中国生物多样性保护与绿色发展基金会良食基金
China Biodiversity Conservation & Green Development Foundation (CBCGDF)

# Good Food Summit Primer

## *Sustainable Food Systems*

2019

08

# 良食议题入门精选

## GOOD FOOD FUND

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A Chinese language version of the Good Food Summit primer was published in August 2019, and is available as an e-book at http://goodfoodchina.net and on the Brighter Green website: https://www.brightergreen.org.

# INTRODUCTION

Until relatively recently in human history, regular consumption of meat was limited in nearly all societies to the wealthy or elite, and even they didn't eat it that often. But over the past sixty years or so, vast changes in agricultural production, including the use of chemical-based fertilizers and adoption of large, confined, factory-like facilities that house hundreds or thousands of animals, bred to grow large very quickly, have made meat, along with dairy products and eggs widely available and broadly affordable.

As meat, eggs, and dairy have become more available, rates of diet-related chronic disease like cancer and diabetes have also gone up. The agricultural practices used to raise livestock on a massive scale have led to widespread ecological devastation, including biodiversity loss, soil erosion, and climate change. Food waste continues to increase, while the welfare of farmed animals is regularly neglected. This system is simply not healthy and not sustainable.

It will require the efforts of all individuals, and all sectors, to create alternatives to our existing industrial agricultural system. With the release of the EAT-Lancet Report, experts in public health, food policy, environmental science, and agriculture have provided guidance for feeding a growing population within planetary boundaries. Already, many universities such as Yale University in the United States and the University of Queensland in Australia have implemented sustainable food policies. Forward-thinking companies like Google have begun to incorporate a holistic, plant-centric philosophy into their food programs. Companies like Beyond Meat and JUST are creating plant-based alternatives to meat products, making it easier for individuals to choose a plant-based diet.

The Good Food Fund (GFF), part of the China Biodiversity Conservation and Green Development Foundation (CBCGDF), is a Beijing based NGO, which works to create sustainable, equitable food systems that includes plant-forward eating, improved farm animal welfare, and illumination of and action on the multiple and broad negative consequences of factory farming in China. GFF provides research and resources for individuals to educate themselves on these issues, holds events, and connects change-makers and leaders in this important field.

This is the third year hosting the Good Food Summit, in which we gather Good Food change-makers, leaders, and those interested in the Good Food movement, to discuss, learn, share, and of course, eat good food. While we cover a lot of topics in our forum, we also wanted to provide a short resource for attendees to take home with them and peruse at their leisure, and perhaps use to motivate their own interest and research. What follows is a primer on GFF's issues that compiles short resources available on our website and in full text here. We also provide suggested additional resources that might not be available in Chinese, so that you can investigate further. These materials cover six major Good Food issues: Climate Change & Ecosystems, Health & Wellbeing, Socio-economic Development, Food Security & Food Waste, Animal Welfare, and Food Ethics.

*The topics are also highlighted on our website library called "The Good Food Academy," accessible here: http://goodfoodchina.net.*

# GOOD FOOD PLEDGE 2019

It is a blessing to sit down and enjoy a good meal. If we are fortunate, the food we eat is abundant, safe, and healthy. It nourishes our bodies and minds and brings together families and communities. Of course, it is even better if our food comes from a production process that treats other beings well and is kind to the natural world. Every day, countless meals around the globe together constitute the core experience of the survival and prosperity of human civilization.

However, today more than 800 million people around the world go to bed hungry every day. At the same time, more than two billion people are overweight or obese. Food problems have led to social injustice and have brought huge public health costs. Today, non-communicable diseases, which primarily are the results of unhealthy lifestyles (mainly diets), have overtaken infectious diseases for the first time in history as the main cause for deaths in humanity.

According to the United Nations estimates, by the year 2050, the Earth's population will reach 10 billion. Never before has the Earth had to feed so many humans, not to mention that every one of the 10 billion people has a more substantial footprint on the Earth's ecology than ever before in human history. On this small planet, the fragile balance of ecosystems, climate, and biodiversity can be broken at any time. Can we have a livable future? Will there be one at all?

The ground-breaking report of the EAT-Lancet Commission on Food, Planet, Health (published in January 2019) states that "Food is the single strongest lever to optimize human health and environmental sustainability on earth." Changing the way food is consumed and produced is known to be the most powerful and effective tool for us to improve human health and the health of the planet. "Good food" is meant to be good for humans and for nature. Indeed, according to the EAT-Lancet Report, if we improve our diet, at least 10 million adult deaths a year can be avoided.

In order to promote ecological sustainability, public health, and social equity, the China Biodiversity Conservation and Green Development Foundation (CBCGDF) and partner organizations hereby formally declare that, starting today, all our work meals and banquets will follow the "Good Food" standards. The Good Food Standards were established by CBCGDF's Good Food Fund and are based on scientific research, including the EAT-Lancet report. The standards are not meant to provide one single dietary recommendation for everyone. Rather, they offer adaptable guidelines that recognize the double crises of public health and ecological deterioration and respect global culinary traditions. Participants may adjust the standards according to their needs.

In different historical periods, mankind has developed different cultures to adapt to the living environment they were in, so that our civilization can survive and prosper. Today, we hope to make the same effort.

We invite you to join us, as individuals or organizations, and take the Good Food Pledge (on the next page).

**I. We take the following as self-evident:**

1. The loss of biodiversity and climate change are common threats to mankind.
2. No one should be hungry.
3. No one should pay the price of health and even life for a bad diet.
4. One should not waste food.
5. There is no justification for abusing farmed animals.

**II. We believe that:**

1. Transforming the food system can actively and effectively mitigate global climate change, preserve biodiversity and improve public health, and better ensure food security and social equity in the case of population growth.
2. Good food nourishes the body and mind and the community, good food production and consumption can maintain the balance of the ecosystem. Good food is the most powerful lever to improve public health and ecosystems.
3. Everyone has the right to know where their food comes from and how they affect themselves and the world.
4. The scientific evidences of food in its relation to health and the environmental are very clear, and we need to act now.
5. In the era of ecological civilization, every citizen has the right to green consumption.

**III. We invite all non-profit organizations around the world to join the following Good Food Pledge, which includes eight principles that each organization can decide which ones they will start to subscribe to now:**

Starting from today, all work meals and banquets of our organization shall follow the following guidelines:

1. Plant Forward—In each meal, plant-based dishes account for no less than 85 percent, while animal protein (meat and egg milk) does not exceed 15 percent.
2. Animal Welfare—Support high animal welfare products such as cage-free eggs and meat.
3. Healthy Eating—Choose whole foods, support healthy cooking, avoid high sugar, excessive salt and deep processed foods and beverages.
4. Reduce Waste—Take/order what we can finish and finish what we take/order.
5. Local Seasonal—Choose local and seasonal ingredients as much as possible, support ecological agriculture, and support small farmers.
6. Circular Economy—Refuse disposables, especially disposable plastics. Recycle and reuse.
7. Preserve Biodiversity—Refuse to eat wild lives, choose sustainable aquatic products, and support sustainable and diverse ingredients.
8. Food Education—Provide food education to employees and encourage them to participate in food education courses.

# BASIC CONCEPTS AND TERMS

## What Is Sustainable Development?

Sustainable development is a complex concept that includes ecological, social, and economic aspects.

The most widely accepted definition comes from the United Nations' 1987 report of the World Commission on Environment and Development, Our Common Future:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[1]

In other words, it is to live a good life while leaving our future generations a healthy environment and livable society, so that they can continue to live a good life.

Since then, the definition has been broadened and adapted by many countries and organizations. The GFF support the sustainable development of our society by promoting a sustainable food system.

## What Is a Food System?

No matter where you are, no matter what you do, you are connected to a food system in some way. According to the United Nations Food and Agriculture Organization (FAO):

Food systems "encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded."[2]

In 2018, the United Nations Environment Program launched The Economics of Ecosystems and Biodiversity for Agriculture and Food (TEEBAgriFood) research program, which expanded the concept to "eco-agri-food systems", in order to emphasize value chain-based system thinking as well as the important but often unrecognized role played by ecosystems.

There are many ways to look at a food system. Below are two ways to perceive a food system and its relationship with the natural and human worlds.

1. United Nations. Our Common Future. http://www.un-documents.net/ocf-02.htm#I
2. Nguyen, H. Sustainable Food Systems. Food and Agriculture Organization of the United Nations (FAO). http://www.fao.org/3/ca2079en/CA2079EN.pdf

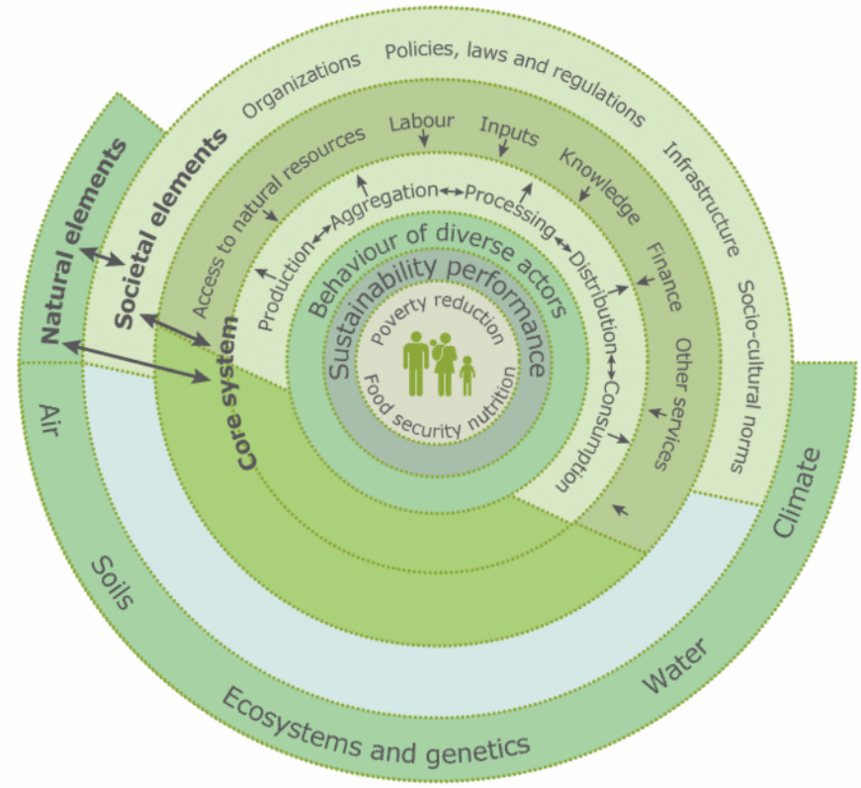


*Figure 1. The Food System Wheel*
*Source: FAO*

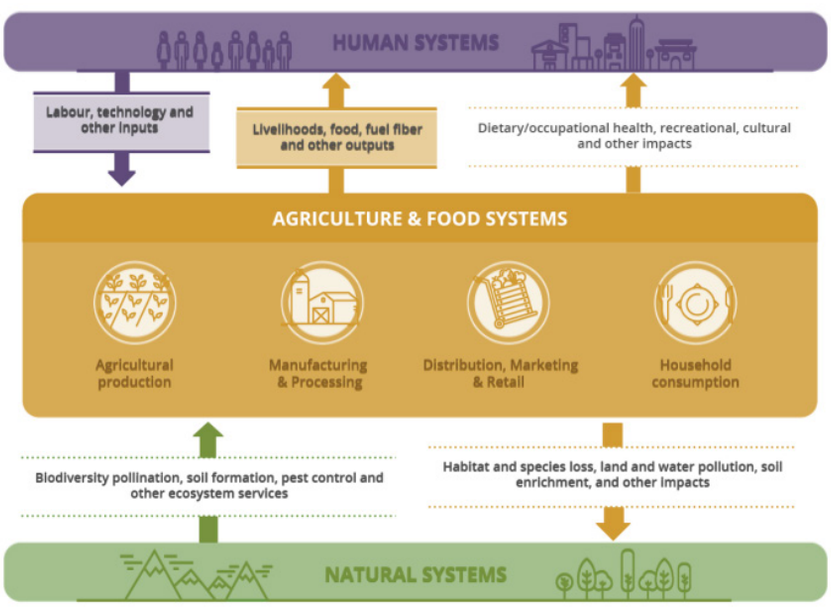


*Figure 2. The Eco-Agri-Food System*
*Source: TEEBAgriFood*

## What Is a Sustainable Food System?

According to the FAO, a sustainable food system is “a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised.”[3]

It is not hard to see that everyone relies on a food system to survive and thrive, and everyone can help shape the food system to be a more sustainable one, for ourselves and for future generations to come.

## What Is Industrial Animal Farming?

Industrial animal farming, also called factory farming or intensive animal agriculture, is defined by the Merriam-Webster dictionary as “a large industrial farm, especially a farm on which large numbers of livestock are raised indoors in conditions intended to maximize production at minimal cost.”[4]

The FAO identified the two main characteristics of intensive animal agriculture as “confinement” and “concentration of production on fewer units (i.e. farms)”.[5]

The intensification and industrialization of animal farming began in mid-1960s. This primer will give an introduction of the development of industrial animal farming (in section 3) and its multifaceted impacts, as well as solutions to these urgent challenges.

3. Nguyen, H., ibid.
4. Merriam-Webster Dictionary. “Factory farming.” https://www.merriam-webster.com/dictionary/factory%20farming
5. Fraser, David. Animal welfare and the intensification of animal production: An alternative interpretation. FAO, 2005. http://www.fao.org/3/a0158e/a0158e02.htm#bm02

# THE GOOD FOOD NEXUS OF ISSUES

Food is intimately connected to every human being and many aspects of our society. The six major issues the GFF uses to frame food and sustainability include: climate change and ecosystems, health and well-being, socio-economic development, food security (and food waste), animal welfare, and food ethics.

Each major issue includes several more specific topics. Altogether, they form a nexus of complex ecological, socio-economic and philosophical issues (see Figure 3). We will go through these six Good Food issues in the following sections.


*Figure 3. The Nexus of Food Issues*

## Section I. Climate Change and Ecosystems

If human civilization is a tree, the ecosystems are the roots. The air we breathe, the water we drink, and the food we eat, all rely on a healthy ecosystem. However, the conventional food system is harming ecosystems and threatening the survival of the human race. For example, industrial animal farming systems:

- Raise large amounts of animals in high concentrations, rely on commercial feed, and produce huge amounts of waste that can hardly be returned to the soil. The nutrient cycle featuring “plants, animals, manure” has been broken, leading to air, water, and soil pollution.

- Convert vast areas of natural grasslands, tropical rainforests, and other ecosystems into agricultural lands for producing feedstuff (e.g. soybeans). This accelerates the extinction of wild flora and fauna, damages biodiversity, and hurts the stability and resilience of ecosystems.

The changes human beings are making to ecosystems are rocking the foundation of our own existence. Climate change is one of the most serious ecological crises we face today.

Ten thousand years ago, the Earth entered an era with a relatively stable climate, which allowed unprecedented development of agricultural civilizations. Since the industrial revolution, we have been emitting greenhouse gases (GHGs) such as carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$) into the atmosphere at an accelerating rate, which has broken the nutrient—especially the carbon—cycles.

GHGs trap heat in the atmosphere, causing a "greenhouse effect" that is rapidly changing the planet's climate, resulting in extreme temperatures, more frequent and severe storms and droughts, melting glaciers, rising sea levels, etc.

Many lifeforms on Earth, including us humans, have never experienced changes at such huge scales. In terms of agriculture and food, climate change is affecting crop yield, and triggering price fluctuations and social conflicts. Although cutting industrial emissions is crucial, food is also an indispensable part of the solution. This section introduces the impacts of the food system on the climate and ecosystems, as well as ways to mitigate the negative impacts.

## 1-1. What is the food system's contribution to the global GHG emissions total?[6]

**Section 3.1.1: The Food System Contributes 20–30 percent of Global GHG emissions.**

Global perspective: food systems contribute 20–30 percent of Global GHGs.

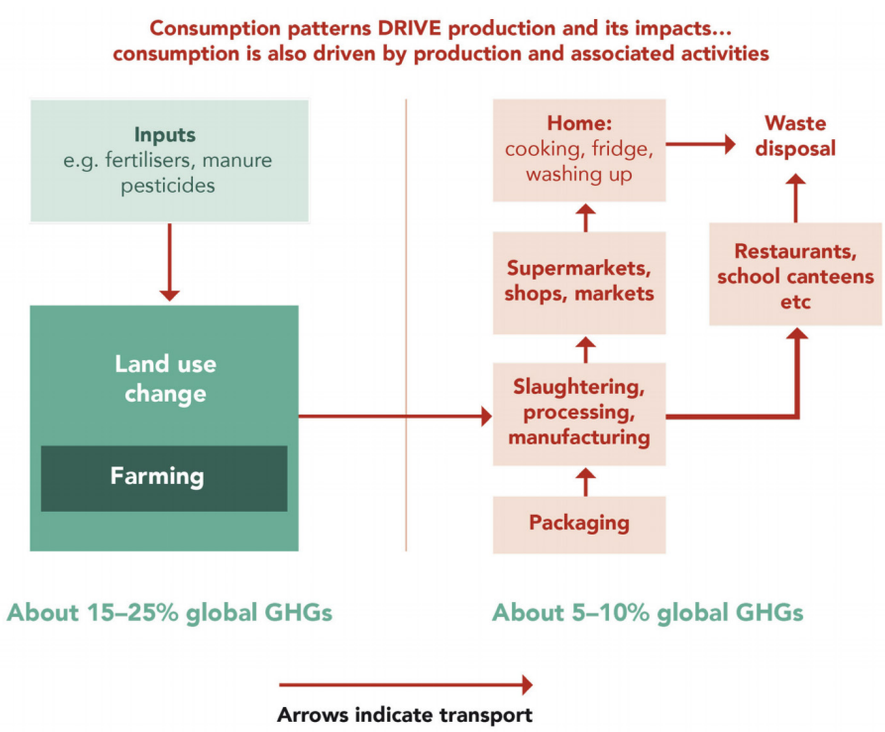


*Figure 4. GHG emission sources in the food system*
*Source: FCRN Foodsource*

6. Food Climate Research Network Foodsource. *What is the food system's contribution to the global GHG emissions total?* https://www.foodsource.org.uk/chapters/3-food-systems-greenhouse-gas-emissions

The food system is estimated to contribute approximately 20–30 percent of global human-made GHGs although there is inherent uncertainty in these estimates.

