

Rodent meat – a sustainable way to feed the world?

Using rodents as food has a long tradition in many parts of the world

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The mere thought of eating a rat would immediately trigger a strong “yuck” reaction among most Westerners, but for many people from around the world a rodent is a much anticipated culinary treat. Rats are a regular staple in Cambodia, Laos, Myanmar, parts of the Philippines and Indonesia, Thailand, Ghana, China and Vietnam. In South and Central America, several rodent species are highly appreciated as culinary items and some are even farmed much like pigs and cows. In some Asian countries, rodent meat is so popular, it is even sold in supermarkets. “Rats are tinned in the Philippines, sold as STAR meat (rats spelled backwards) in supermarkets, often eaten at weddings in Vietnam, and usually considered a delicacy by most South East Asians”, said Grant Singleton, an expert on rodent biology and management at the International Rice Research Institute in the Philippines. Cambodia exports up to 2 tonnes of wild rats to Vietnam per day on the peak of the “rat-season” [1]. Among members of the Adi tribe, in north-east India, rats are valued not just for their taste, but also as a cultural item. Every year, on March 7, they celebrate Unying-Aran, a popular hunting festival where the most precious prey are rats. “Gifts of rats, dead of course, are also an important item in making sure the bride’s relatives are happy to see their daughter leave her old family and join that of her husband”, said Victor Benno Meyer-Rochow at Oulu University, Finland, who recently published a study on the eating habits of this tribe [2].

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The idea of rodents as game or livestock is not just a question of cultural or culinary traditions, however. Some experts suggest that farming and eating rodents could be one solution for alleviating the world’s hunger and malnutrition problems. According to FAO estimates, the human population on Earth is expected to reach 9 billion by 2050, which will require a 50% increase in food productivity. Rodents could be an important part for addressing this problem, Singleton thinks. “The planet cannot sustain the projected growth in demand for meat protein nor the harvesting of bush meat in forests. They are a pest, but instead of fighting rats as a pest we could welcome them as game”, he said. Rather than using nasty chemicals to control them, harvesting rodents as food would create an ecologically clean and productive business, Singleton added, which could also counterbalance some of the 5–10% of annual loss rats and mice inflict on cereals and other food staples. This idea is not new, according to a FAO report, at least 11 species of rodents are used throughout Central and South America as sources of meat, and similar number of species are consumed throughout Africa [3].

One approach would involve non-traditional farming animals, such as rodents, to create “mini-livestock”, according to Louw Hoffman, head of the meat science group at the University of Stellenbosch, South Africa. “Rats are ideal species for mini-livestock farming as they have a high fecundity (number of babies born per year), you can have a favourable ratio of males to females (1:5), can be housed in small enclosures, can be group housed and are great at converting waste food into quality protein fit for human consumption”, he explained. Many rodent species could qualify as mini-livestock, such as cane rats in sub-Saharan Africa, or capybaras, agoutis and guinea pigs in South America for different reasons, commented Ferran Jori at the Botswana College of Agriculture, in Sebele, Botswana. “For capybara, it is certainly for their volume and weight. For cane rats and Guinea pigs possibly because they need limited space to be reared and they are very popular and several females can be reared in one production unit”, he said.

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Cane rats (*Thryonomys swinderianus*), which naturally occur across West and Central Africa, are large animals that can grow up to 60 cm in length and weigh up to



Figure 1. A male Greater cane rat (*Thryonomys swinderianus*) in a breeding station in Owendo, Gabon. Photograph: Aurélia Zizo.

10 kg. They are already hunted as bush meat or even domesticated as farm animals in Benin, Togo, Cameroon, Côte d'Ivoire, Gabon, Ghana, Nigeria, Senegal and other countries (Figs 1 and 2). Owing to their size and abundance as a pest, cane rats have been a focus of current efforts to improve sustainable farming and could even be one solution to contain trade in bush meat. "Colleagues have recently conducted a comprehensive review of this as well as other alternatives in the Central Africa region", said Heather Eves, a wildlife

biologist from Yale University's Energy, Resources and Environment Program. "The take-home [message] from this study [4]—and many others—appears to be that cane rat farming, in theory, has potential as an alternative to bush meat but there are a multitude of socio-economic and cultural conditions that need to align, be effectively managed, and robustly monitored for such activities to (a) be economically viable, (b) promote sustainability and (c) actually be a substitute for bush meat. Where alternatives exist, in many cases, they act as

supplements to rather than substitutes for bush meat".

