Environmental challenges and local strategies in Western Sahara

Matthew Porges

Sahrawi refugee-nomads are finding ways to tackle the interconnected climate-related challenges that they face. Their responses show the importance of flexible, refugee-driven initiatives.

Much of the attention paid to the Western Sahara conflict, particularly from the perspective of refugee and forced migration studies, has understandably focused on the Sahrawi refugee camps near Tindouf, Algeria. These camps were set up in 1975 following the outbreak of war between Morocco and the Polisario Front (Western Sahara's pro-independence movement) and have an estimated population of around 173,000 Sahrawis, the indigenous people of Western Sahara. Polisario administers the camps, as well as about 20% of the territory of Western Sahara – an area it calls the Liberated Territories. This area may have a population of around 30,000–40,000 (although population figures here are even harder to measure), primarily comprising nomadic herders. Population estimates in both the camps and the Liberated Territories are politicised by both Morocco and Polisario, and are also complicated by ongoing movement of families and individuals between Polisario's territory and northern Mauritania, as well as by temporary labour migration from the camps to Spain and Algeria. Population figures, particularly for the camps, are therefore best understood as snapshots of a continuously circulating set of inhabitants.[1]

The harshness of the desert climate combined with the population's historic reliance on nomadic pastoralism (of camels, goats and sheep) have left the population extremely vulnerable to climatic variations. Catastrophic droughts during the colonial period triggered rapid (though temporary) urbanisation, with much of the dispersed nomadic population coalescing around Spanish-controlled cities. The war with Morocco, which lasted until 1991, similarly resulted in significant damage to the

nomadic economy. Since the war, most of the population has resided in the Tindouf camps. Following the conclusion of the war with Morocco, Polisario – which itself maintains substantial camel herds – made a concerted effort to develop the Liberated Territories specifically for nomadic pastoralism by implementing large-scale landmine clearance, installing and maintaining wells, and rejuvenating the nomadic economy.

Climatic challenges – and appropriate responses

Camp life has presented unique challenges for the previously nomadic population, and many of those challenges have been exacerbated in recent decades by a changing climate. Attempts by NGOs to encourage sedentary agriculture – Oxfam, for instance, has invested in the cultivation of the multi-use plant *Moringa oleifera*[2] – have met with mixed success, in part because the camp population is more familiar with animal pastoralism. Another increasingly severe problem has been the increased frequency of flooding in the camps. Rather than experiencing a steady, continuous decline in rainfall, the Algerian desert around Tindouf has seen long droughts interspersed with brief but very intense rainfall. Most semi-permanent structures in the camps were initially built by the refugees from mud-bricks made using locally sourced materials. In some cases, the refugees resisted building with more permanent materials for ideological reasons, preferring to remain perpetually ready to return to Western Sahara and a future independent State. Flooding, previously very rare in the region, has become an almost annual occurrence. In 2015, for instance, many of the mud-brick houses dissolved in the heavy rains, leaving hundreds of refugees homeless. Building with water-resistant materials, like cement, partially mitigates the problem, though the production of mud-bricks in the camps provides employment for many refugees.

Another problem exacerbated by climate change is the depletion of groundwater. The Tindouf camps were deliberately built near a large aquifer, and nomadic movement throughout the Liberated Territories is contingent on the replenishment of either naturally occurring surface water or small man-made wells. Irregular, unpredictable rainfall patterns and prolonged drought, however, make it difficult to depend on ephemeral water sources, and also increase pressure on the Tindouf aquifer. This problem can be partially mitigated by the use of mechanical wells. The development of artificial water resources in the Liberated Territories, moreover, has also allowed for the development of community gardens, with Polisario-run gardening projects emerging in a number of locations.