The major impacts come from farming/agriculture and land-use change (see above), with fertilisers, pesticides, manure, farming and land-use change together contributing as much as 24 percent of global GHGs. Livestock alone contribute 14.5 percent of human-made GHG emissions.

Stages later in the food system such as packaging, retail, transport, processing, food preparation and waste disposal combined contribute around 5–10 percent of global GHGs although their importance and impacts will likely grow.

These stages are discussed in more detail later in this chapter (Sections 3.3 and 3.4).

Within food systems, consumption patterns and production are interrelated, both impacting one another.

**Section 3.1.2: GHG contributions from agricultural production are particularly significant.**

Agriculture contributes to GHG emissions both directly (emissions from agricultural production) and indirectly (land-use change for agricultural purposes).

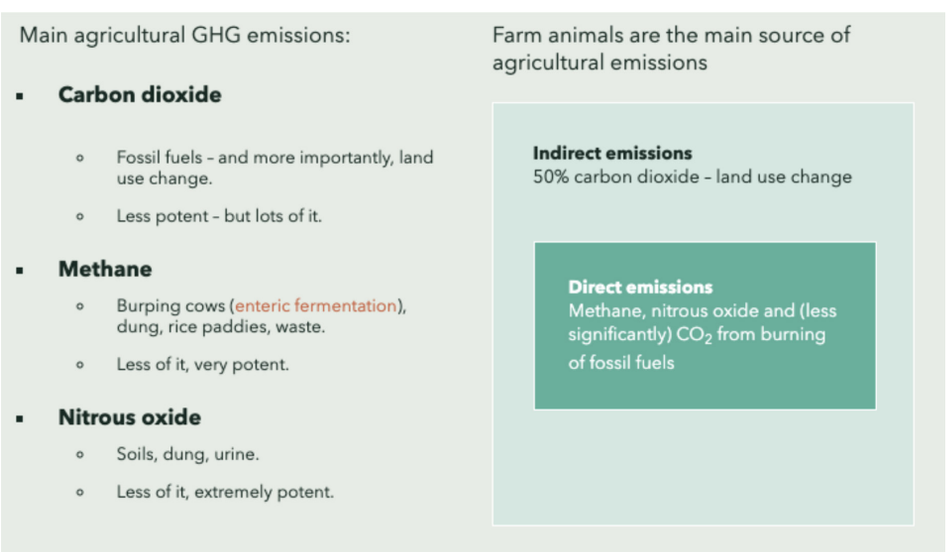


*Table 1. Main agricultural GHG emissions*
*Source: FCRN Foodsource*

For the three major greenhouse gases, direct emissions include:

- $CO_2$ from fossil fuel use (e.g. agricultural machinery, fertiliser production, pesticide production, production of farm structures (e.g. polytunnels).
- Methane from enteric fermentation from ruminant livestock such as cows and sheep, as well as from manure, from rice paddies and from decomposing organic matter (e.g. waste in landfill).
- Nitrous oxide from soil bacteria, from legume production, from livestock manure and urine and from nitrogen fertilisers.

**Global perspective—focus on agricultural GHG emissions**

The GHGs emitted from agriculture and associated land-use change shown here (around 10 gigatonnes of GHGs) account for 24 percent of human-made GHG emissions.

As shown in the graph (Figure 5), direct methane and nitrous oxide emissions constitute around half of this, and these emissions have increased in recent years.

Emissions from land-use change and forestry (mainly $CO_2$) approximately make up the other half. Most, although not all land use change and deforestation is driven by agricultural expansion. Agriculture is estimated to be responsible for 80 percent of worldwide deforestation. Land degradation (deteriorating forests and other lands, rather than actual clearing of forests) is driven more by timber extraction and logging, rather than agriculture.

The land-use change referred to here relates to actual change of use, such as deforestation for crop production or livestock grazing, rather than land and forest degradation. Although degradation is also an important source of $CO_2$ emissions, it is not included here as an impact within food systems.

Some of the carbon losses from deforestation have in recent years been offset by afforestation (re-foresting land), but the net contribution from agricultural land-use change is still highly significant. There are large regional differences, with afforestation more prevalent in northern regions, and deforestation more so in southern regions of Asia and South America.

Within food systems, additional contributions come from transport, storage, and food preparation/ processing (See Section 3.3).

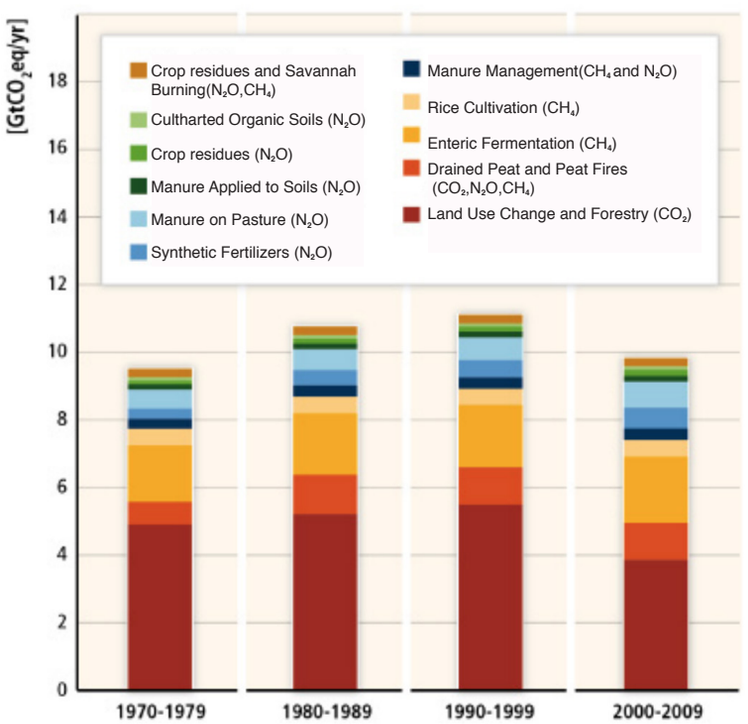


*Figure 5. GHG emissions from agriculture and related land use change.*
*Source: FCRN Foodsource*

**Section 3.1.3: Post-production GHG emissions are on average lower**

Agricultural production (including direct emissions from agriculture, and fertilizer production, pesticide production and energy use for animal feed) contribute the great majority of food system GHG emissions.

Post-agricultural production stages (processing, refrigeration, storage, packaging, processing, retail, catering and consumers, and waste disposal) contribute much less but can be significant for some food types.

On a global scale, there is a great deal of uncertainty in measurements.

**Notes from editor of the Good Food Academy:**

As shown above, land degradation is not categorized as a food system impact by major emission accounting methodologies. However, it is worth noting that the food system plays a role in both land degradation and restoration, depending on how food is produced. For example, large-scale industrial monoculture destroys the soil and leads to increased carbon emission from the soil. On the other hand, sustainable, regenerative agricultural practices protect the soil and can even absorb excess carbon dioxide from the atmosphere, turn it into organic carbon, increase soil fertility and as a result, cut GHG emissions from the land. Therefore, converting agricultural lands from industrial to organic is one of the key methods to mitigate climate change.

## 1-2. Livestock Farming, Communities, Biodiversity and Climate Change (excerpt)[7]

**Impacts on Biodiversity**

- Ten percent of the world's plant and animal species that faces some degree of threat are experiencing habitat loss based on livestock production.
- According to the Millennium Ecosystem Assessment (MEA), the most important drivers of biodiversity loss are habitat change, climate change, invasive alien species, overexploitation, and pollution. Livestock production and intensification contributes to all of these drivers.
- Of the world's thirty-five biodiversity "hotspots", containing the highest levels of endemic species that have lost 70 percent or more of their original habitat, twenty-three are affected by livestock production.

**Examples of the impacts of the industrial livestock sector from all over the world[1]**

- In **Argentina**, the Chaco forests were wiped out to export soybeans to China; but there is still a tendency, even by some NGOs, to call genetically-modified soy production "climate smart" as no tilling is needed and it replaces cattle ranching. There also is a significant loss of genetic diversity amongst livestock since the intensive livestock farming industry is interested in a few animal varieties only.
- In the **United States**, over 95 percent of egg-producing chickens are raised in "battery cages," which are stacked upon each other in rows in warehouses. Each chicken has less floor space than a sheet of paper, preventing them from expressing natural behaviors or even spreading their wings. While the E.U. has outlawed battery cages, they are becoming increasingly common in the global South as the U.S. factory-farming model is exported.[xxii]
- In **Indonesia**, the government is promoting the introduction of genetically-modified crops by Monsanto, as a means to intensify agriculture in the country. There is a push by the government to turn Indonesia into a "food state" (like Thailand), with big plantations of soy, and rice, among other crops. But this strategy only benefits corporations, not the small farmers.

- Corporations in **India** and other parts of Asia create contracts with farmers, which oblige the farmers to grow a certain type of seed to produce corn for chicken feed, as well as the chickens themselves. The company also provides vaccines, growth hormones and/or antibiotics and all other inputs as part of the contract. The chickens basically belong to the corporation, with the farmers having very little to no control over production. Also, chicken fat is being fed to cattle, causing significant risks in the food chain.

- In **Benin**, subsistence farmers are struggling against "land-grabbing" by foreign governments (including Kuwait, China, and Saudi Arabia), which are growing grains and raising livestock to feed citizens in their own countries. This is a serious threat to the food sovereignty of Benin, and other West African nations facing the same intrusions.[xxiv]

## 1-3. EAT-Lancet Commission Summary Report (excerpt)[8]

**Target 2: Sustainable Food Production**

Interacting biogeophysical systems and processes in the Earth system, in particular between the climate system and the biosphere, regulate the state of the planet. The Commission focuses on six of these (Table 1), which are the main systems and processes affected by food production and for which scientific evidence allows the provision of quantifiable targets. These systems and processes are being increasingly recognized as necessary parameters for a system-wide definition of sustainable food production. For each of these, **the Commission proposes boundaries that global food production should stay within to decrease the risk of irreversible and potentially catastrophic shifts in the Earth system.** These planetary boundaries for food production conceptually define the upper limit of environmental effects for food production at the global scale.

For the climate change boundary for food production, the underlying assumption that has been applied is that the world will follow the Paris Agreement (keeping global warming to well below 2°C, aiming for 1.5°C) and decarbonize the global energy system by 2050. It has also been assumed that world agriculture will transition toward sustainable food production, leading to a shift from land use being a net source of carbon to becoming a net sink of carbon. The boundary estimate is thereby an assessment of the maximum amount of non-$CO_2$ gases (i.e. methane and nitrous oxide) that have been assessed as both necessary and hard to further reduce—at least before 2050—in order to achieve both healthy diets for everyone on the planet and the targets of the Paris Agreement.

Achieving a sustainable food system that can deliver healthy diets for a growing population presents formidable challenges. Finding solutions to these challenges requires an understanding of the environmental impacts of various actions. The readily implementable actions investigated by the Commission were: 1) A global shift toward healthy diets; 2) improved food production practices; and 3) reduced food loss and waste. The Commission's aim was **to identify a set of actions that meet the scientific targets for healthy diets and sustainable food production, which will allow for a transition of the global food system to within the safe operating space.**

Applying this framework to future projections of world development indicates that food systems can provide healthy diets (defined here as a reference diet) for an estimated population of about 10 billion people by 2050 and remain within a safe operating space. However, even small increases in the

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7. Brighter Green and Global Forest Coalition. *Livestock Farming, Communities, Biodiversity and Climate Change.* https://globalforestcoalition.org/wp-content/uploads/2013/10/FINAL-version-livestock-briefing-Oct-ENG.pdf
8. EAT-Lancet Commission. Food, Planet, Health: Healthy Diets from Sustainable Food Systems. Summary Report of the EAT-*Lancet Commission*. https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf

consumption of red meat or dairy foods would make this goal difficult or impossible to achieve. The analysis shows that staying within the safe operating space for food systems **requires a combination of substantial shifts toward mostly plant-based dietary patterns, dramatic reductions in food losses and waste, and major improvements in food production practices.** While some individual actions are enough to stay within specific boundaries, no single intervention is enough to stay below all boundaries simultaneously.

| Earth system process | Control variable | Boundary (Uncertainty range) |
|---|---|---|
| **Climate change** | **GHG emissions** | **5 Gt $CO_2$-eq $yr^{-1}$** (4.7 – 5.4 Gt CO2-eq $yr^{-1}$) |
| **Land-system change** | **Cropland use** | **13 M $km^2$** (11–15 M $km^2$) |
| **Freshwater use** | **Water use** | **2,500 $km^3$ $yr^{-1}$** (1000–4000 $km^3$ $yr^{-1}$) |
| **Nitrogen cycling** | **N application** | **90 Tg N $yr^{-1}$** (65–90 Tg N $yr^{-1}$) * (90–130 Tg N $yr^{-1}$)** |
| **Phosphorus cycling** | **P application** | **8 Tg P $yr^{-1}$** (6–12 Tg P $yr^{-1}$) * (8–16 Tg P $yr^{-1}$)** |
| **Biodiversity loss** | **Extinction rate** | **10 E/MSY** (1–80 E/MSY) |

*Lower boundary range if improved production practices and redistribution are not adopted.
**Upper boundary range if improved production practices and redistribution are adopted and 50% of applied phosphorus is recycled.

*Table 2. Scientific targets for six key Earth system processes and the control variables used to quantify the boundaries*
*Source: EAT-Lancet Commission*

*interview with*

## Gidon Eshel, Bard College

**What do you think is the most viable alternative to the current model of industrial animal agriculture?**

The most obvious answer is: don't eat what they produce. Some small scale but super efficient farms are desirable on account of their elemental cycling contributions, but they will be able to produce vastly smaller quantities, hence the above. However, they must be widely distributed; many of them, all over.

**What actions can we take as individuals?**

The most striking and glaring observations is how little legumes people eat. Soy is abundant in our diets, but it is disguised. I am talking about the direct consumption of beans and pulses. Care about animal welfare, climate change, or landscape degradation? Quadruple your legume consumption.

**Based on your research on the environment, what are the top priorities for action around this issue?**

The top priority is elimination of beef except rare and localized operations done right, which is to say with almost no exceptions.

**How do you see different sectors collaborating to address the detrimental effects of industrial animal agriculture?**

I do not see cross-sectorial dialogue that promotes the issues. Governments, not just in the US and not just the current one in the US, have been doing their best to enhance beef and more broadly animal product production, and that is of course extremely counterproductive.

*interview with*

## Scott Edwards, Food & Water Watch

**What do you think is the most viable alternative to the current model of industrial animal agriculture?**

The industrialized animal agriculture model needs to undergo a rapid shift away from its current highly concentrated and monocultured approach. The vision at Food and Water Watch is for a food production system that is less dependent on chemical inputs and is sourced from farms producing a diversity of crops. We envision a future in which the dominance of vertically integrated food and meat distribution companies gives way to family and entrepreneur-owned enterprises. Over the past several years researchers like those at the Leopold Center in Iowa have supported the ability of smaller, more diversified and less integrated systems of locally based food production to feed our populations. To get there will require changes in existing agricultural policies, which reduce opportunities for sustainably produced foods and limit the ability for small-scale farmers to access the marketplace.

**What actions can policymakers around the world take to address the detrimental effects of industrial meat and dairy?**

Policymakers at all levels of government can take steps to reduce/eliminate the impacts of industrial agriculture. In the U.S., where local governments have land use authority, they can enact density, setback, and public health ordinances to reduce the number of facilities in their jurisdictions as well as dictate parameters on their operation and placement. Higher levels of government charged with safeguarding public and environmental health can enact legislation to address all the detrimental air, water and health impacts of this inherently harmful system of meat production. The facilities need to be held accountable under the laws of the land for the impacts on waterways and airsheds, waste disposal needs to be highly regulated, and liability must pass through to the larger corporations who control and benefit most from the industrialized system.

**What actions can we take as individuals?**

First and foremost, individuals should look to hold policymakers at all levels of government responsible for controlling and regulating industrial agriculture. While consumer choice (forgoing meat products or only purchasing sustainably, locally produced meat) can also have a beneficial impact, Food and Water Watch does not believe that we can shop our way out of our broken food system; the systemic change we need to move away from the current method of meat production will only come with responsible government actions and forced policy changes. In addition to policy pressures, individuals in impacted communities should look to build local coalitions to amplify their voices and power, while at the same time engaging with public health specialists and other experts to build their knowledge base and influence. Where legal actions are an option, they should be pursued to place additional pressure on the industrial system.

**Based on your work in the environmental sector, what are the top priorities for action around this issue?**

Industrial agriculture, and particularly the meat sector, is one of the biggest problems facing many of the local and major waterways in the United States; those aquatic impacts are undoubtedly replicated around the world wherever these facilities become concentrated. The number one environmental priority for these operations arises from the massive amounts of animal waste produced with no enforceable, effective mandates for proper, agronomic disposal. Animal waste should be viewed in the same way that human waste is: a byproduct that needs to be properly treated and disposed of to minimize or eliminate harmful impacts. Forcing the industry to address the mountains of animal waste produced means, by necessity, smaller operations with less concentration in tight geographic locations.

