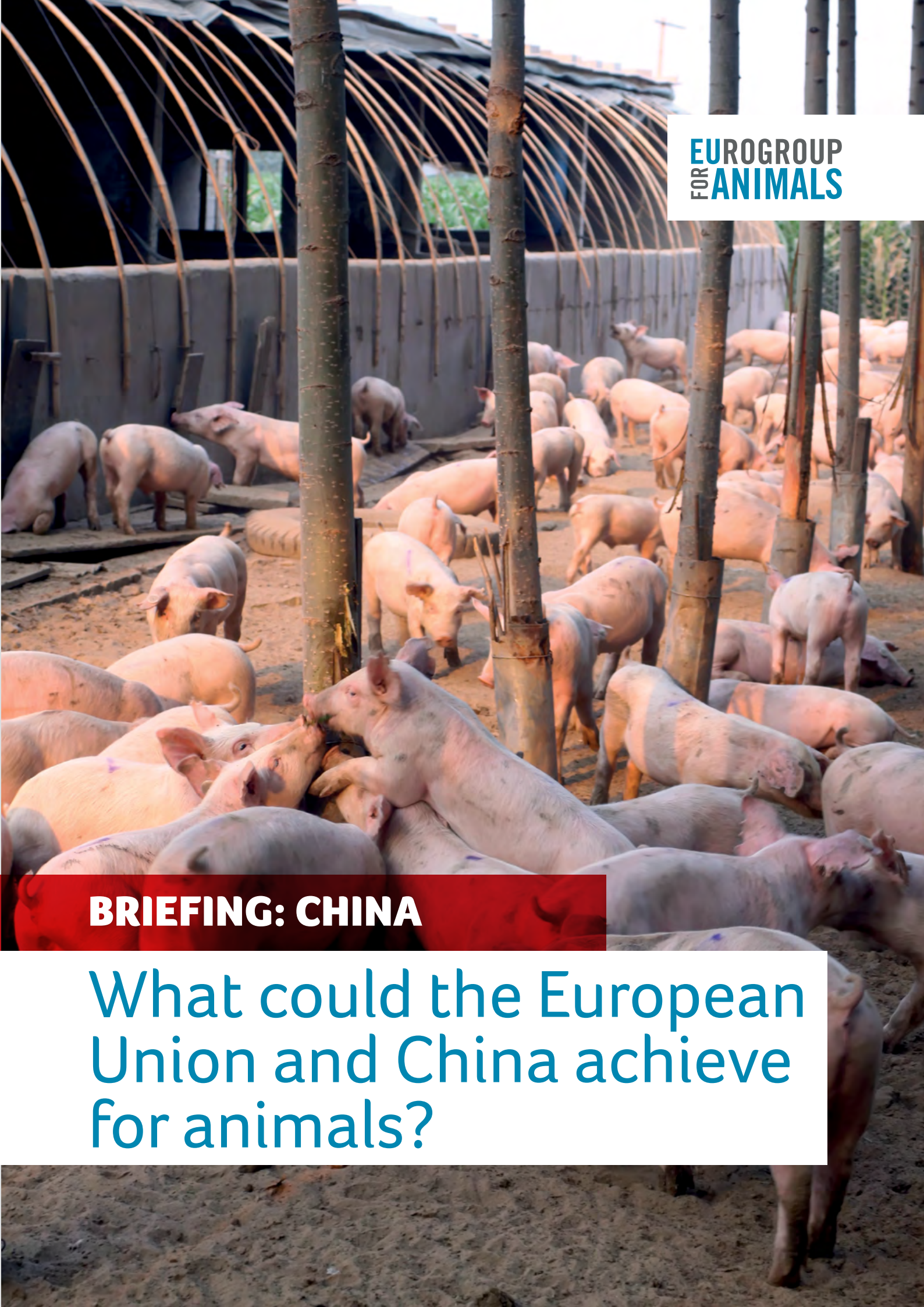

EUROGROUP FOR ANIMALS

BRIEFING: CHINA

What could the European Union and China achieve for animals?

EUROGROUP FOR ANIMALS

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EXECUTIVE SUMMARY

Relations between the European Union and China have reached an unprecedented level since they were first established in 1975, and sustainability has become a key topic for both partners. Recent pandemics such as the African Swine Fever, which has led to the death of half of China's swine population in 2018, and the COVID-19 crisis, which has to date killed over one million people worldwide, have placed a much-needed spotlight on the resilience, and sustainability, of our societies. COVID-19 demonstrated the human and economic costs of a zoonose pandemics and, while it emerged from wildlife, it has also reminded the world of the role played by intensive farming in spreading zoonoses. How we produce and consume food has an impact not only on animals but also on public health, the environment, people and climate.

An increased focus on animal welfare can play a key role in finding solutions to many of the current global challenges we are facing – including climate change and antimicrobial resistance, as well as pandemics. Considering the pressing nature of these crises and recent political developments for both partners, there has never been a better time to call on the European Union and China to cooperate on this topic.

Firstly, improving animal welfare standards can contribute to achieving several objectives. By positively impacting animal health, it can help build more resilience in the food production sector (SDG 2 - Zero Hunger). It also benefits human health by helping to reduce the risk of food-borne diseases and zoonoses, as well as to lessen the use of antibiotics in animal productions (SDG 3 - Healthy Lives). Improving the conditions in which we raise animals can also, if their numbers do not increase, contribute to fighting the climate crisis (SDG 13 - Climate Action). Finally, higher animal welfare standards can also generate concrete economic benefits for the producers (SDG 8 - Decent Work and Economic Growth).

The second path that could generate multiple positive effects is to move towards more sustainable production and consumption systems, which include lowering the production and consumption of meat and dairy products. This could have huge benefits for public health, lowering cases of obesity, diabetes and cardiovascular diseases (SDG 3 - Healthy Lives). The dairy and meat sector also represents around 14.5% of Greenhouse Gas (GHG) Emissions (SDG 13 - CLimate Action) and it is a massive source of water pollution (SDG 6 - Water Quality). Improving sustainability of meat and dairy production and consumption would also help fighting biodiversity loss (SDG 15 - Live on land; SDG 14 - Live under water).

Many innovative practices are being developed in China and in the EU, not only around agriculture but also relying on new technologies. These could serve as a basis to a fruitful cooperation between both partners.

Subsequently, Eurogroup for Animals would provide the following recommendations as a way forward:

- The European Union could improve its **animal welfare standards**, relying on the most recent animal welfare science. It could also develop standards for species which are currently left unprotected. China could also build up on the work led by authoritative organisations such as ICCAW and CAS to establish mandatory animal welfare standards.
- The EU and China could explicitly refer to animal welfare in the coming EU-China 2025 **Cooperation Agenda**, notably in the section related to cooperation around public health.
- Animal Welfare could be explicitly mentioned in the **EU-China agricultural dialogue**, as a dimension of sustainable farming. Programmes put in place under such dialogue, like exchange of young farmers, could also pay specific attention to the topic.
- The EU and China could establish a **joint expert working group** on future food policies including sustainable and higher welfare livestock production as well as animal welfare and humane and sustainable protein innovation. For example, the EU and China could develop **cooperation among researchers**, notably on pig, fish and broiler welfare, to develop guidelines that would allow producers to provide enhance animal welfare, taking into account the specificities of each context
- In the future **EU-China investment agreement**, the Parties could require EU businesses to respect EU-equivalent standards when investing in animal agriculture in China. Provisions on investment and sustainable development could also include the OIE Aquatic and Terrestrial Codes in the list of international commitments the Parties commit to respect
- The EU and China could aim at establishing a **Memorandum of Understanding** between DG SANTE and its counterparts in China - the Ministry of Agriculture and Rural Affairs and the National Health and Family Planning Commission - to develop a more structured cooperation on animal welfare, possibly in the context of the fight against antimicrobial resistance.

1 INTRODUCTION

1.1 THE EUROPEAN UNION AND CHINA – KEY ECONOMIC PARTNERS

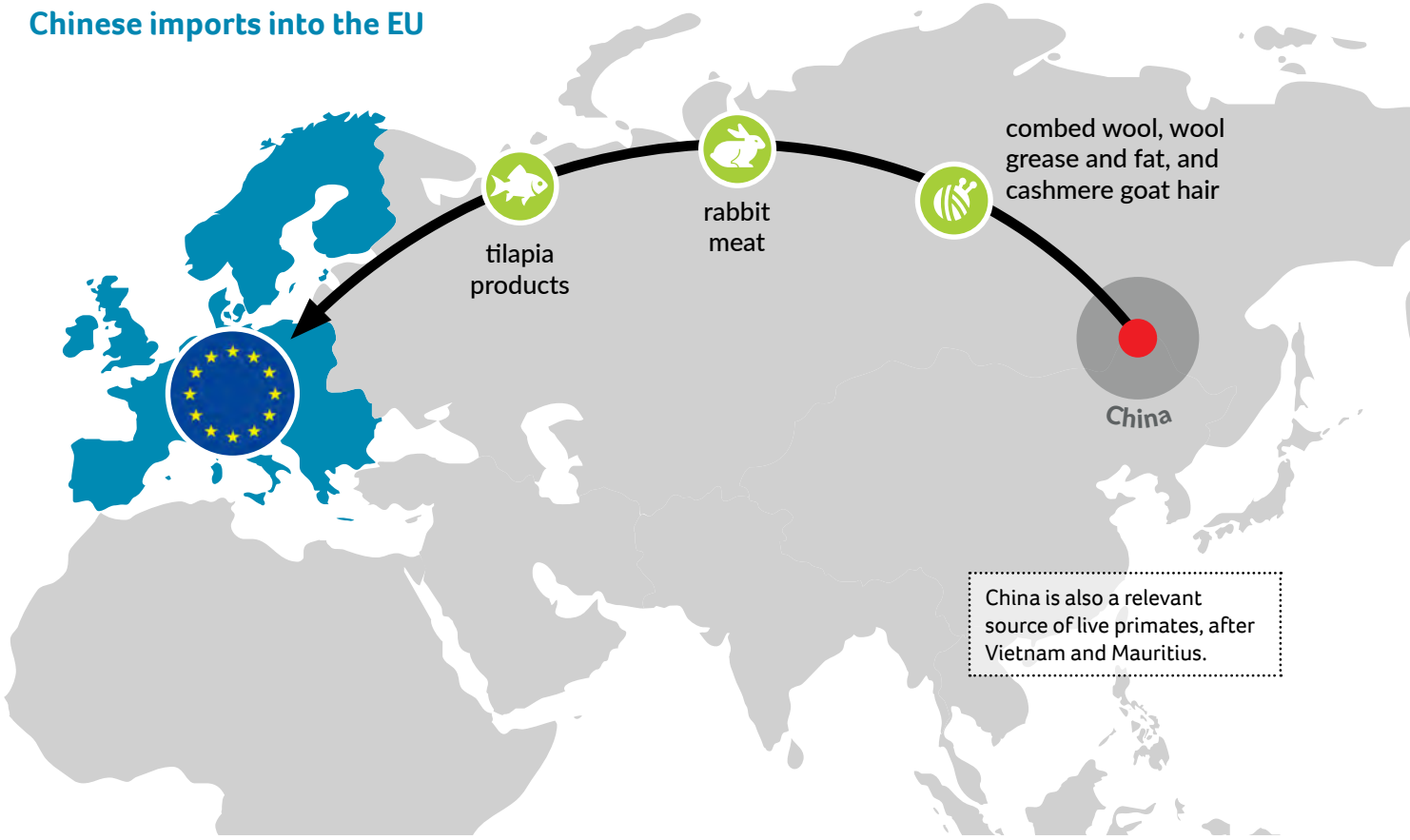
Relations between the European Union and China have developed at an unprecedented scale since diplomatic relations were first established in 1975. The European Union has become China's largest trading partner while China is the European Union's second-largest partner. In 2019, EU-China bilateral trade amounted to EUR 560 billion, with imports of Chinese animal products into the European Union accounting for roughly 0.6% (EUR 2.3 billion) and export of EU animal products to China accounting for 3.7% (EUR 7.3 billion)[1].

In terms of agricultural trade, the European Union has seen a large growth in its exports of high-quality and high-value products (e.g. wines, spirits, dairy products and certain meats) to China, which is the second destination of EU exports of products protected as 'geographical indications'. China predominantly exports labour-intensive products such as fruit and vegetables, and processed agricultural goods. It is the European Union's **largest source of tilapia products and rabbit meat**, the **fourth largest source of preserved/cooked poultry eggs** and **the fifth largest source of pig meat products**. China is also the European Union's **largest source of feathers** used for stuffing and of **combed wool, wool grease and fat**, and **cashmere goat hair**. China is the European Union's first source of imported live reptiles (including snakes and turtles), with around 350,000 animals imported annually to the continent for the past five years. China is also a relevant source of live primates, after Vietnam and Mauritius.

China is also the first destination of EU exports of pig meat (1.4 million tonnes for EUR 3 billion in 2019), of edible offal from bovines, ovines and equines (863,000 tonnes for EUR 1.4 billion) and of pig and poultry fat (120 million tonnes for EUR 155 million), and third for frozen beef (12,000 tonnes for EUR 56 million). The European Union also exports pure-bred breeding pigs and chickens (especially grandparent and parent chicks) to China.

[1] https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_china_en.pdf (statistics including HS categories 1-5, i.e. live animals, meat, dairies, eggs and other raw products)

Chinese imports into the EU



1.2 SUSTAINABLE DEVELOPMENT AT THE HEART OF EU-CHINA RELATIONS

The European Union and China signed a Trade and Economic Cooperation Agreement (TECA) in 1985, and negotiations for a more comprehensive Partnership and Cooperation Agreement (PCA) started in 2007. To date, these negotiations are still open and face many obstacles[2]. EU-China relations have, nevertheless, evolved in the absence of a new legal treaty.

