A snake farm.

Solving our challenges with reptile farming

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By 2050, there will be approximately 10 billion people living on planet earth. Human population growth will occur mostly in the tropics; a protein-starved part of the world where the impacts of climate change are predicted to be most severe. Ploughing up forests to make way for more farms may help in the short term, but it's not sustainable. Reptiles are ideally placed to help solve this crisis, and here's how.

Energy efficiency and resilience

One of the main problems our planet faces is that our livestock systems are fundamentally inefficient[1]. We depend heavily on a handful of energetically extravagant warm-blooded species; high-performance birds and mammals that require large amounts of metabolic energy to support smart brains and high-octane physiologies. Reptiles are the polar opposite. They are fundamentally more efficient. They have evolved specialised adaptations that allow them to exploit the sun's free energy and restrict food and water usage to the bare minimum. Remarkably, they require 90% less food calorie inputs compared to warm-blooded animals, yet they can sustain similar protein production outputs.

Another problem with conventional livestock is the need for metabolic precision. Warm-blooded animals expend significant amounts of their energy budget maintaining homeostasis, a process that involves constantly regulating the body's internal operating environment despite external environmental changes. Commercial livestock species demand a constant flow of food and water to maintain precise body temperatures and water balance. When these prerequisites are not met, mortality rates skyrocket. Back when the climate was predictable this was not such a problem, but it's harder to plan now, and the viability of livestock farming in the face of climate change has become increasingly uncertain.

Resilience lies at the heart of reptile evolutionary success. Many reptiles are specialists at exploiting habitats quintessentially defined by erratic food and water resources. For example, pythons have an adaptive metabolic rate that allows them to fast for months on end without any food or water at all. They can literally shut down metabolic functions altogether, leaving little more than a pilot light on. When conditions improve, they can then radically upregulate metabolic performance to ingest and assimilate over 100% of their body weight in a single sitting, achieving growth rates that can surpass those of conventional livestock. Not surprisingly, this gives python farmers[2] the competitive edge when it comes to livelihood resilience in the face of climate change.

Disease

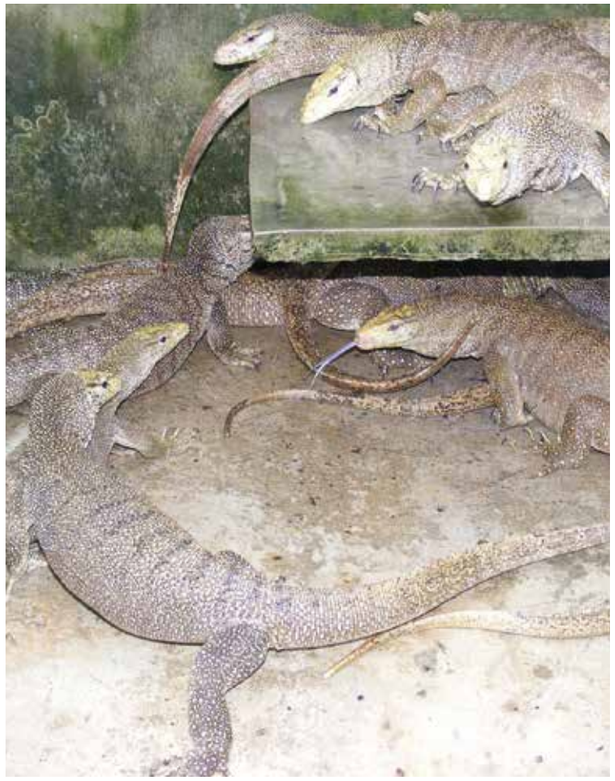
Conventional livestock systems depend heavily on a handful of similar species, most of which have identical warm-blooded physiologies to our own. Three quarters of our farmed protein draws on just five species. Our livestock systems lack physiological diversity, and this matters when it comes to the threat of global pandemics.

Reptiles have a very different physiology to ours. Viruses co-evolve highly specialised relationships with their hosts and are often species-specific. The more different the new and old hosts are to each other, the less likely a virus is to cross over. Compared with transmission between warm-blooded species, the probability of a virus jumping from a reptile to a human is very remote. Reptile farming offers a biological barrier against the growing threat of contagious livestock diseases like bird flu. It helps increase the diversity and resilience of our food systems and ensures safe protein alternatives in the event of an outbreak.

Agricultural intensification

Reptiles are sensitive to temperature, and many species aggregate naturally to buffer against temperature flux. They do not indulge in extravagant behaviours like play or socialising, and many don't move at all unless for food or reproduction. This means they don't need much space compared to warm-blooded animals. Moreover, many species are happy to occupy a three-dimensional living space, be it below or above ground, and this further reduces the

Snakes lay large amount of eggs.




A snake in captivity.


Python meat at a market.

amount of land required for farming.

The digestive efficiency of reptiles results in high conversion ratios and low levels of waste, much of which is in the form of water insoluble urate crystals rather than more volatile urea. They are fundamentally less polluting, and this is why reptile farming is often permitted in urban areas and alongside rivers. Many reptiles like to bask in the sun and are therefore predisposed to synergies with solar energy technologies. Some species adapt well to polytunnels and quickly learn to exploit the trapped heat energy in the same way a gardener makes use of a greenhouse to grow tomatoes in winter.

All this makes reptiles ideal candidates for sustainable intensification[3], whether it be backyard food security, vertical farming or low-carbon regenerative agriculture. It means the production of high-quality animal protein using less land, less water, less feed, less pollution and less waste.

Animal welfare

Killing animals for food understandably does not appeal to everyone, but remains necessary. If we are to respect the nutritional demands of our growing human population in a just and equitable manner, then we must accept the need for animal agriculture. Instead, we should focus on maximising animal welfare wherever possible. Intelligence is not the best metric for animal welfare, but it does count for something. Many world views would argue that the suffering of higher-order animals such as pigs and chickens is more objectionable than the suffering of insects or shellfish.

Reptiles are not smart animals, at least not compared to conventional farmed animals. They have around the same number of brain neurons as fish. Snakes have between 5 and 23 million brain neurons, compared to the 200 million found in chickens and the 2.2 billion found in pigs. If we cannot avoid the need for animal protein, perhaps we can change the species we farm.

Reptiles as a future food

Historically, reptiles formed a major part of tropical diets[4]. Over a billion people still consider reptile meat a culinary staple, and reptile farming has grown exponentially in recent decades to address this need. Colonisation and post-colonial influences have not been kind to the reptile trade, but as a meaty fillet that looks and tastes much like chicken, and with hundreds of new species to choose from, there is every reason to believe that reptile farming has a bright future. This is especially so now given the uncertainty of the world we face. This is also why the fashion industry should think twice before dropping such an important co-product - exotic leathers. Otherwise, like London Fashion Week earlier this year, we may well end up cutting off our nose to spite our face.

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