**How do you see different sectors collaborating to address the detrimental effects of industrial animal agriculture?**

The negative impacts of industries meat production are widespread—environmental and community health, economic disadvantages, worker safety and equity, animal welfare, food safety and social justice consequences. To date, the movement in opposition to this harmful and inhumane system has generally operated in silos, with animal welfare groups refusing to support contract equity for growers, consumer groups turning a blind eye to animal welfare issues, etc. The approach to reforming this broken system must be as broad, diverse and integrated. Assuring factory farm worker/contract grower rights means that large, vertically integrated corporations have to shoulder more of the economic burden of meat production, while addressing environmental impacts means smaller herd sizes and better animal welfare. It would be great to see proposed policies that integrate approaches to many of the impacts of industrialized meat production instead of the narrow focus that is often taken. For example, Food and Water Watch has a proposed contract grower equity bill in the U.S. that not only requires large corporations take on the debt of displaced growers, but also mandates that they take on ownership and proper disposal of all excess animal waste from contract growing operations.

## Additional Resources


Bai et al. (2018). China's livestock transition: Driving forces, impacts, and consequences. Science Advances 4(7): 1–11.

UN IPBES Report on Biodiversity (2019): https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/

UN FAO, Livestock's Long Shadow (2006): http://www.fao.org/3/a-a0701e.pdf

UN FAO, Tackling Climate Change Through Livestock (2014): http://www.fao.org/3/a-i3437e.pdf

# Section II. Health and Well-being

As the Chinese population approaches 1.5 billion, or 20 percent of the world's population, changes in dietary consumption habits have large impacts not just for China, but for the world. Transitioning as a country from a plant-based diet to a diet that favors meat and dairy poses threats to health in the form of both communicable disease and diet-related chronic disease. This section details the many ways industrial livestock production affects the health of consumers and producers. It focuses on diet and chronic disease, communicable diseases like E. coli and Salmonella, antibiotic resistant bacteria, and workplace injuries.

## 2-1. Skillful Means Policy Brief (excerpt)[9]

**Public Health Risks and Realities**

The Chinese adoption of factory-farming methods to produce more meat at a cheaper price is also having visible public health consequences. The percent of energy derived from fat in the average Chinese diet increased by 10 percent in the decade from 1996 to 2006, and a 2008 study found that one in four adults in China are now overweight. More people in China now have diabetes—90 million or nearly one in ten adults—than in any other country.

Other consequences, however, are less direct, and perhaps more insidious: conditions of intensive animal confinement provide ideal conditions for epidemics like SARS, avian flu, and swine blue-ear to take root. In addition, overuse of drugs in farmed animals to promote growth and cut down on disease have resulted in more than 90 percent of some Asian bacteria being resistant to treatment by "first line" drugs.

9. Mia MacDonald and Sangamithra Iyer. Skillful Means: The Challenges of China's Encounter with Factory Farming. Policy Brief. Brighter Green. https://www.brightergreen.org/files/china_policy_brief_bg_1.pdf

## 2-2. EAT-Lancet Summary Report (excerpt)[10]

**Transformation to healthy diets by 2050 will require substantial dietary shifts. This includes a more than doubling in the consumption of healthy foods such as fruits, vegetables, legumes and nuts, and a greater than 50 percent reduction in global consumption of less healthy foods such as added sugars and red meat** (i.e. primarily by reducing excessive consumption in wealthier countries).

However, some populations worldwide depend on agropastoral livelihoods and animal protein from livestock. In addition, many populations continue to face significant burdens of undernutrition and obtaining adequate quantities of micronutrients from plant source foods alone can be difficult. Given these considerations, the role of animal source foods in people's diets must be carefully considered in each context and within local and regional realities.

| | **Macronutrient intake grams per day** (possible range) | **Caloric intake kcal per day** |
|---|---|---|
| Whole grains | | |
| **Rice, wheat, corn and other** | **232** | **811** |
| Tubers or starchy vegetables | | |
| **Potatoes and cassava** | **50** (0–100) | **39** |
| Vegetables | | |
| **All vegetables** | **300** (200–600) | **78** |
| Fruits | | |
| **All fruits** | **200** (100–300) | **126** |
| Dairy foods | | |
| **Whole milk or equivalents** | **250** (0–500) | **153** |
| Protein sources | | |
| **Beef, lamb and pork** | **14** (0–28) | **30** |
| **Chicken and other poultry** | **29** (0–58) | **62** |
| **Eggs** | **13** (0–25) | **19** |
| **Fish** | **28** (0–100) | **40** |
| **Legumes** | **75** (0–100) | **284** |
| **Nuts** | **50** (0–75) | **291** |
| Added fats | | |
| **Unsaturated oils** | **40** (20–80) | **354** |
| **Saturated oils** | **11.8** (0-11.8) | **96** |
| Added sugars | | |
| **All sugars** | **31** (0–31) | **120** |

*Table 3. Scientific targets for a planetary health diet with possible ranges*
*Source: EAT-Lancet Commission*

10. EAT-*Lancet* Commission. Food, Planet, Health: Healthy Diets from Sustainable Food Systems. Summary Report of the EAT-*Lancet* Commission.https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf

**Dietary changes from current diets toward healthy diets are likely to result in significant health benefits.**

The Commission analyzed the potential impacts of dietary change on diet-related disease mortality using three approaches. All three approaches concluded that **dietary changes from current diets toward healthy diets are likely to result in major health benefits.** This includes preventing approximately 11 million deaths per year, which represent between 19 percent to 24 percent of total deaths among adults.

| | | | |
|---|---|---|---|
| **Approach 1**<br>Comparative Risk | 19% | or | 11.1 million<br>adult deaths per year |
| **Approach 2**<br>Global Burden of Disease | 22.4% | or | 10.8 million<br>adult deaths per year |
| **Approach 3**<br>Empirical Disease Risk | 23.6% | or | 11.6 million<br>adult deaths per year |

*Table 4. Estimated deaths prevented among adults by a global adoption of the planetary health diet*
*Source: EAT-Lancet Commission*

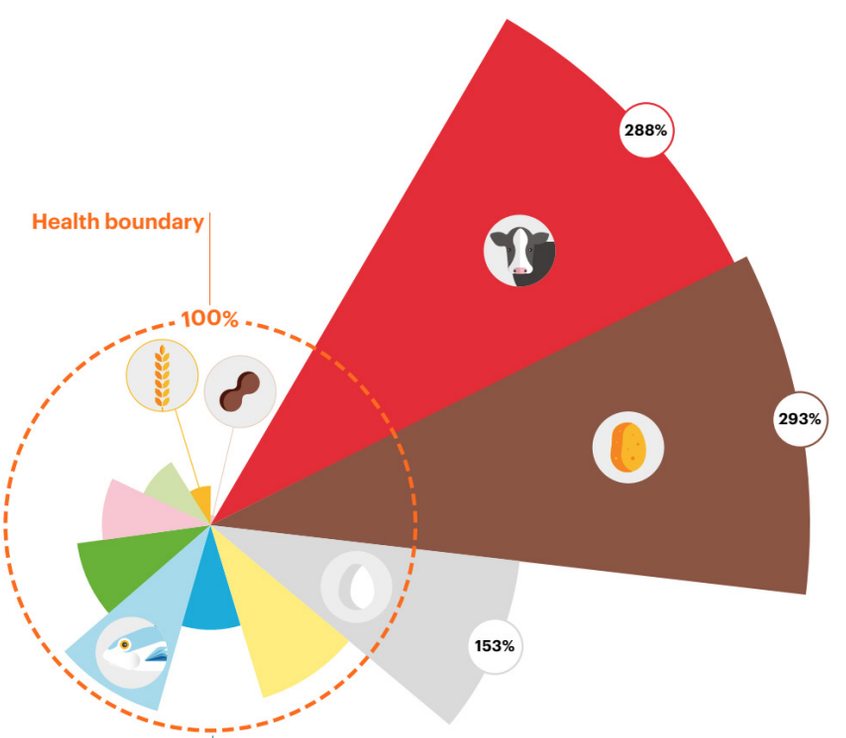


*Figure 6. Compared with the health boundary of the planetary health diet, the world's average diet is too high in red meat, starchy vegetables and eggs while lacking nuts, whole grains, legumes, fruits and vegetables*
*Source: EAT-Lancet Commission*

## 2-3. Factory Farming & Food Safety (excerpt)[11]

**How did we get here?**
Over the past three decades there has been an economic and geographic shift in how and where food animals are raised in the United States. Large scale factory farms raising one type of animal have replaced small or medium scale farms that raised dairy and beef cattle, hogs, chickens and turkeys. The rise of factory farming has been driven by three factors: unchecked corporate power, misguided farm policy, and weak environmental and public health regulations.

**Waste From Factory Farms: An Environmental and Public Health Crisis**
For several decades, the U.S. Environmental Protection Agency and state governments have failed to regulate the environmental impacts of factory farms. When factory farms operate virtually unregulated the environment and nearby rural communities pay the price. The vast quantities of manure from factory farms can—and do—make their way into the local environment where they pollute air and water. Several municipal water systems in the midwest where many factory farms are located must regularly implement costly clean up techniques to remove factory farm pollution from the water supply in order to avoid public health disasters. Likewise, pollution from factory farms runs off into streams that feed into our major waterways like the Chesapeake Bay, Great Lakes and Gulf of Mexico—contributing to algal blooms and dead zones that impact water supplies and destroy aquatic ecosystems, recreation and livelihoods.

Small, diversified farms that raise animals alongside other crops have always used manure as fertilizer without polluting water. The difference with factory farms is scale. They produce so much waste in one place that it must be applied to land in quantities that exceed the soil's ability to absorb it as fertilizer.

**Factory Farms Are Unsafe Workplaces**
Factory farms are unhealthy and stressful work environments. Workers are subjected to increased exposure to air pollutants produced at factory farms, including particulate matter carrying mold, animal dander and pathogens. Exposure to air pollutants can lead to respiratory illness, in fact an estimated one quarter of hog confinement workers suffer from chronic bronchitis.

They are also astonishingly unsafe workplaces. In 2016, six out of every 100 workers in the animal production industry reported a work-related injury or illness. Tyson meat packing plants reported on average one amputation per month in the first nine months of 2015. Across the country, regulations to prevent workplace industries have not kept pace with the rapid growth of factory farms. Idaho had two deaths in 2016 caused by workers falling into dairy manure ponds and drowning. In both cases, federal regulators fined the dairies just $5,000.

**Factory Farms Threaten Public Health**
Factory farms contribute to the rise of antibiotic-resistant bacteria. Every single day, factory farms feed animals routine, low doses of antibiotics to prevent disease in filthy, crowded living conditions. In fact, 80 percent of the antibiotics used in the U.S. are by agriculture. Overuse of antibiotics creates conditions for bacteria to develop resistance to them, and when these antibiotic-resistant bacteria spread to humans either in our food supply, via animal to human transfer on farms, or through contaminated waste they can cause serious or even deadly antibiotic-resistant infections in people. Over two million Americans suffer from an antibiotic-resistant infection every year, and 23,000 people die. The FDA has known about the misuse of antibiotics since the 1970s, but has not required factory farms to stop this dangerous practice.

11. Food & Water Watch. *Factory Farming & Food Safety.* https://www.foodandwaterwatch.org/problems/factory-farming-food-safety

**Factory Farms Create Food Safety Risks**
The stressful, crowded conditions of factory farms make it easy for disease to spread, which can also lead to food safety risks. When thousands of beef cattle are packed into feedlots full of manure, bacteria can get on their hides and then into slaughterhouses where bacteria on even one animal can contaminate thousands of pounds of meat. In 2010, the crowded, unsanitary conditions at two Iowa egg companies caused a recall of more than half a billion potentially Salmonella-tainted eggs.

What's worse is that our government, at the urging of the biggest companies, is trying to essentially deregulate the inspection system for meat and poultry by allowing company inspectors to replace government inspectors, and allowing companies to increase line speeds making it nearly impossible to ensure that all birds and carcasses are closely inspected before heading to processing.

## 2-4. Antibiotic Resistance 101. Executive Summary (excerpt)[12]

Antibiotics are critical tools in human medicine. Medical authorities are warning that these life-saving drugs are losing their effectiveness, and there are few replacement drugs in the pipeline. Bacteria evolve in response to the use of antibiotics both in humans and in animals. The development of antibiotic resistance is hastened by the use of low doses of antibiotics at industrial farms. For decades, the drugs have been used routinely not to treat sick animals, but for disease prevention and growth promotion, a practice known as nontherapeutic use.

Both in the United States and worldwide, agriculture uses vastly more antibiotics than human medicine, and agriculture uses drugs from every major class of antibiotics used in human medicine. The Food and Drug Administration (FDA) reported in 2011 that 80 percent of antibiotics in the United States are sold for agricultural purposes.

Antibiotic-resistant (AR) bacteria can spread from farm animals to humans via food, via animal-to-human transfer on farms and in rural areas, and through contaminated waste entering the environment. The most commonly affected populations are those with under-developed or compromised immune systems: pregnant women, children, the elderly and people with certain health conditions. But increasingly, AR bacteria have the potential to affect anyone.

Antibiotic resistance has become a global problem. People get sicker from these infections, as it takes multiple rounds of increasingly stronger antibiotics to stop the infection, allowing the infection to progress further than it might otherwise. Fewer drug options can make it harder for doctors to treat patients with allergies to some antibiotics and make it more likely for patients to require stronger drugs given intravenously.

## 2-5. How Factory Fish Farms Misuse Antibiotics (excerpt)[13]

Fewer people realize that the aquaculture industry also has an antibiotics problem. Just like raising livestock and poultry, many large-scale fish farming operations rely on the misuse and overuse of antibiotics to compensate for crowded, stressful conditions.

Many fish and other seafood are given low doses of antibiotics in feed over long periods of time to try to prevent the spread of illness. These practices lead to the development and spread of antibiotic-resistant bacteria. Imagine taking a low dose of antibiotics every day to prevent getting sick, rather than going to the doctor to get a prescription or antibiotics when you actually are sick.

Aquaculture production has grown substantially over the last several decades. According to the United Nations Food and Agriculture Organization (FAO), total global aquaculture production has reached nearly 67 billion tons. Aquaculture has risen from just over 13 percent of total global fish production to 42 percent since 1990.

The use of antibiotics in aquaculture varies widely around the world. Since most of the seafood that we eat in the United States is imported, practices used around the world have the potential to affect anyone who consumes seafood. The risks from this poorly regulated industry include residues of antibiotics and other drugs that remain in the products that we eat, as well as antibiotic-resistant bacteria created by the overuse of antibiotics.

12. Food & Water Watch. Antibiotic Resistance 101.https://www.foodandwaterwatch.org/sites/default/files/Antibiotic%20Resistance%20101%20Report%20March%202015.pdf
13. Food & Water Watch. *How Factory Fish Farms Misuse Antibiotics.* https://www.foodandwaterwatch.org/sites/default/files/ib_1604_aquaculture-web_0.pdf

*interview with*

## Erin Biehl, Johns Hopkins Center for a Livable Future

**What actions can policymakers around the world take to address the detrimental effects of industrial meat and dairy (and/or public health impacts of our current food system)?**

Challenges like climate change and unprecedented population growth threaten our global ability to ensure food security and health for everyone on the planet. The dominant narrative often expressed by policymakers is that we simply need to produce more food to feed more people. But the challenges, and solutions, are much more complex than that. Policies that support a food secure, sustainable, and healthy future need to focus not only on producing more food, but on reducing waste and supporting more diverse food production and consumption. That means finding strategies to effectively reduce food waste from the farm to the table, and supporting shifts to diets that reign in overconsumption of resource-intensive animal foods and support more diverse diets high in fruits, vegetables, and pulses.

**What actions can we take as individuals to support plant-based diets and a sustainable food system?**

The simple answer to what an individual can do to support a more sustainable food system is to eat less meat and waste less food. But although these are important steps, they will not be enough to transform the food system. Individuals need to act as food citizens, not just food consumers. This can start at a very local level, like asking schools or local governments to purchase more plant-based food. And it's important not to rest the blame or the responsibility for food system issues on the consumer alone. Our food choices are a product of the food environment, prices, culture, and many other factors that policymakers and businesses have the power to influence as well.

**How do you see different sectors collaborating to address this issue?**

Transforming the food system requires collaboration across all sectors, from the local to global level. To have a widespread impact, people working on the ground to test out new solutions need to be connected with advocacy organizations who can amplify their voice, with researchers who can measure the impact of those solutions, and with policymakers and businesses who can take those solutions and scale them up.

*interview with*

## Walter Willett, Harvard T.H. Chan School of Public Health

**How has your personal life changed since you started to think about [your dietary and lifestyle choices]?**

I grew up in the Midwest of the United States where eating a lot of red meat and potatoes and not too many vegetables was normal. Our data on health was showing that wasn't a very healthy way to eat. So my diet has changed from what I ate growing up, and it's much more interesting now. In fact, we first learned a lot from the Mediterranean diet because that had been well studied. We were seeing that when we looked at the whole diet, it was healthy. But also when we looked at the pieces of the diet, we could identify the pieces that were healthy. And what's emphasized is much more plant source foods than animal source foods, although it's not strictly vegetarian.

We also saw that [healthy meals] could be [created] in almost any country around the world. They might not be the same foods. And they might be put together with different seasonings and flavors. But almost every culture could put together a diet that would be very healthy. So we learned a lot about health first. And then we also started looking at the environmental consequences of eating a more plant-forward diet [to which] I added small amounts of animal protein. We could see that a diet that was healthy could also be better for planetary health.

My own diet has changed, but the rest of my life has changed too. I ride my bicycle to work every day. I find I can get about five hundred miles per gallon of olive oil riding my bicycle. And I do pay more attention to the other ways that I use energy. I feel better doing that. I get more exercise. And I also have more enjoyment eating a diet that's

varied and more interesting from traditions all around the world.