Since 1995, China has been seen as an increasingly important partner, and EU-China relations have become further institutionalised as a result. In 2003, China was even designated as a 'Strategic Partner'. Today, EU-China relations encompass an annual summit, regular ministerial meetings and more than 60 sectoral dialogues.

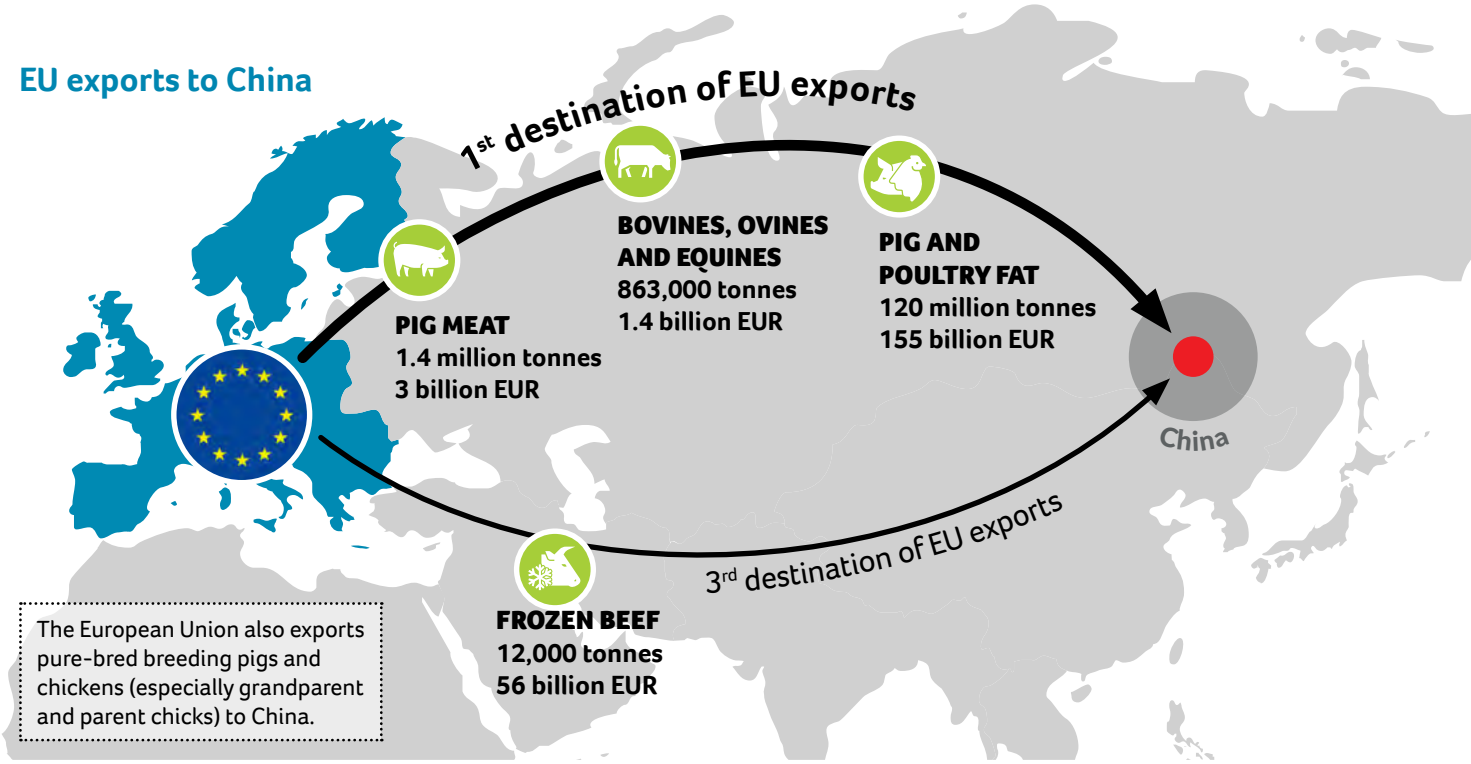
- In 2013, the European Union and China adopted the 'EU-China 2020 Strategic Agenda for Cooperation',[3] which underlined the role of both partners in promoting sustainable development. In this document, sustainable agriculture is recognised as a field for cooperation, as is food safety.
- In 2016, the European Union communicated 'Elements for a new EU strategy on China'[4] which emphasised the need for both partners to observe and promote a more balanced model of development, and to cooperate in the provision of Global Public Goods (GPGs), such as on global health and climate change.. The EU document also mentions cooperation on food safety and the need to encourage China to be more active on antimicrobial resistance.
- In 2019, both partners issued a joint statement after the EU-China Summit reaffirming their commitment to the goals of the EU-China Comprehensive Strategic Partnership, as well as to the implementation of the United Nations Sustainable Development Goals (SDGs)), and the Paris Agreement.[5]

2 https://ghum.kuleuven.be/ggs/research/eucross/eucross-wp-leal-arcas.pdf

3 http://eeas.europa.eu/archives/docs/china/docs/eu-china_2020_strategic_agenda_en.pdf

4 https://eeas.europa.eu/sites/eeas/files/joint_communication_to_the_european_parliament_and_the_council_-_elements_for_a_new_eu_strategy_on_china.pdf

5 https://www.consilium.europa.eu/media/39020/euchina-joint-statement-9april2019.pdf



Following a stocktaking moment in 2019, the European Commission released 'EU-China – A Strategic Outlook', a new communication listing ten key actions the European Union should take regarding China.[6] In its introduction, the document restates the aim expressed by the EU 2016 strategy of promoting common interests at global level, such as on the SDGs. One of the actions also calls for China to peak its emissions before 2030, in line with the goals of the Paris Agreement.

As part of the EU-China 2020 Strategic Agenda for Cooperation, the European Union and China have been negotiating an investment agreement. The 26th round of negotiations took place in April 2020. The aim of the agreement is to create a more even playing field for businesses from both countries and provide each other with more market opportunities. Both parties also agreed in 2019 that the agreement would contain provisions on 'investment and sustainable development'. The European Union had hoped to conclude this ambitious agreement by 2020, but a 2021 conclusion is more likely.

1.3 AFRICAN SWINE FEVER AND THE COVID-19 CRISIS

In August 2018, African Swine Fever (ASF) – a disease only affecting (wild and domestic) pigs that proliferates in overcrowded intensive livestock systems – swept through China, leading to the death of half the swine population and causing a critical shortage of pork.[7] More recently, the COVID-19 crisis has put the spotlight on zoonoses that are transmissible to humans, including those fostered in intensive livestock systems.

While the pandemic was forcing most of Europe into lockdown, the European Union reaffirmed the importance of ensuring a sustainable recovery in its new food policy entitled 'Farm to Fork'. This strategy clearly refers to the importance of animal welfare in ensuring the resilience of the food system as a whole, and the need for the European Union to promote this vision globally.

There has never been a better time to call on the EU and China to cooperate on animal welfare. This report describes the state of play of animal welfare legislation and practices in China and in the European Union, as well as recent political developments that create a favourable context for such cooperation. The report then explores the interconnections between solving key challenges faced by both China and the European Union and, one the one hand, improving animal welfare standards, and, on the other hand, achieving more sustainable production and consumption of meat and dairy products. It goes on to describe innovations and best practices that are currently being developed in China and in the European Union, and which could serve as a basis for cooperation between both partners. Finally, it concludes with key recommendations for policy-makers and other relevant stakeholders.

[6] https://ec.europa.eu/commission/sites/beta-political/files/communication-eu-china-a-strategic-outlook.pdf

[7] https://www.forbes.com/sites/quora/2019/10/22/what-ripple-effects-do-events-like-swine-flu-have-on-agriculture/#5bc2a84f3d98

2 ANIMAL WELFARE IN CHINA

2.1 ECONOMIC AND SOCIAL CONTEXT

2.1.1 Changes in diet

To discuss the current state of animal welfare in China, it is important to understand China's economic development and how this has impacted Chinese society and culture.

Over the past four decades, China has undergone massive transformation, both socially and economically. In 1978, Deng Xiaoping spurred China into economic prosperity with unprecedented growth through the implementation of major agricultural and economic reforms known as the 'Four Modernisations'.[8] The four modernisations aimed to improve agricultural production, international trade, foreign direct investment and infrastructure development.[9] These reforms were necessary to ensure that food production kept up with rapid population growth.

Deng's programme dramatically reduced poverty and created a large middle class in China. These changes also had repercussions on the average daily diet of the Chinese people. In 1981, it was estimated that 84% of the total population was living below the poverty line. By 2010, this figure had steadily declined to 12%.[10] As the demand for meat is income-elastic,[11] reduced poverty led to people buying more meat products. In China, meat is synonymous with prosperity and owes its symbolic status to the fact that it was a scarce commodity for the generations who lived through the Great Leap Forward and the Cultural Revolution.[12] As shown by Figure 1, between 1980 and 2011, consumption of meat in China grew by 288%, and consumption of eggs and dairy products by 415%. Pig meat remained the primary meat consumed, and its consumption tripled (Figure 2).

8 McBeath, Jenifer Huang and McBeath, Jerry. (2010) Environmental Change and Food Security in China. New York: Springer, p.25

9 Ibid.

10 https://blogs.wsj.com/chinarealtime/2013/04/18/heres-how-much-poverty-has-declined-in-china/

11 McBeath, p.41

12 http://www.chinadaily.com.cn/food/2012-10/21/content_15834627.htm

Figure 1 – Average daily diet 1980 vs 2011

Food	Calories		Percentage change
	1980	2011	
Grain	1445	1451	0.42
Produce*	286	471	64.69
Dairy & eggs	33	170	415.15
Meat	131	509	288.55
Other	81	134	65.43
Sugar & fat	169	338	100
Total	**2145**	**3073**	**43.26**

** Fruit and vegetables*

Source: https://www.nationalgeographic.com/what-the-world-eats/

Figure 2 – Breakdown of average daily meat consumption 1980 vs 2011

Meat product	Calories		Percentage change
	1980	2011	
Beef	1	27	2600
Pork	112	346	208.93
Poultry	6	58	866.67
Seafood	7	48	585.71
Other meat	5	30	500
Total	**131**	**509**	**288.55**

Source: https://www.nationalgeographic.com/what-the-world-eats/

2.1.2 Increasing livestock production

Changes in dietary habits and demand for food revolutionised China's agricultural sector, including the livestock industry; dietary change has often been considered as the main driver behind China's transformation into the agricultural behemoth it is today.[13] The livestock sector grew by 5.9% on average each year between 1979 and 2014.[14] In the early 1990s, China surpassed the United States and became the leading livestock producer in the world.[15]

The sheer scale of agricultural production in China is overwhelming. In 1980, landless livestock systems – with animals restricted to confined spaces – accounted for merely 2.5% of the industry.[16] However, the use of such systems increased exponentially, and in 2010, they represented 56% of an industry that had tripled in volume compared to 1980.[17] China also altered its livestock production model, initially reliant on ruminants, to focus on pigs and chickens. In 1980, landless systems already accounted for 62% of the pig and chicken sector, growing to 74% by 2010.[18] The data provided in Figure 3 supports these observations. Due to the confinement animals experience in landless systems, they pose a significant challenge to animal welfare.

Between 1996 and 2017, the total livestock population in China grew by 34.69% , from 1.15 billion in 1996 to 1.54 billion in 2017. The number of pigs slaughtered each year increased by 70.29%, demonstrating the growing demand for pig meat, while continually fewer large animals (cattle, buffaloes, horses, donkeys and camels) were slaughtered. Figure 4 reveals the exponential increase in meat production, showcasing the growing importance of meat in the Chinese diet. Interestingly, industries also started to concentrate in specific regions: pig farming in central and south-western regions, and broiler and laying hens farming in the north and north-east, where grain is produced.[19] This concentration, combined with the vastness of the Chinese territory, imply that live transport often creates significant animal welfare issues.[20]

[13] Zhang, Jin (2019) 'Beyond the 'Hidden Agricultural Revolution' and 'China's Overseas Land Investment': Main Trends in China's Agriculture and Food Sector, Journal of Contemporary China, 28:119, p.758.

[14] Garnett, Tara and Wilkes, Andreas. (2014) Appetite for Change: Social, Economic and Environmental Transformations in China's Food System. Food Climate Research Network, p.98.

[15] Peter and Davey, Gareth (2013). Culture, Reform Politics, and Future Directions: A Review of China's Animal Protection Challenge. Society& Animals, 21(1), p.35.

[16] https://advances.sciencemag.org/content/4/7/eaar8534.full (3.6 million Livestock Units (LUs) of a total of 142 million LUs.)

[17] Ibid.

[18] Ibid.

[19] Li, p.36

[20] Li, p.36

Figure 3 – Livestock population 1996 vs 2017

Animals	Population (in millions)		Percentage change
	1996	2017	
Cattle and buffaloes	110.31	90.39	-18.06
Horses	8.72	3.44	-60.55
Donkeys	9.44	2.68	-71.61
Mules	4.78	0.81	-83.05
Camels	0.35	0.32	-8.57
Slaughtered hogs	412.25	702.02	70.29
Hogs	362.84	441.59	21.70
Goats	123.16	138.24	12.24
Sheep	114.13	164.08	43.77
Total	1145.98	1543.57	34.69

Source: China Statistical Yearbook 2018: http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm

Figure 4 – Meat production 1980 vs 2014

Meat products	1980 (in tonnes)	2014 (in tonnes)	Percentage change
Pork	11,341,000	54,445,500	380.08
Sheep	250,000	2,184,000	773.60
Beef	235,000	6,552,400	2,688.26
Chicken	940,000	12,257,000	1,203.94

Source: Pg.1. Big Meat https://apjjf.org/-Alisha-Gao--Thomas-David-DuBois/5067/article.pdf

2.2 CHINA'S LEGISLATION ON ANIMAL WELFARE AND PROTECTION

China has no specific legislation on animal welfare, but it does have regulations on animal protection, within a range of different laws.[21] The lack of specific animal welfare legislation in China is likely to be linked with China's economic reasoning and a fear that economic growth could be slowed down by the improvement of standards.[22] 'Local protectionism' and competition among Chinese regions can also be seen as a key obstacle for the adoption and implementation of any animal welfare legislation at regional level, with more relaxed regulations acting as incentives for businesses to invest in the region, at the cost of animal welfare.[23]

2.2.1 Animal welfare

A decade ago, China attempted to draft an animal welfare law. This process was led by Chinese scholars and foreign NGOs, such as our member the UK's Royal Society for the Prevention of Cruelty to Animals (RSPCA), but the process was dropped. In some instances, it was considered that the animal husbandry law (2006 and 2015) addressed animal welfare through its references to animals' living conditions. However, that law, while being based on World Organisation for Animal Health (OIE) standards[24] and indirectly impacting animal welfare by requiring adequate feed, water, and space throughout journeys[25], only states that authorities shall 'offer guidance to the producers and business operators of stockbreeding to improve the conditions and environment for the breeding, rearing, and transport of livestock and poultry'.[26] There is no explicit reference to the welfare of animals.

