

A photograph of a monkey, possibly a white-headed langur, looking out from a rusty metal cage. The monkey's face is pressed against the vertical bars, and its right arm is extended, gripping one of the bars. The cage is made of thick, weathered metal rods. In the background, there are trees and a dirt path, suggesting an outdoor market setting.

“THERE ARE PLACES WHERE YOU HAVE THOUSANDS OF ANIMALS, CAGES STACKED UP ON EACH OTHER, ANIMALS BEING SLAUGHTERED RIGHT IN FRONT OF YOU”

With COVID-19 placing bushmeat trade firmly in the spotlight, what does the future hold for wildlife markets and the health of the human population?

By James Fair

There's a wild animal market called Oluwo on the outskirts of Lagos in Nigeria that's been called a “nuclear bomb waiting to happen”. The quantity and diversity of species on sale and the unsanitary conditions are both factors that could release a mushrooming radiation of a novel, potentially lethal virus resulting in the next global pandemic, the remark suggests. If you're not too squeamish, a number of videos online reveal its brutal reality.

In the opening shot of one film, you see civets – incorrectly called “bushdogs” – and tiny forest antelopes known as duikers, and

when the stallholder is interviewed she claims to also sell “pangolins, bush rats and all sorts of animal”. Later we see monstrous cane rats – known as grasscutters – resembling baby hippos, and genets, small carnivores related to civets. The dead animals are piled onto tables and handled freely with bare hands, with no apparent concern as to what viruses they could harbour.

Another stallholder has a large metal bowl of chunks of what she calls “python snake”, yours for 5,000 naira (\$18) to take home for the family pot. In another film, the presenter is shown chowing down on enormous maggots and admiring the fire-roasted heads of monitor lizards. ▶

In destinations such as Mong-Lu, on the Myanmar-China border, animals are kept in tiny cages – here, at an exotic wildlife restaurant for Chinese tourists.



Live monitors are offered for sale alive (so the consumer can see they are fresh), and there's even a small, live crocodile trussed up like a turkey. When asked whether any of these species might host pathogens that could make them sick, local people say it's not a risk, despite the fact that the consumption of forest-dwelling African animals – including chimpanzees and great apes – has been blamed for all the outbreaks of the deadly Ebola virus. It's worth noting that there is an ongoing Ebola epidemic in the Democratic Republic of the Congo right now that's killed more than 2,000 people.

Making the leap

It was, of course, a wildlife market – or, more accurately, the wildlife section of the Huanan Seafood Wholesale Market — in Wuhan, in the central Chinese province of Hubei, that was blamed for being the place where the coronavirus that causes COVID-19 first jumped from an animal to a human.

In fact, scientists from the Wuhan Institute of Virology (WIV) have recently announced they do not now believe this to be the case, and that the market acted as a location where the virus was spread around by perhaps just one infected individual.

But one thing's for sure: SARS-CoV-2 (as the virus is officially known – the first one, SARS-CoV, caused Severe Acute Respiratory Syndrome, or SARS, and was unleashed on

the world in 2002) came from an animal. The reservoir host is almost certainly a horseshoe bat – there are a number of species in China – but the disease probably passed through an intermediate host before reaching us. The \$64 million question is which species and has wildlife trade and markets helped to facilitate this unlikely journey?

A peer-reviewed study in the journal *Nature* identified Malayan pangolins – one of eight species of these strange, scaly mammals – as carrying a coronavirus very similar to the one causing this pandemic. Pangolins are highly prized in many cuisines in South-East Asia, and for their scales in Traditional Chinese Medicine, and are frequently described as the world's most traded mammal. Snakes have also been highlighted as a possible intermediate host, though the evidence for this is less convincing.

But why now? Why should COVID-19 suddenly have jumped ship from pangolins – or whatever species – to us in the year 2020? Was it just bad luck – or something else? The answer may lie in the way in which humans are destroying and fragmenting habitats, especially in tropical parts of the world.

“With increased access into previously inaccessible places, poachers are definitely able to get more animals than they could before,” says Chris Shepherd, executive director of the wildlife trade investigation group Monitor and one of the world's leading



A giant flying squirrel and green pigeons for sale in Mong-La. Top right: a stall in Lagos displays a variety of dead animals.

experts on the legal and illegal trade in wild species. These are animals that, for thousands of years, may have lurked unseen and untroubled by the poacher's snare or spear.

Crossing boundaries

But there's something else, too. Consumption of wildlife (bushmeat) is quite a luxury item, not just in China, but also in many other countries throughout Asia and Africa and, of course, some well-known products are highly prized for their supposed medicinal qualities.

