Harkness Fellows Association

Conservation and Local People

Francis Gilbert

There is something special about the way British explorers have responded to the desert environment of North Africa and the Middle East: Richard Burton, TE Lawrence, Gertrude Bell, Wilfred Thesiger and Harry Philby all fell under its spell. I felt its power on my very first trip to Egypt in 1986, when I was taken around the mountain deserts of South Sinai by my new Egyptian PhD student and his friends. I have worked there as a conservation biologist ever since, also drawing on my wife Hilary's interest in the local people – she became an anthropologist to study their response to modern development. Over the last 15 years we have worked there together, studying the roles of the local people in the landscape. The opportunity to study an area and its people in such detail and over an extended time period has taught us much about the intricate interplay of humans, plants and wildlife in an adverse climate, something that will increasingly affect countries as temperatures rise.

The sweeping panorama of El-Raha that greeted pilgrims to the Monastery of St Catherine as they approached their destination (just visible in the shadows of the left-hand valley) after two weeks of trekking through the desert mountains. The monastery, the oldest in the world that has been continuously inhabited by monks, was established in about 560 CE on the traditional site of the Burning Bush of the Bible, and near the site of the Golden Calf. Above it tower the multiple peaks of Safsafa from where Moses addressed the people of Israel, and behind them is Mt Sinai where he obtained the tablets of the Law. (photo by João Pedro Pio, with permission)

South Sinai is a very special place, ecologically, historically and culturally. It is a semi-

detached region of Egypt – the cradle of one of the world's oldest civilizations, and officially the driest country on earth. In 1996 nearly all of the mountain massif of South Sinai (some 4350 km^2) was declared as the St Katherine Protected Area. It is Egypt's most important area for biodiversity, representing only 1% of the land area yet containing 25% of Egypt's plants, 67% of the butterflies and 36% of the mammals. The availability of water drives all life there.

At the heart of South Sinai lies the great Ring Dyke, a huge incomplete black ring of volcanic rock surrounding a red granite core. In its centre at 1800 m altitude is the town of St Katherine, until recently the only Bedouin-majority town in Egypt, and the only town inside the park. The town is relatively recent: before the Israeli invasion during the 1967 war there was no town, merely a cluster of Bedouin houses near the Monastery of St Catherine, the world's oldest monastery in continuous occupation since its establishment in the year 560 CE.

Research in conservation biology

After the end of the last Ice Age, Egypt gradually became hotter and drier, and the fauna and flora had either to adapt, move north, or move up in altitude. As a result many species became marooned on the mountaintop habitat 'islands' of South Sinai. The Sinai Baton Blue is one of two species of butterfly thought to be endemic to the mountains of South Sinai. As flagship species of the new park, we have studied the biology and conservation of both species over the last two decades.

Male Sinai Baton Blue butterfly (*Pseudophilotes sinaicus*) in the South Sinai mountains. The species is endemic to the small St Catherine World Heritage Area within the 4350-km^2 St Katherine Protectorate. (photo by Dr Mike James, with permission)

My PhD student Mike James worked with an expert local Bedouin guide, Farhan Zidan, under extremely difficult conditions of heat (up to 38°C) and aridity (all water had to be carried up to the study sites 600 m higher in altitude than the town). The Sinai Baton Blue is totally dependent on a single near-endemic plant, Sinai Thyme, because the larvae only feed on thyme buds and flowers, and the adults feed mainly on the nectar of its flowers. Mike found 41 patches of flowers, but only 25 of them were occupied by butterfly populations; subsequent work by another of my PhD students, Katy Thompson, discovered more

small patches of thyme, so the total number is probably between seventy and one hundred. The entire world population of the Sinai Baton Blue is apparently contained within a circle of radius 7 km, and in 2001 the total population was estimated at below 3000 adults. It is now classifed as Critically Endangered on the International Union for Conservation of Nature's (IUCN) Red List scale of extinction risk.

The local people

The longer we worked in the mountains, the more we became interested in the local people and their culture. For centuries, South Sinai's indigenous population consisted just of Bedouin, left mostly to their own devices by successive rulers and governments. There are now approximately 40,000 Bedouin in South Sinai, divided into eight tribes. They are mostly very poor: well over half live below the World Bank's definition of absolute poverty. In remote regions many still have no schools, healthcare, electricity or reliable water.

Their nomadic or semi-nomadic lifestyle has gradually declined as the tribes have settled into fixed dwellings, by choice or otherwise, and have become more integrated with settled communities. This loss of traditional identity has been exacerbated by the low esteem in which nomadism as a way of life is held; nomads are universally – but probably unjustifiably – blamed for overgrazing. The older Bedouin generation is the last whose lives were formed within the context of traditional culture. In South Sinai the Bedouin practise transhumance rather than true nomadism, moving seasonally between the same winter and summer areas with their herds of goats and sheep. They have always used their unrivalled knowledge of the landscape and environment to guide travellers, and inevitably they are now much involved in and dependent on tourism.

