TROM

eating the world and ourselves

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Summary:

Eating is something that we have to do for both energy and mass. No eat - no life; it’s as simple as that. But what do we eat? What is the impact of what we eat on our health and the environment?

We look at all that in this book.

EATING IS SOMETHING THAT WE HAVE TO DO FOR BOTH ENERGY AND MASS. NO EAT - NO LIFE; IT'S AS SIMPLE AS THAT.

But what do we eat?

I, for instance, eat all sorts of things: sea creatures, land creatures (it sounds like I'm a monster, but most of us do this), stuff of many colors that grow out of the ground, and other stuff that I don't know where it comes from or what it's made of, like sweets. But you also get 'good' and 'necessary' stuff from liquids.

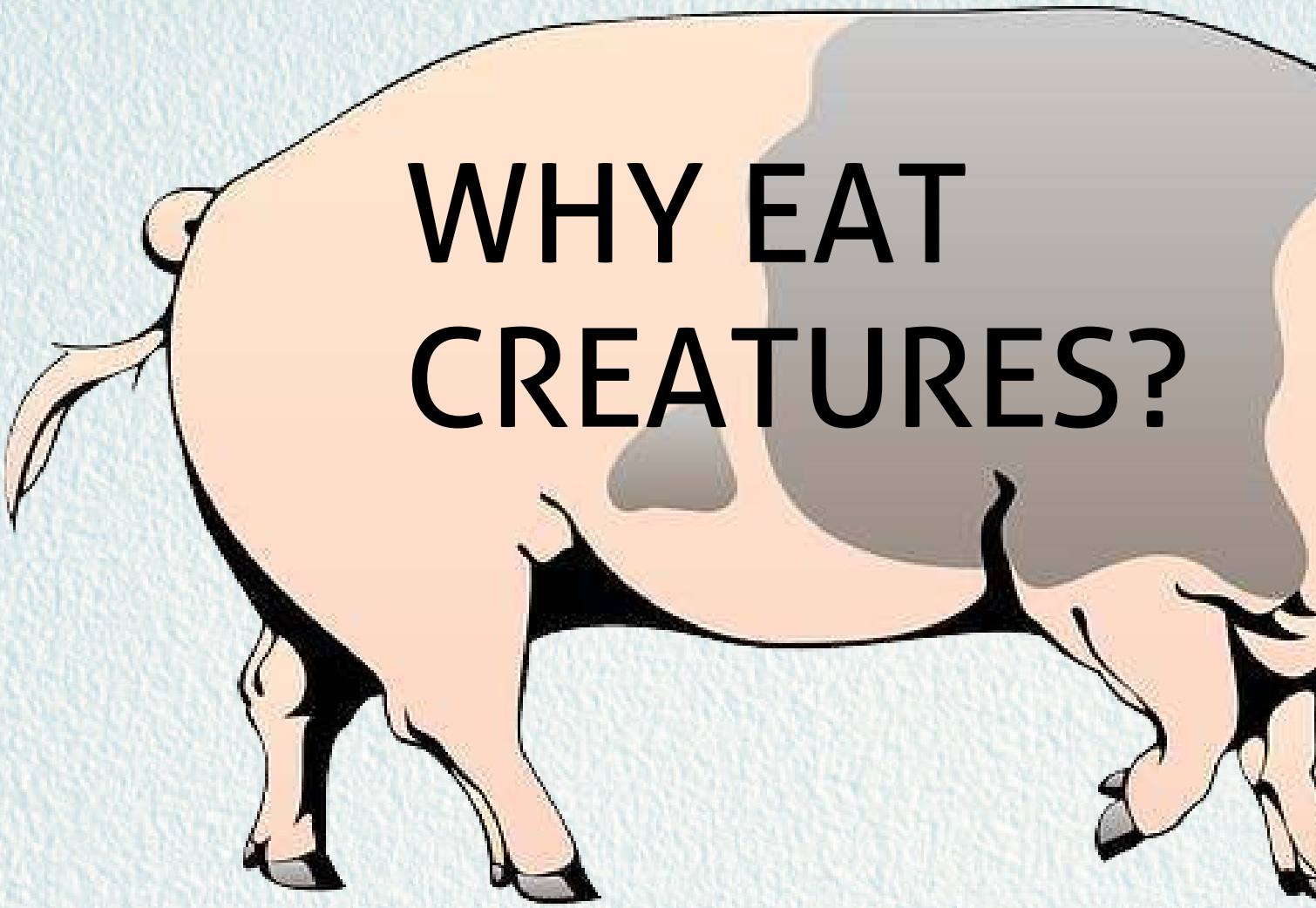
So: chocolate, steak, juice, bananas, soup, cheese, and so on, are all 'stuff' that we chew, lick, drink, dissolve, and then swallow. This mix then moves to our stomachs, where the chain of 'magic' reactions starts providing us with renewed matter (tissue) and energy, although Einstein showed us that both are the same. ;)

These 'things' that we eat can be categorized by their specific properties and that gives rise to specific production technologies. For instance, if you eat colored stuff typically from the ground (vegetables or fruits), you mainly only need fertile 'ground' and the 'seeds' for the stuff you want to grow, plus taking care of these 'things' (soil, water, sunlight, etc.). If you want to eat creatures, then you need to grow the creatures (on land or in water), which takes a lot more time.

You also need to feed them great quantities of food, keep them healthy, deal with the waste they produce, and so on. When it comes to mass producing any these 'things', one of these major food categories requires a huge amount of resources and energy, and that, coupled with today's money-based-profit world, seems to have a major backlash on us, our lives and the environment. I am talking about the creatures that we eat; mainly cattle, pigs and chickens. We call them livestock.

Most people in the world eat the skin, flesh, and some other parts of these creatures, plus some of the 'things' they produce, such as eggs or milk. These 'parts' can be found on most of our plates on a daily basis.

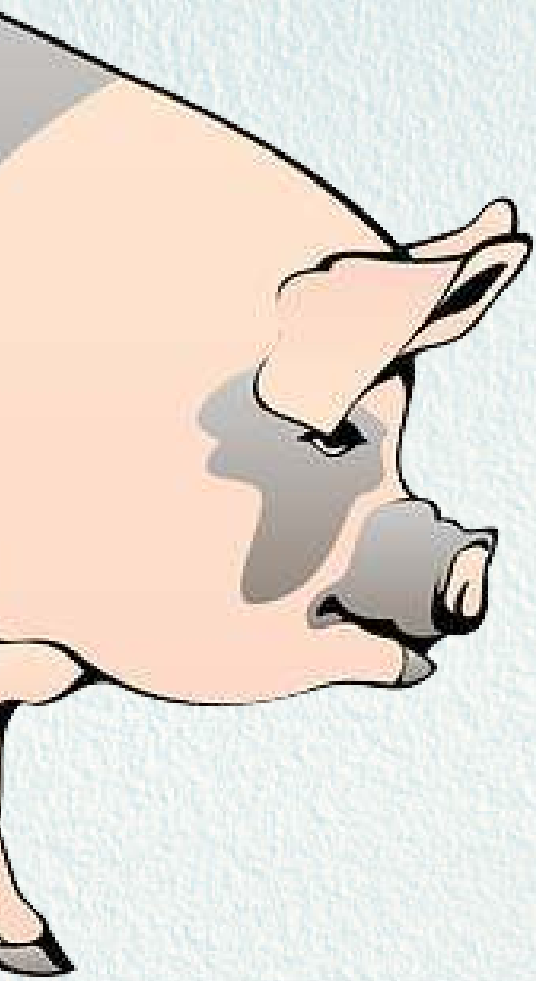
I will try to exemplify the huge amount of resources that consuming these creatures requires; how the monetary motive behind this world-wide consumption pushes many side effects such as major contributions to climate change, deforestation and land use; and how consuming these creatures may have negative impacts on our health - all of that in a situation in which there are plenty of more efficient alternatives, both in how we produce the creatures (or the 'parts' of them that we consume), and in how we could simply replace them with other food sources.



WHY EAT CREATURES?

I come from a tribe (country) where slaughtering a pig for Christmas and eating parts of it, even 'on the spot', is something of a national tradition, a pleasant time, full of joy and relaxation. It may be difficult for many people who did not grow up within this kind of lifestyle to understand how cutting a pig's throat, letting it bleed to death, and then 'cooking' it right away and eating it (many times the elders would cut the skin from the freshly dead pig and give it to children and we'd eat it with salt and it was very good) is regarded as a good Christmas day for some.

The scream of a slaughtered pig means terror for some and food for others. This shows that human behavior is created by each person's environment, and where one may see disgust and fear, another may see delicious food and good times.



The option of eating meat is not only a cultural preference, but is also a choice influenced by money, since one may not be able to afford to acquire his/her own food requirements without meat consumption. On the other hand, much of it is also due to lack of knowledge. Many may not be aware that one can live very well without eating meat or other animal products, or all of the options that exist out there.

Therefore, most of us eat meat and other animal products because of culture and tradition (habit), and because, even if we don't want to, maybe we cannot afford to seek out other alternatives, whether the reasons are financial or otherwise (land use, for example).

Due to ignorance (lack of knowledge or motivation), many don't bother to question what they eat, while some may even wonder what is so damn special about this decision. But once you take into account all of the events that are triggered by mass creature-consumption around the world (as we will show you), maybe you will understand why such questions are very important.

Creatures are complicated 'entities' that require a lot of care, land use, and protection against diseases to raise, slaughter, package, transport, store, and eat them.

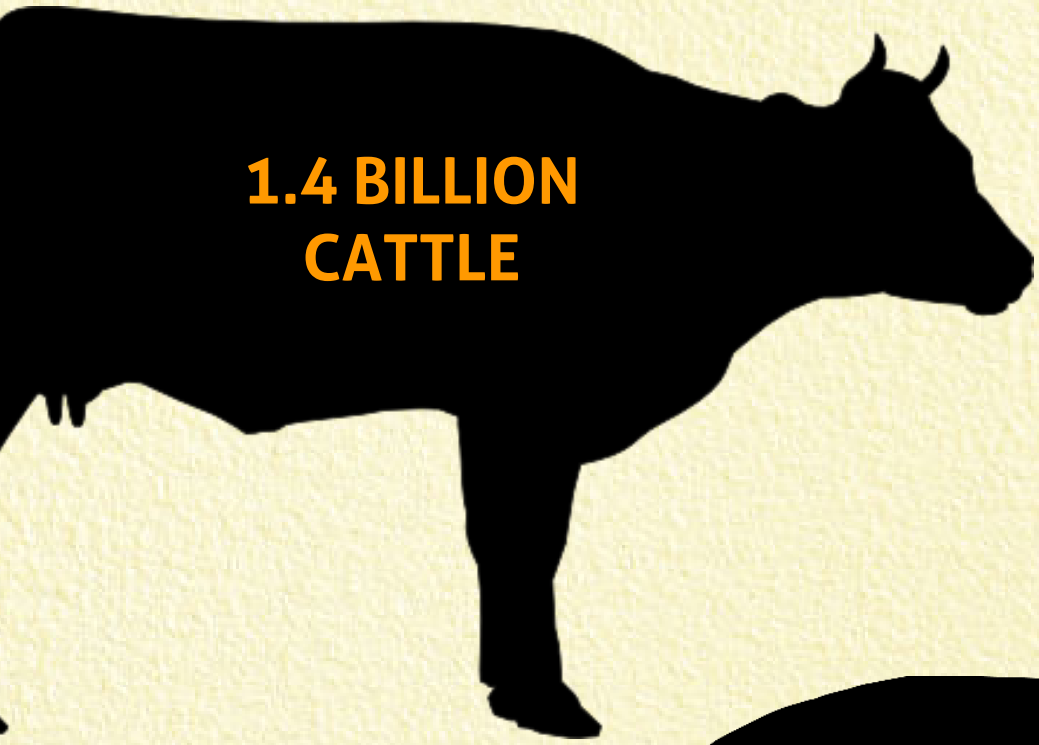
LAND USE AND DEFORESTATION

In order to grow enough creatures to satisfy current demand, which is a direct result of the consumer-based monetary world that we live in, we need lots and lots of space, because creatures eat, poop, fart (you will be surprised how important that is), and need some space to move, and breath. Even more to the point, you also need space to grow all of the food needed by the 'beasts'.