**What hopes do you for have for China?**

I have lots of hopes for China. I must say it's been wonderful being able to have Chinese colleagues and students. When I was in school in the 1960's, it was not even possible to talk to a Chinese person. And so it's been amazing that I have colleagues, friends; I'm able to go to China multiple times, see the emergence of science, technology. That was just not imaginable when I was growing up. We can talk on telephones and email, it's really become one world. Our scientific world would not be the same without this very close collaboration. In fact, we have many Chinese students, fellows, and faculty members with us. Right now, the world leadership on climate changes is with China, and that's really fortunate… it's very good that some countries are taking leadership in this area… it's not the United States at this point in time. So I would hope that we can, despite these false trade wars that are happening now, have much more communication, and learn from each other, because that's going to be essential for the health of our planet.

**As the population increases, the world is getting smaller and smaller. [Do you think] we need to be plant-based or ultimately transition to vegan to really benefit the planet?**

When we look at the world and the kinds of diets that are both healthy and sustainable, they will be mostly plant-based diets, not necessarily strictly vegan. In fact, interestingly there are some kinds of land and resources [where it's] difficult to produce food unless it is animal source food. For example, in semi-arid areas, grazing sheep or goats or cattle is about the only use that we can make of that land. So we will have some animal source food in the food supply almost for sure, we won't all be strict vegan.

Some countries are pretty close to [a planetary health diet] right now, for example, Indonesia, has a diet that is really quite close today to what we describe in the EAT-Lancet Report. I think for a country that's looking at the issue of how to have a healthy and sustainable diet, the first thing to do is to look at the traditional diets of that area. Because they've been formed by experience and cultural survival. And most traditional diets have many good features of them. Many of those good features are being destroyed and disappearing today by the dominance of industrialized diets that are unhealthy.

We now have the scientific evidence and ability to identify the parts of those [traditional] diets that are healthy. And almost every diet has some parts that are not so healthy either. When we look around the world, there is no perfect diet. [All diets] could be improved in some ways. So we can build on the evidence we've accumulated for decades. Start with the pieces of the traditional diet, [take] what's good, modify what's bad. Interestingly, almost nobody wants to eat only their traditional type. They want to explore, enjoy foods from other parts of the world. People like variety, and fortunately, we have the opportunity to enjoy variety today.

## Additional Resources


"The State of Food Security and Nutrition in the World." United Nations Food & Agriculture Organization, 2018.
http://www.fao.org/state-of-food-security-nutrition/en/

"Plates, Pyramid, Planet." Food Climate Research Network, 2016.
http://www.fao.org/3/a-i5640e.pdf

"Changing Diets, Chronic Disease, & Sustainability." Brighter Green, 2017.
https://brightergreen.org/public-health/

"Stop using antibiotics in healthy animals to prevent the spread of antibiotic resistance." World Health Organization, 2017.
https://www.who.int/news-room/detail/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance

# Section III. Socio-economic Development

The current economic system emphasizes monetary values, efficiency, and standardization while ignoring other values that exist in the production and exchange processes but can hardly be monetized, especially environmental, health, and social values. In agri-food systems, such imbalance has led to a series of social ailments, such as conflict between animal producers and nearby communities, corporate control of food, mistrust between producers and consumers, as well as the loss of some traditional values and culture.

Since 1980, the livestock industry in China has gone through major transformations. The once-popular backyard farming has largely been replaced by small- to medium-scale intensified animal farming, which in turn are being pushed out of the market by large producers and meat-packing integrators. Such transition has made meat more accessible for consumers, but not without many profound consequences:

- Large animal farms rely on subsidies that are paid for by taxpayers indirectly;
- Smaller, less competitive producers lose their ground, leading to unemployment and market oligopoly;
- Consumers increasingly rely on supermarkets and e-commerce platforms for meat and produce, thus can hardly connect with food producers to establish transparent and cooperative social relations;
- Consumers no longer know where their food comes from, and the cultural context of the relationship between humans and animals has been lost.

This section introduces the development of industrial animal farming, its impacts on socio-economic development, and methods to counter these negative impacts.

## 3-1. The Triangle: The Evolution and Future of Industrial Animal Agriculture in the U.S., China, and Brazil. Summary[14]

To many people from different cultural backgrounds, a “better life” can’t go without meat, eggs, dairy and other animal products—a vision closely linked to industrialized Western countries. As living standards improve in emerging economies, rising consumption of animal products is one of the factors fueling the expansion of Western-style, large-scale, intensive animal farming (factory farming) and feed crop monoculture. Such practices present considerable challenges for climate change, natural resources, environmental health, public health, farmers’ livelihoods and animal welfare.

The U.S., China and Brazil are three big players in the global meat and feed sector. They form three points of a triangle (see figure): a major exporter of mature industrialized livestock production chains, a rapidly growing economy with a huge appetite for animal products, and a country with conflicts between the seeming economic benefits of increasing livestock-related agricultural production and the need to protect some of the most beautiful and ecologically important ecosystems on planet Earth. The impacts of expanding factory farming are not, however, restricted to these countries (see box).

How did we get here? In the U.S., technical innovations after World War II led to the emergence of industrialized animal farming practices and confined feeding facilities. Vertical and horizontal integration methods adopted by big agribusinesses, together with government subsidies beneficial to them, has facilitated capital concentration, promoted factory farming, and created an oligopolistic market.

In China and Brazil, in addition to domestic attempts at scaling up animal production, market-oriented development since the 1990s has also allowed penetration of multinational agribusinesses, which brought capital-intensive production chains and management patterns. For decades, agricultural policies in both countries have been promoting industrialization and intensification of agriculture, contributing to the development of factory farming.

How should we respond? One common theme in these three countries, as well as many others, is that from the economic perspective, in the face of growing demand, the evolution towards capital-intensive industrialized production is inevitable and desirable. Equally certain, however, is that from the ecological and sociological perspective, such evolution is unsustainable, and more importantly, adjustable and even avoidable.

The concept of “delegitimization” has been discussed in the context of curbing fossil fuel consumption. Similarly, delegitimizing over-consumption of meat has the potential to change the current dominant system to a more sustainable one. Reconsidering the relationship between human beings and animal products, groups and individuals are standing up and making changes around the globe.

14. Wanqing Zhou. The Triangle: The Evolution and Future of Industrial Animal Agriculture in the U.S., China, and Brazil. Summary. Brighter Green. https://brightergreen.org/wp-content/uploads/2015/08/the_triangle_summary_letter_111315.pdf

For such a “globalization from below” to succeed, however, policy support is also needed, such as suggested consumption levels, reduced subsidies for the meat and feed sectors, stricter environmental regulations with stronger enforcement, and convincing public education.

**Soybean Monoculture in Paraguay**

Soybean is the major ingredient in animal feed used in most of the world’s factory farms. Responding to the growing global demand for animal products and therefore animal feed, Paraguay has emerged quickly during recent years to become a major soy producer; it is now the world’s fourth largest soybean exporter. Like its neighbor Brazil, Paraguay is now experiencing the negative impacts of industrialized soybean mono-cropping. These impacts include severe deforestation, loss of biodiversity, soil and water pollution by pesticides, and threats to the livelihoods, health, and rights of small farmers and indigenous communities.

Source: The Impacts of Unsustainable Livestock Farming and Soybean Production in Paraguay, Global Forest Coalition, 2014

## 3-2. The Global Industrial Meat Complex: Understanding China’s Meat Revolution[15]

The original text is from the Institute for Agriculture and Trade Policy (IATP), edited and published by the University of Good Food. See the link in the footnote for the original text and references.

When Chinese company Shuanghui International Holdings announced its intention to acquire Smithfield Foods, it was watched by the US Congress and the media. The fact that a foreign company owns a giant American pork producer and is also an important player in the US food system has created a debate in the government about the link between food security and national security. The acquisition is just the latest in a recent process of increasing the concentration of global industrialized meat clusters, where the long supply chain of feed production, genetics and breeding spans the globe, blurring national borders. Shuanghui recently changed its name to “WH Group Limited” to highlight this global branding strategy and business coverage.

In addition to operations in the United States, the global meat industry is increasingly associated with emerging economies. China and Brazil are now not only huge agricultural producers and consumers, they have also spawned a new series of large agribusinesses that shape the global meat industry cluster. The two governments have embraced the factory-produced meat production model promoted by large US agricultural companies. Both are also accepting Western eating habits and increasing meat consumption.

In 2013, the United States was the world’s largest beef importer and pork exporter; Brazil was the largest exporter of beef and poultry. China is the world’s largest producer and consumer of pork, the world’s second largest poultry producer, and the world’s largest importer of soybeans (for animal feed). Brazil is increasingly meeting the demand for meat products in the global market, while the United States and Brazil are competing for the Chinese soybean market. After the acquisition of Smithfield, Wanzhou International became the world’s largest pork producer. Brazil’s JBS is currently the world’s largest producer of meat products. Tyson in the United States remains one of the world’s largest poultry companies, and JBS is competing in the poultry industry. In short, industrial meat production, processing and consumption have become a global phenomenon with global consequences.

15. Institute for Agriculture and Trade Policy. Global Meat Complex: The China Series. https://www.iatp.org/sites/default/files/2017-05/2017_05_03_FeedReport_f_web_0.pdf

Companies based in the United States and their industrial animal production model are undoubtedly the main catalysts for the rise of industrialized meat production worldwide. In the past 50 years, the production of industrialized meat products in the United States has been full of shocking things. Animal production has shifted from a decentralized family farm model to a more centralized system, with fewer companies producing large-scale animal production in closed spaces. These production operations use standardized feed, genetic screening and mechanized feeding and feeding for weight gain.

Six years ago, a committee funded by the Pew Foundation investigated the production of industrialized meat products in the United States. The committee issued a series of recommendations, including the phased termination of non-therapeutic antibiotic use in animal production, the adoption of stricter regulatory regimes to manage waste, the transition from intensive closed farming to more humane treatment, and strict enforcement. Monopoly law, as well as increased financial support for research on alternative animal production methods. "If these problems cannot be solved, it will only reduce people's confidence in the animal husbandry industry, exacerbate environmental damage, endanger public health, damage animal welfare, and dilute the prospects of rural communities," the committee concluded.

In the agricultural economy of the United States, the industrialized meat industry system has squeezed almost all independent poultry and pork producers out of the market, while independent beef producers continue to persist in many difficulties. Thirteen years ago (2000), IATP recorded changes in US pork production in The Price We Pay for Corporate Hogs. In 30 years (1950–1980), the number of US pig farms has decreased by nearly 80 percent, while the average farm size has increased six-fold. By 1990, 50 percent or more of the farmers were under some contractual production constraints, and four companies (including Smithfield) controlled 20 percent of production. In the past decade, this process has only been further strengthened. By 2007, four companies controlled 66 percent of production—American farmers, consumers, the environment, and public health paid a heavy price. In addition, working conditions in industrial meat processing facilities are considered to be among the most dangerous in the United States.

In response to various problems in the production of industrialized meat products in the United States, rural communities, farmer groups, environmental protection and public health organizations across the country have opposed industrialized meat systems on various fronts and have won several battles. But although the per capita consumption of meat products in the United States has declined over the past four years, the output of meat products in the United States has continued to rise due to the increase in exports of meat products. In the American experience, there are obvious lessons to be learned.

Like many agricultural commodities, the meat industry is not local, regional or national, it is global. Multinational companies that dominate the industry from production to feed to processing and distribution are determined to export this industrialized production model to the world. The industry has been assisted by trade agreements that reduce labor safety, health and environmental standards while giving multinational companies greater legal advantage to challenge national regulation.

This is becoming more and more clear: the dark side of the global industrialized meat industry must have an international dimension. There is no doubt that the health threats associated with the production of industrial meat products—avian flu, mad cow disease, H1N1 (swine flu), antibiotic-resistant bacteria, melamine poisoning—are not subject to national borders.

Will China, Brazil, and India repeat the mistakes of American industrialized meat production? Is there another way?

At this stage of our study of the global industrialized meat industry cluster, let us first examine the role of China. We delved into four parts of China: feed, pork, dairy and poultry. We try to understand and share how China's transition to a large-scale American agricultural enterprise model is both a story that shares commonality with industrial meat production around the world and a story with Chinese characteristics. In addition, we also try to show why the Chinese story, like the American story, is a global story with global connections and global influence.

Understanding how Chinese companies "go global" to develop their supply chains, and how the major US and other countries' livestock and dairy companies "walk in" and come to China will help us better understand this industrial cluster. The nature of globalization and its domestic and global impact. This will help us to go beyond the newspaper's large news headline on the growth of Chinese meat consumption, and understand how and why this happens, and imagine a way to achieve fairness, nutrition, public health, and environmental protection in food production. The experience of the United States has provided us with a ready-made lesson.

The current trend of globalization is the continual merger between fewer and fewer powerful companies that control increasingly scarce water and land resources and raise millions in closed spaces. Animals to produce cheap meat products. How citizens and their governments should respond to the externalities of this sector and its global spread is worth pondering. As the world's largest pork producer, the second largest poultry producer, the largest feed importer, and the fourth largest dairy producer, China is undoubtedly a key piece of this global puzzle.

## 3-3. What's at Steak? The real cost of meat. Executive Summary[16]

This report aims to expose the many ways in which industrial livestock farming is impacting our lives and environment, and to argue that—precisely because it does cause so many problems—transforming the industrial livestock sector should be a key objective not only the United Nations Food and Agriculture Organization, but also of the Parties to the Convention on Biological Diversity and the UN Framework Convention on Climate Change. Put simply, changing the way we produce meat and dairy products, and how much of them we eat, could provide relatively easy to achieve but far-reaching win-win-win impacts—for people, including farmers and women, for forests and biodiversity, for animals and for our climate.

This is because the industrial livestock industry is a major contributor to forest and biodiversity loss and to climate change, as well as posing a threat to the world's small-scale food producers, and the availability of healthy and nutritious food for all. For example, the livestock sector as a whole already contributes an estimated 14.5 percent of global greenhouse gas emissions. So far these impacts have received little attention, but concern is growing. We aim to help turn the spotlight onto this overlooked sector, looking at what's happening on the ground in five countries: Bolivia, Brazil, India, Paraguay, and Russia.

This is an urgent matter, because livestock production (for grazing and feedcrops) already accounts for the majority of agricultural land use across the world. In anticipation, without corrective measures, global demand for livestock products is expected to increase by 70 percent by 2050. Demand for meat in developing countries is spiraling, and urbanisation is changing people's eating habits. This in turn threatens to drive up demand for cropland, and to increase the use of fertilisers, tropical forest loss and greenhouse gas emissions.

16. Ronnie Hall, Mary Louis Malig. What's at Steak? The real cost of meat. Global Forest Coalition. http://globalforestcoalition.org/wp-content/uploads/2016/11/whats-at-steak-web-English.pdf

Beef is a particular concern. Figures from the Food and Agriculture Organization (FAO) show that beef and cattle milk production are the worst offenders as far as climate change is concerned, accounting for 41 percent and 20 percent of the livestock sector's emissions respectively. This is partly because cattle ranching is a significant driver of forest and biodiversity loss, especially in Latin America, where much of the world's deforestation takes place. It has been estimated that emissions from cattle raising may be responsible for half of all Brazil's greenhouse gas emissions. Our case studies show that Bolivia and Paraguay are similarly impacted.

Another important trend is the fact that small family farms are rapidly giving way to large-scale, factory farms, and this is particularly prevalent in the livestock industry. In Paraguay, for example, the problem of land being grabbed from small farmers and Indigenous Peoples for cattle-ranching and soy production remains a key preoccupation, because it is systematically undermining the country's capacity to produce food for local consumption.

In India household backyard poultry production—mostly by women for their own families' consumption and for additional income—used to be ubiquitous, but has now been almost totally replaced by a vertically integrated industrial model where farmers work under contract with large agribusiness corporations.

Millions of animals are being raised in inhumane, unsanitary and polluting industrial conditions, including in Concentrated Animal Feedlot Operations (CAFOs) such as mega-dairies. This intensive approach to livestock is associated with numerous health issues. In many countries animals are treated with hormones and antibiotics to promote growth. The unnecessary use of antibiotics is leading to drug-resistant bacteria and the spread of untreatable bacterial infections. The industrial production of livestock—in India's poultry sector for example, and to produce pesticide-sprayed soya in Paraguay—also creates significant public health dangers, and water availability and quality is a particular concern. Overall, consumers eating food products may be consuming a cocktail of pesticides, hormones, parasites and/or bacteria.

Many impacts relating to livestock production are quantity-related as well, so the number of animals is an important factor in the sustainability of any livestock production system. Due to the relatively high ecological footprint of farm animals, small-scale and extensive systems like pastoralism and family farms have significantly less negative environmental and social impacts, and health and animal welfare impacts, than CAFOs and other systems where thousands of animals are farmed. Limiting demand for livestock products like meat and dairy is essential.

Nevertheless governments are seeking to expand industrial agriculture, including by boosting international trade. The inclusion of agriculture in the then newly established World Trade Organization (WTO) in 1995 was a major coup for large agribusinesses: Bringing agriculture into the WTO meant that WTO members and new applicants had to negotiate to open up their agricultural markets to imports, creating new business opportunities for companies big enough to trade internationally.

Russia demonstrates the policy problems that can arise as a result, because of the conflict created between its WTO obligation to open its markets and its desire to ensure food self-sufficiency. A similar tension is evident in Bolivia, where incoming Brazilian investors have taken advantage of the low cost of land and free trade 'tariff preferences' under the Andean Community (CAN).

Governments in countries such as India, Brazil and Paraguay are actively encouraging corporate concentration in the livestock sector. For example, Brazil, has a so-called 'national champions' policy which favours large companies who are expected to advance the country's interests as they prosper. This has put many small slaughterhouses out of business, and made life much harder for small cattle

breeders, who have become captive to the big slaughterhouses, who pay them lower prices and grab their profits.