Indeed, Chris says that thanks to the huge profits to be made, it's not just habitat loss that's driving the (mainly illegal) wildlife trade. “Even without roads, poachers will go in and sometimes set up camps that allow them to live in the forest for months, setting their snare lines and hunting,” he says. “Helmeted hornbills, pangolins, bears, tigers, rhinos – these are the things that people will go to no end to get.”

The poachers will probably have a contact, a middleman, who will buy whatever they catch once they emerge from the forest again. Pangolins may be traded dead or alive, though

if destined to be eaten, they could end their life being shoved into a freezer, according to Steve Blake of the campaigning group WildAid, with a most likely end destination of either China or Vietnam.

Some are carried over borders in backpacks, but customs seizures show that mass transport is also taking place. “A year or two ago, there was a bust of several hundred frozen pangolins on a small vessel that came into a port in Guangdong,” Steve says. “Chinese customs take this stuff pretty seriously, so it's not easy to get products like this into the country. In the last few years, they have really stepped up their game on enforcement.”

Any transport of pangolins over a border is illegal under the global Convention on International Trade in Endangered Species (CITES) treaty, and meat consumption is also mostly outlawed. Use of scales, for medicinal purposes, can be legal in China if they have come from a government stockpile, though this of course opens up all manner of opportunities for corruption. But in June 2020, China decided to upgrade pangolins

to the highest level of protection and remove them from the traditional list of Chinese medicine treatments, a move welcomed by conservationists.

However, the Environmental Investigation Agency (EIA) has since reported that while pangolin has been removed from a section of the 2020 pharmacopoeia that lists key traditional Chinese medicine ingredients, it is still included as an ingredient in patent medicines – meaning the government continues to legitimise its use.

Out in the open

Once in China, wild animals may be sold in a number of ways – online trading is becoming increasingly popular, and showing off your wares in a physical market is increasingly hard to do but clearly still happens. It's important, at this point, to understand the distinction between a wet market and a wildlife market – the former will be mostly selling legal vegetables and meat from domestic livestock and poultry, but there may be one small section where live and dead wildlife species are available.

WILDLIFE MARKETS



As Steve Blake points out, the market in Wuhan was primarily dealing in fish. “There were close to 1,000 vendors at that market, and three or four sold wildlife,” he says. “If it's being sold openly [in China], it's never on any kind of scale.”

Since the SARS crisis, where it was shown that humans became infected as a result of contact with, or eating, civets, many of the markets selling wildlife have disappeared, Steve adds. There was a famous one in Guangdong that closed some years ago. “And if you want to eat this stuff in restaurants, you have to ask for it in a certain way, otherwise they know you are an investigator. It's not nearly as open as you would think.”

Despite its reputation, China is ahead of many of its neighbours, and some countries in Africa, when it comes to shutting down this type of wildlife trade. Chris Shepherd, of Monitor, has done much of his research in a notorious wildlife market on the Myanmar-China border called Mong-La, infamous as a place where some of the most sought-after wildlife products in the world are openly on

Why now? Why should COVID-19 suddenly have jumped ship from animals to people?

Above: bushmeat is for sale in the markets of Lagos, Nigeria. Right: horseshoe bats are thought to be the source of SARS and COVID-19.



WILDLIFE MARKETS



An army of workers was sent to disinfect Huanan Wholesale Seafood Market in March 2020.

sale. Reports suggest you can buy tiger skins, elephant ivory and Tibetan antelope skulls here, plus meat from giant flying squirrels or green pigeons.

And at places like this, the distinction between animals sold for food and for medicinal uses breaks down.

“A bear will be brought in and the gallbladder is sold for traditional medicine,” Chris says. “The paws and the rest of the meat is for food, while the skull might be sold as a trophy, and the teeth as jewellery. Whether people believe there’s medicinal value in the meat and the paws is not clear, but the main issue is status. It is often a ‘Look at how much money I have’ kind of thing.”

Chris is also in no doubt that wildlife markets are ripe for transmitting pathogens from animals to humans. As many people have pointed out, you have many different species, cramped into tiny cages that are piled on top of each other, with the animals stressed and scared and therefore shedding whatever viruses they are carrying at an alarming rate – either to other animals, stallholders or customers.

It’s more than that, though. “These markets generally are disgusting,” says

Chris. “I have never been to a hygienic one. The meat is often on the ground, the pavement or openly laid out on tables, there’s blood everywhere, and there’s no refrigeration in most of these places. I don’t think I’ve been to any [wildlife] market that has refrigeration. They boggle my mind.”