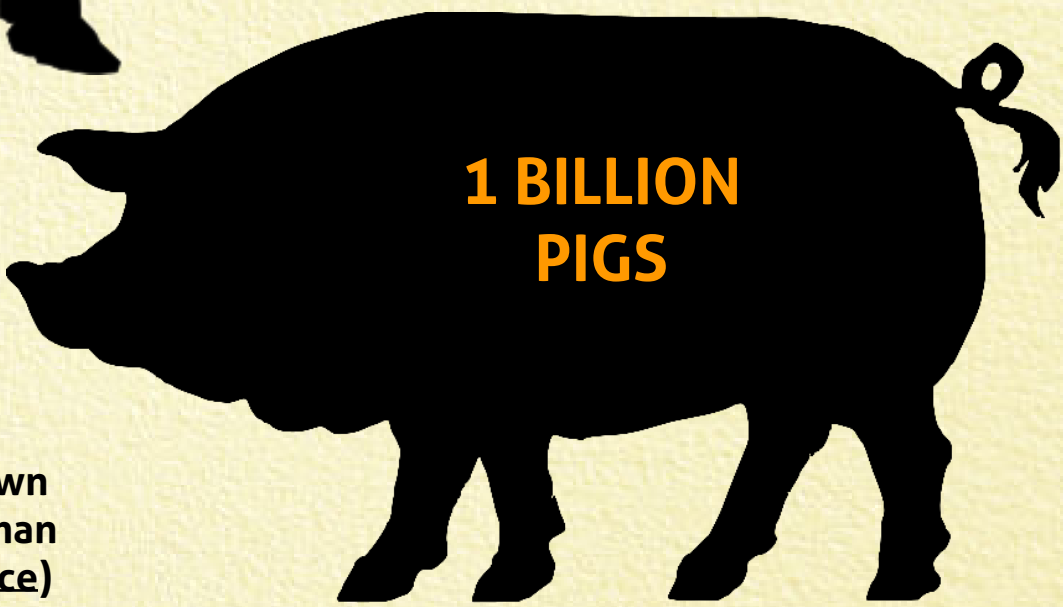
THE MAIN CREATURES THAT HUMANS EAT ARE CHICKENS, CATTLE AND PIGS.

CURRENTLY BEING 'GROWN' AROUND THE WORLD, THERE ARE ABOUT:

19 BILLION CHICKENS

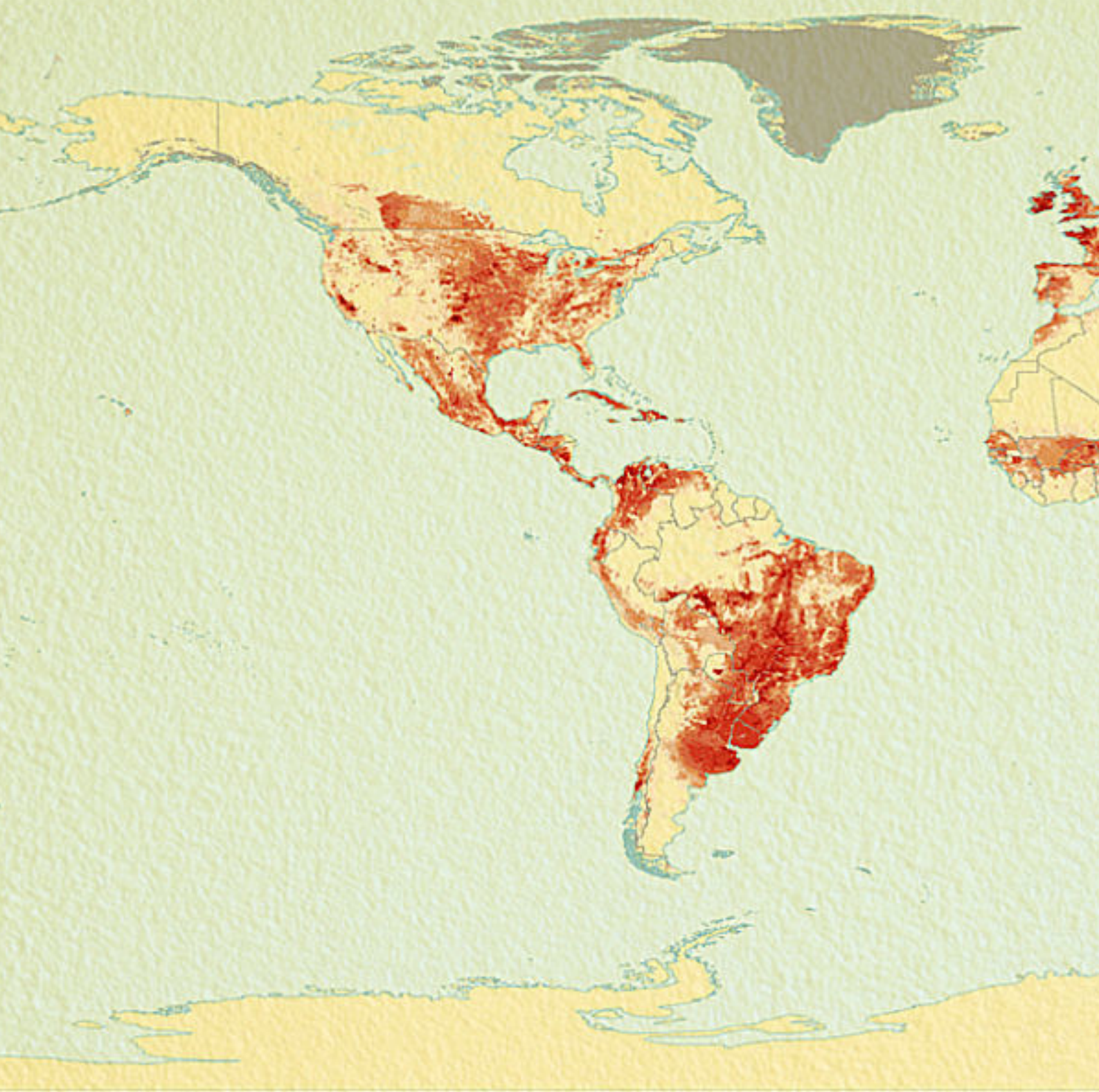


1.4 BILLION CATTLE



1 BILLION PIGS

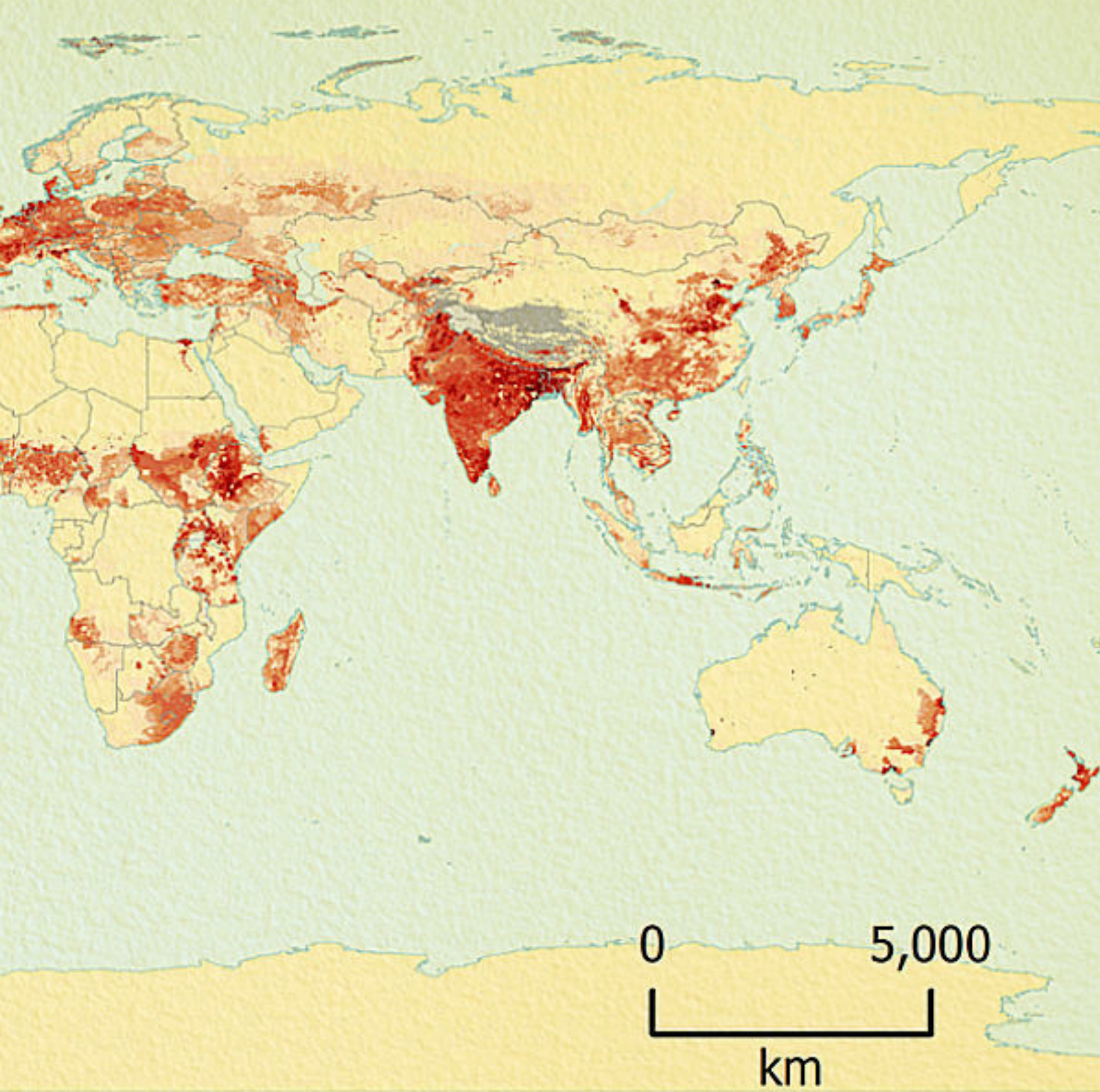
They are being grown specifically for human consumption.(source)