India's poultry sector exemplifies 'Tysonisation': the introduction of a vertical integration model in which the company (originally Tyson in the US) controls all aspects of production. In practice this means that it owns each of its millions of chickens from before they hatch to the day they are slaughtered, taking on contracted farmers to do most of the work and also shoulder most of the risk if things go wrong.

This corporate concentration dynamic is playing out on a global scale now, as industrial agriculture is conducted through 'global value chains' that account for some 80 percent of global trade. This situation is exacerbated by the fact that WTO negotiations failed to stop large-scale farms being subsidised in the US and the EU. This has created the double challenge of unsubsidised farmers in developing countries having to compete with products from large industrial farmers elsewhere in the world, who are already operating to economies of scale and supported financially by their governments.

Given the industrial livestock sector's many negative impacts it is ironic that the livestock sector is promoting the further 'sustainable intensification' of its operations as a solution to problems like climate change and hunger. However, a growing body of research shows that the changes proposed cannot possibly counter the predicted scale of demand for meat and dairy products. Similarly, proposals to address livestock emissions through carbon accounting or even carbon markets will fail to address the many social impacts of unsustainable livestock production, and its impacts on water, biodiversity and animal welfare.

These approaches also ignore the very essence of sustainable agriculture: maintaining the balance between producing food, crops, and pasture for grazing, and regenerating soil, preserving ecosystems, and co-existing with forests.

There are many practical alternatives already in existence, including agroecology, agroforestry, traditional pastoralist practices that enhance forest conservation, and the restoration of traditional livestock-breeding lands and farming with native breeds. This means that we can rapidly transition to ways of producing and consuming diverse and healthy foods that work for families and communities, create livelihoods and employment, and are in harmony with our environment.

Reforming livestock production and consumption has the potential to generate really significant and far-reaching benefits for us and for our planet, and with relative ease. With respect to climate change switching to healthier diets with less meat, combined with a reduction in food waste, and improvements in livestock production, could result in emissions from livestock production almost halving by 2050.

Other measures are needed as well though, to address the many other significant social, environmental, health, and animal welfare problems caused by the corporate take-over of the livestock sector.

Fiscal reforms should support sustainable livestock production and consumption. These should include redirecting subsidies and other forms of economic support to more sustainable livestock production methods in line with the Aichi targets of the Convention on Biological Diversity. It is particularly important to eliminate perverse legal, fiscal and other incentives for commodity chains like unsustainably produced beef and animal fodder, which are major drivers of forest loss.

Government support for policies that build awareness and capacity in relation to sustainable livestock

practices, and facilitate alternative models of production—such as farmer cooperatives and collectives—is critical. These should uphold small farmers' rights, and provide better support for existing and new small-scale food producers, with a specific focus on gender issues.

Reforming other governance and trade practices and policies is also essential. This should include developing and implementing strict legislation prohibiting livestock practices that involve environmental pollution, weak labour standards, increasing the gender gap, land grabbing, health risks and the maltreatment of animals. CAFOs should be prohibited, and livestock-related pollution standards, including strict regulations on the use of antibiotics, should be introduced, strengthened and/or effectively enforced.

In general, it is essential that we change the way in which soils and productive resources are being used, recovering land and traditional patterns of land management, with a view to managing agricultural and pasture land judiciously for the benefit of the whole population, distributing productive resources fairly for the primary purpose of food security, food sovereignty and sound nutrition.

## 3-4. From Polluter to Model Farmer: The Hog Waste on Radish Hill[17]

Mr. Dong, a staffer of Qiantang River Waterkeeper, typically works around the clock patrolling a river in Gaojia Town, Qujiang District, Quzhou City, China. May 1st of last year, however, was not a typical day for him. He was patrolling the river with two other environmental observers, Yunlong Yang and Shiliang Li, when they passed a hillside dubbed "Radish Hill" that housed 26 pig houses for Xixi Farm. To the right of the livestock, just below a sewage treatment pool under construction, a stream of muddy wastewater with an unpleasant odor flowed along Radish Hill into an irrigation canal, saturating adjacent farmland with pig waste.

According to local villagers, the draining of animal sewage into nearby farmland had been common practice by Xixi Farm for nearly two years. Mr. Dong immediately contacted Qiantang River Waterkeeper's longtime partner 'Focus Today,' a Zhejiang television program, to cover the story and bring awareness to the issue. A film crew was scheduled to investigate the site within the week.

On May 17th, the Xixi hog farm segment aired. News that a local farm was polluting neighboring farmland and waterways spread quickly, soon reaching the secretary of Zhejiang Provincial party, Mr. Baolong Xia. Within two days Mr. Xia had investigated the farm himself and declared that livestock farming must not pollute the environment. He emphasized the need to operate with a proper Environmental Impact Assessment and encouraged a rapid upgrade of livestock operations.

Under the guidance of various governmental departments, Xixi Farm became a model ecological farm within a month, earning the praise of Mr. Xia. The owner of Xixi Farm acknowledged that substandard sewage management caused pollution, and that proper treatment of sewage would benefit him, neighboring farms, and the nation. Mr. Dong was proud of the positive change he and Qiantang River Waterkeeper brought to his hometown of Quzhou.

In Zhejiang Province there are many stories like that of Raddish Hill, largely thanks to Qiantang River Waterkeeper's training of citizens in environmental protection and water safety. In June 2016, Qiantang River Waterkeeper received continued support from the Alibaba Public Welfare Foundation to continue the 'Clean Source Action' project undertaken by the Zhejiang Environmental Observation program.

17. Xin Hao, Ding Fan, and Mei Xue of Qiantang River Waterkeeper. From Polluter to Model Farm: The Hog Waste on Radish Hill. https://waterkeeper.org/from-polluter-to-model-farmer-the-hog-waste-on-radish-hill/

The ‘Clean Source Action’ project hosts round table meetings with partners to explore solutions to local water pollution issues. It invites individuals from environmental protection departments and civil organizations that are often on the first line of action to train the public, especially young people, on environmental inspection skills. There are now over 170 environmental observers joining Qiantang River Waterkeeper in their efforts towards clean water. A mobile app called “smart-river” was even designed to help solve river issues. Thanks to the app, 91 pollution cases were resolved, including Xinnan Lake’s acid water case, illegal discharge of wastewater by an industrial park, and dumping of waste near coastlines.

Environmental observers have provided nearly 100 pieces of evidence to provincial and municipal news media showing the true strength of a grassroots movement. This citizen engagement has gotten government’s attention, and many regional leaders have shown their support for Qiantang River Waterkeeper.

## 3-5. Factory Farming & Food Safety (excerpt)[18]

**Factory Farming Increases Corporate Control of our Food**

As the number of companies that farmers sell livestock, eggs or milk to has decreased due to mergers and increasing consolidation of the food industry, the number of dairy, hog and beef cattle producers in the United States has also declined sharply over the last 20 years. The meatpacking, milk and egg processing industries have become more controlled by just a handful of big players and the remaining farms raising food animals have grown bigger. In the chicken industry, contract farming is now the norm—meaning farmers sign up with a corporate integrator that provides the animals and the feed and micromanages the day-to-day operations on the farm—often through the use of unfair one-sided contracts. The real price farmers receive for livestock has trended steadily downward for the last two decades. Most farmers barely break even.

18. Food & Water Watch. *Factory Farming & Food Safety.* https://www.foodandwaterwatch.org/problems/factory-farming-food-safety

*interview with*

## Larry Kandarian, Kandarian Organic Farms

**What do you think is the most viable alternative to the current model of industrial animal agriculture?**

I think the most viable [alternative] would be adaptive grazing rather than conventional grazing that we see going on. The way they house dairy animals—that all needs to be changed.

As far as beef industry, we have to get rid of feedlots. Feeding soy and GMO stuff, we need to get out of that. We need to get rid of confinement and disease. It's no different than raising salmon in captivity. As soon as you think you know more than Mother Nature, you just are dumber than hell. I just want to emulate Mother Nature and listen to what she says. Emulate and learn from that. I'm old, I'm 74, so I've learned lots of lessons. Some of the most important ones are that you don't need to fight everything. When you work with it, nature has a beautiful system.

We're doing natural farming and biointensive farming. I think what Mr. Fukuoka is talking about is one of the things we could utilize certainly. The natural systems are the best systems to utilize. We're trying to grow nutrient dense crops. In order to do that, the first thing we have to grow is soil. We're looking at carbon-nitrogen ratios and bacteria-fungus ratios. And if we can get our soil to emulate a forest floor, which is permaculture at its best.

One word of clarification—you said we were doing regenerative organic agriculture. The ag systems in place are not agricultural systems, they're agribusiness systems. Because this is all about money. I distinguish myself as being part of agriculture and not agribusiness.

**What actions can policymakers around the world take to address the detrimental effects of industrial meat and dairy?**

TI would say the main thing is to cut out the GMO stuff and cut out the use of antibiotics. Those two would go hand in hand. There's way too much water used in those systems and then because of the close housing you end up with antibiotics being used, which then carries over in the humans imbibing that milk… and then if we could get non GMO that would cut all the soybeans and corn right out there.

**What actions can we take as individuals?**

I think it's really simple. You can buy local, stay out of supermarkets that say they're food stores—they're really not. We need to get out of the food stores and into the farmers markets that are valid markets, reputable markets selling stuff. Know your farmer, know his practices, learn a little bit about the farm. Get somebody that is adept enough to be posting on instagram showing pictures of the farm. We're certainly transparent.

At the farmers market, the farmer is the transportation. [The farmer] doesn't higher a trucker to deliver the stuff. You're cutting out transportation industry, cutting extra heavy miles . . . the whole system changes to one that is more natural and more conducive to living. Rather than when we're just chasing dollars.

## Additional Resources:

Jennifer Clapp. (2016). Food. 2nd edition. London: Polity Press (English)

# Section IV. Food Security (and Food Waste)

Thanks to economic development, China has largely eliminated hunger. But the abundance and shifting dietary structure pose a new question: how can the use of food be more effective and reasonable?

Globally, about one third of all the food produced is lost or wasted. In China, as much as 3.65 million tons of food is lost or wasted every year, which is equivalent to the total amount of imported food and worth tens of billions of dollars, enough to feed hundreds of millions of people.[19]

Meanwhile, nearly 50 percent of cereals and more than 90 percent of oilseeds in the world are processed into animal feed (with vegetable oils as the by-product), instead of being used to feed people directly.[20] It takes 5 to 25 kilograms of feed to produce 1 kilogram of meat.[21] From the perspective of resource allocation, at a time when 800 million people are still starving, it could be considered wasteful to use so much land, freshwater, and energy to grow animal feed.

China is the origin of soybeans, but the country is increasingly reliant on imported soybeans for feed as the demand for meat grows. In 2017, China imported 9.55 million tons of soybeans,[22] equivalent to 7.3 times the amount of soybeans produced domestically. The imported soybeans usually come from highly industrialized, large-scale monocultures in South and North America. Mass-produced at the cost of ecological and human health, these soybeans are highly competitive price-wise. Chinese soybean farmers have been largely pushed out of the market, taking a devastating blow in the birthplace of soybeans.

This section introduces the state of food waste in China and globally, as well as food security challenges raised by China's need for feed.

19. Jiang Heping and Jiang Hui. Reduction of food loss and waste urgent in China. Chinese Academy of Agricultural Sciences. http://www.fao.org/save-food/news-and-multimedia/news/news-details/en/c/350718/
20. FAOSTAT. http://www.fao.org/faostat/en/#home
21. A Well-Fed World. Feed: Meat Ratios. https://awfw.org/feed-ratios/
22. Ministry of Commerce of the People's Republic of China. Department of Foreign Trade. Monthly Reports on China's Agricultural Commodities Trade (December 2017). http://wms.mofcom.gov.cn/article/ztxx/ncpmy/ncpydtj/200603/20060301783733.shtml

## 4-1. Food System Facts, Feedback Global[23]

**The Impact of Our Food System**
Our food system is currently responsible for approximately 60 percent of global terrestrial biodiversity loss, 24 percent of greenhouse gas emissions and 33 percent of degraded soils.

**A Third of the World's Food Is Wasted**

The UN Food and Agriculture Organisation claims that **"roughly one-third of the edible parts of food produced for human consumption, gets lost or wasted globally, which is about 1.3 billion ton per year."**

Estimates of global food waste have been as high as 30 or 50 per cent, the evidence shows **"there is little doubt that the scale is substantial".**

**Food Waste Is A Climate Change Issue**
Food waste generates 3.3 billion tonnes of greenhouse gases. Food waste uses up to '1.4 billion hectares of land—28 percent of the world's agricultural area'. A recent study showed that reducing food waste is the third most effective way to tackle climate change.

**The Food System Destroys Our Oceans and Depletes Fish Stocks**
The Scottish fish farming industry wasted **10 million fish in 2016.** The **FAO reports that globally 35 percent of global fish catches are wasted,** this is particularly worrying considering a third of the world's fish stocks were over fished in 2015.

**Our Livestock Production Model Is Inherently Wasteful**
**36 percent of world crops are fed to livestock** but animal-based foods (meat and dairy) but they only deliver 12 percent of the world's food calories. Livestock production is **the least efficient process in our food system,** with losses of 78 percent or 840 million tonnes. Livestock production **uses 70 percent of all available agricultural land and consumes around 40 percent of the world's grain harvest.**

**Food Production is Controlled by Corporations**
Only four big companies control **99 percent of livestock breeding.** Ten companies control 75 percent of world seed production.
Supermarkets have over 85 percent of the market share of grocery stores in the UK.

**We Grow Enough Food to Feed Everyone**
UN estimates that if farmers globally fed their livestock on food waste and on agricultural by-products, enough grain would be liberated **to feed an extra 3 billion people**, more than the expected population by 2050.

**Our Current Food System Destroys Our Soils**
**A third of the planet's land is severely degraded** and fertile soil is being lost at the rate of 24 billion tonnes a year.

23.Feedback Global. *Food System Facts.* https://feedbackglobal.org/knowledge-hub/food-waste-scandal/

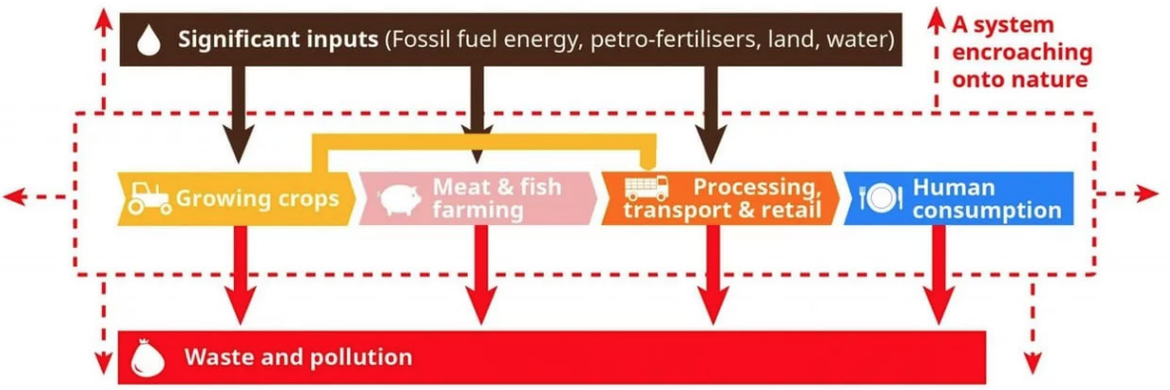


*Figure 7. Our Current Food System—*
*Linear and Wasteful*

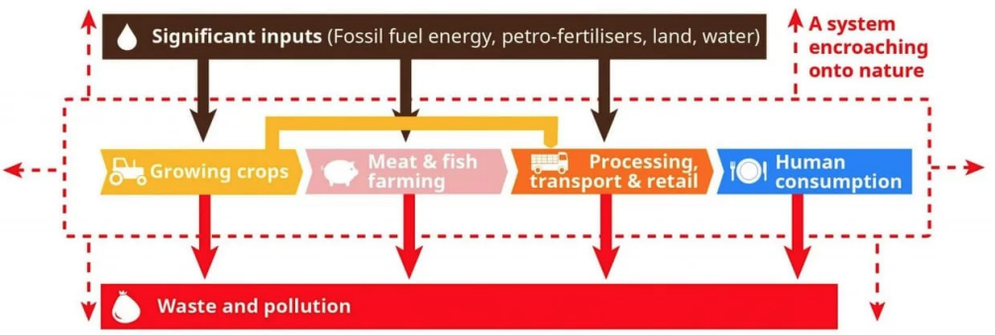


*Figure 8. A Stable, Constrained System*

## 4-2. The Need for Feed: China's Demand for Industrial Meat and Its Impacts. Executive Summary [24]

China's need for feed and the globalized supply chain of the industrial livestock industry is contributing to land use change in China and abroad. It is transforming the government's approach to grain self-sufficiency, landbased investments abroad and its policies on trade in meat versus feed. The Shuanghui (now called the WH Group) acquisition of Smithfield is an example of one clear way in which global meat companies are responding to and seeking to profit from China's exploding demand. This paper presents an overview of China's feed "needs" and its feed sector. It also examines the critical linkage between China and the Americas in procurement of feed and highlights the impacts that a growing Chinese demand for meat (and hence feed) are having in Latin America and increasingly in other parts of the world. How Chinese policy makers address industrial livestock production and situate meat in their definition of food security has and will continue to have a critical impact on global land use, global agricultural trade, rural livelihoods and food security issues.

Only 12 percent of total cereals produced are globally traded, of which a large proportion is feed—particularly corn, oilseeds and soybean meal. The FAO projects that per capita global meat consumption will reach 52 kg by 2050 for over 9 billion people. That's 480 million tons of meat compared to 293 million tons in 2010. Today, China produces and consumes half of the world's pork, produces nearly 20 percent of the world's poultry, 10 percent of the world's beef and is the fourth largest milk producer of the world.