Rules enacted in 2005 on fur-producing animals could be seen as partially recognising animal sentience, as they acknowledge that animals can feel pain and should not suffer.[27] China also has legislation on animal experimentation,[28] including provisions on the housing and transport of experimental animals.[29] Another set of national rules was published in 2008 regarding slaughter,

21 Li, p.36.

22 https://www.forbes.com/sites/michaeltobias/2012/11/02/animal-rights-in-china/

23 Ibid.

24 Interview with researcher based in China

25 http://www.fondation-droit-animal.org/proceedings-aw/animal-welfare-in-asia/

26 http://lawinfochina.com/display.aspx?id=19803&lib=law

27 https://api.worldanimalprotection.org/country/china

28 http://en.pkulaw.cn/display.aspx?id=79b97e78521e4572bdfb&lib=law&SearchKeyword=&SearchCKeyword=%b6%af%ce%ef

29 Li, p.41

but these are limited to the pig meat industry and do not address welfare at the time of slaughter.[30]

In 2014, the first animal welfare standard was adopted by the Chinese Association for Standardisation (CAS), focusing on pig welfare.[31] CAS, a body recognised by the Chinese government, has since adopted other standards around animal welfare, but there is no legal obligation for producers to follow such standards.

2.2.2 Animal protection

In contrast with animal welfare, Chinese legislation makes some references to animal protection. For instance, the fourth version of the Constitution of the People's Republic of China, from 1982[32], states in Article 9(2) that 'The state ensures the rational use of natural resources and protects rare animals and plants'.[33] In 1988, China also adopted the 'Law of the People's Republic of China on the Protection of Wildlife.'[34] However, the text has been criticised for its lack of specific provisions and decentralised approach, making enforcement the real challenge.[35] In addition, animals were classified as being part of the country's natural resources, meaning they can be exploited.[36]

China is a country rich in terms of biodiversity. It has a long history of wildlife farming, which is now a booming private activity notably to produce fur, and also has many wildlife markets sustaining illegal wildlife trafficking. In addition to impacting the conservation of species of wild animals, these issues also affect their welfare: the manner in which animals are trapped and transported, as well as how they are kept afterwards, is detrimental to their welfare.

In 2010, China adopted a ban on zoo performance and in 2016, a new 'Wild Animal Conservation Act' was enacted, offering protection to wild animals and their habitats. This text was seen as a significant step forward, but many pointed out that traders could still apply for licences, allowing them to circumvent the law. In 2017, China also adopted a ban on the trade in ivory.

Following the COVID-19 crisis, China suspended the trade in wild animals for food in order to curb the epidemic.[37] It also narrowed down the list of wild animals considered as livestock – for which breeding and trading is allowed – removing species suspected to be vehicles for zoonoses, such as pangolins and bamboo rats.[38] However, this list did not prevent breeders from raising these animals to be used in fur farming, to make traditional medicines or to supply zoos and circuses. While some observers underlined that the Chinese ban was only temporary and likely to be reversed as soon as the COVID-19 crisis ends, at least 15 Chinese metropolitan or provincial governments have already transposed the ban into permanent regulations.[39] The National People's Congress, China's legislative power, has also announced that they will review the Wild Animal Conservation Act.[40]

Nonetheless, there are serious issues with enforcement in China. A prime example is the legislation adopted in 1997 to improve the conditions of bears in the bear farming sector.[41] These rules are most often violated, as media reports on bile extraction demonstrate.[42] In addition, even though China legislated as early as in 1988 on conservation issues, a rapid decline of species was still observed over the past 40 years, mostly attributed to overexploitation of natural resources.[43] An example is the case of the Chinese paddlefish, which became extinct around 2003.[44]

30 http://en.pkulaw.cn/Display.aspx?lib=law&Cgid=105516

31 http://www.fondation-droit-animal.org/proceedings-aw/animal-welfare-in-asia/ / 'Farm Animal Welfare Requirements for Pigs (CAS 235-2014)

32 https://capn-online.info/

33 https://www.wipo.int/edocs/lexdocs/laws/en/cn/cn147en.pdf

34 https://www.ecolex.org/details/legislation/law-of-the-peoples-republic-of-china-on-the-protection-of-wildlife-lex-faoc006515/

35 Li, p.41

36 https://www.forbes.com/sites/michaeltobias/2012/11/02/animal-rights-in-china/

37 http://www.xinhuanet.com/english/2020-01/26/c_138735496.htm

38 https://www.npr.org/sections/goatsandsoda/2020/06/28/883900042/pandemic-causes-china-to-ban-breeding-of-bamboo-rats-and-other-wild-animals?t=1594629612473

39 https://www.rspca.org.uk/-/the-pandemic-and-china-s-wildlife-trade

40 https://www.npr.org/sections/goatsandsoda/2020/06/28/883900042/pandemic-causes-china-to-ban-breeding-of-bamboo-rats-and-other-wild-animals?t=1594629612473

41 "Tentative Regulation on the Use and Management of Black Bear Farming Technology."

42 Li, p.42

43 Lu, Bayne and Wang (2013), Current Status of Animal Welfare and Animal Rights in China, ATLA, 41, p.352

44 https://www.nationalgeographic.com/animals/2020/01/chinese-paddlefish-one-of-largest-fish-extinct/

3 ANIMAL WELFARE IN THE EU

3.1 ECONOMIC AND SOCIAL CONTEXT

3.1.1 Changes in diet

Although Europeans continue to be among the largest consumers of meat in the world – with 446 million people, the European Union represents 5.7% of the world's population, yet accounts for around 10% of the world's meat consumption[45] – increasing concern about the environmental, ethical and health impact of their diet means habits are starting to change. A recent study carried out by the European Consumer Organisation (BEUC) found that 44.9% of consumers are willing to change their eating habits towards more plant-based foods.

While the number of people in the European Union identifying as vegetarian remains modest and varies considerably across the region – estimates are at 1.2% of the population in Portugal, 1.5% in Spain, rising to 10% in Germany and Sweden – growing proportions of the population are identifying as 'flexitarian' or 'part-time vegetarians', such as in Germany and the Netherlands at 55%[46] and 37%[47] respectively.

These shifts have also seen the market adapt to a newfound demand for meat-free options. Between 2014 and 2018, 39% more products containing legumes such as beans, lentils or soybeans came onto the European market.[48] Europe has also been the dominant market for meat substitutes, with sales of these products growing by an impressive 451% between 2013 and 2017.[49] Predictions are that these products will have a global net worth of just under USD 6 billion by 2022 and that Europe will maintain its trend in dominating the market.

However, despite good intentions and some changes in purchasing behaviour, data on actual consumption tell a slightly different, and more complex story. Statistics show that meat consumption per capita in the European Union has been on a broad upward trend since 2014.[50] However, projections suggest that across the European Union, meat consumption will decrease by around 700 g per capita by 2030.

45 OECD-FAO. 2018. OECD-FAO Agricultural Outlook 2018-2027. Available at: http://www.fao.org/3/i9166e/i9166e_Chapter6_Meat.pdf (Accessed: 30 September 2020)

46 https://english.fleischwirtschaft.de/economy/news/Consumer-survey-Share-of-flexitarians-increases-42043

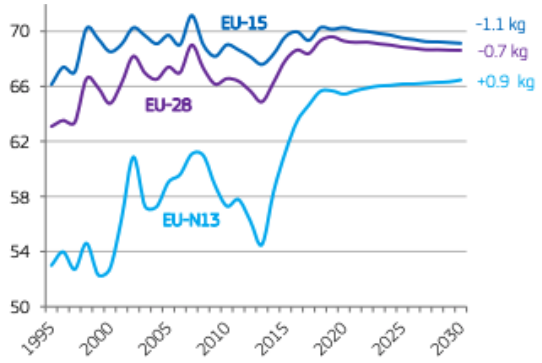
47 https://www.natuurenmilieu.nl/wp-content/uploads/2019/11/Natuur-Milieu-Vegamonitor-2019-RAPP_e1.pdf

48 https://www.uni-hohenheim.de/en/press-release?tx_ttnews[tt_news]=39041

49 Ibid.

50 https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agricultural-outlook-2019-report_en.pdf

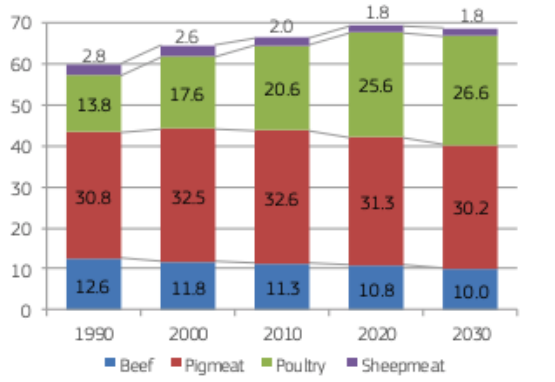
Graph 1 - EU total meat consuption (kg per capita)



Source: EU agricultural outlook 2018–2030 (https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/medium-term-outlook-2018-report_en.pdf, p60)

Statistics on the type of meat consumed is also revealing. While consumption of pork meat has essentially remained stable over the last 30 years, figures show that people are consuming less beef and sheep meat, and more poultry meat.[51] This trend may be attributed to various factors including perceived health benefits of eating less red meat, as well as availability of cheap poultry meat.

Graph 2 - EU total meat consuption (kg per capita)

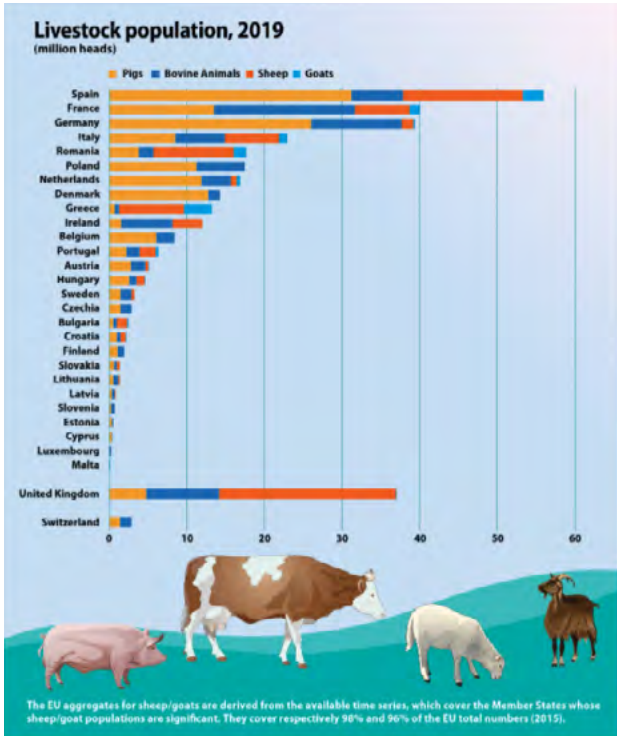


Source: EU agricultural outlook 2019–2030 (https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agricultural-outlook-2019-report_en.pdf, p44)

In terms of dairy products, European consumers are turning away from drinking milk,[52] while demand for cheese is on the increase, partly due to its use in convenience foods such as ready meals and pizza.[53]

3.1.2 Changes in livestock production

Livestock production makes up 45% of the European Union's agricultural production value, contributing around EUR 168 billion annually to the European economy and providing employment for around 30 million people.[54] Livestock production plays an even more important role in some EU countries, such as Ireland, Denmark and Belgium, where the sector makes up 74.2%, 66.4 and 58.9% of agricultural production value respectively.



Source: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20200923-1

The European Union has a substantial livestock population: in December 2019, there were 143 million pigs, 77 million bovine animals, and an estimated 62 million sheep and 12 million goats. The EU livestock herd has been increasing overall in recent years, with mixed trends in different sectors: while poultry and pig numbers have risen steadily since 2013, the number of bovines is seeing a downward trend.[55] The latter can be partly attributed to the phasing out of EU milk quotas in 2015[56] as well as to an increase in the milk yield per cow.[57]

[51] European Commission. 2018. EU Agricultural Outlook for markets and income 2019-2030. Available at: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agricultural-outlook-2019-report_en.pdf (Accessed: 30 September 2020)

[52] https://www.independent.ie/business/farming/dairy/diet-and-health-choices-lead-to-huge-decline-in-milk-consumption-35284691.html

[53] https://ec.europa.eu/info/news/eu-agricultural-outlook-2018-2030-growing-export-demand-dairy-products-world-population-expands-2018-dec-07_en

[54] Animal Task Force. 2017. Why is European animal production important today? Available at: http://animaltaskforce.eu/Portals/0/ATF/Downloads/Facts%20and%20figures%20sustainable%20and%20competitive%20livestock%20sector%20in%20EU_FINAL.pdf (Accessed: 30 September 2020)

[55] https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/medium-term-outlook-2018-report_en.pdf

[56] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agricultural_production_-_livestock_and_meat&oldid=427096#Livestock_population

[57] https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/medium-term-outlook-2018-report_en.pdf

It is worth noting that the majority of EU livestock are reared in just a few EU Member States: according to end-2019 figures, Spain, Germany,France and Poland.[58]

A point of concern is that 72% of European livestock products come from Europe's largest farms,[59] showing an ever-increasing concentration of meat and dairy production in fewer and larger farms.