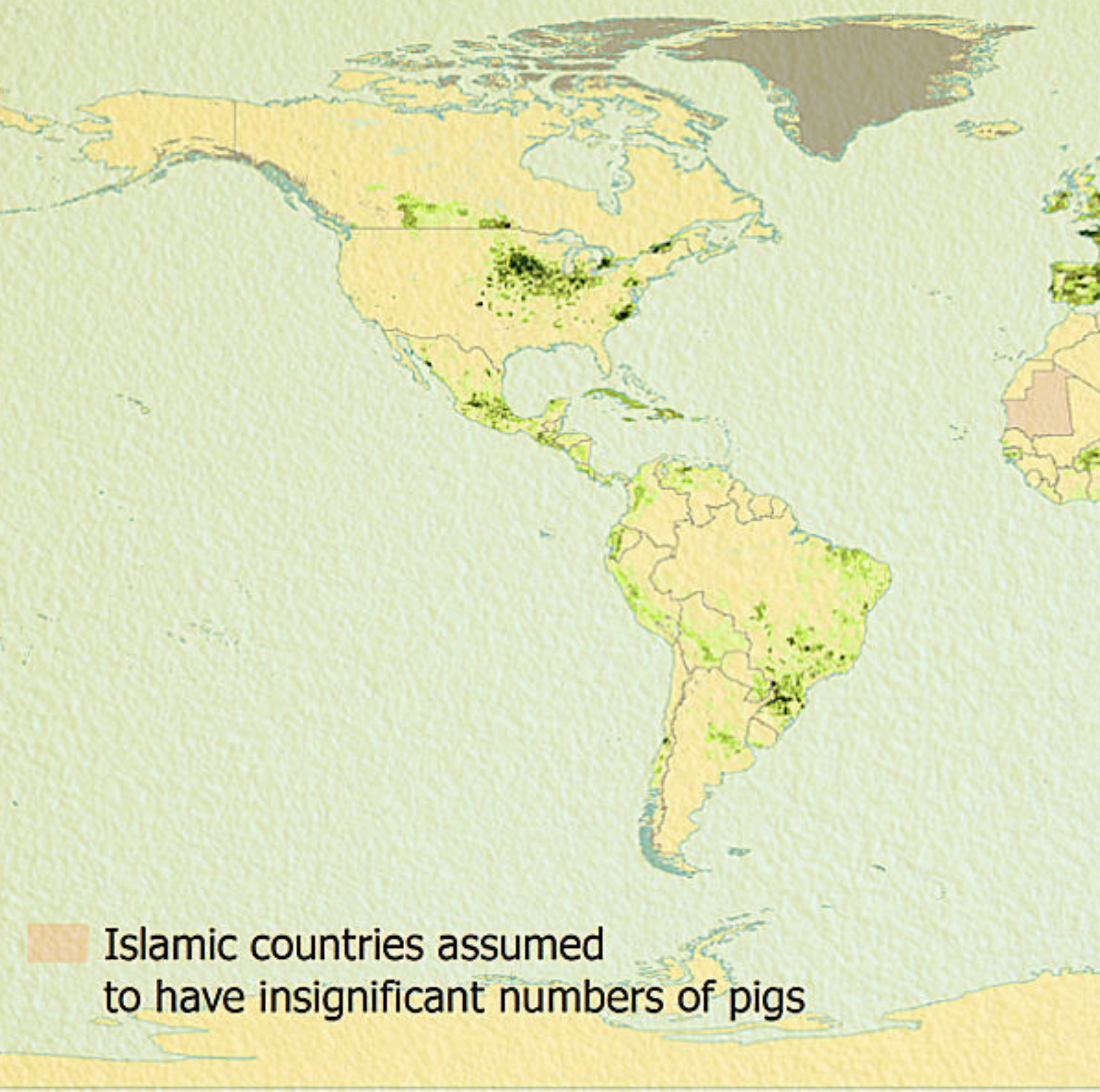
GLOBAL DISTRIBUTIONS OF CATTLE

Head per km²

- < 1
- 1 - 5
- 5 - 10
- 10 - 20



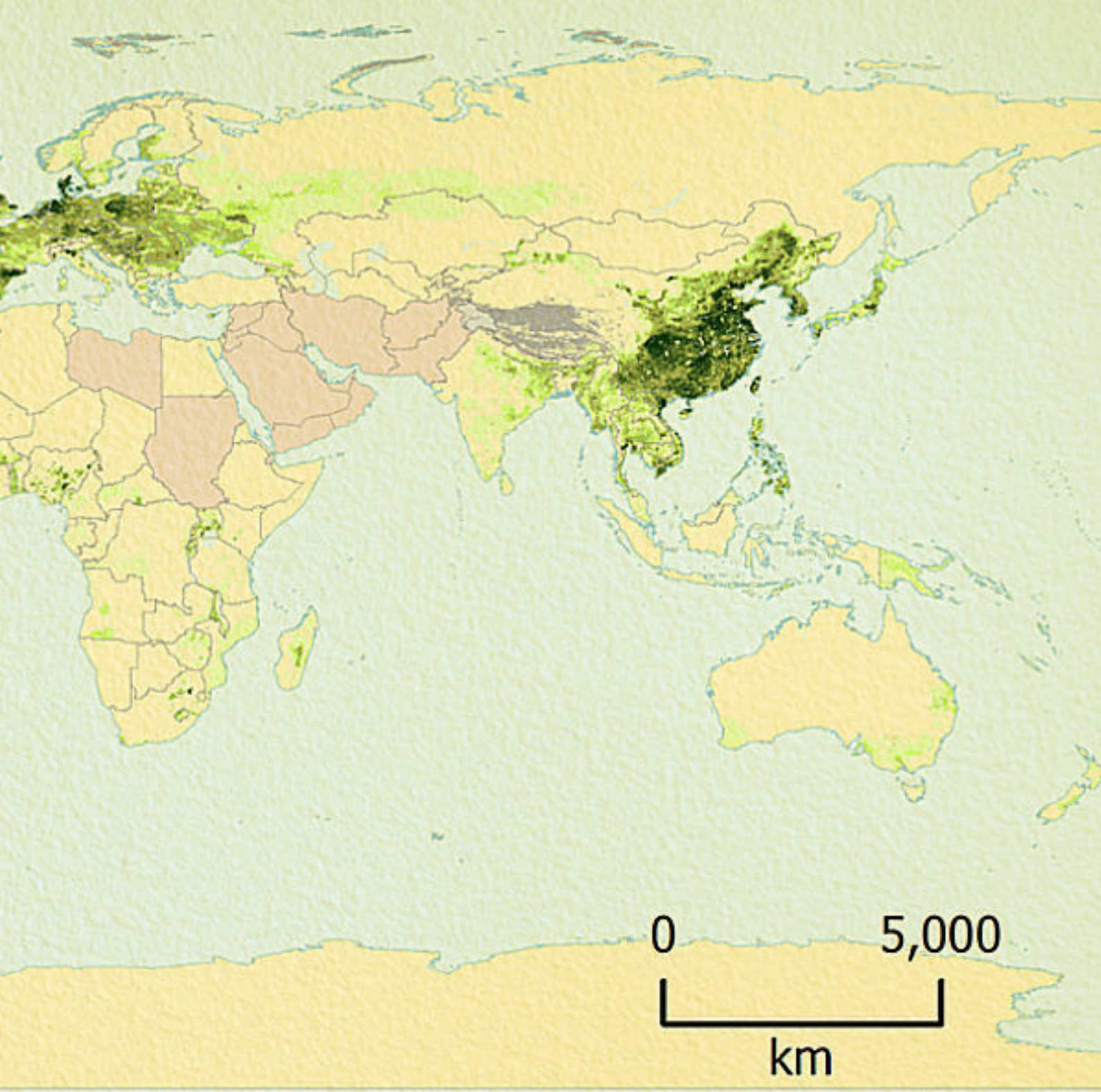
20 - 50
50 - 100
100 - 250
> 250
Unsuitable