Dividing opinion

Sue Lieberman, an expert in the illegal wildlife trade and vice president of the Wildlife Conservation Society (WCS), makes the point that these markets don’t only exist in China, Vietnam or other parts of South-East Asia – there are plenty of similar ones in major African cities such as Brazzaville, Kinshasa and, of course, Oluwo outside Lagos.

Sue is adamant that wildlife markets of this nature have to be shut down. “The reason they exist is they’re selling perishable commodities with the economy of scale,” she says. “You don’t have to go to the consumer, the consumer comes to you.” If you close these markets, a lot of this trade, and the risk of another global pandemic, is substantially reduced.

“People want places where the animals are slaughtered right in front of them, so they can see the meat is fresh,” Sue continues. “If you close them, they’re not going underground, because how are they going to find their consumers?”

“People keep saying it’s illegal species we should be focusing on, not legal ones, but that’s ridiculous.”



Mong-La is known for the trade and consumption of illegal wildlife products. Below: pangolin scales and meat are sought after.

Others disagree. For example, a number of prominent conservationists with an expertise in wildlife trade – including Dan Challender, chair of the IUCN Pangolin Specialist Group – argued in a piece written for *The Conversation* in April 2020 that the COVID-19 crisis “should not be used opportunistically to prescribe global wildlife trade policy”.

Wildlife trade, including for many plants and edible fungi, as well as animals, benefits people all over the world, and banning it completely might have many unintended and negative consequences, including an increased risk of bringing in organised crime elements and raising perceptions of scarcity that drives up black market prices, they argue. Better to regulate the trade properly, the

authors argue, giving full consideration to public health issues to reduce risks of another COVID-19 type outbreak. “This could be achieved by focusing on highest-risk species and improving conditions along supply chains and in markets.”

Indiscriminate nature

Chris Shepherd is dismissive of the idea that you can regulate these markets to stop the transmission of another outbreak. “People keep saying it’s illegal species we should be focusing on, not legal ones, but that’s ridiculous,” he says. “These viruses aren’t affecting illegal species only. We should be getting away from trading in wildlife, from allowing these disgusting markets to persist. Much of the bat trade in the world is legal, and bat species are rarely protected under any laws, but that doesn’t mean you aren’t going to get sick from eating a bat.”

China has already put a temporary ban on wildlife markets, and there’s a good chance they will make this permanent. Sue Lieberman says the Vietnamese government is also discussing such a move, but it’s vital

that countries such as Cambodia, Laos and Myanmar do the same. Small-scale wildlife markets, that act more to feed local people, rather than to line criminals’ pockets, should also close in the long-run, but not until alternative food sources can be found for those who rely on them.

The markets that offer the greatest threat – those that could be the source of the next pandemic – are those big city ones where people mass in huge numbers.

“We’re not talking about places where someone buys a smoked deer that’s just out of the forest,” Sue says, “but those where you have thousands of animals, cages stacked up on each other, animals being slaughtered right in front of you. From an epidemiological perspective, it’s amazing it took this long to even consider it.”



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Catching a killer

Besides COVID-19, there are many other significant, disease-causing zoonosis viruses that can infect and kill people.

HIV

HIV, which causes AIDS, was first passed to humans – probably from either chimpanzees or gorillas infected with SIV (Simian Immunodeficiency Virus) – as long ago as 1920 in Kinshasa, in what is now the Democratic Republic of the Congo (DRC), most likely during the butchering process. Another strain of HIV appears to have come from monkeys called sooty mangabeys. An estimated 25 million people have died from AIDS.

EBOLA

Ebola virus disease was first recognised in 1976 – there were two simultaneous but unrelated outbreaks in what is now South Sudan and DRC. There are six different species of Ebola virus, but all of them appear to have fruit bats as their natural reservoir. The virus is then spread to other animals, including monkeys and other forest wildlife, which may then be hunted by humans. Between 2014–2016, 28,000 people were infected and 11,000 died.

SARS

Severe Acute Respiratory Syndrome first appeared in the Guangdong province of southern China in 2002. It is caused by a coronavirus closely related to COVID-19. It’s believed that horseshoe bats are the reservoir for the virus, and that humans caught it from masked palm civets, which were consumed as food (any trade in the species has been made illegal in China). During the 2002–2004 outbreak, there were over 8,000 cases and 774 deaths.

RABIES

Rabies is primarily a virus that infects domestic (and feral) dogs, but it can cause symptoms in a wide range of mammals, including humans. Each year, according to the US Centers for Disease Control and Prevention, nearly 60,000 people across the globe die after catching it. There has been a rabies vaccine for more than 100 years, so most deaths occur in poorer countries with limited resources. Rabid dogs are the cause of 90 per cent of human cases and 99 per cent of deaths.