Intensification can also be clearly seen in poultry meat production in the European Union, with a cumulative rise of about 25% since 2010, and a 4.8% rise between 2017 and 2018.[60] In Poland, the European Union's largest producer of poultry meat, data shows that between 2012 and 2018, the number of layer hens increased by 27.7% to 56.3 million, and the number of broiler chickens rose 82% to 124.4 million. The European Union is the fourth largest importer and the third largest exporter of poultry meat, making it a major trading partner in the global poultry meat market.

Demand for organic food products is also growing across the EU and the organic meat production sector is developing rapidly, though there are significant differences between countries and categories. Sales of organic meat saw increases across the European Union between 2012 and 2017, e.g. France (from 2.4 % to 3.7 %), Italy (from 0.8 % to 1.7 %), Spain (from 1.3 % to 1.5 %), and Germany (from 1.2 % to 1.6 %).[61]

3.2 EU LEGISLATION ON ANIMAL WELFARE AND PROTECTION

The European Union has been actively advocating for animal welfare for over 40 years and is recognised as having some of the world's highest animal welfare standards. EU legislation mainly concerns the treatment of farm animals (on the farm, during transport and at slaughter) and the first legislation for their protection dates back to Directive 74/577/EEC in 1974 that dealt with the protection of animals at slaughter.

An important step was made in 1998 when the European Union passed the Council Directive 98/58/EC . These rules, based on the European Convention for the Protection of Animals kept for Farming Purposes, address the protection of all species of animals (including fish, reptiles and amphibians) 'bred or kept for the production of food, wool, skin or fur or for other farming purposes'[62] and reflect the 'Five Freedoms': freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury and disease; freedom to express normal behaviour; and freedom from fear and distress. Four more directives were adopted between 1999 and 2008, governing the welfare of laying hens, broiler chickens, pigs and calves.

58 https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190325-1

59 https://www.greenpeace.org/eu-unit/issues/nature-food/1807/71-eu-farmland-meat-dairy/

60 https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agricultural_production_-_livestock_and_meat&oldid=427096#Livestock_population

61 https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/medium-term-outlook-2018-report_en.pdf

62 Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31998L0058

Another key development in the advancement of animal welfare in the European Union came when the Lisbon Treaty in 2009 introduced the recognition that animals are sentient beings, and affirmed that when formulating and implementing any EU policies, 'the Union and the Member States shall, since animals are sentient beings, pay full regard to the welfare requirements of animals'.[63]

This explicit recognition of animals as sentient beings – as opposed to being previously seen as 'goods' or 'products' – paved the way for campaigners to secure major improvements in EU law across a wide range of animal welfare issues. In recent years alone, some of the significant achievements that specifically targeted the living conditions of animals (as opposed to more temporal aspects like transport or slaughter) included:

- 2013 banning the use of individual stalls for pregnant sows
- 2012 banning the use of battery cages for laying hens
- 2013 prohibition to market finished cosmetic products and ingredients in the EU which were tested on animals.

EU legislation has somehow improved the overall quality of animal transport, thanks to a major revision of existing legislation in 2005, while a 2009 regulation on the protection of animals at the time of killing aimed to minimise pain and suffering through the use of appropriate stunning methods.

Some changes required by EU law have indeed led to improvement in animal welfare, and some of these laws are being respected. However, adherence and enforcement is not consistent across EU Member States, and rules are sometimes blatantly flouted. For example, despite EU Directive 2008/120 that banned the docking of pigs' tails, this practice is still carried out. Furthermore, many of the animal species kept in the European Union are not explicitly covered by legislation, including some of the ones that are facing the worst animal welfare problems. Foie gras production, where ducks (97%) and geese (3%) are force-fed in cramped conditions, is a case in point, and there is currently no EU legislation that prevents poor welfare for ducks.

Where legislation does exist, the wording used may also lead to confusion and variation in interpretation. For example, some experts point to issues with the use of terms such as 'necessary suffering' and 'natural behaviour'[64], which can be interpreted differently by policy-makers. To remedy this, terms related to animal welfare should be used in accordance with scientific meanings to remove any doubt or ambiguity.

The European Green Deal – the European Union's plan to make the EU economy sustainable, presented in December 2019 – heralds the way for long-awaited improvements in animal welfare, and includes two key strategies: the 'Farm to Fork' and 'Biodiversity' strategies. The Farm to Fork strategy includes a 'fitness check' of the EU animal welfare legislation for food-producing animals,[65] which provides an opportunity to ensure that legislation is in line with the most recent scientific evidence and worded appropriately. *Both, 'Farm to Fork' and 'Biodiversity' strategies, have set a target for an increase on organic production* – which encourages high standards of animal welfare and requires farmers to meet animal's specific behavioural needs – presenting it as a key ally in the transition that we are leading towards a more sustainable food system and a better protection of our biodiversity.[66]

[63] https://ec.europa.eu/food/animals/welfare_en

[64] Lundmark, F. (2016), Mind the gaps! From Intentions to Practice in Animal Welfare Legislation and Private Standards, Ph.D. thesis, Acta Universitatis Agriculturae Sueciae, 95. SLU Skara, ISSN 1652-6880.

[65] https://ec.europa.eu/food/sites/food/files/animals/docs/aw_fitness-check_roadmap.pdf

[66] https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1548

4 WHY THE TIME IS RIGHT

As the world grows ever closer, the international community faces increasingly complex and interconnected challenges, ranging from climate change and biodiversity loss, to zoonoses and antimicrobial resistance. It is only together, through coordinated strategic efforts, that we can respond to these challenges with actionable solutions.

4.1 GROWING PUBLIC AWARENESS IN THE EUROPEAN UNION AND CHINA

In Europe, a 2016 Eurobarometer survey revealed that 94% of Europeans consider that the welfare of farmed animals must be protected. 82% believe that animals must be better protected than they are now, and 89% that the European Union should foster greater public awareness on animal welfare. Almost 90% also recognised that the European Union should do more to promote animal welfare at global level.[67] More recently, in the Consultation on the Future of Europe, one in seven European citizens mentioned animal welfare in an open question about their hopes for future EU priorities.[68]

In China, animal welfare is quite a new term, only introduced a few decades ago. A Chinese survey conducted by Nanjing Agricultural University in 2014 revealed that two thirds of respondents had never heard of the concept of animal welfare.[69] However, 65.8% of those surveyed believe there should be laws to improve the welfare of animals. In the context of food safety, 72.9% of respondents believed that conditions of livestock production should be improved.[70] This promising increase in public awareness of animal welfare in China over the past decade is particularly reflected in increased media attention and growing activism. A recent survey revealed that the public is concerned with different areas related to animal welfare, ranging from hunting to zoo animals.[71] Public awareness is mainly driven by highly publicised animal cruelty cases and the rising popularity of vegetarianism and Buddhism.[72]

67 https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/71349

68 https://ec.europa.eu/commission/sites/beta-political/files/online-consultation-report-april-2019_en.pdf

69 Lu, p.355

70 You, Li, Zhang and Zhao (2014), A Survey of Chinese Citizens' Perceptions on Farm Animal Welfare, PLoS ONE 9(10), p.1

71 Li, p.42

72 Ibid.

4.2
A CHANGING POLITICAL CONTEXT

4.2.1 In China

Over the past years, China's political leadership has shown more openness to discussing animal welfare issues. The creation in 2013 of the International Cooperation Committee of Animal Welfare (ICCAW), a government-backed non profit organisation dedicated to 'promoting animal welfare concepts, implementing animal welfare-friendly farming systems and improving the quality and safety of livestock products', was a first important step. In 2017, Yu Kangzhen, the Chinese Vice Minister for Agriculture, attended the 'World Conference on Animal Welfare' organised by the ICCAW, the Food and Agriculture Organization of the United Nations (FAO) and the UK's Royal Society for the Prevention of Cruelty to Animals (RSPCA). In his opening remarks, he stated that 'promoting animal welfare has become not only an important choice for the green development of agriculture and a significant measure to ensure food safety and healthy consumption, but even more so an important embodiment of human caring in modern society'. He then laid out a series of commitments that unequivocally placed the promotion of animal welfare at the heart of China's agricultural development. Most significantly, Mr Yu indicated, in the strongest terms yet heard from senior Chinese officials, a commitment to introducing animal welfare legislation.

> *"We will accelerate the process of animal welfare legislation, when appropriate adding to and amending the relevant provisions of existing laws and regulations, while at the same time facilitating the development of comprehensive new legislation and regulation for the promotion of animal welfare."*
>
> Yu Kangzhen, Vice Minister for Agriculture, 2017

This trend continued in the following years. At the 2019 World Conference on Animal Welfare, Zhai Huqu, the President of the China Association for the Promotion of International Agricultural Cooperation (CAPIAC), pointed out that animal welfare was a symbol of the progress of human civilization and of the overall improvement of human welfare. He added that farm animal welfare was closely related to human health and that the pressure from consumers who increasingly recognise the healthiness and good quality of animal welfare friendly products would greatly contribute to promoting the development of such standards. At the same occasion, Ma Youxiang, the Chief Director of Animal Husbandry at the Chinese Agriculture Ministry, when talking on the positive developments of animal husbandry in China, indicated that in the future, China would vigorously promote work on animal welfare.[73] In May 2020, delegates in the Chinese Peoples' Political Consultative Conference (CPPCC) – the role of which is close to an advisory Upper House – also increasingly championed the idea of an animal protection law, picking up on the work achieved a decade ago.[74]

4.2.2 In the European Union

In the European Union, the von der Leyen Commission will definitely have sustainability at the heart of its action. May 2020 saw the publication of the 'Farm to Fork' and 'Biodiversity' strategies, two key elements of the European Green Deal, which was presented in December 2019. The Farm to Fork strategy foresees, among others, the review of animal welfare legislation, including on slaughter and transport, to align it with the most recent scientific evidence. It also underlines the importance of aligning trade policy with the objectives of this strategy, notably by using trade policy to obtain commitments on animal welfare from third parties.

After a decade without any progress on farm animal welfare in the European Union, the coming years should finally see improvements for animals, and the discussions around the new standards and their scientific basis will also provide material to exchange views with China. After the COVID-19 crisis, the European Union is putting a strong emphasis on building resilience and levelling the playing field. Working with China on animal welfare could contribute to both of these objectives.

In the past, the European Union has shown willingness to suggest animal welfare cooperation to China, notably by offering participation in workshops under the 'Better Training for Safer Food' (BTSF) initiative. China also participated in the regional 'Workshop on EU Legislation on Animal Welfare' in 2012, which was hosted in South Korea.[75] The European Union was also involved in the 'Animal Welfare Standards Project' coordinated by the Regional World Organisation for Animal Health (OIE) Collaborating Centre for Animal Welfare Science and Bioethical Analysis for Asia. The project aimed to promote OIE standards on animal transport and slaughter in the region, with a specific focus on China.[76] It is high time to pick up on these first steps and to design a strategy for deeper cooperation between the partners on this topic.

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[73] http://www.iccaw.org.cn/a/The_industry_information/20191017/1704.html

[74] https://twitter.com/paulrspca/status/1264483940775141376?s=20

[75] https://www.europarl.europa.eu/doceo/document/E-8-2015-011130-ASW_EN.html

[76] Ibid.

5 WHAT CAN THE EUROPEAN UNION AND CHINA DO? HOW COULD ANIMAL WELFARE BE PART OF THE SOLUTION?

The following chapter introduces the key challenges faced by China and the European Union and describes how animal welfare can play an important role in finding holistic and long-term solutions. For the first set of issues, we set out how improving animal welfare standards could have a positive impact, while, for the second section, the focus should be on reducing the consumption of specific animal products. Neither approach should preclude the other.

In recent years, the 'One Welfare' concept has received increasing attention. This expands upon the 'One Health' theme by linking animal health and welfare, biodiversity and the environment to improved human health and well-being.[77] The One Welfare approach 'recognises the interconnections between animal welfare, human well-being and the environment', and 'fosters interdisciplinary collaboration to improve human and animal welfare internationally'.[78] This vision emerged from concerns about contentious trade-offs between animal welfare, on the one hand, and human well-being and environmental sustainability, on the other. Eurogroup for Animals attests that the One Welfare model, which is in line with the 2017 World Organisation for Animal Health (OIE) Global Animal Welfare Strategy,[79] offers an integrated approach towards promoting key global objectives such as supporting food security, sustainability, human health and equality outcomes.

> *'In a global economy where animal welfare policy decisions in one country can impact food costs, wildlife habitats, and energy consumption across multiple nations, these concerns can no longer be addressed without a broader vision.'*
>
> Colonius and Earley, 2013[80]

[77] R. García Pinillos, M. Appleby, X. Manteca, F. Scott-Park, C. Smith, A. Velarde, One Welfare – a platform for improving human and animal welfare https://veterinaryrecord.bmj.com/content/vetrec/179/16/412/DC1/embed/inline-supplementary-material-1.pdf

[78] http://www.onewelfareworld.org/about.html

[79] The strategy is based on a vision of 'a world where the welfare of animals is respected, promoted and advanced, in ways that complement the pursuit of animal health, human well-being, socio-economic development and environmental sustainability'.

[80] Colonius & Earley, One welfare: a call to develop a broader framework of thought and action, J Am Vet Med Assoc 2013;242:309–310.