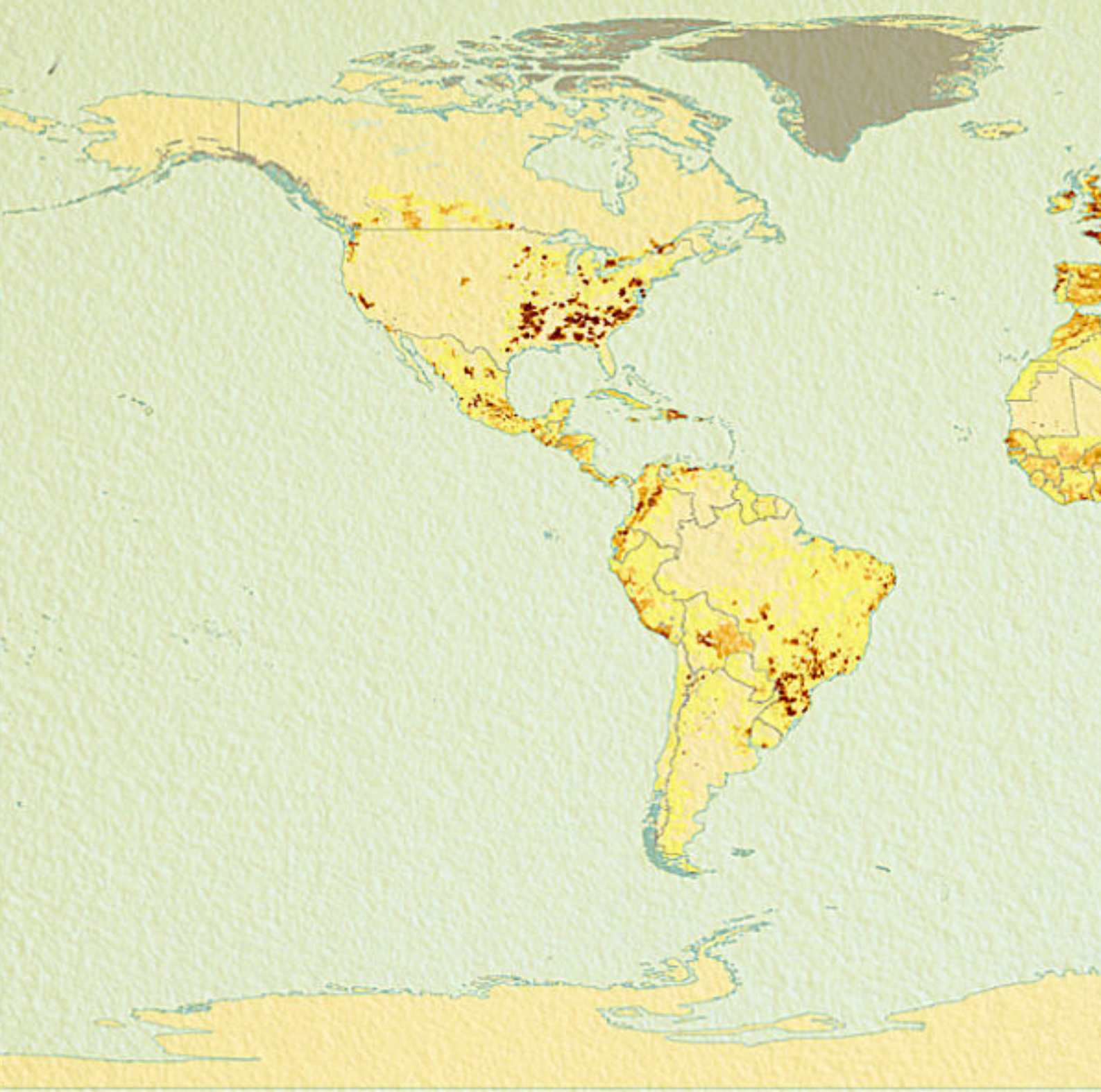
GLOBAL DISTRIBUTIONS OF PIGS

Head per km²

- < 1
- 1 - 5
- 5 - 10
- 10 - 20



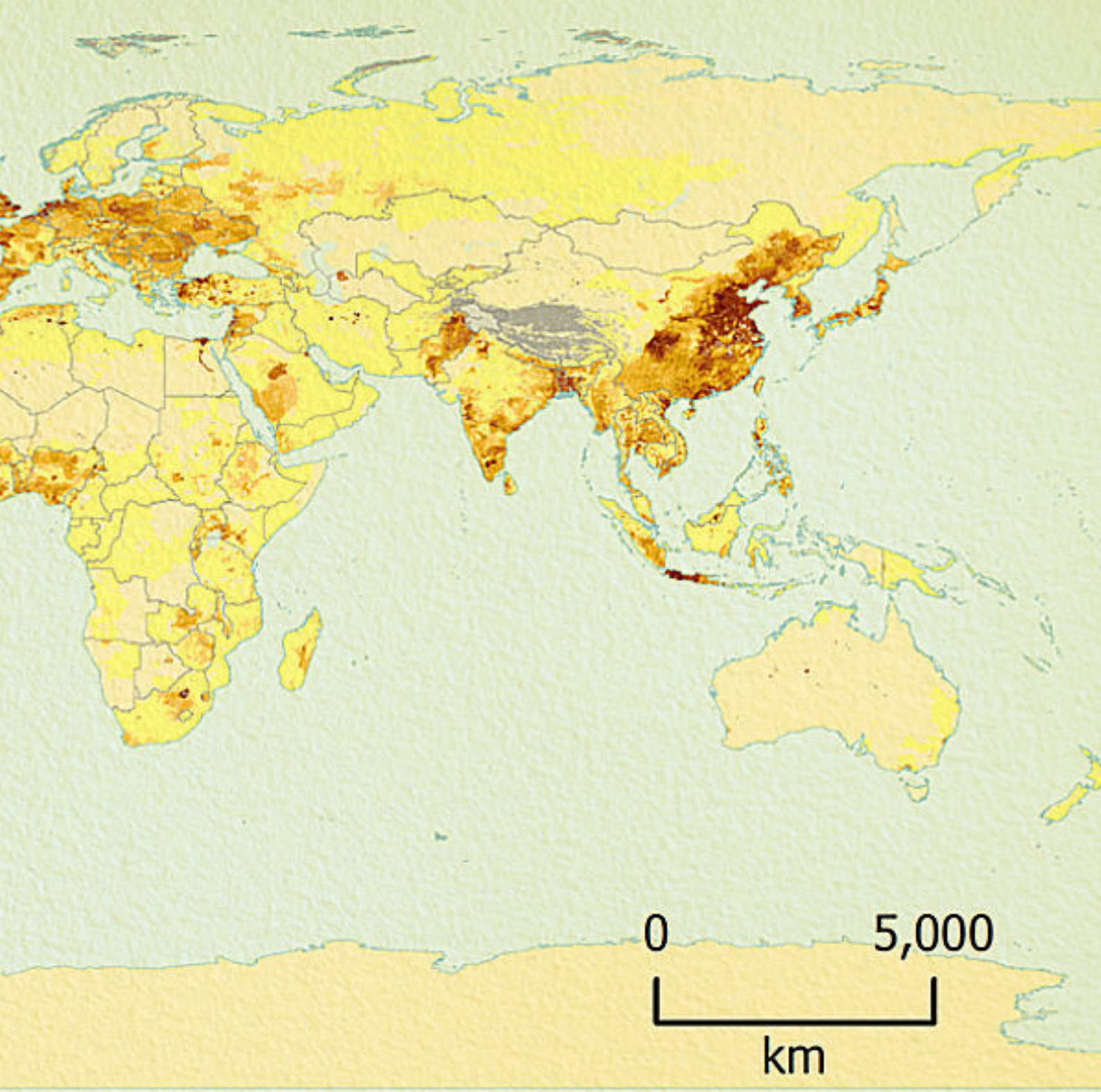
20 - 50
50 - 100
100 - 250
> 250
Unsuitable