Rodent mini-livestock would also be well suited for city dwellers to improve their menu with self-reared meat. "As space becomes a limiting factor, especially in urban areas, we will all start looking at having our own biological food processor at home, and this could include mini-livestock", said Steven Belmain, Professor of Ecology at the University of Greenwich's Natural Resources Institute in the UK. This could also help to reduce the environmental impact of meat production. Beef and pork are particularly expensive in terms of energy, water and land resources needed. A ton of beef requires somewhere between 16,000 and 20,000 cubic metres of water only to produce the feed the animals need; a ton of pork would need between 4,600 and 5,900 cubic metres of water. Rodents, on the other hand, could be maintained on smaller spaces, feed on leftover vegetables and other discarded foods and therefore drastically reduce water usage as no additional feed would be required.

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Nonetheless, this would not necessarily replace beef and pork altogether, Jori commented. Both traditional farm animals and rodent mini-livestock have their own advantages and disadvantages: it may depend on the context where they are raised. "For Andean communities living in the highlands where there is limited grazing, guinea pigs are definitely better than cows or pigs to produce protein and feed people", Jori explained. Thus, rodent meat would not necessarily replace beef, pork or chicken but rather add to it with the overall aim of increasing global food production in a sustainable way.

A taste for rodents is hardly a new trend and goes back many centuries. Guinea pigs were the first rodents raised for food, in Peru back in 2500 BC [5]. Rats were eaten in China during the Tang dynasty (618–907 AD) and called "household



Figure 2. Side view of the face of a capybara (*Hydrochoerus hydrochaeris*), the world's largest rodent. Photograph: Yinan Chen.

deer" [5]. According to the authors, one speciality people ate during these times was new-born rats stuffed with honey, "conveniently snatching them with chopsticks".

In many countries and regions, rodent meat is a major component of peoples' diet—and not just of the poor. Rodents are eaten in many places of the world and appreciated for their taste. The agouti (*Dasyprocta punctata*) is a regular dish in several Latin American countries. In Peru, the famous cuy or guinea pig is considered one of the top culinary delicacies and popular among Peruvians and foreigners. Curious eaters do not even need to travel to Asia or South America to get a taste: cane rats are served in some African restaurants in Europe. "There are African restaurants here in London which serve cane rat, and in Paris too", said Belmain.

But will European and North American palates find rodent meat tasty? British TV presenter Stefan Gates, who has been exploring some of the world's most unusual delicacies, including rodents, thinks so. In Yaounde, Cameroon, he found farmed cane as a special delicacy. "[Cane rat] was the most delicious meat I ever had in my life", he said. "A bit like pork, but very tender, like slowly cooked pork shoulder. Extraordinarily tender, gentle and delicious, the stew was very succulent, juicy and with

a lovely layer of fat that has melted down beautifully".

Darrin DuFord, food writer and traveller, has also eaten different rodent species in South and Central America and said they beat your chicken breast any day. DuFord found Cuy being served in some restaurants in New York, and in many restaurants throughout Peru and Ecuador along with pacas (*Cuniculus paca*), also known as "conejo pintado", majas, labba or tepezcuintle. "I had one my most memorable preparations of paca at the house of Therese Castillo in the coastal town of Hopkins in Belize. One of her specialties is gibnut (the local word for paca), which she prepares in a simple stew with onions that accentuates the meat's sweet, porky richness", DuFord remembers. In Panama, the paca is such a desirable meat that the country's authorities declared hunting paca illegal to keep the species' population sustainable, he added. In Uruguay, DuFord found nutria (*Myocastor coypus*) being served at an upscale restaurant in Montevideo. The meat vaguely reminded him of frogs' legs and rabbit in texture and flavour.