The beautiful high-mountain garden of a Jebeliya Bedouin man well known for the passion which he devotes to tending his garden: it produces grapes, almonds, apricots, pears and a host of other fruits, vegetables and herbs. His summer house is at the

The Bedouin are broadly egalitarian in their outlook – generosity is more important to them than hoarding wealth, so they are suspicious of people who appear wealthier than others. They do have positions of leadership, electing them (*sheikhs* and headmen, or *omdas*) for a fixed term. They are superb poets, both men and women using spontaneous poetry in everyday life to express their feelings about

upper left. (photo by Tim Hurst, with permission www.timhurstphoto.co.uk)

personal or political issues. A memorable taxi ride from St Katherine to Sharm el-Sheikh involved two hours of continuous sing-song poetry from the driver all about us and our love of Sinai! Bedouin culture developed without being written down, so the best poems are memorized and recited again and again. They have a well-developed tribal law, which created and enacted a legal system without the need for a government. Virtually every aspect of their culture is an adaptation to the arid environment: their beliefs, social behaviour, law, poetry, diet and dress have all developed as answers to the challenges that hyper-arid desert life creates.

The Jebeliya tribe originated from a group of herders from Wallachia in the SE Balkans, brought by the Emperor Justinian in 563 ACE at the founding of the Monastery. The tribe has about 4,000 members living mostly in the high mountains around the town of St Katherine ('Jebeliya' means 'people of the mountains'). Our research has revealed them to be the world's least genetically variable human population. The park completely encloses the Jebeliya tribal lands within its core. Unlike elsewhere, a more enlightened conservation approach meant that the people were not thrown out of the park at its establishment. Instead the park's mission was to involve the people into its conservation management practices: it is sad that this laudable aim died with the end of the grant that established the park.

The Bedouin and conservation

Pastoralists everywhere have found that about 40-50 goats and sheep are required in order to provide enough to supply a family's needs, but most Jebeliya families settled in the town have far fewer than this (typically 5-6) because of the risk of localized overgrazing – there is simply not enough grazing within a day's walk of the town centre.

Away from St Katherine, the Jebeliya have a sophisticated way of sustaining the grazing over the long term, a system called *hilf*. This is essentially an agreement backed by tribal law to rotate areas of fallow land, selecting particular wadis (dry river valleys) and deliberately not using them for grazing for a specified period of time, or until the plants have recovered to a specified height. *Hilf* is also applied to the cutting of live trees and the collection of dead wood. The breaking of *hilf* has serious financial consequences in tribal law for the culprit and/or his extended family. Islamic principles support *hilf* but prevent its over-zealous application that might deny food or fodder to hungry people.

Most Bedouin are very interested in all aspects of their natural world, and in fact

An apricot tree (*Prunus armeniaca*) in full flower in one of the walled gardens that form a traditional and very important part of the life of the Jebeliya Bedouins. (photo by Hilary Gilbert)

regard themselves as the guardians of the environment. The tribe was very happy to enact *hilf* in the main areas where the Baton blue populations occur, just in case grazing was a problem to the butterfly (we discovered that, contrary to widespread assumptions, it is not).

Traditional small-scale orchard gardening is the other typical occupation of the Jebeliya, studied in detail by my PhD student Olivia Norfolk, supported by one of the most knowledgeable of all the Bedouin guides, Nasr Mansur. The miracle of discovering such lush green shady gardens in the harsh hyper-arid landscape has to be experienced to be believed.

The orchards are found within (dry-stone) walled gardens in the valleys of the high mountains, supplied with water from wells. Their structure cleverly retains water during flash flooding.

A Bedouin man tends his garden by cleverly managing the water that he has pumped from his well (using the black pipes seen in the background). (photo by Tim Hurst, with permission)

Some gardens have been cultivated for 1500 years: on average each is about 2000 m^2 in area, and contains 50 trees. There are more than 600 of these gardens within the core of the park. Most importantly for conservation, the gardens act as 'islands' of biodiversity in the sea of relatively species-poor desert habitat that surrounds them. The unpredictable rainfall or snowmelt seeps into the bedrock, to be harvested via wells and dams for use in orchard gardens, allowing the Bedouin to cultivate a wide range of trees and crops throughout the year. Rainwater harvesting techniques such as these are known to improve crop yields and enhance food security in arid regions.

In the gardens, in addition to orchard trees and seasonal vegetables, the Bedouin also grow culturally important but minor crops such as fennel and mint. These elements have a dramatic positive effect upon the structure of plant-pollinator visitation networks, supplementing the resources provided by wild flowers, and maintaining the pollinator community through the hot summers. In early spring the presence of wildflowers has a positive effect upon pollination services to an important crop (almond), by attracting higher densities of wild pollinators into the gardens and facilitating enhanced fruit set. The higher abundance of resources within the gardens increases the variety and density of birds in the region, and is particularly important for the huge numbers of spring and autumn European migrants, providing important stop-over oases where the birds can revive and feed.