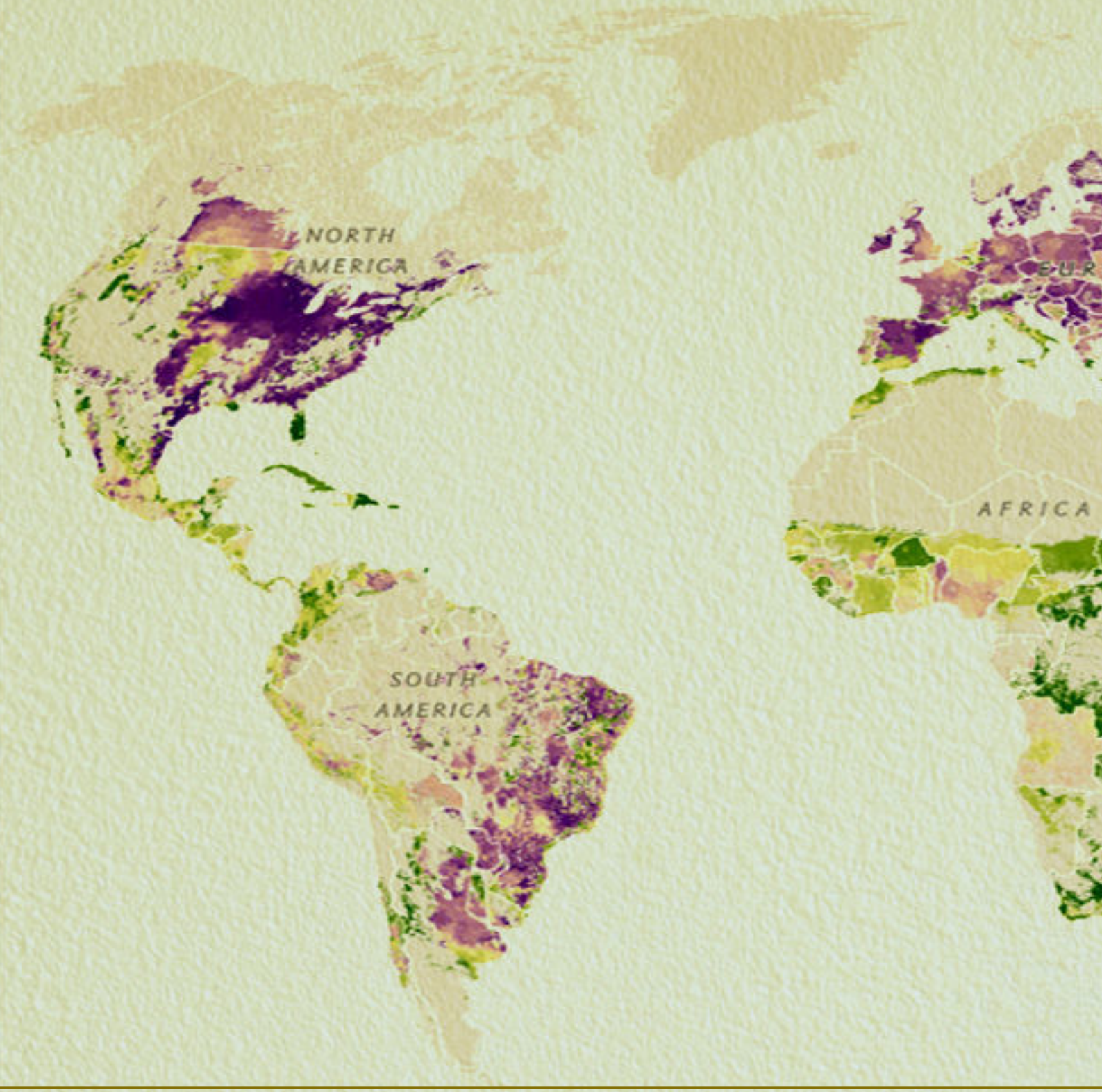
GLOBAL DISTRIBUTIONS OF CHICKENS

Birds per km²

< 1	50 - 100
1 - 50	100 - 250



250 - 500
500 - 1,000
1,000 - 2,500
2,500 - 10,000
> 10,000
Unsuitable



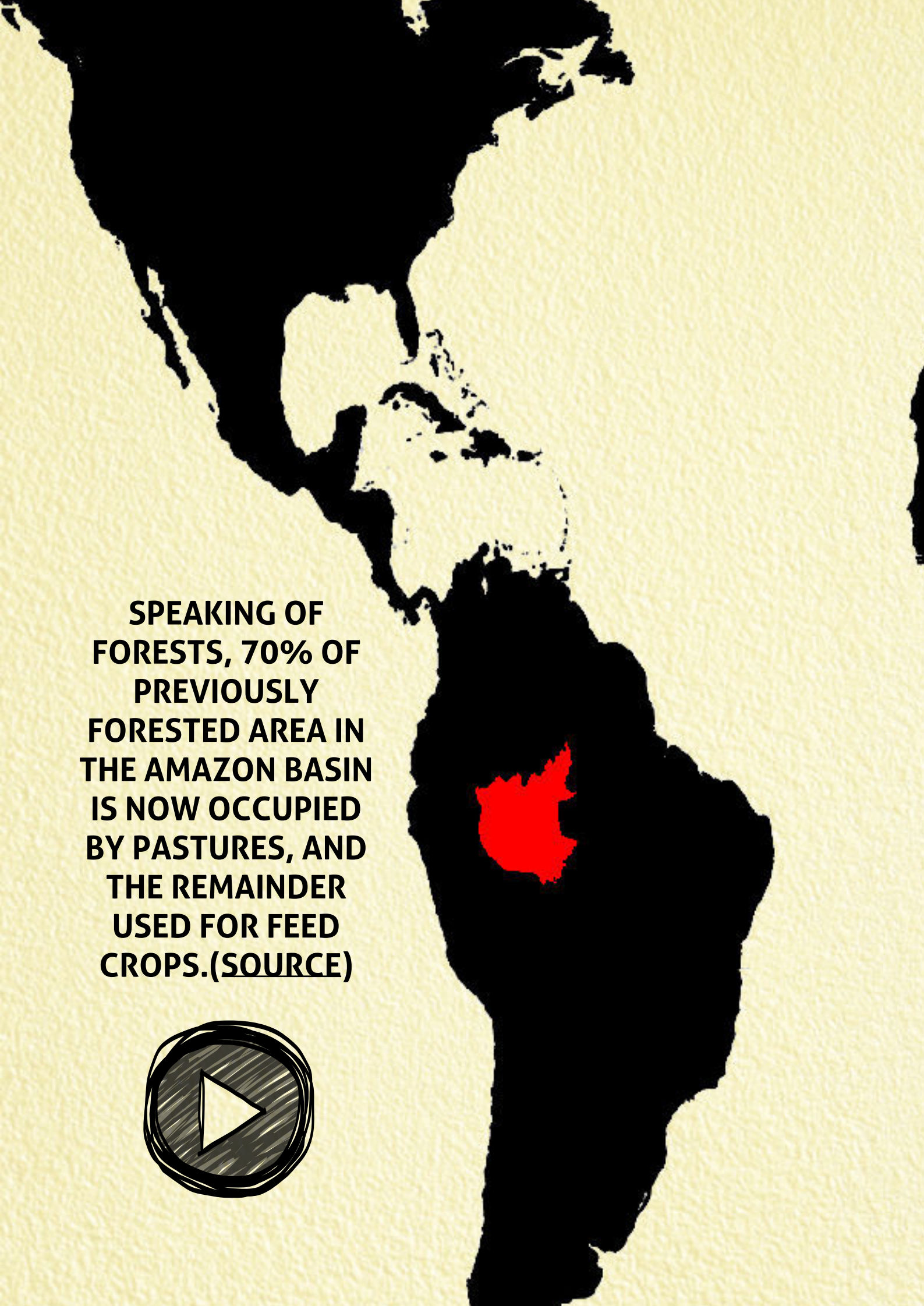
GREEN - CROPS GROWN FOR FOOD

PURPLE - CROPS GROWN FOR ANIMAL FEED AND FUEL

Although livestock producers have tried to squeeze more and more of these creatures into more and more tiny spaces, triggering mass outrage among many people who say that treating other beings this way is inhumane, the overall land requirements is still huge.

So huge that most of all of the land used for agriculture is reserved for raising and feeding these creatures.

To help you visualize more clearly just how much land that is, the raising of livestock currently 'claims' 30% of **all** of the available land on Earth, which includes about 33% of the planet's arable land devoted to growing food for these animals (domesticated animals raised in an agricultural setting to produce commodities such as food, fiber and labor).(source) Remember that the surface of the planet is full of mountains, hills, deserts, forests, and other land that is not suitable for raising livestock or their food. Considering that, the space that livestock 'consumes' adds up to quite a lot of land.



SPEAKING OF FORESTS, 70% OF PREVIOUSLY FORESTED AREA IN THE AMAZON BASIN IS NOW OCCUPIED BY PASTURES, AND THE REMAINDER USED FOR FEED CROPS.(SOURCE)

To put this in perspective, from 1991 to 2000, an area of about the entire size of Spain was deforested. Imagine Spain viewed from space, all green and full of trees (and other plants and animals), and in just 10 short years, all of that gone.

IT IS ESTIMATED THAT IN 20 YEARS THE TOTAL AMAZON FOREST WILL BE REDUCED BY 40%

This is a distortion-adjusted map of the planet and all of the countries that reside on it

IT'S TRUE THAT DEFORESTATION HAS DECREASED OVERALL IN RECENT YEARS, BUT MESSING WITH FOREST ECOSYSTEMS, ESPECIALLY AT SUCH LARGE SCALES, IS NOT SOMETHING WE SHOULD BE PLAYING WITH.

In our Earth book we highlight how connected we are with the environment (in a scientific way), and how trees affect the atmosphere, the atmosphere affects people, and how all creatures and plants are interconnected.

More than that we also show how creatures and places offer us not only inspiration for developing science and technologies, but also protection for preserving the delicate balance that we all depend upon.

Forests are responsible for 28% of all of Earth's oxygen content and are also considered one of the world's largest storage banks for all of the carbon emitted into the atmosphere through natural processes and human activities.

As you cut down forests, you are not only reducing the oxygen production and the capacity for CO2 absorption, but also releasing their stored CO2. Trees also absorb water from the soil and release it back into the atmosphere, so less trees means a drier atmosphere, which then means that we are causing conditions that are not favorable to the growth of rainforests around the world, or the massive biodiversity within them.

MORE THAN THAT, CONSIDER ALL THAT LIVES IN FORESTS - BILLIONS OF SPECIES OF ANIMALS AND PLANTS (80% OF THE WORLD'S PLANT BIOMASS)

When you cut down forests, you kill many creatures or endanger their survival. And the extinction of one species always causes a chain reaction by the endangering of another one, highlighting yet another destabilization of the global 'natural' system.

Imagine a cute fluffy-white-sparkly-shiny ball of cells that is a creature. It makes sounds, emits heat, and moves. That is a species: a unique set of characteristics that an animal/insect/plant exhibits.

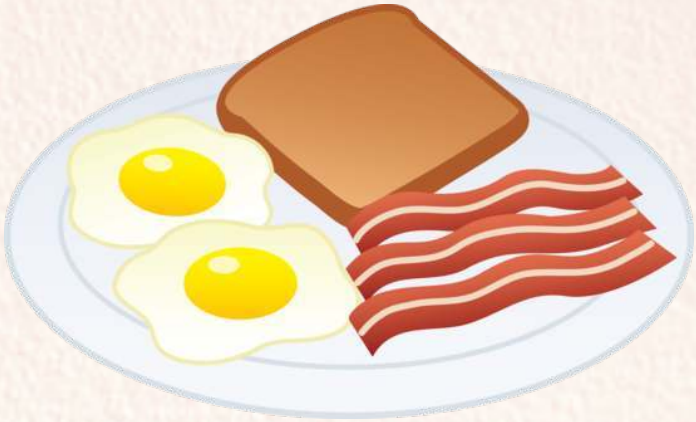
There are thousands of such unique creatures (with legs and hands, eyes and spines, interesting biology and fascinating morphology) **that are lost every single year** due to deforestation.

For a more detailed list of the effects of deforestation, visit our friend Wikipedia.

WASTE, INEFFICIENCY AND CLIMATE CHANGE

To raise and manage creatures for food production requires a lot of fresh water and food, both of which can be considered as waste if we agree that there are better methods of creating and distributing food. You need fresh water for both the creature's food and the creature itself, but also for dairy operations, other on-farm needs, plus the fresh water used in the production/management of the food that we make from these creatures: milk, meat, eggs, etc.(source)

For those who choose to consume it, think about the bacon on your plate.



To get to you, it first needs to be a living pig that is fed, occupies land, consumes water and food, and even emits gases (farts, poop, burps); Methane to be more precise, which is a very powerful greenhouse gas.

Combine several farts/burps per day, per animal, over billions of pigs, cattle, sheep or other animals that exist solely for human consumption (most of them would not exist otherwise), and that sure makes for one hell of a fart/burp. Actually, this level of gas emission is taken very seriously, as it equates to 2.5% of all human-made greenhouse gasses emitted by the US tribe alone.

Also, do not forget that the food the pig eats is also taking space and consuming water. Plus the raising of the feed crops, the transportation of this food to the pig, the pig to slaughter, it's packaging and transportation of the meat to other places, the preparation of meat, and in the end, the transformed meat being transported to supermarkets. That is finally capped of with your drive to the market, the refrigeration units that keep it 'safe to eat' before you buy it, the trip back home, and then your own refrigeration until you're ready to cook and eat it.

Thus, it takes all of that (and more, of course) just to create some 'bacon' on your plate, and this is just one of the many products that are made out of such creatures.

THIS MAP OF SHIPPING ROUTES ILLUSTRATES THE RELATIVE DENSITY OF COMMERCIAL SHIPPING IN THE WORLD'S OCEANS.

There are so many tribes in the world that, in order to provide so much ‘food made of creatures’ to all of the tribals, the tribes engage in a ‘dance’ of exchanges and mutual advantages.

One tribe may have the land to raise the food for the creatures, while another tribe has the means to raise the creatures and has to import the food for them, and yet another one has no such means and needs to import the food eventually made out of these creatures.(source)

This 'dance' of exchange around the world consumes a lot of energy and produces a lot of additional greenhouse gasses.

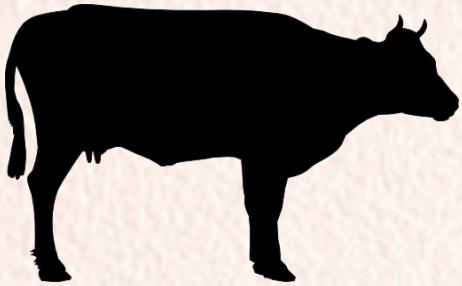
GREENHOUSE GAS EMISSIONS FROM AGRICULTURE, INCLUDING CROP AND LIVESTOCK PRODUCTION, FORESTRY AND ASSOCIATED LAND-USE CHANGES, ARE RESPONSIBLE FOR A SIGNIFICANT PORTION OF HUMAN-INDUCED EMISSIONS.

It is estimated that agricultural production will have to increase another 60 percent by 2050 to satisfy the expected demands for food and livestock feed, if current trends continue.

This is projected to lead to a 30 percent increase in greenhouse gas emissions just from the animal agricultural sector alone.(source)

THE CREATURES THAT WE RELY UPON THE MOST FOR PRODUCING FOOD ARE ALSO QUITE INEFFICIENT AS FOODS.