Overall, DuFord said that for people in countries such as Guyana, Trinidad & Tobago, Panama and Uruguay, edible rodent meat is just another game meat, much like deer or a wild hog: "I've never detected any rodent stigma. So eating edible rodents in

the above places is not a necessity, at least not in this age of globalization—the meat is a fresh, flavourful dinner choice". Furthermore, "[a]n edible rodent can be a healthier choice compared to industrially raised chicken, beef, or pork. You won't find factory farms shooting up guinea pigs with antibiotics or feeding them ground-up guinea pig brains", he added.

For chef Pocho Garcés, owner of the restaurant "Aguacero" in the Venezuelan island of Margarita, consumption of rodent meat is deeply embedded in Venezuelan culture and society, dating back to the times of the Spanish conquest. "The Chigüire was eaten during holy seasons, as Catholics did not eat beef in those dates. It was probably consumed instead of fish during Easter, due to its aquatic habit, spending most of the day submerged in the many of the ponds in the Venezuelan Llanos", he said. Capybaras (*Hydrochoerus hydrochaeris*) or Chigüire were likely domesticated in Brazil even before the arrival of Europeans. In Venezuela, the capybara, a massive rodent that can weigh up to 80 kg, is raised on ranches, which produce about 85,000 animals each year.

"Its meat is fibrous, dark-pink coloured of an intense scent with certain reminiscence of cod and its flavour is rather uncommon but accepted, it is a sort of mixture of pig and fish", Garcés explained. He thinks that this odd flavour of pig plus fish and the aquatic habit of the animals is what made it popular. One of the traditional ways of cooking capybara meat in Venezuela involves "threshing the meat to fine fibres, which are then cooked in a previously prepared 'sofrito criollo' (a mixture of finely chopped onions, peppers and sweet peppers stir-fried in vegetable oil) coloured with 'onoto'", Garcés said. Onoto is a local spice, also known as annatto, and derived from the seeds of the achiote tree (*Bixa orellana*).

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Another rodent historically eaten in Venezuela is the Lapa, which weighs up to 15 kg. The meat requires many hours of

cooking in order to soften it. “The meat is fibrous and firm but its flavour is exotic and attractive for the Venezuelans, its scent is intense but slightly fruity”, Garcés said. However, the species is currently endangered and seldom eaten in Venezuela today. “Both, Chiguire and Lapa are ours by heritage and biodiversity and therefore we should honour them and make them part of our dining tables, either in popular or high cuisine restaurants, but in a sustainable manner”, Garcés added.

Yet, for most people rodents still ignite disgust and even fear. “I think the major problem is due to the fact that rats were the carriers of fleas infected with the bacteria that caused the Bubonic Plague”, Hoffman said. “Rodents are known vectors and reservoirs for more than 60 diseases that can be transmitted to humans”, Belmain added. But as long as the rats are well cooked, diseases should not be a problem, he noted.

The main problem is in the handling of the meat, Belmain said: “Slaughtering rodents is the more risky part, where people will be exposed to blood and other fluids. We simply do not know the health risks of butchering and eating wild-caught rats”. This risk is not hypothetical. In the Mekong River Delta region of Vietnam, where up to 3,600 tonnes of rat meat were produced per year back in 2001/2002, waste water within and around the rat processing areas hosted the disease-causing bacteria *Clostridium*

perfringens and *Enterococcus faecalis* [6]. The study also found that none of the workers handling the rats knew of the health risks of their trade or used protective clothing.

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There are also legal issues, Jori said. “Legal bottle-necks for the trade of wild animals (even when coming from farms) are probably the main reason why farming of capybaras or collared peccaries and has never really taken off in South America”, he explained.

But if you can get past the yuck factor and health risks, you may want to try one of the Adi’s favourite dishes: a stew called “bule-bulak oying” or one of the culinary experiences from South-East Asia. “I have eaten rat meat on at least six occasions in the Mekong delta of Vietnam, including at a modern cuisine restaurant in HCMC. How can one refuse a dish described as ‘Fresh young field mice with ginger, lemon grass and garlic?’” Singleton recalled. Should we expect rat meat in the supermarket shelves anytime soon?

Meyer-Rochow thinks the secret may be in the details: “If prepared in a way that does not make it obvious that one deals with rat meat (“fish-sticks”, sausages or pate comes to mind) then there could be a chance of a change in attitude”.

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