5.1
IMPROVING ANIMAL WELFARE STANDARDS

5.1.1 Ensuring food security (SDG 2 – Zero Hunger)

According to the United Nations' Committee on World Food Security:

> *'food and nutrition security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life'.*[81]

In 1962, when the European Union created its first Common Agricultural Policy (CAP), it had a clear focus on food security in Europe, and this remains an important priority for the European Union. It is equally evident that the Chinese authorities have placed the utmost importance on ensuring their citizens have enough to eat, as demonstrated by the country meeting its Millennium Development Goal of halving its number of hungry people by 2015.[82]

Yet, the pressure to produce more and cheaper animal products has significant consequences on animal welfare, and still fails to address the inequalities in our diets. Livestock production has boomed in recent decades, as has its intensification; particularly chicken and pork farming. Many industrial farms use production methods that severely restrict basic animal behaviour and needs, such as access to the natural environment and free movement, especially in high stocking densities. Mutilation such as tail-docking of pigs and beak-trimming are then employed to address subsequent problems such as aggression that results in animals injuring each other.

There is evidence that poor husbandry and stress, as well as sub-par sanitary conditions, negatively affect animal health and welfare. For example, during transport or at the point of slaughter, stressed animals tend to release more pathogens, such as E. coli, Salmonella or Campylobacter, in their faeces, resulting in increased cross-contamination. This can result in a drop in productivity due to illness and contamination of meat.[83]

The stability of the food chain is jeopardised by poor animal welfare measures, which are often intrinsically linked to poor animal health standards. These can result in disease and mass mortality, or poor-quality products that cannot be safely placed on the market. The 2018 outbreak of Asian Swine Fever in China clearly demonstrates the impact of such diseases, fostered by poor animal health.[84] With an estimated loss of over 40% of the Chinese pig herd, the country's pork supply remains under enormous pressure, leading to increasing pork prices and inflation. According to the Chinese National Bureau of Statistics, pork prices rose 110% in November 2019.[85] Given that China is the world's largest producer and consumer of pork, it has simply not been able to meet its domestic demand, while increased demand for imports has spiked pork prices worldwide, putting financial pressure on global consumers.

5.1.2 Ensuring public health (SDG 3 – Healthy Lives)

Animals, including farm animals and their products, pose risks to human health. In fact, more than 70% of the infectious diseases that have emerged in humans since the 1940s can be traced to animals. This includes SARS, the Ebola virus and COVID-19. Other concerns include food-borne diseases and increasing antimicrobial resistance.

81 http://www.fao.org/3/MD776E/MD776E.pdf

82 https://www.wfp.org/countries/china

83 https://www.researchgate.net/publication/277605621_Feed_and_fishmeal_use_in_the_production_of_carp_and_tilapia_in_China

84 http://www.fao.org/ag/againfo/programmes/en/empres/FAO_ASF_call_for_action.html

85 https://www.pigprogress.net/Health/Articles/2019/12/ASF-China-First-signs-of-recovery-pork-prices-rise-508026E/

Food safety and food-borne diseases

Industrial animal agriculture is a powerful incubator of diseases. In particular, overcrowding at factory farms is the ideal breeding ground for the evolution of these pathogens[86] as it increases not only the proximity of animals, thereby facilitating transmission, but also chronic stress levels which directly affect the animals' immune systems.

Several bacteria hosted by farmed animals, such as E. coli, Salmonella or Campylobacter, are amongst the main causes of food-borne zoonotic illness in humans, with almost 350,000 confirmed cases recorded in the European Union in 2018.[87] Campylobacter is considered by the World Health Organisation (WHO) to be the most common cause of human gastroenteritis in the world,[88] and the European Food Safety Authority (EFSA) has declared it the most important food-borne pathogen.[89] EFSA studies reveal that the primary source of human campylobacteriosis is poultry meat, accounting for 80% of EU cases.[90]

In high-intensity farming, chickens reared for meat are chosen for their ability to put on weight as quickly as possible, and in developing its animal agriculture sector, China has imported fast-growing, high-yielding breeding stocks. However, these non-indigenous breeds are not accustomed to China's environment, which can lead to lower productivity, and to animals that are less resilient and therefore prone to health issues.[91] Foreign breeds require greater investment in health and nutrition, as well as general care.[92] Raising more indigenous livestock could be beneficial to animal health, and thus better accommodate China's increasing demands, especially as these breeds are more resilient.[93] Achieving lower levels of stress achieved by higher-welfare chicken production systems, as well as slower-growing breeds, could balance environmental stressors and therefore animal health consequences.

Moving towards less intensive and higher animal welfare systems would contribute to improving animal health and reducing the risks of developing future food-borne diseases.

86 https://grain.org/es/article/6438-nuevasinvestigaciones-sugieren-que-las-granjasindustriales-y-no-los-mercados-de-productosfrescos-podrian-ser-el-origen-del-covid-19

87 https://www.ecdc.europa.eu/sites/default/files/documents/zoonoses-EU-one-health-2018-report.pdf

88 https://www.who.int/news-room/fact-sheets/detail/campylobacter

89 European Food Safety Authority (EFSA). (2017). The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2016. EFSA Journal, 15, 5077.

90 8 EFSA Panel on Biological Hazards (2011) Scientific Opinion on Campylobacter in broiler meat production: control options and performance objectives and/or targets at different stages of the food chain. EFSA Journal, 9(4): 2105.

91 Ibid.

92 Leenstra, F.R. (2013). Intensification of animal production and its relation to animal welfare, food security and 'climate smart agriculture', Wageningen UR Livestock Research, report 702, p.12.

93 Garnett, Tara and Wilkes, Andreas. (2014) Appetite for Change: Social, Economic and Environmental Transformations in China's Food System. Food Climate Research Network, p.109.

The next – and potentially worse – pandemic could easily emerge from what is now the norm in food production in most developed parts of the world: intensive farming. Farmed animals from the same genetic strains kept by the billions (trillions, if we consider fish in aquaculture) are reservoirs and pathways for diseases that can be dangerous, if not devastating, for humans and wild animals.

A recent study found that 'since 1940, agricultural drivers were associated with >25% of all – and >50% of zoonotic — infectious diseases that emerged in humans, proportions that will likely increase as agriculture expands and intensifies'.[94] The impacts of such diseases are far-reaching: in 2010, the World Bank estimated the direct economic cost of zoonotic diseases over the past decade to be USD 20 billion, with further indirect losses estimated at over 200 billion USD.[95]

Intensively farmed pigs and poultry are most notable for Highly Pathogenic Avian Influenza (HPAI) and Swine Influenza, the recurrence of which is due to human interaction with animals whose immune system is compromised. This is of particular concern as pigs and poultry are the most widely farmed species in the European Union[96] and China.

Pigs can be infected with both avian and human influenza strains and may provide a 'mixing' vessel, allowing novel combinations to emerge. This is called a reassortment. In this way, pigs may act as an intermediate host in the introduction of novel influenza subtypes into the human population. The virus can then transmit from person to person, potentially leading to a pandemic.[97]

Multiple reassortment events in pigs gave rise to the H1N1 swine flu pandemic that emerged in 2009 in Mexico. At the time, the US Center for Disease Control and Prevention (CDC) reported that the H1N1 virus had killed between 151,00 and 575,000 people worldwide, 80% of whom were under the age of 65.[98] In a joint statement, the WHO, the FAO and the OIE warned about 'the circulation of A(H1N1) subtype influenza viruses in the swine population in China with evidence of zoonotic potential [that] has alerted the world to the pandemic risk associated with swine influenza viruses'. According to Keith Sumption, Chief Veterinary Officer of the FAO, the virus 'showed characteristics associated with increased ability for zoonotic transmission – the potential ability to infect humans'.[99]

Scientists are also warning that certain coronaviruses circulating among pigs could, in the future, be transmitted to people.[100] Transport of live pigs over long distances facilitates the mixing of swine influenza viruses that can lead to multiple reassortments and give rise to new outbreaks. Transport is also an incredibly stressful event for animals due to the multiple stressors it involves, such as gut clearing, noise and vibrations, and also cramped conditions. The latter is particularly concerning given the increased opportunity for pathogens to spread in such small spaces.

It is often argued by the poultry sector that avian influenza is mainly spread by wild birds. However, the viruses carried by wild birds are usually of low pathogenicity[101] and only evolve into a more dangerous form of avian influenza[102], [103] when they reach overcrowded sheds.

Once again, de-intensifying animal production, both spatially (by distancing farms) and by drastically reducing the numbers of animals, coupled with better animal welfare, will improve animal health and contribute to reducing the risk of future pandemics.

94 https://www.nature.com/articles/s41893-019-0293-3#Ack1

95 World Bank. 2010. 'People, Pathogens and Our Planet : Volume one : towards a one health approach for controlling zoonotic diseases'.

96 https://www.ncbi.nlm.nih.gov/pubmed/17187567

97 https://www.ciwf.org.uk/media/3756123/Zoonotic-diseases-human-health-and-farm-animal-welfare-16-page-report.pdf

98 https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html

99 https://www.oie.int/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/Swine_influenza/2020-09_TripartiteStatement_RiskSwineFlu.pdf

100 http://english.cas.cn/newsroom/archive/news_archive/nu2018/201804/t20180409_191518.shtml

101 http://www.fao.org/avianflu/en/wildlife/index.html

102 https://www.cms.int/sites/default/files/Scientific%20Task%20Force%20on%20Avian%20Influenza%20and%20Wild%20Birds%20H5N8%20HPAI_December%202016_FINAL.pdf

103 Nickbakhsh, S. et al., 2016, Modelling the impact of co-circulating low pathogenic avian influenza viruses on epidemics of highly pathogenic avian influenza in poultry, Epidemics, 17:27-34

The WHO defines antimicrobial resistance (AMR) as what happens when microorganisms such as bacteria, fungi, viruses, and parasites change over time and no longer respond to antimicrobial drugs (such as antibiotics, antivirals, antifungals, and antiparasitics), making it harder to treat infections, and increasing the risk of disease spread, illness and death.[104] It stresses that antibiotic resistance is 'one of the biggest threats to global health, food security, and development today'.[105]

The economic costs of not mitigating AMR are immense, as in the long term, it will lead to the proliferation of diseases that might have been preventable. AMR is said to be responsible for an estimated 33,000 deaths per year in the European Union[106], and around 700,000 worldwide. An AMR review commissioned by the UK Government in 2016 even forecasts ten million AMR-related deaths per year in 2050.[107] It is estimated that AMR costs the European Union roughly EUR 1.5 billion per year in healthcare costs and productivity losses.[108]

In September 2016, the United Nations General Assembly admitted that overuse of antimicrobials in livestock production, which are then released into soils and waterways, is the primary cause of the surge in antimicrobial resistance.[109] This phenomenon is mainly linked to intensive farming systems, in which antimicrobial products are routinely and increasingly used to counterbalance poor animal welfare practices. In their Global Action on AMR, the FAO, WHO and OIE indicated animal welfare as a key consideration in efforts to limit the emergence of antimicrobial resistance.[110] In 2017, the EFSA and the European Medicine Agency (EMA) echoed this position,[111] stating that 'measures must be implemented that improve animal health and welfare and thereby reduce the need for antimicrobials in the first place'.

The European Commission recognises this link in its One Health Action Plan against AMR, which underlines the importance of considering these issues when negotiating trade agreements. This interlinkage between animal welfare and the fight against antimicrobial resistance has also been recognised by the Council of the European Union

[104] https://www.who.int/health-topics/antimicrobial-resistance

[105] https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance

[106] DG SANTE website on Antimicrobial resistance - https://ec.europa.eu/health/amr/antimicrobial-resistance_en.

[107] https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf

[108] DG SANTE website on Antimicrobial resistance - https://ec.europa.eu/health/amr/antimicrobial-resistance_en.

[109] https://www.cddep.org/wp-content/uploads/2017/10/science.0929PolicyForum-1.pdf

[110] https://www.oie.int/en/for-the-media/amr/international-collaboration/

[111] EMA (European Medicines Agency) and EFSA (European Food Safety Authority), 2017. EMA and EFSA Joint Scientific Opinion on measures to reduce the need to use antimicrobial agents in animal husbandry in the European Union, and the resulting impacts on food safety (RONAFA). [EMA/CVMP/570771/2015]. EFSA Journal 2017;15(1):4666, 245 pp. doi 102903/j.efsa.2017.4666. [Online.

itself in its 'Council conclusions on animal welfare – an integral part of sustainable animal production',[112] where it emphasised that 'good animal welfare in general improves animal health and reduces the need to use antibiotics, and consequently reduces antimicrobial resistance'. Yet, AMR persists and is even increasing in the European Union, in spite of regulations on the use of veterinary medicines in animal agriculture and the on-going strategy to reduce the use of antimicrobials.[113]

According to the Organisation for Economic Co-operation and Development (OECD), China is the largest producer and user of antibiotics in the world. China's usage of antibiotics amounts to 40% of global use. The OECD estimates that 66% of China's antibiotic use aims to promote animal growth, with 85% used only in pig and poultry production.[114] In 2013, it is estimated that China used 48.4 million kg of antibiotics in swine production alone.[115] China started to address antimicrobial resistance with its 'Five Year Action Plan for the Comprehensive Management of Veterinary Drugs in China (2015-2019)' and its 'Work Program for the Reduction of the Use of Antimicrobials in Animals (2018-2021)'. Both documents aim to promote responsible management and a reduction in the use of antimicrobials on farm animals,[116] as well as a greater focus on education, training and awareness of the impacts of antibiotic usage in animal production.[117]

Veterinarians are essential in providing stewardship on the proper use of antibiotics. For this reason, the shortage of farm animal veterinarians in China is reason for concern.[118] In 2014, there were only 700,000 veterinarians in China, which equates to one veterinarian per square kilometre. This is in sharp contrast with the Netherlands for instance, which has 8.3 veterinarians per square kilometre.[119]

Moving towards less intensive animal productions, using robust local breeds, coupled with genetic selection for health and welfare outcomes instead of productivity, and improved animal welfare practices are all beneficial to animal health. Adopting these strategies would reduce the need for antibiotics and, therefore contribute to the global fight against the rise of antimicrobial resistance.

