launch the project and bring Ripple Effect Images, award-winning National Geographic photographer Annie Griffiths and photojournalist Lynn Johnson on board. The following year,

hundreds of photographs were taken and distributed to families inside Azraq refugee camp. The project, by offering photographs to those that asked for them, showcased the deep love and bond held within these families and provided an important step in rebuilding dignity and reinforcing resilience in the face of crisis.



▲ Siblings holding their newly printed family photograph, Azraq.

## IMPLEMENTATION

# REDEFINING WHAT'S POSSIBLE

**Imagine walking down a street in a camp where refugees have used greening innovation and urban agriculture to transform their environment and create a place where they can thrive.**

You can hear the sound of shouting and laughter from where children are running and playing outside in clean, green open spaces. Along the tree-lined streets, people take a moment to shelter under an olive tree, or to enjoy sitting in one of the communal gardens while they rest or catch up with friends.

A rich variety of colours lights up the camp, from the green of the trees to the flowers filling communal gardens or peeping out from hanging baskets and containers in home gardens. When the wind blows, the perfume of roses and tulips drifts across the camp.

Men and women walk along with a sense of purpose as they have a job or voluntary work that uses both the skills they brought with them to the camp, and the new skills

they have learned here, and enriches their lives. And when they get home, they can relax by tending a garden, which they have been able to establish because they have been allocated an adequate plot of land. They can cook and enjoy a meal made of fresh vegetables and herbs, grown using wastewater as well as homemade organic compost.

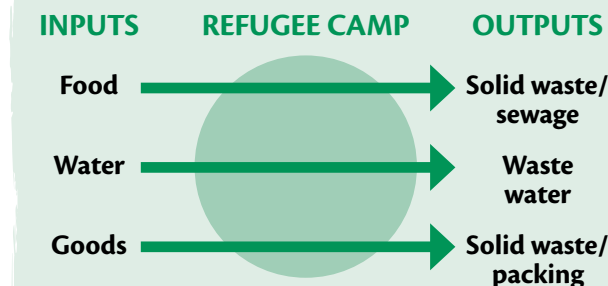
Life here is very different from the current harsh conditions in many refugee camps, but we believe the picture described above represents what is possible. The strategies and simple technologies that can transform the camp environment already exist: all that is needed is the will and the funding to put them into practice.

**This is our vision.**

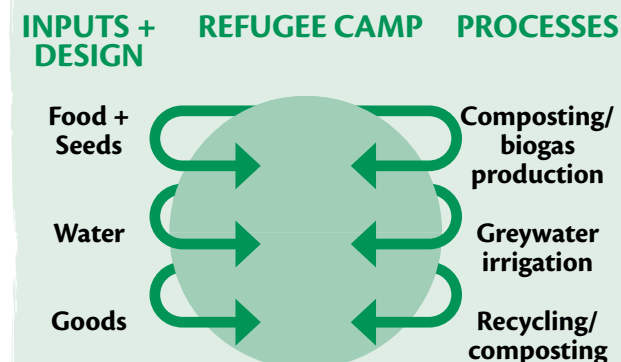
**With your help, we can make it a reality.**

*"We Syrians really love green things. And in Kurdistan they understand this, and they give money to support this. We like Kurdistan because of this. We feel more like we are back in my country, rather than a refugee."*

## LINEAR WASTE FLOWS



## CLOSING-THE-LOOP FOR REFUGEE CAMPS



▲ Source: adapted from Jones, A., Pimbert, M. and Jiggins, J. (2011) *Virtuous Circles: Values, Systems, Sustainability*. IIED and IUNC CEESFP. London

# MOVING FORWARD

**In taking this vision forward, we will expand our programme in Iraq, developing larger-scale food gardens and small businesses so that projects can move to a more entrepreneurial footing. At the same time we will continue to build a greening innovation network through partnerships with other NGOs, government bodies and UN agencies, working in other geographical areas and cultural contexts.**

Through this, we will build the evidence base we need to make a clear argument, through applied practice, that refugee camps can no longer be planned around the old model of modernist cities. This linear model, of inputted resources and ejected waste, has already been identified as unsustainable for global cities: it is also unsustainable for the accidental city that many refugee camps have become.