TO PRODUCE 1KG (2.2 POUNDS) OF MEAT REQUIRES:



BEEF

13620 LITRES OF WATER
(3598 GALLONS)

10 KG OF FOOD
(22 POUNDS)

PORK

4364 LITRES OF WATER
(1152 GALLONS)

5 KG OF FOOD
(11 POUNDS)

CHICKEN

3546 LITRES OF WATER
(937 GALLONS)

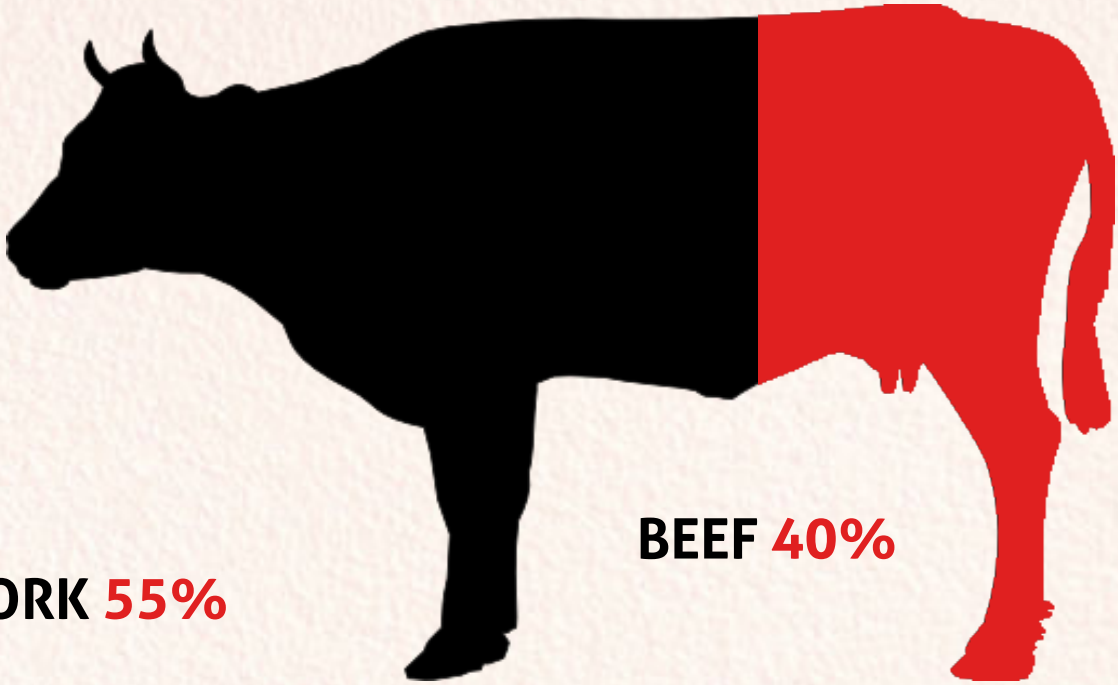
2.5 KG OF FOOD
(5.5 POUNDS)

BUGS

13 LITRES OF WATER
(3.4 GALLONS)

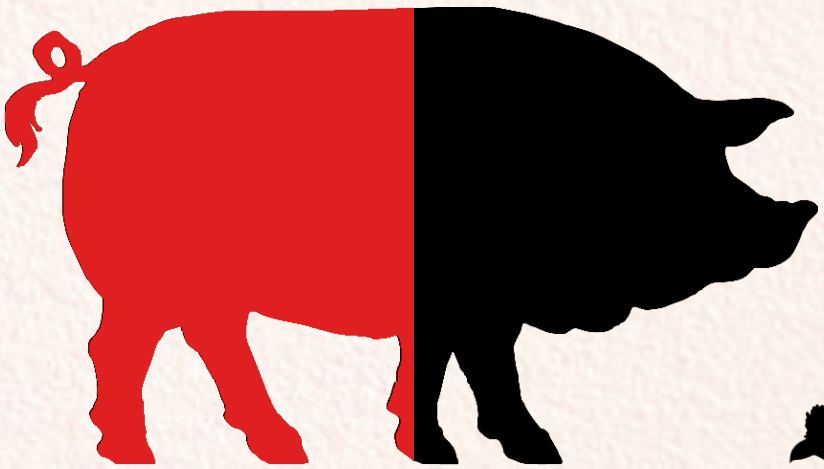
1.7 KG OF FOOD
(3.7 POUNDS)

THE PERCENTAGE OF THE ANIMAL THAT IS EDIBLE:

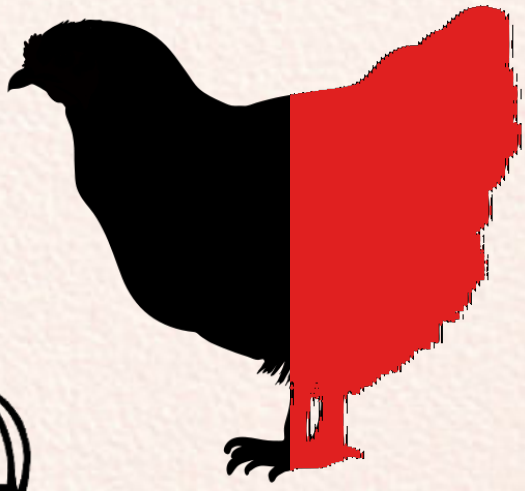


BEEF 40%

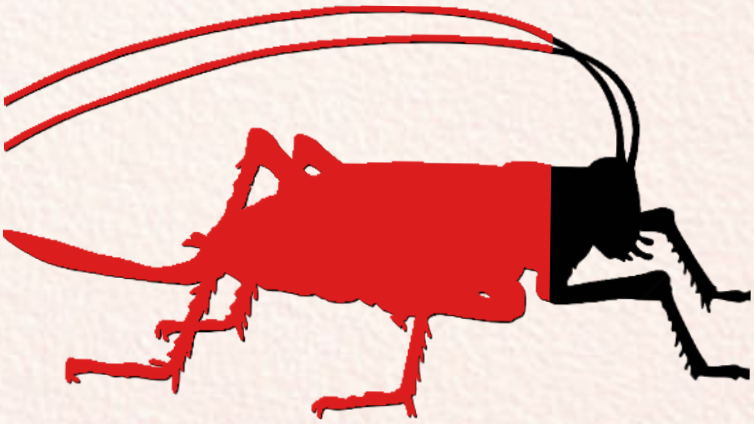
PORK 55%



CHICKEN 55%



BUGS 80%



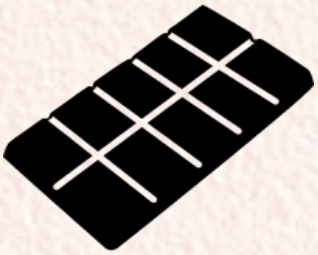
THE AMOUNT OF WATER OTHER FOODS NEED TO PRODUCE 1KG (2.2 POUNDS) OF FOOD:

CORN

818 LITRES OF WATER
(216 GALLONS)

POTATOES

900 LITRES OF WATER
(238 GALLONS)



CHOCOLATE

24000 LITRES OF WATER
(6340 GALLONS)

RICE

3400 LITRES OF WATER
(898 GALLONS)

APPLE JUICE

(1 litre - 0.26 gallons)

950 LITRES OF WATER
(250 GALLONS)

CHEESE

4546 LITRES OF WATER
(1200 GALLONS)

BREAD

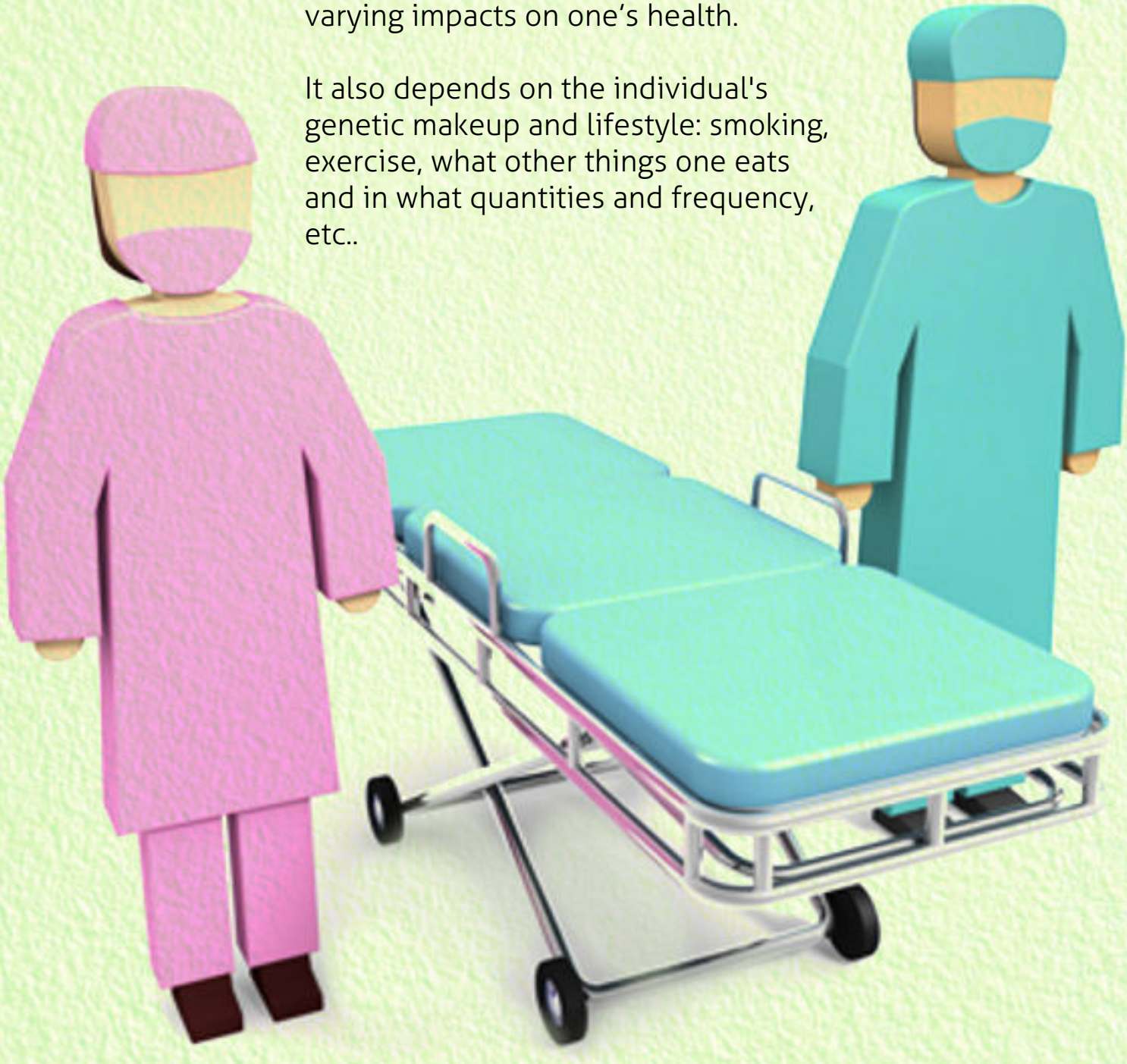
80 LITRES OF WATER
(21 GALLONS)

(source 1, 2, 3)

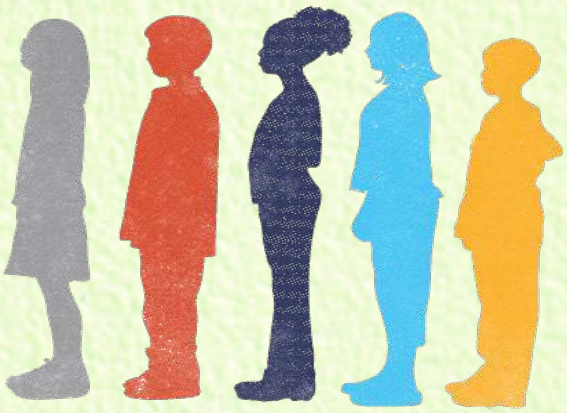
HEALTH CONCERNS

Although health concerns seem to be the main reason why many avoid eating creatures, the science is not at all exact when it comes to causality. First of all, creatures come in all shapes and forms and often have multiple parts that people eat, and those parts can have varying impacts on one's health.