Water, land and labor shortages make grain production expensive in China relative to the global market. Twelve percent of China's land is arable. And rapid urbanization has created a massive exodus of rural labor into cities with agriculture now employing 37 percent of the population. These factors create real limits on China's ability to expand meat production and raise critical questions about the ecological and social tradeoffs involved given that urban Chinese are now consuming much more meat than their rural counterparts.

With increasing food and feed imports, the government and Chinese experts are revisiting their definition of grain self-sufficiency in wheat, rice and corn. Such debates have thus far largely focused on whether China should import meat or feed from a national security point of view, rather than question China's meat demand and health problems associated with overconsumption.

China liberalized soy for feed production in the 90s. China's soy imports increased by 253 percent from 03-04 from nearly 17 million tons to nearly 60 million tons (mt) by 2011-2012. The next largest buyer of soy, the EU 27, bought a little less than 12 mt. Brazil and the U.S. alone accounted for 84 percent of total soy exports to China in 2011-2012. While foreign transnationals controlled more than 70 percent of the soy crushing market in the mid2000s, new laws enacted in 2007 have scaled back foreign control. Foreign TNCs including Wilmar (working with ADM),Cargill, Bunge, Noble and Louis Dreyfus today control less than 40 percent of the soy crushing market in China.

In 2011, China used approximately 70 percent of its total corn production for feed, 20 percent for industrial use and only 5 percent for food. The total global trade in corn is much less than China's entire corn feed demand. Further consolidation and "modernization" of Chinese livestock farms is only increasing the demand for corn (and other grains such as wheat). Though China has seen phenomenal growth in domestic corn production in the last ten years, corn imports have risen sharply in recent years. The U.S. Grains Council predicts that China will incur a deficit of 19-32 million tons of corn by 2022. Thirty-two million is nearly a third of the entire world trade in corn today. This has huge implications for the world price of corn. China has also begun importing dried distillers grains (DDGs),

24. Shefali Sharma. The Need for Feed: China's Demand for Industrial Meat and Its Impacts. Global Meat Complex: The China Series. Institute for Agriculture and Trade Policy. https://www.iatp.org/sites/default/files/2017-05/2017_05_03_FeedReport_f_web_0.pdf

primarily from the U.S. and grains such as barley, wheat and sorghum for feed from several countries. Unlike soy, however, where TNCs are deeply embedded, Chinese domestic agribusiness firms like the New Hope Group are poised to become the key corn traders.

Eight Chinese companies are listed in the top 20 feed companies worldwide (by volume). Already in 2010, 16 companies were producing 33 percent of total feed in China--each with an individual output greater than one million tons annually. The high return on investment combined with thin margins incentivizes these companies to vertically integrate into other parts of the livestock supply chain for greater profit margins.

In 2008, China's state planning agency issued a directive that sought direct investment in Brazil and other countries. The "going out" was part of a broader national security strategy to diversify sources of imports from different countries for food generally, but particularly for feed and meat. Chinese private companies are indeed "going out" to source feed and fodder in Africa, Southeast Asia and Eastern Europe. Though, Latin America still remains one of the primary regions of interest and investment—particularly for soy. Chinese state-owned and private companies are investing directly in Brazil's soy supply chain, competing with the oligopolistic might of foreign transnational corporations through direct access to soy and by mimicking their methods of vertical and horizontal integration of the commodity chain including through contracts and storage.

Producing "cheap" feed grains has come at a great ecological and social cost in Latin America. Twenty-seven million hectares of Brazilian land are being used to cultivate soy (large tracts of it forest, previously). Efforts to reduce deforestation rates in the Amazon have resulted in the intensification of soy production, 75 percent of which is GM--further increasing pesticide and herbicide use, flowing into major tributaries of the Amazon. As in Brazil, the soy boom in Argentina has also led to land use change and land and environmental conflicts (almost all Argentine whole soy exports go to China) associated with widespread use of GM crops, herbicides and toxic chemicals.

In April 2012, China authorized GM corn imports from Argentina, creating competition for U.S. GM corn. In June, China also approved three varieties of GM soy, all grown in Brazil, for processing. Sky-rocketing meat production has already changed the grain production landscape in China as well. Many soy farmers have switched to planting corn as they have not been able to compete with much cheaper U.S. and Brazilian soy. The government has invested in the intensification of corn--largely for feed needs, but also for manufacturing. The intensification has brought about monoculture plantations, rapidly declining biodiversity and like Argentina, increased use of strong agro-chemicals and hybrid seeds. From 1998-2003, a massive shift occurred from the traditional grain producing areas of central, south and east regions to the north and northeast. High yields have resulted in high degrees of environmental stress including high levels of soil salinity and acute water shortages. In addition, the shift northward to fragile ecosystems that are even more water-scarce may actually add to challenges. Grain is therefore ironically migrating to areas that are even more susceptible to environmental degradation.

China's agriculture policy makers face a number of challenges: There is a growing demand for meat aided by the government's prioritization for abundant and cheap meat (see IATP's China's Pork Miracle? Agribusiness and Development in China's Pork Industry for a detailed analysis) and grain self-sufficiency; while the government tries to raise rural living standards even as rural labor migrates to cities and agriculture faces ever more degraded and scarce land and water resources. Which issues should take priority, and how can competing goals be balanced? Increasingly intransigent environmental, health and food safety problems associated with the livestock industry are beginning to make some Chinese experts, government authorities and consumers question the current approach to meat production and consumption. The debate has thus far largely centered on whether to import feed or meat. (Though some are also beginning to raise critical questions about China's seemingly unquenchable appetite for meat, its massive industrialization and whether, in fact, China has reached "peak meat.")

Proponents of meat imports believe that livestock imports will alleviate China's livestock-related environmental, health and food safety problems--thereby externalizing its worse effects. While other Chinese experts believe quite the opposite. They, along with other foreign experts, believe that if China started depending on the world market for meat imports—it would be hard-pressed to find the supply and thus encourage feed imports to support the large investments that have established the Chinese meat industry. On the other hand, state-led support for large scale meat production over the last two decades has created a powerful and increasingly globalized domestic constituency of companies vested in the supply chain (meat processing, feed, vaccines) and financiers—creating strong incentives to import both "cheap" meat and feed and/or exporting them--depending on the bottom line and agreements between them and other global entities along the supply chain.

While the FAO, the OECD and other investment banks take the appetite for industrial meat for granted—much of it projected to come from China and India--they fail to address the natural resource intensive, climatic, social and public health impacts of this unquestioned appetite in OECD countries (which still far exceed all healthy norms of meat consumption) and in developing countries. This paper shows the evolution of China's feed-related supply chain and the policies that have helped shape it. It demonstrates the increasingly global and domestic impacts of this evolution and the domestic challenges this forces on China: How much more meat production and consumption? By and for Whom? What production model? The paper has tried to provide a picture of the ecological and social challenges that Chinese and policy makers in exporting countries must confront in order to assess the future direction and model of industrial meat production, distribution and consumption. It is hoped that the findings and analysis in this report help catalyze a more holistic debate about these deliberate policy choices.

*interview with*

## Carina Millstone, Feedback UK

**What do you think is the most viable alternative to the current model of industrial animal agriculture?**

To start, I'll say that there is no ecologically sound model to produce industrial meat and dairy. As the FAO itself has pointed out in its research, the bulk of emissions linked to industrial meat and dairy are from animal feed production, some enteric fermentation, and a bit due to manure management. That means there cannot be any emissions reduction through energy decarbonisation. The core business of producing meat is what creates the most greenhouse gas emissions, induces land use change, and causes biodiversity loss.

Any kind of "improvements" to the industrial meat and dairy production model are inherently inefficient as the model itself is destructive. The viable alternative is a massive reduction in industrial meat and dairy production. This includes diets where proteins are plant based, aquaculture with herbivorous fish, and some (suitable) meat in specific circumstances, such as pigs and chicken fed on unavoidable food waste.

**What actions can policymakers around the world take to address the detrimental effects of industrial meat and dairy?**

Different departments can do different things, but we need an integrated strategy across government institutions. In good news, the recommendation to reduce meat and dairy aligns the health and environmental agendas. Promoting diets rich in plant proteins also means promoting a healthy diet. In fact, if everyone in the U.K. followed the healthy diets suggested by the government, we would already see an 87 percent reduction in meat consumption.

Now it's time to think of next level policies, such as meat taxation and plant based public procurement projects. There is a big role for governments to use market power to help drive this shift in venues such as schools, prisons, hospitals, and other government institutions.

On the supply side; there is a big role for policy makers to help prioritize plant based food, horticulture, pulses over meat and dairy, etc. We need to start reassessing how subsidy regimes operate and shift them to prioritize nutritious crops for human consumption, rather than those supporting meat and dairy production.

**What actions can we take as individuals?**

This is really important. The environmental and climate crisis feels like the end of the world and something that we can't tackle. We need fossil fuels to run our daily lives; to drive to work (or even take public transportation); to live in most modern homes. We are constrained on what we can do to minimize our carbon footprint in these matters, but not with our diet. We already know what a plant rich diet looks like and the alternatives to meat are readily available on the market. We can save money by choosing to eat less meat, and improve our health--this is the most powerful things we can do as individuals. Rarely can something be done so easily without a massive change in lifestyle and within most people's budgets.

The other thing that we can do quite easily is not waste meat and dairy. One of the most commonly wasted foods currently is milk. Meat and dairy are the worst kind of food waste because it wastes something that was energy intensive, and biodiversity destroying, to produce in the first place.

**Based on your work in global food systems, what are the top priorities for action around this issue?**

We can do some things as individuals, as mentioned above, but, in reality there are limits to what we can achieve at the personal level. Zero waste from farm to fork doesn't exist.

This is a transformation that will need to take place on the same scale as the energy transformation. Many governments now understand that there is a need to fully decarbonize our energy grid--a need to revolutionize housing and transportation.

Policy makers now need to realize we need a similar revolution in agriculture and in our diets. We need to put political pressure on our policy makers to enable putting this new regime in place. Subsidy regimes for farmers and health interventions (regulatory) need to be in place to support a dietary shift.

**How do you see different sectors collaborating to address the detrimental effects of industrial animal agriculture?**

This is an issue with a limit to collaboration. I don't think we can have a viable planet with industrial animal agriculture. Take the Emissions Impossible study (2018) done by the Institute for Agriculture and Trade Policy (IATP) and Grain; given the current predictions and trends for the top 35 meat corporations, and assuming all other sectors decarbonize, by 2050, the sector will account for 80 percent of GHG emissions (in a 2-degree Celsius scenario).

So this is an area where collaboration is quite difficult, especially if the end goal is to end industrial meat and agricultural practices all together. There is a role for finance in terms of financing alternatives (e.g. alternative plant based protein companies), role for governments (shaping market and subsidy regimes), a role for civil society to support these changes, and a role for retailers to provide these options.

However, ultimately the industrial meat and dairy industry itself will need to shrink, or shift if we want to prioritize climate and environmental sustainability.

## Additional Resources:

"Food Loss and Food Waste," UN FAO: http://www.fao.org/food-loss-and-food-waste/en/

"Food waste starts long before food gets to your plate," Yale Climate Connections (2019)

"Food wastage footprint Impacts on natural resources," UN FAO (2013)

# Section V. Animal Welfare

When was the last time a city-dweller saw a live chicken, cow or pig? We are often disconnected from the food we purchase and eat, which means we often don't know how farm animals are raised. Most factory farms have crowded and dirty living conditions that lead to poor physical, mental, and emotional health for animals.

While this is clearly a humanitarian concern for animals themselves, it can also potentially affect consumers: heathy animals produce a more wholesome product.

This section provides an introduction to the issue of animal welfare on industrial farms and offers two examples, using pigs and egg laying hens, to describe problems caused by suboptimal farm conditions and provide possible solutions. In the following section, we discuss the ethical implications of meat consumption in general.

## 5-1. "Farm Assurance Schemes and Animal Welfare." Executive Summary.[25]

**Measuring animal welfare**

Animal welfare refers to the well-being of the individual animal. It includes animal health and encompasses both the physical and psychological state of the animal. The welfare of an animal can be described as good or high if the individual is fit, healthy and has a good quality of life, which encompasses both freedom from suffering and the opportunity to experience positive feelings of well-being.

Legislation should aim to ensure that all farmed animals are given a life worth living. Assurance schemes can play an important role in promoting welfare standards above the legal minimum, giving consumers the confidence to buy meat, milk and eggs knowing that the animals have had a good life.

Welfare can be poor in any farming system if stockmanship is poor. However, systems vary in their potential to provide good welfare. Even if stockmanship is good, welfare is likely to be poor in confinement systems that severely restrict freedom of movement or in barren overcrowded conditions that limit behavioural expression.

A farming system that provides for behavioural freedom without compromising health can be described as having high welfare potential. Major concerns for animal welfare arise from farming systems with low welfare potential, i.e. those that fail to meet the behavioural and physical needs of the animal and are therefore likely to cause suffering.

The ability of a system to provide good welfare is determined by factors that are built into the system, such as provision of sufficient living space and access to resources that meet the needs of the animals.

25. Farm Assurance Schemes & Animal Welfare. Compassion in World Farming, 2012. https://www.ciwf.org.uk/media/5231246/standards_analysis_exec_summary.pdf

Whilst it is essential to set high input standards to ensure livestock production systems have high welfare potential, it is also important to monitor welfare outcomes (such as mortality, disease, lameness, injuries and the occurrence of normal and abnormal behaviours) to assess the extent to which that potential is realised. Welfare outcomes reflect the overall performance of the system, which will be influenced both by the welfare potential of the system and by the level of human management skill applied to it.

**The Five Freedoms :**

1. Freedom from hunger and thirst by ready access to fresh water and a diet to maintain full health and vigour
2. Freedom from discomfort by providing an appropriate environment including shelter and a comfortable resting area
3. Freedom from pain, injury or disease by prevention or rapid diagnosis and treatment
4. Freedom to express normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind
5. Freedom from fear & distress by ensuring conditions and treatment which avoid mental suffering.

## 5-2. Pig Welfare. Compassion in World Farming (CIWF)[26]

**Sow Stalls**

In much of the world it is common for a pregnant sow to be kept in a sow stall (also called a 'gestation crate') for the whole of her 16-week pregnancy. A sow stall is a metal cage—usually with a bare concrete/slatted floor—which is so narrow that the sow cannot turn around, and she can only stand up and lie down with difficulty.

Sow stalls deprive pregnant sows of almost all natural behaviours; they cannot explore, exercise, forage or socialise. Most will never go outside in their lives. Pigs are naturally curious animals who spend much time exploring their environment and searching for food. Keeping sows in cages means they suffer from boredom and frustration; they do not have a life worth living.

Sow stalls also increase abnormal behaviour such as sham chewing and bar-biting, indicating severe frustration and stress, and sows in crates can exhibit behaviour likened to clinical depression. Feed is often restricted during pregnancy, causing chronic hunger and increasing the level of frustration.

Sow stalls are illegal in Sweden and the UK. Their use is limited in the EU, with a partial ban enforced from 2013. However it is still permitted for sows to be kept in sow stalls from weaning of the previous litter until the end of the first four weeks of pregnancy. They are being phased out in certain states in the US and in New Zealand, and there is a voluntary industry agreement to phase out their use in Australia. A number of food producing companies are starting to phase them out voluntarily on animal welfare grounds, due to consumer pressure.

**Farrowing Crates**

Shortly before she is due to give birth (referred to as 'farrowing'), a sow is typically moved to a farrowing crate. This is similar to a sow stall except that there is space to the side for the piglets. Bars keep the sow out of the piglets' lying area to prevent crushing. Most intensive systems use farrowing crates.

26.Compassion in World Farming. Farm Animals: Pig Welfare. https://www.ciwf.org.uk/farm-animals/pigs/pig-welfare/

Like sow stalls, farrowing crates also severely restrict the sow's movement and frustrate her strong motivation to build a nest before giving birth. They prevent the sow from being able to get away from her piglets, for example if they bite her teats. It is common for piglets to have their teeth ground down or clipped, without anaesthetic, to minimise biting injuries.

Piglets are weaned and taken away from their mother when they are three to four weeks old, and even earlier in some countries. In the wild, sows would continue to feed their piglets until they were around 13–17 weeks old but the females would often stay together as adults. Male pigs disperse to find a mate and start their own family group.

Within a couple of weeks of weaning, the sow is inseminated again (often artificially) and starts her next pregnancy. Commercial sows normally produce just over two litters a year with around 10–12 piglets per litter. She has a breeding lifetime of about three years before being sold for slaughter and replaced.

Farrowing crates have been banned in Sweden, Norway and Switzerland. In the rest of the world they are widely used.

**Housing of Fattening Pigs**

Fattening pigs are bred for meat and often kept in barren, crowded conditions. This can be on slatted concrete floors without straw for bedding or rooting. These pigs have no access to outdoors and will never experience fresh air or daylight. They are unable to behave naturally and become bored and frustrated. They tend to fight and to bite each other, sometimes causing severe injury, particularly to their tails.

In addition to tooth cutting, most piglets have their tails docked to discourage tail biting. Both of these procedures are painful and performed without pain relief. Stress, illness and conflict often result when piglets are abruptly weaned and mixed with unfamiliar young pigs.

Most male piglets in Europe (but not in the UK and Ireland) are castrated. Public pressure has led to a voluntary declaration aimed at ending the surgical castration of pigs in Europe by 2018. As a first step, signatories will ensure that prolonged pain relief is used for surgical castration of pigs from 2012.

**Tooth Clipping**

Soon after they are born, the teeth of piglets are often clipped. The purpose of teeth clipping is to reduce injuries caused by piglets to each other and to their mother as they fight for the best teats.

Sows don't always have enough milk to feed all their piglets, especially if they have large litters or their bodies are in poor conditions. To ensure that at least some of the piglets survive, the strongest get preferential treatment.