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[112] Council of the European Union. 2019. Council conclusions on animal welfare - an integral part of sustainable animal production. Available at: https://www.consilium.europa.eu/media/41863/st14975-en19.pdf (Accessed 30 September)

[113] https://www.ecdc.europa.eu/en/publications/EU-summary-report-antimicrobial-resistance-zoonoses-2017-2018

[114] https://www.oie.int/amr2018/wp-content/uploads/2018/11/S8_5_MichaelRyan.pdf

[115] https://www.frontiersin.org/articles/10.3389/fvets.2019.00136/full

[116] Qu, Junyan; Huang, Yimei and Ly, Xiaoju (2019) Crisis of Antimicrobial Resistancein China: Now and the Future. Frontiers in Microbiology. 10:2240, p.3.

[117] https://www.oie.int/amr2018/wp-content/uploads/2018/11/S8_5_MichaelRyan.pdf

[118] https://www.oie.int/amr2018/wp-content/uploads/2018/11/S8_5_MichaelRyan.pdf

[119] Garnett, p.109

Efforts to reduce wildlife trade and the consumption of wild animals is crucial to both preventing and building resilience to future zoonosis outbreaks. The exploitation of wild animals and illegal cross-border trade is not only a primary cause of biodiversity loss, but can also be an important mechanism for spreading zoonoses as it exposes humans to contact with viruses and other pathogens hosted by those species. Certain wild species are bred for trade and for human consumption. This too poses a danger due to the absence of adequate hygiene measures and the fact that there are many unregulated farms.[120]

Many of the species bred in wildlife farms, whether for food, so-called medicinal properties, or fur, are potential reservoirs for zoonotic diseases. For example, racoon dogs, which are bred for fur, contribute to the spread of rabies.[121] Animal welfare is compromised in these farming systems as animals' basic needs – including social, hunting and explorative behaviour – are not met.

In late-February 2020, as part of its response to the COVID-19 epidemic, the National People's Congress of China issued a ban on the consumption of non-aquatic wild animals. Since then, several Chinese conservation organisations developed a questionnaire[122] to understand public attitudes towards the consumption of wild animals, and circulated it on Chinese social media (e.g. WeChat, Weibo), receiving over 100,000 responses. Among the respondents, 88% of whom lived in urban areas, 96.4% were in favour of banning consumption of all wild animals, and more than 90% supported a ban on all trade in wild animals, including for food consumption, medicinal use and others.

In the European Union, the farming of wild animals for human consumption is less common, though there are still many fur farms. As shown by recent COVID-19 contamination in mink farms in Spain[123] and the Netherlands[124], these farms can be a danger to human health, acting as incubators of pathogens potentially transmissible to humans. In the Netherlands, a genetic and epidemiological investigation showed that at least two farm workers caught the virus from minks.[125] With the industry having to cull around one million minks in the Netherlands and around 100,000 in Spain, the crisis also underlined the lack of resilience of the sector.

Alongside these farms, another key issue is the exotic pet trade. The European Union is an important destination for this trade and there is a growing interest for exotic pets in China. This trade has a detrimental impact not only on the welfare of animals and on biodiversity, but also on public health as it may play a role in the spreading of zoonoses. Better regulation of this trade will be important in ensuring the resilience of the European Union and China. This could be done through the introduction of a 'positive list' for the trade in exotic pets, the same system that has been introduced in China since the COVID-19 outbreak to clarify which species are allowed to be farmed for meat and fur.[126] Although the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a powerful tool to regulate or even ban the international trade of threatened species, there are several criminal ways to circumvent it, such as setting inappropriate export quotas or systematically exceeding them. Customs and law enforcement officers lack knowledge and expertise on the identification of the multitude of traded species, especially reptiles, also contributing to an increase in the trade of more endangered species. In addition, less than 1% of wildlife species are listed in the CITES Appendices, and many endangered species are not listed. As a consequence, even if these species are protected under local law, trading them in the European Union or China would still be deemed legal.

Adopting a 'positive list' approach (listing the species that can be traded, rather than those that cannot) would ensure the trade in exotic or endangered species is not stimulated. This approach would also facilitate enforcement by customs authorities and constitute a more precautionary approach towards species whose status – and the impact its trade could have on biodiversity conservation, human health and animal welfare – is still unknown.

By promoting better animal welfare, which would imply closing wildlife-based meat and fur production farms, and by making efforts to reduce wildlife trade and consumption, the European Union and China could improve resilience to possible future diseases and pandemics.

[120] https://wwfeu.awsassets.panda.org/downloads/the_loss_of_nature_and_rise_of_pandemics__protecting_human_and_planetary_health.pdf

[121] https://www.researchgate.net/publication/257802878_The_biological_potential_of_the_raccoon_dog_Nyctereutes_procyonoides_Gray_1834_as_an_invasive_species_in_Europe-new_risks_for_disease_spread

[122] http://www.shanshui.org/information/1926/

[123] https://www.bbc.com/news/world-europe-53439263

[124] https://www.dw.com/en/coronavirus-minks-netherlands/a-54723018

[125] https://www.sciencemag.org/news/2020/06/coronavirus-rips-through-dutch-mink-farms-triggering-culls-prevent-human-infections

[126] https://news.mongabay.com/2020/04/china-releases-list-of-animals-to-be-farmed-after-covid-19/

5.1.3 Fighting the climate crisis (SDG 13 – Climate Action)

Intensive livestock farming negatively affects the environment at all stages of production, with a far greater impact than arable farming or other forms of agriculture. The livestock sector has a direct impact on climate through the emissions generated by enteric fermentation and manure decomposition, and an indirect impact through emissions generated by the production and transport of feed, as well as by land-use changes. Animal agriculture is, indeed, one of the key drivers of deforestation. The FAO estimates that emissions from livestock supply chains, including feed production, processing and transport, as well as energy used on and off-farm, and post-farm emissions, account for about 14.5% of total human-generated emissions. It is not only the number of animals raised, but also how they are raised, that impacts the environment.

Some of the mitigation techniques that are often suggested, such as the use of specific diets or feed additives, have negative implications for animal welfare and health. Feeding highly concentrated grain-based diets to pigs in industrialised systems where access to roughage is scarce, reduces emissions per kilo of meat, but is associated with intestinal problems and gastric ulcers.[127] Similarly, genetic selection and imports of more productive foreign breeds can be counterproductive if the imported breed does not adapt to the local climate and environment. Finally, switching from ruminant (cattle and sheep) to monogastric species (chickens and pigs) in intensified production systems negatively impacts the environment through the generation of high levels of air, soil and water pollution – not to mention that these systems are intrinsically detrimental to animal welfare.

There should be no need to turn animal production systems into industrialised chains to make them climate-friendly. On the contrary, substantial emissions reductions can be achieved by adapting current systems, rather than requiring a further shift to industrialised farming.[128]

According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 'approximately 25% of the planet's greenhouse gas (GHG) emissions come from land clearing, crop production and fertilisation, with animal-based food contributing 75% of that. Intensive agriculture has increased food production at the cost of regulating and non-material contributions from nature'.[129]

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[127] Shields, Sara and Orme-Evans, Geoffrey, The Impacts of Climate Change Mitigation Strategies on Animal Welfare, Animals 2015, 5(2), 361-394

[128] Gerber, P.J.; Steinfeld, H.; Henderson, B.; Mottet, A.; Opio, C.; Dijkman, J.; Falcucci, A.; Tempio, G. Tackling Climate Change through Livestock—A Global Assessment of Emissions and Mitigation Opportunities; Food and Agriculture Organization of the United Nations: Rome, Italy, 2013.

[129] https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf, p28

Grass-based and mixed-farm systems, which are less dependent on additional feed, have better capacities for carbon sequestration.[130] Well-managed grazing can improve soil organic carbon and nitrogen content, and therefore partially offset net GHG emissions. Other options to promote carbon sequestration in livestock systems include restoration of degraded grazing land with the introduction of silvopastoral and other agroforestry systems, which also have the potential to deliver better animal welfare conditions.

Working on animal productivity by improving animal welfare, for instance by lowering environmental stress, can also positively affect the level of GHG emissions emitted by the sector, provided the level of production is not increased. Poor livestock health and well-being are associated with behavioural and metabolic changes such as reduced feed intake, reduced ability to digest food, and increased energy requirements for maintenance, all of which can lead to the culling of affected animals, and thus to a decrease in emission efficiency. In addition, it has been shown that the growth of pigs is badly affected by several stressors such as thermal stress, restricted space allowance, and regrouping.[131] To the contrary, improvements to pig welfare, notably by reducing social stress, is thought to directly contribute to improved feed efficiency.[132] In 2017, academics concluded that 'the majority of these strategies [to reduce GHG emissions from livestock production] aim to increase productivity (unit of product per animal), which in most cases cannot be achieved without good standards of animal welfare'.[133]

Improving animal health and welfare could also help reduce methane and nitrous oxide emissions per kg product by diminishing the number of animals that are lost due to health issues, and by cutting the emissions attributed to animals that die before they can reproduce or produce consumable products.[134] Although a long life is not always one worth living,[135] extending dairy cow lifetime is an example of such an approach. Cows can easily live for up to 15 years or longer, but on most intensive indoor dairy production facilities the lifespan of a cow is typically closer to six years. Improved longevity would reduce the total lifetime emissions of dairy cows when accounting for the resources needed for rearing replacement animals. In the UK, the proportion of methane emissions produced by replacement heifers has been estimated at up to 27% of the total emissions.[136] Improvements in health may also reduce inefficiencies and poorer productivity of individual animals. Both lameness and mastitis reduce milk output, which leads to an increase of GHG emissions per litre of milk produced.

The Chinese government has shown an intention to identify and promote livestock practices that minimise carbon footprint. In 2018, a new research collaboration was launched between Chinese researchers and agencies, Wageningen University & Research, the Research Program on Climate Change, Agriculture and Food Security, and the Global Research Alliance on Agricultural Greenhouse Gases. They will look in particular at a tool that can assess emissions from improved livestock practices at the dairy farm level.[137]

Climate change also impacts livestock directly, for example through heat stress and increased morbidity and mortality, and indirectly, through quality and availability of feed and forages, and animal diseases. Smallholders, livestock keepers, fishers and pastoralists are among the most vulnerable to climate change, especially those in the Global South. As global leaders, the European Union and China should work together to promote animal welfare-based solutions for an increasing 'ecological agriculture'. This supports both partners' aims to improve their environmental record and sustainable development based on green and innovative production.[138]

[130] Canu & Forabosco (UNEP DTU 2018), Greenhouse gas emissions of livestock raised in a harsh environment, International Journal of Global Warming, 2018 Vol.15 No.4, pp.431 - 446

[131] Llonch p. et al, Review: current available strategies to mitigate greenhouse gas emissions in livestock systems: an animal welfare perspective, Animal (2017), 11:2, p 280

[132] Ibid.

[133] Ibid.

[134] Shields, Sara and Orme-Evans, Geoffrey, The Impacts of Climate Change Mitigation Strategies on Animal Welfare, Animals 2015, 5(2), 361-394

[135] https://pdfs.semanticscholar.org/e1d7/152d27e3db79938fa420c424c098c63d1544.pdf?_ga=2.81627031.1846170942.1594040383-580902818.1594040383

[136] Garnsworthy, P.C. The environmental impact of fertility in dairy cows: A modelling approach to predict methane and ammonia emissions. Anim. Feed Sci. Tech. 2004, 112, 211–223.

[137] https://ccafs.cgiar.org/news/china-takes-action-climate-change-agriculture-0#.XwbgMCgzbIU

[138] These goals are mirrored in Sustainable Development Goal 12; the EU's Green Deal and statements China's Agricultural Ministry.

20% **ESTIMATED MORBIDITY AND MORTALITY**
due to animal diseases

60
million tonnes
of meat

150
million tonnes
of milk

300
billion UDS
per year

5.1.4 Improving sustainable growth of animal agriculture (SDG 8 – Decent Work and Economic Growth)

Continuing expansion of the livestock sector is expected, with demand for animal products fuelled by the one billion increase in world population projected by 2030, alongside rising incomes and rapid urbanisation.

According to the World Bank, the effects of agriculture on poverty reduction are greatest for the poorest in society; agriculture is, in general, two to three times more effective at reducing poverty than an equivalent amount of growth generated in other sectors.[139] Yet the livestock sector is often characterised, within production, between commercial and subsistence farmers. Productivity tends to be higher among commercial producers – who often have better access to capital, land, technology and marketing infrastructures – and lower among subsistence farmers.

Animal health and welfare are closely linked to animal productivity. Improving animal welfare directly improves animal health by reducing the risk of illness and premature death. The OIE estimates that morbidity and mortality due to animal diseases cause the loss of at least 20% of livestock production globally. This represents at least 60 million tonnes of meat and 150 million tonnes of milk, with a value of approximately USD 300 billion per year.[140] A study has shown that poor handing can lead to 10% 'dark cutting' meat, entailing a financial loss for livestock producers.[141] Good animal welfare therefore has direct and indirect financial benefits, and certain measures can be easily and cheaply implemented. Overall, humane farming is proven to be both sustainable and profitable.[142]

Intensive agriculture is spreading all over the world. Globalisation and efforts towards further trade liberalisation tend to favour bigger companies that can withstand the competitive environment and has led, in the dairy and meat sector, to increased integration and intensification, especially in developed countries. This is, however, a trend that is picking up in developing countries too. José Graziano da Silva, the former Director General of the FAO, confirmed with no ambiguity that 'Smallholders must not be pushed aside by large capital-intensive operations'.[143] Industrialised systems typically employ fewer people than traditional ones, as many integral tasks become automated. Wages are low, and the seasonal nature of the work creates prolonged job insecurity. The sector also employs many migrant workers who are especially vulnerable due to their precarious legal status and who are particularly likely to experience poor working conditions, unfair wages and limited access to public services.[144] The spread of such jobs will thus have negative repercussions on hourly earning rates and on the total unemployment figures. As the livestock sector is experiencing growth, especially in developing countries,[145] it is crucial to ensure such growth is fully inclusive and sustainable. Smallholders and smaller scale operations, where animal welfare can be respected, should be favoured and supported in enhancing their animals' productivity – and hence their livelihoods – through improved healthcare, welfare and nutrition.