It also depends on the individual's genetic makeup and lifestyle: smoking, exercise, what other things one eats and in what quantities and frequency, etc..



To give you an example how hard it is to even relate all of this, let alone to find specific causality, take a look at some big studies focusing on just one edible 'part' of creatures: red meat.



12 YEARS
500,000 PEOPLE

For 12 years, half a million people between the ages of 35 and 69 were part of a study looking at the effects of red or processed meat on health. The subjects were carefully tested for various diseases and risks, while their lifestyles were placed 'under the microscope' for tracking habits such as smoking and physical exercise.

Over the course of the study, over 25 thousand deaths were observed, while they concluded that around 3.3% of those deaths could have been prevented if red meat consumption were lower among those participants. Also, a strong correlation was identified between processed meat consumption and cardiovascular diseases, cancer, and 'other causes of death'.

Their conclusion: "The results of our analysis support a moderate positive association between processed meat consumption and mortality, in particular due to cardiovascular diseases, but also to cancer." You can read the entire study here.

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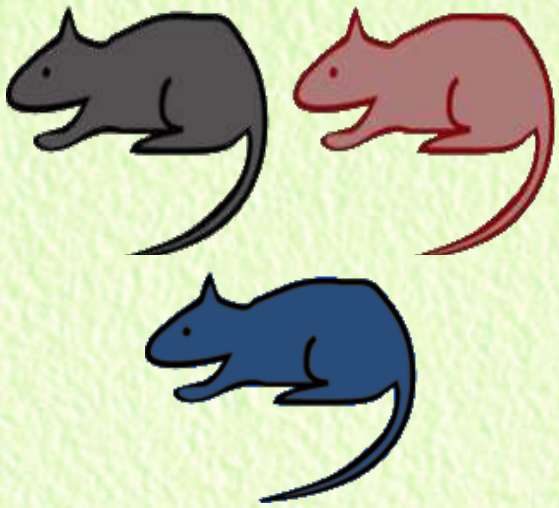
LAB RATS AND RED MEAT



Red meat (a type of flesh) appears red because it contains a substance called 'haem'. Since separate studies had shown that other types of meat (poultry or fish-based 'white meat') do not show any significant correlation between consumption and health issues, they isolated this 'haem' as 'the suspect', and added it to the food of several hundred lab rats.

They observed that the rats who ate food with 'haem' had an increase in promotion of tumor growth, similar to if they had been fed beef steak. Full study here.

But, of course, it's not at all that simple. There are some studies suggesting that eating a small amount of meat is healthier than not eating any meat at all, while other studies suggest the opposite.

To help exemplify this, over 17 thousand people took part in a similar experiment from 1986 to 2010, testing the effects of many types of meat on human health. Throughout the course of the study, 3683 deaths occurred, but none of them were linked to the consumption of any kind of meat.(source)

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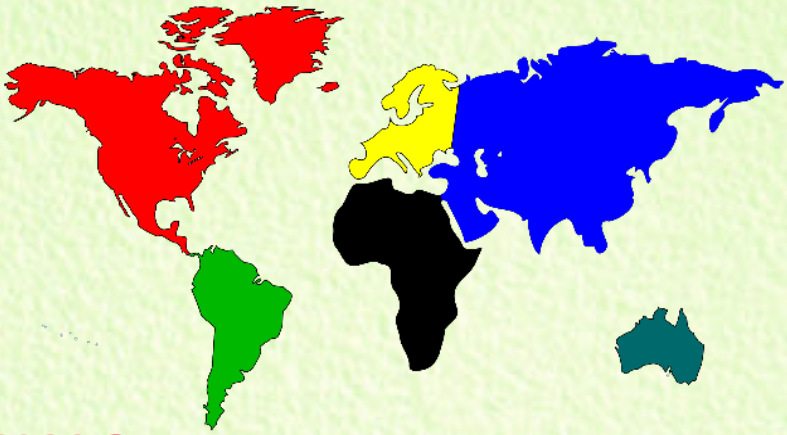


1,218,380 INDIVIDUALS ACROSS 4 CONTINENTS

A collective summary of twenty relevant studies conducted with 1,218,380 individuals from 10 countries across four continents (North America, Europe, Australia, and Asia) found that only 'processed' meat (meat preserved by smoking, curing or salting, or those with the addition of chemical preservatives, such as bacon, salami, sausages, hot dogs or processed deli or luncheon meats) seems to have a negative effect on human health. These results were not observed for unprocessed meat from beef, lamb or pork, excluding poultry. The study suggests that the "differences in salt and preservatives, rather than fats, might explain the higher risk of heart disease and diabetes seen with processed meats, but not with unprocessed red meats." The entire study can be read about here.

It's obviously a very complicated matter, however, most doctors and studies agree on one thing: consuming large quantities of red or processed meat is not good for your health. From some types of cancer to cardiovascular diseases, diabetes, or obesity, this type of food consumed in large quantities seems to be heavily related to such big health issues.(source)

These issues are huge when you consider the fact that most tribes in the world consume large quantities of this type of food. In the US tribe, for instance, people consume 2-3 times more meats than what is recommended.

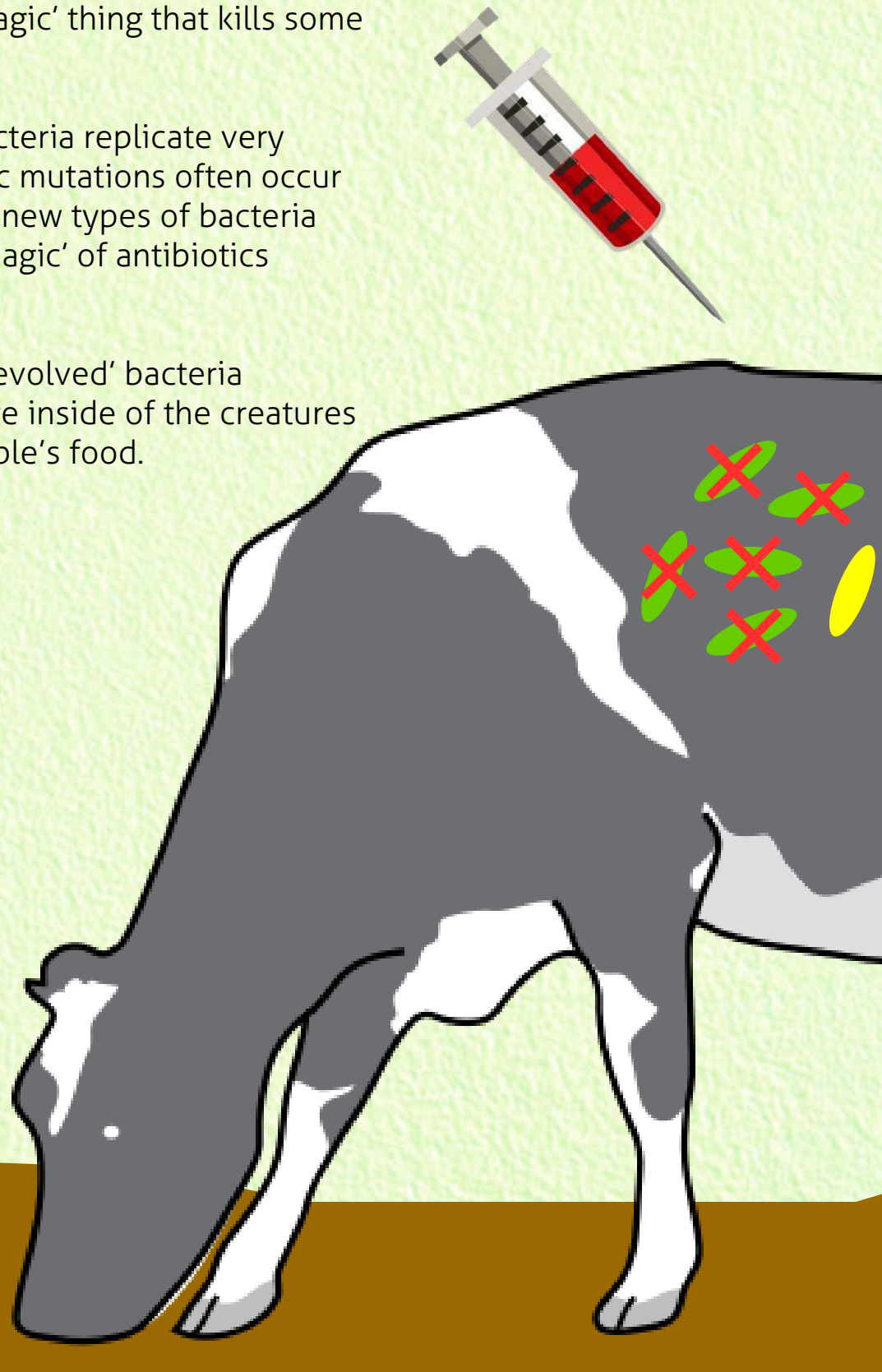
Therefore, a good chunk of the creatures that people currently eat around the world are not a healthy choice, at least in the way that they are typically consumed today.

Another very important issue with raising and eating such creatures is bacteria that is harmful to humans.

In order to keep these creatures healthy for consumption, they are given various types of antibiotics, a 'magic' thing that kills some types of bacteria.

However, since bacteria replicate very quickly and genetic mutations often occur during replication, new types of bacteria emerge that the 'magic' of antibiotics cannot kill.

Thus, this type of 'evolved' bacteria replicate even more inside of the creatures and end up in people's food.