The teats nearest the front of her body get the most milk. The teats towards the back of the body get progressively less. Once a piglet has established ownership of a teat, he or she will vigorously defend it.

**Castration**

Within a week of being born, many male piglets are surgically castrated, usually without anaesthetic or pain relief. This is done by cutting the scrotum with a scalpel, pulling out the piglet's testes and cutting them off. In Europe, this is around 70 percent of all males, the equivalent to around 90 million piglets every year. This is a painful procedure and major welfare concern.

The main reason piglets are castrated is to prevent “boar taint”. This is a smell or taste of pork, caused by the sex hormones testosterone and androstenone. Males that are not castrated may also be aggressive and show more sexual behaviour. This may cause injury to others if they fight or mount each other and can be dangerous to farm workers if they are aggressive during handling.

### Welfare Issues of Castration

Many piglets are castrated without any anaesthetic or pain relief (analgesics), which causes them short and long-term pain and stress. It also leaves the piglets more prone to infection from the open wound with limited immunity at such a very young age. The extra time and cost involved in pain relief means that alleviating piglets’ distress is rarely considered.

In some countries, such as Denmark and Germany, pain relief is now commonly used, but the timing of the injection is important and it should be given at least half an hour before the procedure, which may not be the case in practice. In the Netherlands $CO_2/O_2$ or Isoflurane is used as an anaesthetic. $CO_2/O_2$ is known to be aversive to pigs, so while it may make them unconscious, it is a very unpleasant experience.

In a minority of countries, such as Sweden and Lithuania, both anaesthetic and pain relief may be used. The use of both pain relief and a non-aversive anaesthetic is important when surgical castration is performed but this mutilation is causing distress to the pigs and risking their health and welfare. Switzerland has banned castration since 2010.

In some countries pigs are reared to a heavier weight so that certain meat cuts or fat content can be produced. This means there is more risk of boar taint because the pigs reach puberty, as well as the welfare risk of them injuring each other. Where rearing entire males is not practicable there is another alternative.

### Transport and Slaughter

Pigs travel badly and are easily stressed by transport and by pre-slaughter handling. They do not have sweat glands and are particularly susceptible to heat stress during transport. Internationally, significant numbers of pigs die each year in transport or in lairage at slaughterhouses as a result of stress.

### Higher Welfare Alternatives for Pigs

There are alternative commercial systems that improve the welfare of pigs by providing a more enriched environment which allows for more natural behaviour.

## HOUSING

### Higher Welfare Indoor Systems

Pigs are kept in groups on solid floors with straw or other material for bedding and rooting. Although there is no access to the outdoors, there is greater opportunity for natural behaviour, free movement within the pen or shed, less crowding, conflict, boredom and tail-biting. Deep bedded systems allow foraging and comfort.

Sows may still give birth in farrowing crates, but in the better systems they give birth in huts or pens.

### Outdoor Bred

Sows are kept outside with straw-filled huts for shelter: this is where they will give birth to their piglets. There are no sow stalls or farrowing crates.

Sows have a higher quality of life and are able to act naturally by building nests, rooting, wallowing and foraging. The piglets benefit from the free-range conditions until they are weaned. At weaning, the piglets are taken indoors and reared in extensive or intensive conditions.

**Outdoor Reared**

Piglets are born outside (without stalls or crates) and spend around half of their lives outside (around three months).

**Free-Range**

Whilst there is no legal definition of 'free-range pork', a voluntary industry code in the UK requires that free-range pigs have permanent access to pasture: born outside (without stalls or crates) and then reared outside throughout their lives.

In the best free-range and organic pig farms, the sows and the growing pigs are kept outside for their entire lives. The piglets stay with their mothers for longer (up to six to eight weeks), mixing of unfamiliar pigs is reduced and tail-docking is not used.

## ALTERNATIVES

**Mutilations**

Farming systems should be designed to fulfil the welfare needs of the animals rather than altering the animal, through physical or genetic mutilations to fit a bad system. Mutilations can and should be avoided by better breeding, appropriate enriched environments, management and nutrition.

**Tooth Clipping**

Breeding sows to produce smaller litters which they can feed properly can reduce injuries caused by fighting for teats. This can also reduce the number of piglets that will starve, provided the sow is properly fed. Some breeds of sow have higher levels of fat and this can help them to maintain high levels of milk.

Keeping the sow in high welfare farrowing systems may also help. Research in Denmark found that sows in free-farrowing systems ate more food than those kept in crates and it was suggested that they were probably producing more milk. Piglets in the free-farrowing systems grew better and were heavier at weaning than those in crates.

There are fewer injuries to the sow's teats, and to other piglets, in systems with plenty of space and enrichment such as straw. European Union rules insist that environment and stocking density should be dealt with before resorting to teeth clipping.

**Castration**

There are alternative options to castrating piglets which can vastly improve their welfare:

*Rearing Entire Males*

In some countries, such as the UK, Ireland and parts of Spain, Portugal and Greece, male piglets are not castrated but are slaughtered at a younger age (with a lower weight), lowering the risk of boar taint developing in the meat that can occur during puberty. In the Netherlands this approach is also being taken, with around 70 percent of males now reared entire.

Although the pigs are slaughtered at a younger age, as they get close to slaughter weight, some may develop mounting behaviour. Gilts (young female pigs) are smaller than males and they can be injured during mounting, sometimes leading to lameness. Both males and females may also suffer from cuts and abrasions leading to skin lesions. It is therefore recommended that the males and females are separated to help reduce this risk.

People's sensitivity to boar taint varies between nationalities and sexes and some argue that even those slaughtered at a younger age may have boar taint. Where this is an issue technology is being developed to detect the scent of boar taint on carcasses at the slaughterhouse. Alternatively a person sensitive to boar taint can be employed to use the human nose to detect the smell after singing a small area of meat while the carcass is on the line. However, countries currently do not agree of what is an acceptable level of 'boar taint' smell and the test is very subjective.

*Improvac*

In some countries, a vaccination called Improvac is used as an alternative to surgical castration, by delaying the maturity of pigs. The vaccination cannot be found in the meat and is perfectly safe. It is not a hormone and should not be referred to as chemical castration which is when toxic chemicals are injected into the testes directly, causing pain and irreparable damage.

As well as stopping boar taint, it also reduces aggression and sexual behaviour in the pig. Reducing mounting behaviour improves the welfare of the pigs being mounted who are often not able to escape from it. Care needs to be taken though to minimise pain or stress to the pig while it is administered, as with any vaccination. It has been shown that the use of Improvac reduces the use of antibiotics and reduces piglet mortality by 1.5 percent (Colruyt Group) in comparison to surgical castration.

Farmers that use the vaccination report to have improved growth performance and also feel their working environment is safer as pigs are calmer and more predictable.

**Future Solutions**

In the future it may be possible to select to breed from pigs which have lower levels of boar taint, and reduce the presence of the two main hormones responsible. This is a long term solution and would take five to ten years to work, and aggression between the males would still need to be controlled.

## 5-3. About Egg Laying Hens. Compassion in World Farming (CIWF)[26]

**Welfare Issues for Egg Laying Hens**
Good animal welfare depends on three components:

- Physical well-being
- Mental well-being
- Natural living.

In intensive egg farming all three of these are compromised by periods of confinement in battery cages or "enriched" cages, health problems and beak trimming.

It is estimated that more than 60 percent of the world's eggs are produced in industrial systems, mostly using barren battery cages.

**Battery Cages**
While barren battery cages were banned in the EU in 2012, the majority of laying hens in the rest of the world remain confined within them. Each battery cage generally houses up to 10 birds. The average space allowance per bird in a typical battery cage is less than the size of an A4 sheet of paper, and the height is just enough to allow the hen to stand.

The cages usually have a sloping wire mesh floor and are kept in rows stacked in several tiers. Each shed typically houses tens of thousands of hens this way, and the largest sheds can contain more than a hundred thousand birds. Typically these buildings are artificially lit and ventilated. Caged hens may usually never experience natural light or fresh air and do not leave their cages until they are taken to slaughter.

**Enriched Cages**
So called "enriched" cages were developed when barren battery cages were banned in the EU. They only provide more a small amount of extra space per bird (than compared to battery cages). They and can allow hens to express more of their natural behaviours, such as perching, dustbathing, and nesting.

However, the design of the cages means these behaviours are still very restricted. The perches are very low (just a few inches from the floor of the cage) so hens cannot fly up to a high perch to be safe from feather pecking, the litter area is often very limited, and effective dust bathing generally is not possible. The 'nest' consists of a plastic sheets hanging down from the top of the cage, which creates a more secluded area for egg laying.

Luxembourg has banned the use of enriched cages for laying hens, and Austria and Germany are phasing these out.

**Brittle Bones**
Modern commercial hens have been bred to produce large numbers of eggs. This depletes the hen's store of calcium and can result in high levels of osteoporosis (brittle bones) and fractures. Restricted movement can also contribute to osteoporosis.

Several tiers of crowded cages make inspection difficult, and in large cage sheds injured birds are often left to die unnoticed.

27.Compassion in World Farming. About Egg Laying Hens. https://www.ciwf.org.uk/farm-animals/chickens/egg-laying-hens/

**Feather Pecking**
Through stress and boredom, caged hens often suffer from feather pecking. Hens often lose a large proportion of their feathers due to damage from the sides of the cage and pecking from other hens. To prevent feather pecking, chicks often have part of their beaks cut off without anaesthetic. While beak trimming with a blade became illegal in the UK in 2011, this technique, along with beak trimming with a specialized infrared light, remains legal in the US. Infrared beak trimming may be less painful than blade trimming, although blade trimming is more common.

**Salmonella**
Even though it is often claimed that confined animals are better protected from infection, a survey by the European Food Safety Authority found that eggs produced in cages are more likely to be contaminated with Salmonella than those produced in cage-free systems.

There are alternative methods of egg production that do not require the hen to endure the suffering of cages.

**Higher Welfare Alternatives for Hens**
In the UK, free-range systems are the most popular of the non-cage alternatives, accounting for around 50 percent of all eggs produced, compared to four percent in barns and three percent organic.

**Barns and Aviaries**
In barn systems, hens are kept in sheds using the floor space only, but those with several levels of platforms or perches are called aviaries. In Europe, the maximum stocking density is nine hens per square metre.

This allows the hens much greater freedom of movement than is possible in cage systems. They can stretch, flap their wings and fly. They can also perform other natural behaviours such as pecking, scratching and laying their eggs in a nest.

**FREE-RANGE AND ORGANIC SYSTEMS**

**Organic Laying Hens in the UK**

In free-range systems, hens are housed in barns or aviaries but they also have constant daytime access to an outside range with vegetation. In the EU each hen must have at least four square metres of outside space (in non-rotational systems).

Organic systems also provide free-range access. Organic farms certified by the Soil Association, must provide additional space; each hen has a minimum of ten square metres of outside space, and do not allow beak trimming. EU organic regulations limit stocking density inside the shed to 6 birds per square metre.

*interview with*

## Joyce Tischler, Animal Legal Defense Fund and Lewis & Clark Law School

**What do you think is the most viable alternative to the current model of industrial animal agriculture?**

The most logical alternative is a plant-based diet, which will eliminate most of the problems caused by intensive animal agriculture. The problem with that approach is that asking human beings to change their diet is complex and difficult, because we are quite emotional about what we eat. Often, we crave the foods our parents and families cooked for us; that was one way they showed us love. In the U.S., most of us grew up eating meat, chicken, fish, dairy and eggs. In countries where meat has not been available or was too expensive, as people make more money, they see eating meat as a symbol of financial well-being and status. It's hard to break through those strong emotional feelings.

My choice has been to switch to eating a plant-based diet, which I have done for the past twenty years. I'm healthier and happier on this diet. I'm very excited about the alternative plant-based food industry, whose message is: you can still have the taste of meat, without any of the negative impacts on the animals, your family's health, or the environment.

In order to encourage other people to adopt a plant-based diet, we have to make it as easy and enjoyable as possible. I would like to see plant-based food marketed on a world-wide basis as the modern, sophisticated, healthier and delicious way to eat.

**What actions can policymakers around the world take to address the detrimental effects of industrial meat and dairy?**

I would like to see policymakers deal with two essential issues:

1. The treatment of farmed animals being raised in the industrial animal agriculture system is almost completely unregulated in the U.S. The industry itself establishes the (lack of) standards, and the conditions are abhorrent. Animals suffer greatly, and die in pain and terror in slaughterhouses that are severely under-regulated. While, in Europe, the EU sets standards that look okay on paper, they are poorly enforced. Although it is my preference that animals not be raised and killed for food, the following suggestions assume that policymakers will be more willing to engage in reforming the industrial meat, dairy and egg industries. With that in mind,

In terms of animal welfare, policymakers should:

(a) mandate that farmed animals be returned to living and grazing in the fields, where they have plenty of room to roam freely and engage in natural behaviors, fresh air, adequate and nutritionally satisfying food, effective veterinary care, and other basic necessities;

(b) legislate for enforcement of the Five Freedoms;

(c) legislate minimum standards for the care and treatment of farmed animals, and put in place strong enforcement mechanisms;

(d) mandate elimination of all sub-therapeutic use of antibiotics in farmed animal feed;

(e) mandate video surveillance of all slaughterhouses, with effective oversight and enforcement against violators;

(f) mandate video surveillance of all farmed animal facilities, and vehicles in which farmed animals are transported, with effective oversight and enforcement against violators;

2. The animal agriculture industry is kept afloat in the U.S. by governmental subsidies and unfair tax benefits. This industry is not expected to pay for the many harms it causes. For example, the industry pollutes waterways, but it is the American taxpayers who pay huge amounts of money to clean them up. When we are small children, we are taught: if you make a mess, you must clean it up. Policymakers should force the industry to pay its fair share, in other words, internalize the costs that are currently externalized. If industry harms waterways, it should have to bear the costs of cleaning them up. Frankly, if the industry had to pay for all the harms it causes, it would soon become clear that it would be unable to make a profit. "Cheap meat" is not really cheap; it is only possible because of government subsidies that keep the industry afloat.

In terms of subsidies and corporates social responsibility, policymakers should:

(a) eliminate subsidies and tax incentives currently offered to the animal agriculture industry;

(b) force the animal agriculture industry to pay for all of the harms it causes to the environment, including air pollution, water pollution, soil erosion, and greenhouse gasses linked to climate change;

(c) pass legislation that gives preferential treatment, in the form of tax incentives and subsidies, to producers of vegetables, fruits, and other plant foods which do not harm humans or the environment, or require massive clean-ups;

(d) mandate action plans for each country, and deadlines for the animal agriculture industry to comply with the goals and terms of the Paris Agreement.

**Based on your work in the non-profit and legal sectors, what are the top priorities for action around this issue?**

(a) Educate the general public about the strong connection between industrial animal agriculture and climate change. This reality has been hidden and ignored for too long. Help people to understand the problem, and then ask them to contact their governmental authorities or representatives and demand effective action. This will be a more effective motivator for change than simply arguing about the animal welfare issues. Humans always ask the question: what's in it for me? Learn how to answer that question.

(b) Support the plant-based food industry with your consumer dollars. I read meat industry journals on a daily basis and industry is very worried that the plant-based industry will cut into their profits. Let's make that fear a reality!

(c) Realize that you have power as a consumer, and let the meat, dairy and egg industry, as well as local grocery stores and restaurants know that you want plant-based foods to eat, and that if they are selling animal products, they must assure that the animals were humanely raised in a manner that does not harm the environment;

(d) Learn more about a plant-based diet, and integrate it into your daily life. Start with Meatless Mondays, and do as much as you can. You don't have to be perfect (no one is).

*interview with*

## Joyce D'Silva, Compassion in World Farming

**What actions can policymakers around the world take to address the detrimental effects of industrial meat and dairy?**

In terms of animal well fare, obviously they could phase out the most cruel systems such as keeping hens in cages, keeping pregnant sows in narrow stalls, etc. But they could also attack factory farming which is the source of so much farm animal suffering in other ways by imposing strict regulations on pollution from factory farms, which is a big problem in many countries.

They could also give financial encouragement to farmers who are farming in high welfare ways using regenerative agriculture. So there are quite strong ways like banning a system, but there are also other more subtle ways in which you could make factory farming less financially profitable for the people who do it.

[Policymakers] could try to restrict imports of soya from South America and the USA if they're in countries that do that, and many countries do. And they could work toward encouraging farmers to grow the feed on the farm for the animals they keep. So encouraging mixed farms where you grow the crops and feed the animals on those crops, and you only produce as much waste as the soil on that farm can absorb. So it's kind of a circular system that doesn't pollute outside and doesn't use up resources from outside.

And of course they could encourage people to eat less meat overall. They could do that through their own public procurement policies, not buying factory farmed meat, serving more vegetarian meals in government institutions and at government events . . . this is something that local councils could do as well. And governments could think about introducing a meat tax, or a tax on products from factory farms.

I think on health grounds, governments could encourage people to eat less meat. You can't ban meat, obviously people need to have some level of choice…For public health reasons, there's so much evidence out there about colon cancer, and the association with dairy and prostate cancer, possibly breast cancer. So there are lots of reasons to encourage people to eat less meat.

**What actions can we take as individuals?**

What individuals can do is cut down on meat and dairy consumption. Either they can give those things up altogether… even if people just have a certain number of meat free days a week, I think that would be helpful. And obviously if they're buying meat, to only buy meat that has got a really sound label on it, like organic, free range, so they know that it's not a product that's coated in suffering.

And also there are other reasons as well as animal welfare. It's better for the planet, better for the climate, and there's been good research from Oxford University showing if you measure the GHG emissions of people on a fairly high meat diet, an ordinary meat diet, pescatarian diet, vegetarian diet, vegan diet—the vegan diet comes out as the best diet for the planet. Because the GHG emissions are the lowest from eating a vegan diet.