In addition, there is growing concern about animal welfare among consumers, as evidenced by a global increase in vegetarianism and veganism, coupled with more and more meat-free products, such as Beyond Meat.[146] Consumers are increasingly demanding to know what they are eating and they are willing to pay a higher price for the products they consume. A 2013 study into the animal welfare market in China postulated that 'people pay more and more careful attention on [sic] animal welfare because it is considered to be an important factor that could affect human health, food safety, quality of life'. High animal welfare products are also perceived to be part of a trend for 'Green Food' which is pollution-free, non-toxic and free of chemical residues.[147] This trend is also visible in the European Union. There is thus a market here to take, especially as the costs of higher welfare are far lower than previously projected.[148]

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139 https://blogs.worldbank.org/jobs/five-new-insights-how-agriculture-can-help-reduce-poverty

140 https://rr-africa.oie.int/en/news/impact-of-diseases-on-meat-and-milk/

141 https://marcusoldham.vic.edu.au/wp-content/uploads/2018/03/201301MOC-CSA-Where-Animal-Welfare-Meets-Profit-by-Sarah-Chaplin.pdf

142 https://www.worldanimalprotection.org/our-work/animals-farming-supporting-70-billion-animals/farm-animal-welfare

143 José Graziano da Silva, 2018. 10th Global Forum for Food and Agriculture: Shaping the Future of Livestock – sustainably, responsibly, efficiently http://www.fao.org/director-general/my-statements/detail/en/c/1098613/ Accessed 16 March 2018

144 HLPE. 2016. Sustainable agricultural development for food security and nutrition: what roles for livestock? A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome

145 FAO (2018), Transforming the Livestock Sector through the Sustainable Development Goals

146 https://worldin2019.economist.com/theyearofthevegan

147 Shaoyang Xu, Creating a potential market for animal welfare-friendly products in China, https://edepot.wur.nl/257860

148 World Animal Protection, Valuing Higher Welfare Chicken - Making the Financial Case of more Humane Chicken Production, 2019

Case study – Higher welfare systems in the chicken meat industry

Our member World Animal Protection studied the implementation of a higher welfare indoor system for chicken production in China, which would be similar to the Dutch NDRS indoor system (see box). Their study revealed that moving from conventional systems towards a higher welfare indoor system would increase the cost per kilogram by 9.3%, or 7.3 euro cents.[149] The indoor system considered by the study implies a slower-growing breed, access to natural light, lower density and enrichments.

THE NEW DUTCH RETAIL STANDARDS (NDRS)

In 2016, the Netherlands implemented the 'New Dutch Retail Standard' (NDRS), which is a moderately higher welfare indoor system. This new standard, as well as the creation of a three-tiered animal welfare labelling scheme by producers, retailers and NGOs, led to the removal of intensively farmed chicken from the domestic market .150 This experience showed that the Dutch consumer was ready to pay 22% more for higher welfare chicken. Another study carried out in 2017 demonstrated that Dutch consumers would even be prepared to pay around EUR 6 per 500 g of chicken meat, which then represented a 50% price increase.

Upgrading from regular EU systems to NDRS represented an increase in cost of 15% per kilogram. To upgrade to the system suggested by World Animal Protection, which has lower density and access to natural light, requires an additional increase of about 6.5% per kg. Under the Welfare Quality Scoring System, animal welfare would increase by 12.5 points for every euro cent of production.

The survey on consumer perception included in the study indicates that, in 2018, 87% of Chinese consumers want to buy products 'where they know the chickens have had a good quality of life', regardless of price.[151] This percentage had increased by 5% since the previous survey carried out in 2016. This is encouraging as it indicates an increasing willingness to pay more for higher welfare products.

[149] World Animal Protection, Valuing higher Welfare Chicken, p.26

[150] World Animal Protection, Valuing higher Welfare Chicken, p.12

[151] World Animal Protection, Valuing higher Welfare Chicken, p.5

Case study – Higher welfare systems in the pig meat industry

Another report by World Animal Protection looks at the pig industry.[152] On intensive pig farms, pigs suffer many painful procedures, such as tail docking, castration, teeth reduction and ear tagging or notching, all of which are generally carried out in the piglet's first week of life. These mutilations inflict pain and cause distress. Nerve pain can last for weeks after the procedures. They also prevent natural behaviours such as communication, as pigs use their ears and tails to communicate. Early weaning can impact the pigs growth and weaken their immune system. Ulcers are another common problem in the sector, while overcrowding, boredom and competition also negatively affect their immune system. This situation has an impact on the productivity and profitability of the industry. Sick pigs are less active, and attract more tail biting and aggression from other pigs, leading to body, ear and tail lesions. These wounds are costly due to energy loss, poorer feed conversion and risks of secondary infection, which translate into less growth. The high use of antibiotics to remedy the situation adds further costs. The conclusion of the report is that improving pig welfare by avoiding painful procedures and delaying weaning can lead to higher profit as it improves the pigs' health and makes them more robust. Providing adequate space, which is key to animal welfare, can reduce the risk of tail and ear biting, body lesions and ulcers, and providing enrichment positively impacts growth rate. A study carried out in 2013 for the US market concluded that by practicing immunocastration, rather than painful surgical castration, US pork producers can make a net financial gain of USD 5.32 per pig. An EU study, also published in 2013, valued improved feed conversion for vaccinated (i.e. immunocastrated) pigs at EUR 6.1 above surgically castrated pigs.[153] A survey among Swedish farms also showed multiple benefits to giving more straw (enrichment) to pigs, including reduced tail injuries and stomach ulcers, and increased growth. A survey among Chinese consumers demonstrated support for such an approach. More than two thirds of those surveyed found imagery of intensive pig farming 'upsetting, wrong or shocking', 60% said they would 'probably' or 'definitely' not buy pork from a supermarket that sourced from where piglets experience teeth grinding, cutting or tail docking and castrations, sometimes without pain relief. Between 80 and 93% agreed that 'it is important that pigs are reared with higher welfare standards'. All this shows that higher animal welfare standards and profitability can be achieved, driven by consumers' increasing willingness to buy higher-priced and better-quality animal products.

[152] World Animal Protection, Sharing Success - the Global Business Case for Higher Welfare for Pigs Raised for Meat, 2019

[153] https://ec.europa.eu/food/animals/welfare/practice/farm/pigs/castration_alternatives_en

Case study – Organic egg and chicken meat in China

In the hills near Beijing, a farm raises premium and traditional Chinese You Chickens –- a dual-purpose breed – in a way that improves the welfare of the chickens, the lives of the farmers and the environmental performance of the farm.[154] The males are raised for meat and the females are raised primarily for eggs and then used for meat at the end of their laying lives. The company farm and the farmers they supply birds with, rear a total of around 3 million birds per year, including 800,000 laying hens.

The eggs produced by this farm are sold for nearly twice the price of standard eggs. The profit per meat bird is reportedly RMB 2-3 (32-48 US cents) for the farmers, compared with RMB 1 for an intensively reared bird. The company can thus make an additional RMB 20 per bird. In addition, animals benefit from better welfare conditions as they live free-range and male chicks are not killed upon hatching. Alongside these economic benefits, this kind of farming is also more environmentally friendly, as it does not rely on pesticides and uses a bio-digester to turn farm waste into renewable energy.

[154] https://www.ciwf.cn/news/63&sa=D&ust=1600246219220000&usg=AFQjCNEbnZaVCf7qFG-n_q9ZUalRnBMNKA

Case study – Pig meat in China

Dongnong Sanhua Pig,[155] which owns both pig breeders and finishing farms, demonstrated the multiple economic benefits of improving animal welfare. In 2015, the company finished around 15,000 pigs per year, but its long-term plan is to produce 500,000 finishing pigs yearly.

Concerned by animal welfare from the start, the farm implements a stall-free system with no stalls or crates at any stage of production. When compared with production based on gestation crates, the farm reports no detrimental impact on production; it even has a higher rate of successful farrowing than crate-based production (90% versus 85%). This result is likely to be linked to reduced stress levels, which makes the animals more resilient to health issues.

The subsequent reduction in antibiotic use resulted in average savings of RMB 60 per pig. By providing short straw as enrichment and ensuring appropriate ventilation, incidences of tail biting were greatly reduced, allowing the farm to maintain its practice of not docking pig tails. This also allowed the farm to move towards banning tooth clipping. In turn, avoiding such mutilations and the stressful handling they imply, contribute to further reducing stress.

Thanks to this more animal welfare-friendly production method and the breed that is used, the pig meat produced by these farms is sold at a price 40 to 50% above average.

[155] https://www.google.com/url?q=https://www.ciwf.cn/news/64&sa=D&ust=1600246219220000&usg=AFQjCNHKN_8QbjJfVpokj6kobpaVpJINBg

5.2
SUSTAINABLE PRODUCTION AND CONSUMPTION

Unsustainable food production and consumption negatively affect human, environmental and animal health. The FAO defines sustainable diets as 'those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are:

- Protective and respectful of biodiversity and ecosystems
- Culturally acceptable
- Accessible
- Economically fair and affordable
- Nutritionally adequate
- Safe and healthy
- Apt at optimising natural and human resources

Our current food system is no longer tenable. It is driving biodiversity loss, ocean acidification and accounts for 30% of global GHG emissions. The inequalities in terms of food distribution are equally staggering: nearly one billion people experience hunger and one billion lack important micronutrients in their diets. Overall, there are nearly three billion people with inadequate diets. Meanwhile, a further one billion are over-consuming food, spawning a new public health epidemic involving chronic conditions such as type-2 diabetes and cardiovascular disease. In 2015, the WHO categorised red meat as carcinogenic to humans.

One of the most recognised ways to tackle these global challenges is through reducing consumption of meat and dairy products. Yet, today, meat production is 470% higher than it was 50 years ago. In this same period, the global population doubled.[156] The FAO and OECD project that meat consumption will continue to increase: by 2026, beef production will grow by 6% in developed countries and around 17% in developing countries; Asia alone will see a 44% increase.

A new dietary culture that promotes a lower consumption of animal products and emphasises plant-based foods is urgently needed to address climate change, public health, and the overuse and degradation of land, water and other resources. This change will contribute to better nutrition, food security and the achievement of global sustainable development goals. It also provides new economic opportunities.

[156] https://data.worldbank.org/indicator/SP.POP.TOTL?end=2019&start=1970

5.2.1 Ensuring Public Health (SDG 3 – Healthy Lives)

The overconsumption of animal products such as meat and dairy are directly linked to non-communicable diseases. These pose one of the greatest threats to public health and economic growth at local, national and global levels. Obesity, cardiovascular diseases, cancer, and diabetes are responsible for 35 million deaths and 60% of all deaths every year globally. In Europe, these conditions play an even more substantial role, accounting for 70% of all deaths.[157]

China's rapid economic growth over the past four decades, and subsequent explosion of the 'middle class', has been accompanied by an almost equally dramatic rise in demand for meat products.[158] In 1976, the average Chinese consumed less than 10 kg of meat per year; today, the country's average per capita meat and fish consumption is over 80 kg, and the country consumes more than twice as much meat as the United States.[159]

[157] https://eurohealthnet.eu/sites/eurohealthnet.eu/files/publications/EPHAC-Position-Paper.pdf

[158] https://www.globalanimalnetwork.org/interview-dr-peter-li

[159] http://www.earth-policy.org/plan_b_updates/2012/update102

5.2.2 Obesity

Obesity is a form of malnutrition. It significantly exacerbates the risk of chronic diseases such as cardiovascular disease, hypertension, diabetes, coronary heart diseases and certain cancers, bringing substantial direct and indirect costs that put a considerable strain on healthcare and social resources.

China is now the country most affected by obesity, surpassing the United States. According to China's Global Times, 'China is home to 43.2 million obese men and 46.4 million obese women, accounting for 16.3% percent and 12.4 percent of obese men and women around the world'.[160]

Weight problems and obesity are also increasing rapidly in most EU Member States, with estimates of 51.8% of the European Union's adult population being overweight in 2017, and 15% obese. According to the WHO, around one in every three children in the European Union aged between 6 to 9 years old were overweight or obese in 2010. One study has predicted that 20% of all children around the world will be obese by 2030. In the 1980s, merely 5% were.[161]

The European Union published its Strategy on Nutrition, Overweight and Obesity in 2007. The text suggested a series of actions that should complement those of Member States to fight obesogenic environments and reduce high-risk behaviours.[162] The strategy is still used as the basis of EU action on this field. The European Union then regulated information provided on food products and claims made by producers, and, in 2014, it launched an Action Plan on Childhood Obesity, running from 2014–2020. This phenomenon has a cost. According to the EU official sources, '7% of national health budgets across the European Union are spent on diseases linked to obesity each year. Substantial indirect costs are also incurred from lost productivity arising from work absences due to health problems and premature death. Recent estimates show that around 2.8 million deaths per year in the European Union result from causes associated with overweight and obesity'.[163]

[160] http://www.globaltimes.cn/content/977264.shtml

[161] https://www.theguardian.com/global-development-professionals-network/2015/nov/24/defusing-chinas-childhood-obesity-timebomb; https://www.telegraph.co.uk/news/2017/05/12/one-four-china-children-expected-overweight-2030-amid-obesity/

[162] https://eur-lex.europa.eu/legal-content/EN/AUTO/?uri=celex:52007DC0279

[163] https://ec.europa.eu/health//sites/health/files/nutrition_physical_activity/docs/childhoodobesity_actionplan_2014_2020_en.pdf

5.2.3 Cardiovascular diseases

Dietary factors make the highest contribution to the risks of cardiovascular diseases.[164] A study established that consumption of red meat was the leading cause of abdominal obesity for Chinese men,[165] and abdominal obesity, or waist circumference, is a key indicator of increased risk of cardiovascular diseases.