However, we are aware that significant change is needed before greening innovation and urban agriculture can be adopted more widely as part of the solution to protracted crises. Research and policy change are beginning to make a difference in some areas; in others, local authorities are reluctant to acknowledge the long-term nature of refugee camps. But even if camps are politically managed as temporary sites, we can still plant trees, encourage home gardens and support small-scale food production to preserve the natural resource base, regardless of its long-term use. Host communities will invariably benefit through improved land, reduced traffic and the planting of trees, even after a camp has been dismantled. Adopting a closed-loop model means scarce resources such as water

and organic waste are valued throughout their life cycle, feeding directly into creating gardens, landscapes, jobs, energy and food. This paradigm shift needs to underpin innovation at all levels of the humanitarian system, informing policy in UN agencies and local governments and respecting the everyday creative practices of refugees on the ground.

We hope that donors and NGOs will start their own pilot projects and then take them to scale, from greenhouses and seed distribution, to garden competitions, so that greening innovation and urban agriculture can transform more lives across the world. We are keen to work with you in creating partnerships, building capacities, researching best practices, and implementing exemplars in the field. In order to mainstream greening innovation and urban agriculture, we need more partners, more data, and new opportunities to demonstrate how these concepts can bring dignity, empowerment and food sovereignty for those who are building new lives in under-resourced communities. If you feel you can offer such a partnership, we would be delighted to hear from you.



▲ Domiz camp 2012.



▲ A refugee home garden 2017.

# EXAMPLES OF CURRENT GUIDELINES

**Earthscan's *Cities and Agriculture: Developing Resilient Urban Food Systems*** provides information on the role of urban agriculture in disasters and emergencies.

**The Humanitarian Innovation Project** (page 38/39) has produced two excellent research reports promoting the importance of supporting refugees at the grassroots where innovation is flourishing.

**The Livestock Emergency Guidelines and Standards** (LEGS) provide a set of international guidelines and standards for the design, implementation and assessment of livestock interventions to assist people affected by humanitarian crises.

**The Sphere Handbook** (2011) offers guidelines for developing and protecting primary food production, and planning and design recommendations for allocating small plots of land for use as home gardens in refugee camps, as well as encouraging the use of grey or domestic wastewater for irrigating home gardens. The Sphere Handbook will be updated in 2018.

**The RUAF Urban Agriculture Magazine** Issue Number 21 featured Linking Relief, Rehabilitation and Development (LRRD) and the role for urban agriculture.

**UNCHR, along with different partners**, have produced a range of guidelines for refugee camps tackling environmental management, cooking and energy, livelihoods programming, agriculture, livestock keeping and animal husbandry, forest management and permaculture.

**The World Fish Centre** has produced a report on agriculture in refugee camps and settlements based on lessons from Zambia. Aquaculture, importantly, uses a water recirculation system, reducing both inputs and outputs and helping to close the loop.

**Over the last year the work of Lemon Tree Trust has featured in three articles:**

- 1)** an overview on the benefits and challenges of incorporating urban agriculture into refugee camp infrastructure;
- 2)** an examination of the role agroforestry can play in refugee camps, and;

**3)** a brief on linking urban farming and urban planning in times of crisis.

**However, guidelines are still not being widely applied and old conventional models of delivering humanitarian aid remain strong despite their high cost. This situation is unlikely to change until responding donors, UN agencies and international NGOs show vision, leadership and technical capacity.**

See page 43 for details of many of these guidelines and reports.



▲ Winning Rose Garden 2017.

# USEFUL PUBLICATIONS AND MANUALS

Adam-Bradford, A. (2016) Agroforestry for Refugee Camps.

*Agriculture for Development*, 28: 29-31.

<http://lemontreustrust.org/wp-content/uploads/2017/05/Agroforestry-for-Refugee-Camps-2016.pdf>

Adam-Bradford, A. and van Veenhuizen, R. (2015) 'Role of urban agriculture in disasters and emergencies'. In de Zeeuw, H. and Drechsel, P. (eds.) *Cities and Agriculture: Developing Resilient Urban Food Systems*. Earthscan, London, pp. 387-409.