The unpredictable rainfall, generalised drought and depletion of groundwater are problems for both nomads and refugees, but the population of the Western Sahara camps is unusual in that it retains a tie to both refugee and nomadic worlds. The anthropologist Cindy Horst, writing about Somali refugee-nomads in Kenya's Dadaab refugee camp, defined Somalis' nomadic heritage "as consisting of three elements: a mentality of looking for greener pastures; a strong social network that entails the obligation to assist each other in surviving; and risk-reduction through strategically dispersing investments in family members and activities."[3] In a sedentary community, this nomadic mentality persists in the form of opportunism, flexibility, social solidarity and resisting single points of economic failure – which are largely the values that Sahrawi refugees ascribe to their own nomadic heritage. Any climate resilience strategy implemented in the Tindouf camps, then, will have to bridge the refugee and nomad categories.

It is perhaps unsurprising that the most promising strategy comes from the population itself. In 2016, a Sahrawi refugee named Taleb Brahim, who had previously trained as an engineer in Syria, began experimenting with hydroponic agriculture. Hydroponics is the practice of growing plants without soil, typically by immersing the roots in nutrient-enhanced water. Hydroponic agriculture is vastly more water-efficient than most other methods, and is therefore a promising strategy for intensive agriculture in arid climates. Brahim's earliest hydroponic

crop was barley, a very simple crop to grow. Using his first home-built hydroponic system, Brahim was able to feed his own goats, reducing his need to move in search of pasture while also increasing the quality and quantity of the milk and meat produced (goats in the camps often eat plastic refuse, contaminating their products).

Expensive, complicated, high-tech units are not a scalable solution by themselves. In 2017, Brahim demonstrated the success of his initial system to the Innovation Accelerator initiative of the World Food Programme (WFP) in Munich. Brahim's system was selected for Innovation Accelerator funding and a WFP programme called H2Grow was subsequently established, under which Brahim – working with WFP and Oxfam staff – developed a range of hydroponic units derived from his first model, reducing the unit cost while retaining productivity. These new units were cheaper, relied on locally available materials, and were easier to use and repair. Crucially, they could also be adapted to specific local requirements. With assistance from WFP, Oxfam and Polisario, Brahim began running hydroponic workshops in the camps, eventually training over a thousand Sahrawi refugees in the use of the low-tech systems. Under the H2Grow programme, Brahim's hydroponic systems were tested in refugee camps in Chad, Jordan, Sudan and Kenya; in each case, the units could be modified and optimised for local requirements. This, Brahim argued in a speech in 2019, "allows people to become part of their own solution", implementing a refugee-driven, refugee-focused aid programme.[4]

Taleb Brahim tends plants grown using a hydroponic system.

Lessons for climate resilience

There are several lessons here for analogous contexts of displacement. Most obviously, the specific technologies and practices of hydroponic agriculture and climate-resistant construction can be exported, and in some cases have already been tested elsewhere with positive results. In cases where refugees have a history of nomadic movement, that heritage presents specific opportunities (involvement in regional economies, pastoralist autonomy) and challenges (discomfort with sedentary life, reliance on modes of production that may not be possible in a camp context) that must be taken into account by host communities and aid providers. More generally, the lesson of climate resilience in Tindouf is that refugee communities are not essentially alike; they retain the practices, skills and cultural contexts of their pre-displacement worlds, and climate resilience policies must be implemented in that context. Finally, it is likely that in many cases refugees are best positioned to devise these strategies themselves, approaching problems from their

own perspective and side-stepping the pitfalls of unilaterally applied external solutions.

It is also significant, from the perspective of aid provision, how one chooses to define the parameters of the problem. A limited approach to environmental challenges in Tindouf might focus on irregular rainfall patterns, or the accumulation of plastic in the diets (and products) of camp-raised livestock. Broadening the perspective, however, to the involvement of the refugees in, for instance, the nomadic economy of the Liberated Territories means that drought and loss of pastureland must be included in the analysis. A comprehensive environmental strategy will have to incorporate the full range of these entanglements. No single environmental policy can tackle such disparate challenges, but individual refugee-centred strategies have already had promising success in Tindouf and the Liberated Territories.

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