In China, eating a lot of meat, and certainly a lot of dairy, has not been part of the traditional diet. And if you think back to the great Chinese philosophers, Lao Tzu and so on, there's this feeling of being at one with nature. And if anyone goes into a factory farm, an industrial farm, it is so far from being at one with nature. It's a desecration of nature and of our relationship with animals…I think there are lots of good things in China's history that can perhaps support China's people in making different and more compassionate choices in their food.

**How do you see different sectors collaborating to address the detrimental impacts of industrial agriculture?**

I do think that NGOs should cooperate, environmental NGOs and animal welfare NGOs. We've been doing that in the UK. About a year ago, CIWF put on a big conference on extinction and livestock, and linking extinction of wildlife with industrial livestock farming. And we had partners in that, one of our partners was WWF. So a very big environmental organization was happy to put their name with us on that topic. I think the more of that sort thing you can do, the better.

I also think governments should be open to consulting with people like CIWF, Brighter Green, WWF, whoever it may be relevant to that topic. Perhaps putting up working groups of civil servants and people from the NGOs to get a wider perspective on things.

But also where it's possible, individuals can put pressure on governments, on their elected representatives be it on the local level or at the national level. Writing letters, a peaceful march where appropriate.

## Additional Resources:


"From Farm to Refrigerator." Good Food Academy. http://goodfoodchina.net/departmentsshow.php?cid=47&id=194

"Gateway to Farm Animal Welfare." United Nations Food & Agriculture Organization. http://www.fao.org/ag/againfo/themes/animal-welfare/en/

"Animals in Farming." World Animal Protection, https://www.worldanimalprotection.org/our-work/animals-farming-supporting-70-billion-animals.

World Organization for Animal Health. http://www.oie.int/en/

# Section VI. Food Ethics

Food is related to ethics. From the ancient Chinese saying that “a noble man stays far away from slaughter sites” to the rise of vegetarianism, fair trade, and local slow food movement, all foods reflect the values of their producer and consumer.

According to the Food Ethics Council, “food ethics” touch on three main issues: well-being, autonomy, and justice:

- Well-being: what will be good or bad for humans and animals, for their health and welfare?
- Autonomy: how far should people be free to make their own choices about what they eat?
- Justice: are our ways of producing and consuming food fair to everyone?

This section focuses on the relationship between humans and animals, and how humans put our ethical principles into practice through the food we eat. This section defines “speciesism” and “carnism”, and illuminates how the mainstream carnist perspective is viewed as “natural” rather than as a choice to consume meat. We’ve also included a BBC interview of several professors who offer their views on the ethics of eating meat. Interviewees raise philosophical questions about animal consciousness and the right to pursue a fulfilling life.

## 6-1. Food and Speciesism[28]

In the discussion of food justice, the concept of speciesism is worth noting. Speciesism refers to discrimination based on species membership and is usually used to describe discrimination from human beings against non-human animals. For example, treating chickens, pigs, cows, and sheep as food, cats and dogs as pets, while seeing human beings as the superior to other animals, is a prevalent speciesist view.

The idea of speciesism was proposed by British psychologist Richard Ryder in the 1970s and popularized by Australian philosopher Peter Singer. In his book *Animal Liberation*, Singer reviewed the evolution of Western societies’ attitude towards animals, dating back to Judaism and ancient Greek culture.

In the Holy Bible, human beings were granted a special status. In the Garden of Eden, humans were created to feed on fruits from trees and to rule over all other animals peacefully. It was after the fall of man when human beings were allowed to kill and eat animals and sacrifice them.

In ancient Greece, Pythagoras was a vegetarian and encouraged people to respect animals. However, Aristotelianism proved to have influenced the society in a more profound way. Aristotle believed that rationality is unique to human beings. Those who are good at rational thinking are born to rule, those who lack the ability to think properly are born to be ruled. Therefore, “irrational” animals, as Aristotle saw them, are born to be ruled by human beings.

28.Caroline Wimberly, Wanqing Zhou, and Yi-Wen Lee. Food Forward Forum Toolkit. Good Food Fund and Brighter Green.

Born in the Roman Empire, Christianity absorbed both the Judaist and ancient Greek views about the human-animal relationship and reinforced the belief that only human lives are sacred; human beings are superior to other beings.

Such belief provided the foundation for speciesism in western societies, which led to a series of abusive behaviors towards animals, and later underlaid the industrialization of agriculture and animal farming.

It was not until the eighteenth century when English philosopher Jeremy Bentham condemned human beings' violent dominion over animals. Bentham believed that abuse towards a living being should not be justified based on its ability to think, speak, or any external characteristics; as long as a living being is capable of suffering, its welfare should be considered on equal terms.

Since then, many western thinkers have accepted the idea of animals' rights. However, most of them could't implement the idea when it came to eating animals. Why not?

In order to answer this question, American social psychologist Melanie Joy promulgated the concept of "carnism", which explained many speciesist behaviors around us, such as why people love dogs but eat pigs.

Joy believes that carnism has a deeply rooted ideology in western societies. It normalizes the behavior of eating and exploiting animals so that it is difficult to break the habit. However, as soon as people are aware of this hidden ideology, it becomes much easier to make changes.

Compared with the anthropocentric philosophies in the West, oriental philosophies—including the three major philosophies in China: Confucianism, Buddhism, and Taoism—tend to advocate for respect, understanding, and care toward other animals.

In the Confucius worldview, "all living things grow together in their order without harming each other", while human beings, through learning the nature of all beings, are able to "assist the forces of creation of the Universe", which is similar to the ideal world in the Garden of Eden.

The Buddhist worldview includes reincarnation and karmic forces where lives are reborn into different life forms again and again. Therefore, the Buddha taught people to treat all living beings equally and with compassion, not to kill, and not to eat the meat of animals.

The Taoist worldview is that "the myriad kinds of beings in the Universe co-exist with us, one kind is no nobler than another, and the non-human beings are not bred for humans' sake", and thus recognizes the intrinsic value of all beings. This philosophy aligns with the idea of equity and anti-speciesism from the West.

When applied to food, these philosophies translate into these principles:

- Work with nature to produce food instead of against it. For example, practice agroecology, eat seasonally, and locally.
- Eat a diet that the human body is designed for, which mainly includes whole grains, beans, fruits, and vegetables, i.e. a plant-based or plant-centric diet.
- If one chooses to eat meat, the animal(s) should not have been raised or slaughtered in a way that causes suffering or ecological damage.

## 6-2. Beyond Carnism and Toward Rational, Authentic Food Choices (excerpt)[29]

We tend to assume that only vegans and vegetarians follow a belief system. Now, carnism is a dominant ideology, meaning it's so widespread its doctrine is seen as a given rather than a choice. Eating animals is just the way things are. And, it is a violent ideology. Meat cannot be procured without violence.

Clearly the animals pay for our carnism, but we are also victims of the system. We pay for our carnism with our health. Eating an animal-based diet can lead to serious disease, while eating a plant-based or vegan diet can optimize health. And we pay for our carnism with our hearts and with our minds. With our dampened empathy and diminished objectivity. But of crows invisibility alone cannot maintain the system, hints of the truth surround us. So another defense is necessary: justification.

The way that we learn to justify eating animals is by learning to believe that the myths of meat, eggs, and dairy are the facts of meat, eggs, and dairy. These myths are expressed largely through what I refer to as "The 3 N's of Justification". Eating animals is normal, natural, and necessary. Haven't we heard this somewhere before?

Slavery is normal, natural, and necessary. Male dominance is normal, natural, and necessary. Heterosexual supremacy is normal, natural, and necessary. And as with other dominant ideologies, the myths of carnism are institutionalized. Carnistic bias is embedded within the very foundations of the system. And when we are born in an institutionalized system such as carnism, we inevitably internalize it. We learn to look at the world through the lens of carnism.

Carnism uses a set of defenses that distort our perceptions of farmed animals. For example, carnism teaches us to see farmed animals as abstractions, as lacking any individuality or personality of their own. "A pig is a pig, and all pigs are the same." And carnism blinds us to the absurdities of the system.

Voltaire is right. If we have believe absurdities, we shall commit atrocities. And carnism is but one of the many atrocities, one of the many violent ideologies that are an unfortunate part of the human legacy. And although the experiences of each set of victims will always be somewhat unique, the ideologies themselves are similar. The mentality that enables such violence is the same.

It's the mentality of domination and subjugation, of privilege and oppression mentality. It's the mentality that causes us to turn someone into something. To reduce a life to a unit of production. It is the "might makes right" mentality, which makes us feel entitled to wield control over the lives and deaths of those with less power, just because we can. And to feel justified in our actions because they're only savages, women, animals. It is the mentality of meat.

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29. Joy, M. "Beyond Carnism and Toward Rational, Authentic Food Choices." TEDx Talks. https://www.youtube.com/watch?v=o0VrZPBskpg

If we fail to pick out the common threads that are woven through all violent ideologies, then we will recreate atrocities in new forms. But if we identify these common threads, then we can unravel atrocities in all forms. So this brings us to our final question:

What is the solution? How can we lead more authentic and and freely chosen lives and bring our optimal selves into the world?

It turns out the solution is already in our grasp. Seventeen minutes ago you may not have been aware of carnism. The invisible ideology that disconnects us from our rationality, our feelings and our values, and which enables a massive global injustice. You couldn't see carnism. Now, you can. Now, you are aware. Your awareness is the first step of the solution. And acting from your awareness is the rest. And awareness has always been the antidote to violent ideologies. Virtually every atrocity was made possible because the populace turned away form a reality they felt was too painful to face. And virtually every revolution ,every social transformation was made possible because of those who chose awareness and who acted on what they had learned.

And the good news is that there is an alternative to carnism. The vegan movement which is the counterpoint to carnism, is one of the fastest growing social justice movements in the world today. And the good news is also that we can make minor changes that will have a major impact. We can reduce and ultimately eliminate our consumption of meat, eggs, and dairy. To start wee can eat just one vegan meal a day, or one vegan day a week. And we can spread carnism awareness.

## 6-3. Can We Justify Killing Animals for Food?[30]

**Peter Singer: Our future selves will consider meat eating to be barbaric**

*Peter Singer is professor of bioethics at Princeton University and the author of Animal Liberation.*

"You could say that if you kill a cow you're depriving it of the rest of its existence, which could also have been a happy, good existence, so why deprive it of that just because you want to eat some meat when you've got other healthy, nutritious, delicious things that you could also eat?

"The counter-argument is this cow would not have existed if we had not already planned in advance that at some point we would kill it and we would sell the meat, because obviously it costs something to rear a cow, and we can only meet that cost if we are going to kill it.

"So in a sense the cow could thank us for her existence—at least she has some existence rather than none.

"If a cow is killed that will make it possible for another cow to come into existence who will have a good life, and if the first cow were not killed it would not be possible for the other cow to come into existence.

"So yes, this cow standing in front of us will lose the rest of her life, but that loss is replaced by bringing the other cow into existence and the other cow will also have that happy life.

"In theory—other things being equal—I do buy that argument. I say in theory because I think it's very hard to produce circumstances where that actually occurs and there aren't other undesirable side effects. Given the animals in our food supply are mostly cattle and sheep, and they are major producers of greenhouse gases, I think on balance, it would be better if they didn't exist.

"I think we'll come to view [eating meat] in the way we now look back on the Roman games; having crowds of enthusiastic people cheering on the lions as they slaughtered the Christians or gladiators fighting each other to the death.

"The last time I intentionally ate meat was 1971. I grew up eating a lot of meat in Australia and I liked it, but I really haven't missed it for a long time."

**Elizabeth Harman: A moral mistake but not morally wrong**

*Elizabeth Harman is associate professor of philosophy in human values at Princeton.*

"The kind of moral picture that I would urge is one in which we think about whether we can justify our treatment of individuals. If you're going to do something terrible to a particular morally significant individual, how can that be justified?

"Animals have moral status, and animal suffering matters because it's a harm to something that counts morally. Killing an animal harms the animal. We're actively doing something that deprives it of future life.

30. BBC. Can we justify killing animals for food? http://www.bbc.com/news/science-environment-34541077

“One way of thinking about how to justify an action is what could you say to the one that you’re harming? That works very well with people. It works less well with cows who can’t understand justifications.

“But we can imagine someone who is a representative of the cow and what could you say to the cow’s representative to justify your treatment of it? If you kill one cow and then you create another cow, that doesn’t justify killing the one cow at all, in my view.

“I think that meat production is morally wrong, and I think that eating meat is a moral mistake but not morally wrong.

“If you buy or eat meat, you’re doing something that plays some kind of causal role in meat production, but it’s a very removed causal role, so it’s not plausible that any particular animal suffering depends on whether you make a particular purchase. So in that way you don’t have any particular bit of animal suffering or death on your head for that instance of meat eating.

“What you’re doing is participating [in] the continuation of meat production, and you’re also failing to participate in the vegetarian movement, which I think is a really good moral thing that’s happening.

“I do still eat meat and I’m really torn about how I feel about that.”

**Jeff MacMahan: Cows have a moral interest in continuing to live**

*Jeff MacMahan is White’s Professor of Moral Philosophy at the University of Oxford.*

“If you didn’t kill the cow, it could go on living and have a life that would be good for it. That’s part of why it would be wrong for me to kill you. It would be depriving you of the good experiences that you would have if I didn’t. And an animal has an interest in living to have its next meal as well.

“You don’t have to think about humans in exactly the same way that you think about cows. But you’ve got to explain why you think it’s permissible to do to an animal what you think it would be impermissible to do to a human being. In the case of people their suffering matters, but their happiness also matters. The same should be true in the case of animals.

“Do I think it’s permissible to kill a cow and eat it if it has had a life that’s been good and it’s killed painlessly?

“If people couldn’t get adequate nutrition otherwise, then I think yes. In a society like contemporary America or Great Britain my inclination is to say no. It’s not at all clear that the interest that people have in killing and eating the cow outweighs the interests that the cow has in continuing to live.

“That’s because the flesh of the cow is going to provide a certain amount of additional pleasure for the people who eat it. When we do the cost benefit analysis here, we shouldn’t weigh all the pleasure that people get from eating a meal with the cow’s meat in it; we should weigh just the difference in pleasure that they would get from eating the cow and eating some meal that didn’t have meat in it.

“My own view is that in most cases that’s not very much. I don’t feel as a vegetarian that I’m in any way deprived.”

**Gary Comstock: Cows can learn—and know they're doing so**

Gary Comstock is professor of philosophy at North Carolina State University.

"In killing an animal we deprive it of its ability to have a future and to satisfy its desires, so I'm very interested in whether cattle look forward. I think they do.

"An interesting experiment was done by Donald Broom and colleagues at Cambridge a few years ago with heifers—one-year-old cows—which seems to show not only that they can learn, but that they take satisfaction in knowing that they are learning.

"In the first control group, heifers learned to hit a button that let them into a long chute, at the end of which was a reward. They knew which button to push, but had no control over when the gate would open. They were interested to get to the end of the chute, but otherwise their behaviour was unremarkable.

"A second group of heifers had control over when the gate would open. As they learned which button to push to open the gate, they got better at pushing the right button, and the gate opened faster so they got the reward more quickly.

"When the second group of heifers saw their own improvements in performance, they jumped and kicked and galloped down to get the reward, behaviours that suggest strongly that they not only anticipated the pleasure of the coming reward, but were also taking pleasure in their own role in making it happen. It seems they were aware of—perhaps even proud of—their accomplishment.

"There is a danger of anthropomorphising the animals, of over-interpreting their behaviour, [but] these are controlled experiments, these are not my intuitions about what I think is going on in cattle's minds.

"There is also anatomical evidence. If you look at the brains and neural pathways in cattle, and compare them to humans, there are massive similarities. The amygdala, the cerebellum, the thalamus which are all involved in processing pain in us, are all found in cattle.

"People used to justify eating meat for biological reasons: we are omnivores, our incisors are designed to eat meat, this is a natural thing for us to do. The problem is there are many natural things that are not right for us to do, and the biological features are irrelevant to the question of how we ought to live our lives.

"Evidence seems to be building that the shoe's on the other foot now; that those who want to kill animals and eat them ought to justify their view. It shouldn't be the other way round."

*interview with*

## Jeff Sebo, New York University

**What actions can we take as individuals to address the detrimental effects of industrial meat and dairy?**

The single best way for individuals to address the negative effects of industrial meat and dairy is to go vegan. Industrial animal agriculture is a leading cause of animal welfare, public health, and environmental harms, and we can each reduce the harm that this system causes by eating plant-based products instead of animal products. However, going vegan is not enough. We also need to encourage other people to go vegan, and we all need to work together to create a food system that can provide everyone with healthful and affordable food in an ethical and sustainable way.

**How do you see different sectors collaborating to address the detrimental effects of industrial animal agriculture?**

Industrial animal agriculture is a complicated problem, and it demands a complicated solution. We need to bring about social change, institutional change, political change, and technological change all at the same time. That means encouraging people to eat plant-based food, encouraging business leaders to invest in plant-based food, encouraging political leaders to support plant-based food, and encouraging researchers to develop plant-based food, including plant-based meat and dairy. Each of these changes makes the others easier, so if we work on them all, we can make a big difference overall.

**Based on your work in the field of political philosophy and bioethics, what are the top priorities for action around the issue of industrial meat and dairy?**

From an animal welfare perspective, the top priority is chicken and fish, since chicken and fish production cause more animal suffering than other kinds of animal agriculture. From an environmental perspective, the top priority is beef and dairy, since beef and dairy production cause more environmental harm than other kinds of animal agriculture. But my view is that we should prioritize all forms of animal agriculture roughly equally. A plant-based food system is best for humans, animals, and the environment, and animal and environmental advocates should work together to expand this kind of food system as much as possible.

## Additional Resources:

"Peter Singer". Utilitarian Philosophers.
https://www.utilitarian.net/singer/

"Beyond Carnism"
https://www.carnism.org