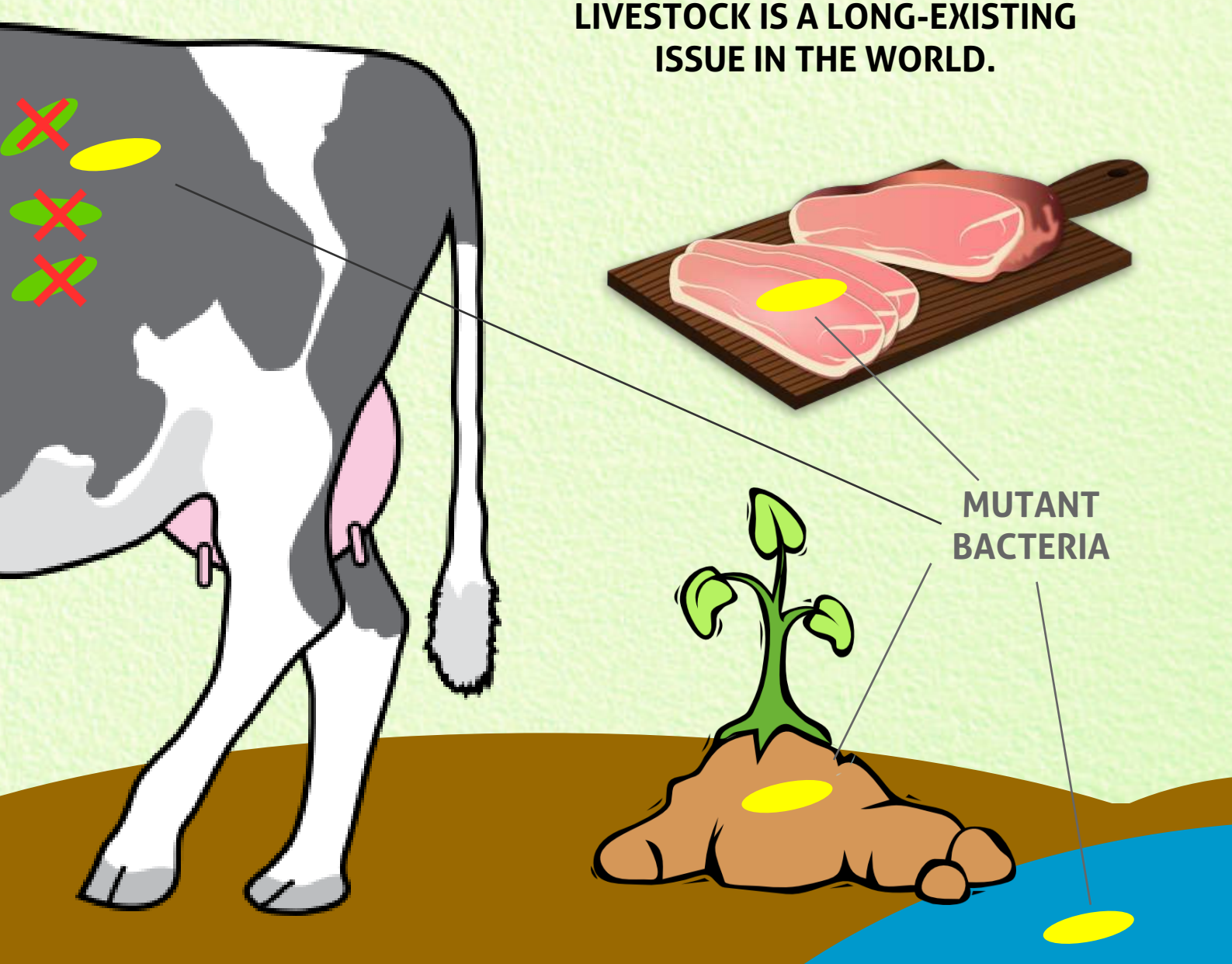


The most obvious way is for these mutant bacteria to be transmitted to us directly through the creature's flesh, the meat that you buy (or order at a restaurant) and eat. If not cooked thoroughly enough, these mutant bacteria find their way inside you and mess with your health.

They can also become airborne or 'travel' underground. As creatures poop and urinate, bacteria from the evaporating 'waste' can end up traveling and spreading through the air, or waste can eventually reach into the groundwater, introducing them into the water supply that we use for cooking, drinking, bathing, etc..

Then consider the fact that, because these are 'mutant' bacteria, there are no treatments for whatever issues they might cause within us. As a result, new treatments need to be continuously developed for ever-increasingly resistant bacteria.(source)

THE OVERUSE OF ANTIBIOTICS IN LIVESTOCK IS A LONG-EXISTING ISSUE IN THE WORLD.



ALTERNATIVES

Eating creatures has become a very complicated process. From raising them, to keep them healthy and then 'transforming' them or their by-products into foods: meat, sausages, eggs, milk, and so on. Then there is the continuous transporting of food grown and prepared specifically for them from one corner of the world to another, plus transporting them or their eventual 'parts' around the world, not to mention the much-less-than-enjoyable lives that most of them lead from birth to slaughter.

It is also deeply concerning that this entire sector occupies so much land, clearing so many forests that results in losing many species of plants and animals, while also greatly reducing the capacity of the Earth to absorb greenhouse gases. This approach also emits a lot of new greenhouse gases into the atmosphere, contributing to an already damaged global climate. And as we've discussed above, one of the most (if not 'the' most) consumed part of these creatures (processed red meat) is alarmingly associated with a plethora of diseases.

Taking all of that into account, perhaps human ingenuity can come up with something much better than all of this damaging chaos.

It's now 2015, but we are still using food production methods that are basically as old as those used 5,000 or more years ago.

In order to make rubber 100 or so years ago, used in so many domains/ products, you had to grow certain trees and 'milk' them for this substance. The process was slow and posed numerous environmental issues.

Then, they invented synthetic rubber (rubber made in the lab, without the need of growing trees) and it turned out to be better for our needs than natural rubber, and more efficient to create. **This is the kind of shift that our food production needs to make.**

WHEN IT COMES TO FOOD, WHAT WE REALLY NEED IS PRODUCTS, NOT THE CREATURES THEMSELVES.

We need something that we call 'nutrients'. Plants get these nutrients from soil or air, but we need to ingest 'stuff' that contains these nutrients, so that our digestive system can break the 'stuff' down and work the rest of its 'magic'. These nutrients transform our bodies, allowing us to grow, and live (energy). From tissue generation to movement and heat production, these nutrients are our fuel.

To better understand this process, watch this very simple and well-done video.

If the only thing that we need are these nutrients, then why aren't we 'producing' or isolating them and simply 'inject' them into our bodies? Instead of growing creatures or other 'things' from which we can get these necessary nutrients, why aren't we inventing foods that provide all of our nutritional needs?

NUTRIENTS

Couple this way of thinking with the idea of extracting nutrients from more convenient sources such as bugs, vegetables and fruits, and we could come up with something that is far better than the current food production approach.

We talk in detail about these solutions in our book on Automation and Autonomous World, here. We look closely at vertical farming, meat grown in the lab or direct mixtures of substances that can be ingested (drink, eat) without the need for growing any plants or animals to extract them from.

But even if humans develop ideas that are far more sustainable and efficient, that is not enough at all. We must not forget that we live in a world that is still very separated by monetary gain (power) and tribal patriotism. Entire tribes depend monetarily on meat production and thus may not see any incentives to invest in other foods/production methods, but they may do whatever they can to not lose their perceived differential advantage. In today's world, you cannot just put a stop to such industries, because they are too embedded in today's infrastructure, affecting people and the environment.

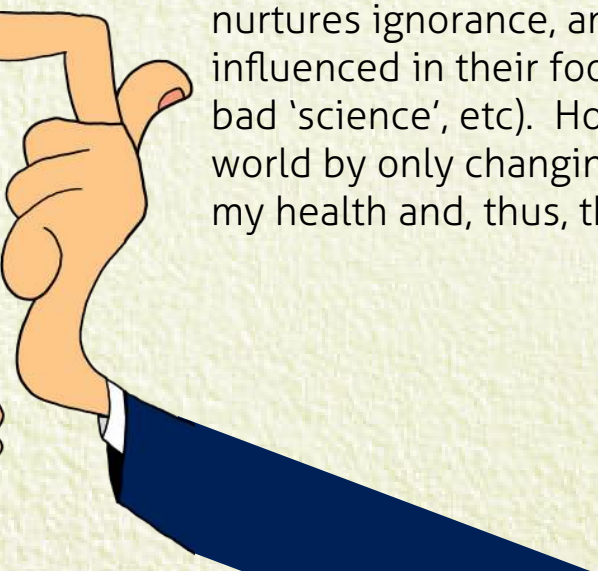
Also, many of the problems with what we eat and the way we eat are directly related to our reliance on money. If companies find a profit from producing and selling food from creatures, they will do that with little concern for the environment, because their main drive is profit. They are also investing large amounts of money in marketing, thus shaping people's food choices. Also, as long as meat is cheaper, then people will buy it. It has been estimated that global meat consumption is expected to double from 2000 to 2050, partly as a consequence of increasing world population, but also partly because of increased per capita meat consumption.(source)

Inventing better methods inside the monetary system will face the same recurring problems of corruption, profit over health/ environment, the loss of jobs as new systems of food production require less and less people, etc., and this will trigger its own chain of negative impacts on the monetary system. Even if plenty of vertical farms emerge, or other kinds of food production facilities with no significant impact on the environment or people's health, many people will not be able to afford to buy the food they produce. As we have echoed a couple of times in the past there is more than enough food already produced around the world to feed everyone, yet so many are starving. This is because the world-wide monetary system is simply not working.

Thinking that maybe if people choose other alternatives of food production than those that rely on livestock, and that stopping the practice of eating animal products will change the world is, I think, not nearly enough. It's much more intelligent, civilized and efficient to create a global society in which no one feels a need to rely on others to, for instance, turn off the lights to preserve energy, but instead provides a comprehensive system in which lights turn on and off automatically when they detect or no longer detect a presence, utilizing an infrastructure that is based on renewable energies so that the loss of energy is not that important.

The same goes for eating habits, where I think the solution is to create a different kind of society in which no one has any need to make a buck from selling unhealthy food, or pre-modeling people's food choices through advertisements and attempting to influence the research on their products' safety by using the power of money. This system would provide all of the relevant information about what a healthy human diet is, uninfluenced by any 'powers' as it is in today's world; a system in which no one would have any interest in building such costly and energy/ resource inefficient means of food production.

I would say never rely on people to change their habits, but instead invent better systems and methods that would produce the desired result. I can (and probably will) start to not eat creatures anymore, but I don't think that will have any significant impact on a worldwide food production system that is desperately pushed by billion dollar investments, a global population where most people are highly separated from nature by culture which nurtures ignorance, and where most of that population is highly influenced in their food choices by these companies (advertising, bad 'science', etc). However, even if I can't change the whole world by only changing my eating habits, it will definitely improve my health and, thus, this change is worth it.



In a trade-free society society, not only will the focus be on the quality and variety of food and its distribution to all people without a price tag, but new methods of producing food will quickly emerge, as they will not be limited by money,

while the safety of foods will be assured by an environment in which people have no reason to seek any kind of profit-motive shortcuts, as their main concern will center around the total health of people and the environment.

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