Oryx

Farming with giants: investigating tortoises using farms in the Galapagos Islands

By Kyana Pike, 5th January 2022

When people picture the Galapagos Islands, they usually think of a picturesque uncharted tropical paradise filled with wildlife, including the enigmatic giant tortoises. Many of these scenes have been inspired by documentaries that showcase some of Galapagos' rugged beauty and untamed wildlife, making the archipelago seem like an uninhabited exotic destination. The last thing that comes to mind is cattle ranching or coffee production. Many are often shocked to find out that the Galapagos Islands have approximately 30,000 inhabitants, visited by almost 300,000 tourists each year. When I tell people about my research on tortoises and their interaction with farms on the island of Santa Cruz in Galapagos, they are understandably confused.

Left: Two of the iconic endemic species in the Galapagos Islands that many tourists travel to see; a giant tortoise and one of Darwin's finches. Right: A giant tortoise resting in a row of spring onions in the agricultural area. Photos: Kyana Pike

The Galapagos Islands have been inhabited since before Charles Darwin visited in 1835 during his voyage on the Beagle. Farming also has a long history in the Galapagos. However, as is the case elsewhere, Darwin's picturesque paradise is not immune to the conflicts between biodiversity conservation and meeting the demands of a growing human population. The humid highlands, where most of the farming takes place, are an important habitat for giant tortoises. During the dry season large adults migrate from the arid lowlands to these more hospitable areas, as they have done for millennia. Even Darwin noticed some of the well-worn paths that transected the islands created by these lumbering giants as they make their way to greener pastures. Nowadays, the vast majority of the lush green highlands caters to cattle and crops, and tortoises must now share this land with farmers.

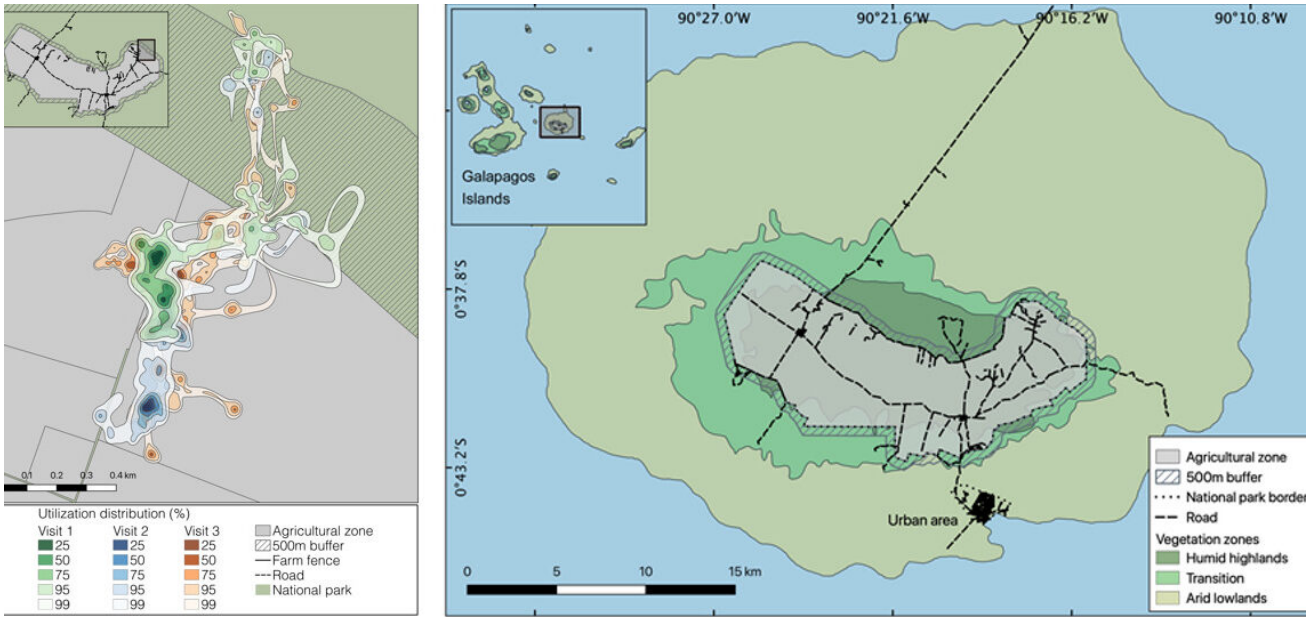
Some curious cows inspect one of the GPS tagged tortoises in the highlands. Photo: Ainoa Nieto-Claudin

Galapagos tortoises are endemic, keystone species vital for ecosystem health and stability. Conserving the remainder of the Critically Endangered populations of tortoises on Santa Cruz Island is critical. The challenge is understanding the best way to support tortoises in farms, while balancing both the farmers' requirements and those of the tortoises. Knowing what farmers need is easy enough; luckily, most are happy to talk about their farming practices and the challenges they face. I have tried asking tortoises what they need from the humid highlands, but unfortunately, I have yet to receive an answer. Instead, our team is trying to pry out answers using GPS tracking data and other methods.

Left: Tortoises can spend hours wallowing in ponds and muddy puddles in farms. Right: Kyana observing a large male tortoise wallowing in a cattle farm. Natural and artificial ponds in farms are important resources both for tortoises and farmers. Photos: Kyana Pike

To better understand how tortoises were interacting with farms, we needed to know more about their interactions. Some of the key questions we aimed to answer were: how many farms do tortoises visit? Do they visit the same farms? How much space do they use in farms? Are there different patterns of farm use among males and females and different sized tortoises? We can use the detailed information we obtain from our GPS tags to answers some of these fundamental questions. We paired the information we received from the GPS tracks with sophisticated models of animal movement and information on the locations and extent of different farms. This allowed us to work out that on average tortoises spend about 150 days a year in the agricultural area, but female and smaller individuals are likely to stay for shorter periods. Although this may seem like a long time, we also found that while tortoises are in the agricultural area, they will only visit about four different farms on average, and only use a small proportion of those farms. Another of the interesting findings to come from this work have included that tortoises largely revisit the same areas each time they visit farms, showing us tortoises are creatures of habit.

Knowing the answers to these questions helps us build a better picture of how tortoises are using farms, and alongside our continuing work, we are slowly understanding how best to balance the needs of tortoises and farmers in the Galapagos.



Left: Occurrence distributions of one eastern Santa Cruz tortoise C. donfaustoi during three separate farmland visits in the agricultural zone. The shaded areas show the 25–99% utilization distribution; darker shades indicate higher intensity of use. There is much spatial overlap of utilization between farmland visits, indicating high inter-annual philopatry within the agricultural zone. Right: Santa Cruz Island, with the national park, a small urban area, and the agricultural zone that covers most of the humid highlands.

The article Body size, sex and high philopatry influence the use of agricultural land by Galapagos tortoises is available in *Oryx—The International Journal of Conservation.*

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Kyana Pike is a PhD candidate at James Cook University, Australia, researching the interaction between agricultural land and wildlife, focusing on giant tortoises from the Galapagos. Kyana uses animal movement, behaviour and ecology to understand how agricultural practices may impact this endangered ecosystem engineer, with the aim to use this information to balance the needs of farmers and tortoises.