A flowering almond tree (*Prunus amygdalus*) next to a broom bush (*Retama raetam*) in the low desert of South Sinai (photo by Hilary Gilbert)

Rain-fed irrigated agriculture in arid environments has the potential to increase biodiversity above that found in the unmanaged environment. In St Katherine traditional Bedouin practices enhance wildlife within the park, and thus initiatives to fund and support gardeners should be encouraged in the future – something that does not happen now. Rainwater harvesting in arid regions offers a low-cost strategy for increasing agricultural productivity that does not undermine the biodiversity on which it depends.

The modern world arrived with a bang with the Israeli invasion during the Six-Day War

(1967) and subsequent occupation, followed by the return of the Egyptian administration in 1982 with a new interest in reinforcing its control in Sinai. Both effectively treated Sinai as a colony and the indigenous Bedouin residents as subordinate, uneducated primitives. Successive Egyptian governments have largely ignored the needs of the Bedouin, who understandably feel undervalued and neglected. The establishment of the park, once the initial phase finished, has made little difference.

The value of the gardens to Bedouin wellbeing

Compared to World Health Organization standards, Bedouin children are well below average weight for height, with 13% of them malnourished according to the standard definition, and 6% of them extremely malnourished. Figures for the general Egyptian population are 7% and 1% respectively, confirming the position of Bedouin as among the poorest and most marginalized of all Egypt's citizens. The degree of malnourishment becomes more and more pronounced as the children get older, but improves if the family has livestock, especially if these feed on natural vegetation rather than purchased fodder.

The largest impact on child weight-for-age is of course the amount of household income to buy food – the more the family has, the better their children's health is. A close second in impact is the ability of women to make a cash contribution to the family economy (via paid work, selling produce, or sale of handicrafts to tourists – an option which has now vanished with the recent collapse of tourism in Sinai). A third impact is the source of the family's water: the possession of their own well makes a positive impact, whilst being forced to obtain their water by buying it from a water tanker makes a negative impact on weight-for-age, probably because of sickness arising from the poor quality of commercial water. The contribution women can make 'in kind' (i.e. by tending goats for milk, or from garden produce for the family table) also has a clear positive effect, this time on the weight of infants (1-2 years of age).

Gardens are owned and worked by the men, but the produce is often owned by the women. Tribal law has a lot of rules to protect the people who make the huge investment that creating a new garden represents – approximately the resources needed to survive for an entire year. If the garden owner is not present, then no entry is allowed: entering a garden without permission is regarded as an insult and a violation of the privacy of the family, with very serious consequences in tribal law. Penalties such as a camel for every step taken beyond the gate may seem draconian, but the value of a garden is immense. As is normal in Arab culture, the law allows for exceptions when a traveller is in danger of dying for lack of water or food.

Conclusions

The peaks of Mt Serbal as seen from the oasis of Feiran, a richly vegetated area of the western side of the Sinai peninsula. Traditionally it is identified with Rephidim, one of the sites of the Exodus, where Moses struck a rock and produced a spring of water. (photo by Francis Gilbert)

The extreme conditions under which the Bedouin live, and the prejudices they suffer, are typical for indigenous people all over the world. They are almost certainly not destructive of their environment, as so often asserted. On the contrary, their traditional law of *hilf* has preserved the vegetation upon which their goats depend. Bedouin traditional livelihoods of herding and orchard gardening enhance and maintain Bedouin well-being, not only culturally in terms of their self-image and feelings of self-worth, but also directly in improving the health and growth of their children. They also enhance biodiversity in a very clear and obvious way. Those Bedouin who wish to maintain such traditional livelihoods deserve to be supported.

Our studies in South Sinai fit in with those of others elsewhere in suggesting that, while indigenous people have modified their environment over thousands of years, local biodiversity now depends on the maintenance of local ways of life. Once these have been lost, they are very hard or impossible to retrieve.

About the Author

Drs Francis Gilbert (right) and Katy Thompson (left) working on a population of the Sinai Baton Blue butterfly. Two individuals of the host-plant of its

After completing his PhD in 1981, Francis Gilbert was a Harkness Fellow in 1982-3, choosing to work with ecologists in Vermont, Florida and Oregon. He is Professor of Ecology & Conservation at the University of Nottingham. Dr Hilary Gilbert studied the Bedouin for her PhD, completed in 2011, after a career in the NHS and running charities in the UK.

The South Sinai Foundation was

larvae, Sinai thyme *Thymus decussatus*, are in the foreground. (photo by Hilary Gilbert)

set up in 2009 by Hilary Gilbert to raise funds to support Bedouin-led development work in South Sinai. We welcome donations!

www.southsinaifoundation.org

The academic background to the above account can be found here, choosing the 'Bedouin traditions' page from the sidebar. Published details of Hilary's work and the work of the Foundation can be found on the 'Bedu' page. We recently wrote a book about conservation aimed at young people, incorporating our work in Sinai as its main examples.

Starting in 2021, St Katherine is currently being rebuilt as a tourism centre under a project of the Egyptian Government, and the Jebeliya Bedouin have an uncertain and unknown future (see here for details)

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