Borra, B., van Veenhuizen, R., Schut, M. and Adam-Bradford, A. (2016) Linking Urban Farming and Urban Planning in Times of Crisis. *Urban Agriculture Magazine*, 31: 38-40.

<http://www.ruaf.org/linking-urban-farming-and-urban-planning-times-crisis>

Humanitarian Innovation Project (2015) *Refugee Innovation: Humanitarian Innovation that Starts with Communities*. University of Oxford, Humanitarian Innovation Project and Refugee Studies Centre.

<http://www.oxhip.org/resources/refugee-innovation-humanitarian-innovation-that-starts-with-communities/>

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LEGS (2014) *Livestock Emergency Guidelines and Standards (LEGS)*.

Second edition. Practical Action Publishing.

<http://www.livestock-emergency.net/wp-content/uploads/2012/01/LEGS-2nd-edition-reprint-October-2015-reduced-locked.pdf>

Perkins, C., Adam-Bradford, A. and Tomkins, M (2017) Thriving Spaces: The Benefits and Challenges of Incorporating Urban Agriculture into Refugee Camp Infrastructure. *Forced Migration Review*, 55: 46-48.

<http://www.fmreview.org/shelter/perkins-adambradford-tomkins.html>

RUAF (2009) *Urban Agriculture Magazine. Linking Relief, Rehabilitation and Development: A Role for Urban Agriculture? Issue Number 21*.

<http://www.ruaf.org/sites/default/files/UAM21%20Complete.pdf>

The Sphere Project (2011) *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response*.

<http://www.sphereproject.org/sphere/en/handbook/the-sphere-handbook/>

UNHCR (2002) *Refugee Operations and Environmental Management: A Handbook of Selected Lessons Learned from the Field*.

<http://www.unhcr.org/406c38bd4.html>

UNHCR (2002) *Cooking Options in Refugee Situations: A Handbook of Experiences in Energy Conservation and Alternative Fuels*.

<http://www.unhcr.org/406c368f2.pdf>

UNHCR (2012) *Livelihood Programming in UNHCR: Operational Guidelines*.

<http://www.unhcr.org/4fbdf17c9.html>

UNHCR and CARE (2002) *Livelihood Options in Refugee Situations: A Handbook for Promoting Sound Agricultural Practises*.

<http://www.unhcr.org/406c2fae7.html>

UNHCR and IUCN (2005) *Livestock-keeping and Animal Husbandry in Refugee and Returnee Situations: A Practical Handbook for Improved Management*.

<http://www.unhcr.org/4385e3432.html>

UNHCR and IUCN (2005) *Forest Management in Refugee and Returnee Situations: A Handbook of Sound Practices*.

<http://www.unhcr.org/438724c42.pdf>

UNHCR and SAFIRE (2001) *Permaculture in Refugee Situations: A Handbook for Sustainable Land Management*. Southern Alliance for Indigenous Resources (SAFIRE), Harare, Zimbabwe and United Nations High Commissioner for Refugees (UNHCR), Geneva, Switzerland.

[http://postconflict.unep.ch/liberia/displacement/documents/UNHCR\\_SAFIRE\\_Permaculture\\_Refugee\\_Situations.pdf](http://postconflict.unep.ch/liberia/displacement/documents/UNHCR_SAFIRE_Permaculture_Refugee_Situations.pdf)

World Fish Centre (2011) *Fish Production in Refugee Camps and Settlements: Lessons from Zambia, Policy Brief 2011-31*.

[http://www.worldfishcenter.org/resource\\_centre/WF\\_2830.pdf](http://www.worldfishcenter.org/resource_centre/WF_2830.pdf)


Recycling grey water drainage  
back into farm zone

4 hectare site that is unsuitable  
for housing but ideal for small  
scale commercial farming

Despite their crowded nature, refugee camps often have large areas that are unsuitable for housing but ideal for agriculture.

In Domiz camp we aim to transform this 4 hectare site into a mixed pomegranate, olive and rose petal farm.





The waste water run off that cuts across the site is ideal for irrigation, while the commercial potential could create jobs and income for a significant number of camp residents

New tents and housing

## Written by

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Juliet Millican

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