Cardiovascular diseases have become the leading cause of death in the European Union[166] and in China, accounting for respectively 37%[167] and over 40% of total deaths in both urban and rural areas.[168] In China, the percentage of the population living with a cardiovascular disease has increased by 15% between 1990 and 2016, but the mortality rate of these diseases has dropped over the same period.[169] The situation is similar in Europe, where the absolute number of people living with a cardiovascular disease has increased, as well as the number of new cases in most countries, but where mortality is also decreasing.[170]

These diseases have an economic cost. In the European Union, the cost of cardiovascular disease is estimated at EUR 210 billion per year, with around 53% (EUR 111 billion) due to healthcare costs, 26% (EUR 54 billion) to productivity losses, and 21% (EUR 45 billion) to the informal care of sick people.[171] In 2017, over 950,000 deaths in the European Union were linked to dietary risks due to unhealthy diets, most of which (817,302) were related to cardiovascular diseases.[172]

5.2.4 Diabetes

In 2016, WHO estimated that around 10% of China's adult population, or 110 million people, was living with diabetes. The organisation expected this figure to rise to 150 million by 2040.[173] More worryingly, it also considered that 500 million Chinese live with pre-diabetes, which also increases the risk of cardiovascular disease.[174] In 1980, merely 1% of the Chinese population had diabetes.[175] The prevalence of diabetes in Europe is also high, and has increased rapidly over the last ten years, growing by more than 50% in many countries.[176]

It is noteworthy that in China, the rise of such health problems coincides with the rapid change in diet, from one based on vegetables and grains to one with excess meat and fatty processed foods, following reforms implemented in the 1980s.[177] A factor that contributed to China's growing obesity problem was the one-child policy, which produced the undesirable effect known as 'Little Emperors':[178] only children spoiled by parents who grew up in times of food scarcity in the 1960s and 1970s.[179]

However, these issues can be remedied in the long-term. Consumers and citizens can improve their health by changing their diet and eating less meat and processed food. Dr Bernhard Schwartländer, the WHO Representative in China, confirmed that 'making some simple lifestyle changes can go a long way towards reducing the risk of diabetes and other noncommunicable diseases. Consuming less sugar, salt and fat, eating more fruits and vegetables, and getting more physical activity is key to helping reverse the tide'.[180] The Chinese government has recognised the link between these health-related concerns and diets, and the Chinese National Health and Family Planning Commission urged its citizens to eat less meat and eggs. It also encouraged them to eat healthy food, including vegetables.[181]

In 2020, the European Union's new food policy, Farm to Fork, confirms the need for a shift in diets in Europe, and the role of reducing meat consumption in the fight against obesity, cardiovascular diseases and diabetes: 'Reversing the rise in overweight and obesity rates across the European Union by 2030 is critical. Moving to a more plant-based diet with less red and processed meat and with more fruits and vegetables will reduce not only risks of life-threatening diseases, but also the environmental impact of the food system.'

164 http://www.ehnheart.org/cvd-statistics.html

165 Wang, Zhihong & Zhang, Bojun & Zhai, F. & Wang, H. & Zhang, Jihua & Du, W. & Su, Chang & Jiang, H. & Popkin, Barry. (2014). Fatty and lean red meat consumption in China: Differential association with Chinese abdominal obesity. Nutrition, Metabolism and Cardiovascular Diseases. 24. 10.1016, p.2

166 https://bit.ly/3n9oXb6

167 http://www.ehnheart.org/cvd-statistics.html

168 https://bit.ly/2luqHwx

169 http://www.chinadaily.com.cn/a/201903/14/WS5c89be4ba3106c65c34ee98a.html

170 http://www.ehnheart.org/cvd-statistics.html

171 Ibid.

172 https://ec.europa.eu/jrc/en/health-knowledge-gateway/societal-impacts/burden

173 http://www.wpro.who.int/china/mediacentre/releases/2016/20160406/en/

174 https://www.who.int/china/news/detail/06-04-2016-rate-of-diabetes-in-china-explosive-

175 Cheng, Hu. And Weiping Jia. (2018). Diabetes in China: Epidemiology and Genetic Risk Factors and Their Clinical Utility in Personalized Medication, Diabetes 67, p.3

176 http://www.ehnheart.org/cvd-statistics.html

177 http://web.mit.edu/lipoff/www/hapr/fall01_health/prosperity.pdf; https://www.nationalgeographic.com/what-the-world-eats/

178 https://bit.ly/2UnGIqN

179 http://www.chinadaily.com.cn/food/2012-10/21/content_15834627.htm

180 https://www.who.int/china/news/detail/06-04-2016-rate-of-diabetes-in-china-explosive-

181 https://bit.ly/2JZr2Z5

This reduced consumption would also benefit animal welfare. Firstly, by reducing the number of animals needed to produce the required volume of animal-source food. Secondly, by putting less pressure on the production systems, allowing for higher welfare systems to expand. If consumers decrease the amount of animal products they buy, this could reduce demand for cheap meat produced in intensive farming systems, as they might opt to buy smaller quantities of better-quality products. However, this is not merely down to citizens. Governments should take the lead in raising awareness and supporting producers who undertake to improve their animal welfare standards.

5.2.5 Fighting the climate crisis (SDG 13 – Climate Action)

China's rapid and unprecedented economic progress made it the largest producer of carbon emissions in the world.[182] The livestock farming industry, in addition to its well-documented role in emitting carbon dioxide, also produces 37% and 65% respectively of our global methane and nitrous oxide emissions.[183] Both these GHGs are significantly more potent than carbon dioxide, with methane having a global warming potential 20 times higher. Animal farming is also responsible for emissions of ammonia, a ubiquitous atmospheric pollutant, which are primarily related to animal waste management and nitrogen fertiliser use.

There are other staggering climate costs that go beyond the emissions produced on farms. Clearing land to grow soybeans in the Amazon rainforest is responsible for clearing over 100 million hectares of forest, releasing enough carbon into the atmosphere to increase the rate of global warming by 50%.[184] It is evident that a significant reduction in meat and dairy production is essential if food-related emissions are to decrease and if we are to meet the binding Paris targets.[185] The United Nations even launched a campaign calling for people to eat less meat, claiming every climate action mattered.[186]

Likewise, climate change could render farming more and more difficult. For example, it may affect plant growth and production by promoting the spread of pests and diseases; increase exposure to heat stress; or encourage soil erosion due to stronger winds or flooding.

An example of successful circular animal agriculture is the farm of Adam Arnesson in Sweden, who cut his GHG emissions in half by shifting from conventional dairy production to more extensive pig farming and growing oats for human consumption.[187]

[182] https://time.com/5669061/china-climate-change/

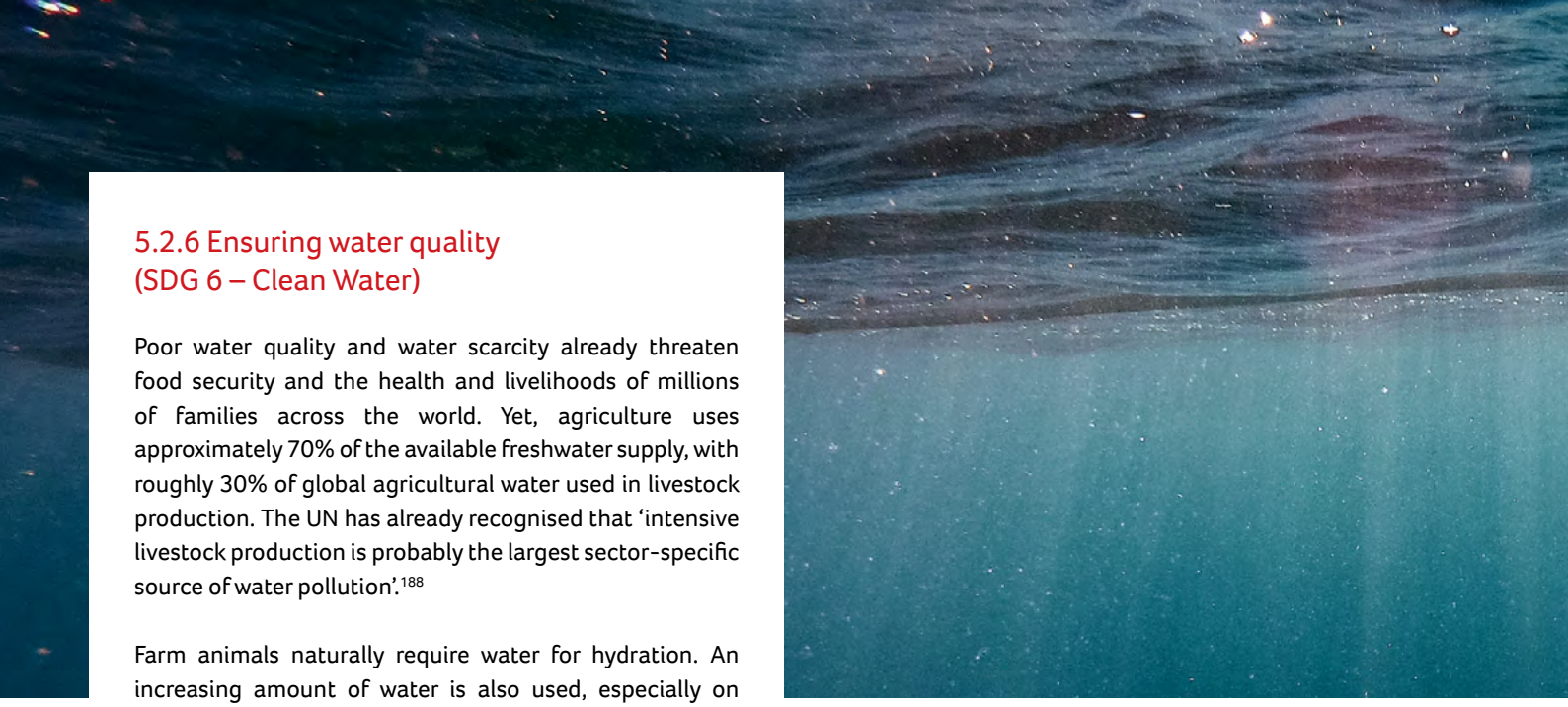
[183] https://www.ciwf.org.uk/factory-farming/environmental-damage

[184] https://worldinfo.org/2012/01/food-for-thought-soybean-endangers-brazil-amazon-rainforest/

[185] https://www.chathamhouse.org/publication/changing-climate-changing-diets

[186] https://www.un.org/en/actnow/

[187] https://www.independent.co.uk/independentpremium/long-reads/oat-milk-oatly-climate-change-sweden-farming-adam-arnesson-a9122901.html



5.2.6 Ensuring water quality (SDG 6 – Clean Water)

Poor water quality and water scarcity already threaten food security and the health and livelihoods of millions of families across the world. Yet, agriculture uses approximately 70% of the available freshwater supply, with roughly 30% of global agricultural water used in livestock production. The UN has already recognised that 'intensive livestock production is probably the largest sector-specific source of water pollution'.[188]

Farm animals naturally require water for hydration. An increasing amount of water is also used, especially on industrial farms, to dispose of waste, for cooling animals, as well as for cleaning enclosures and sheds. Processing animal products also requires large volumes of water [189] and can result in significant amounts of waste water. Finally, the culture of animal feed is also water intensive. A less-recognised contributor to water usage is, perhaps surprisingly, the farming of fish. Aquaculture can consume a large amount of freshwater through pond evaporation, dilution needs, and fish feed production. The Water Footprint Network (WFN) estimates the water footprint of aquaculture in freshwater and brackish environments in China to be 3,349–21,215 m^3/tonne and 2,204–57,125 m^3/tonne respectively. The higher ranges outstrip even beef's water footprints.[190]

In addition to using a huge quantity of water, animal agriculture is also increasingly polluting the remaining stock of water. As water is used to dispose of waste and clean sheds, bacteria from the waste, including in faecal matter, are then released into lakes and other surface water bodies used for recreation, into commercial shellfish farms, and into drinking-water sources. Growing feed also contributes to this pollution. Only 30–60% of the huge quantities of nitrogen fertilisers used to grow feed is taken up by feed crops, with the rest running off to pollute water and marine ecosystems.[191] The contribution of the European livestock production to water pollution, both in phosphorus and nitrogen, is estimated at 73% of the overall agricultural impact.[192]

Because of this, industrial farm animal production is a major contributor to, amongst other things, eutrophication, soil acidification, 'dead' zones in coastal areas, and degradation of coral reefs and water supplies. This pollution also comes from the use of vast amounts of antibiotics on farms, which contributes to human health problems and to the emergence of antibiotic resistance. It also has an impact on human health, as studies have shown a correlation between concentration of nitrate in drinking water and increased incidences of colon cancers.[193]

Run-off and nutrient leaks from concentrated sources of livestock waste are a hazard to freshwater sources as well as to ocean and marine environments. Such pollution impacts the welfare of fish and other marine life living in these waters, and of the humans whose livelihoods depend on them. The increase in nutrients and minerals induces excessive growth in aquatic plants and algae which use the oxygen present in the water and block light, resulting in a hypoxic environment that leads to the death of fish.[194]

Thus, given the large and growing water footprint and environmental degradation associated with livestock production, improving water-use efficiency throughout the production system, and therefore favouring systems that have lower water footprints, is important to achieve SDG 6 and thereby ensure access to safe water sources and sanitation for all.

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188 José Graziano da Silva, 2018. 10th Global Forum for Food and Agriculture: Shaping the Future of Livestock – sustainably, responsibly, efficiently http://www.fao.org/director-general/my-statements/detail/en/c/1098613/ Accessed 16 March 2018

189 http://www.fao.org/3/CA1201EN/ca1201en.pdf

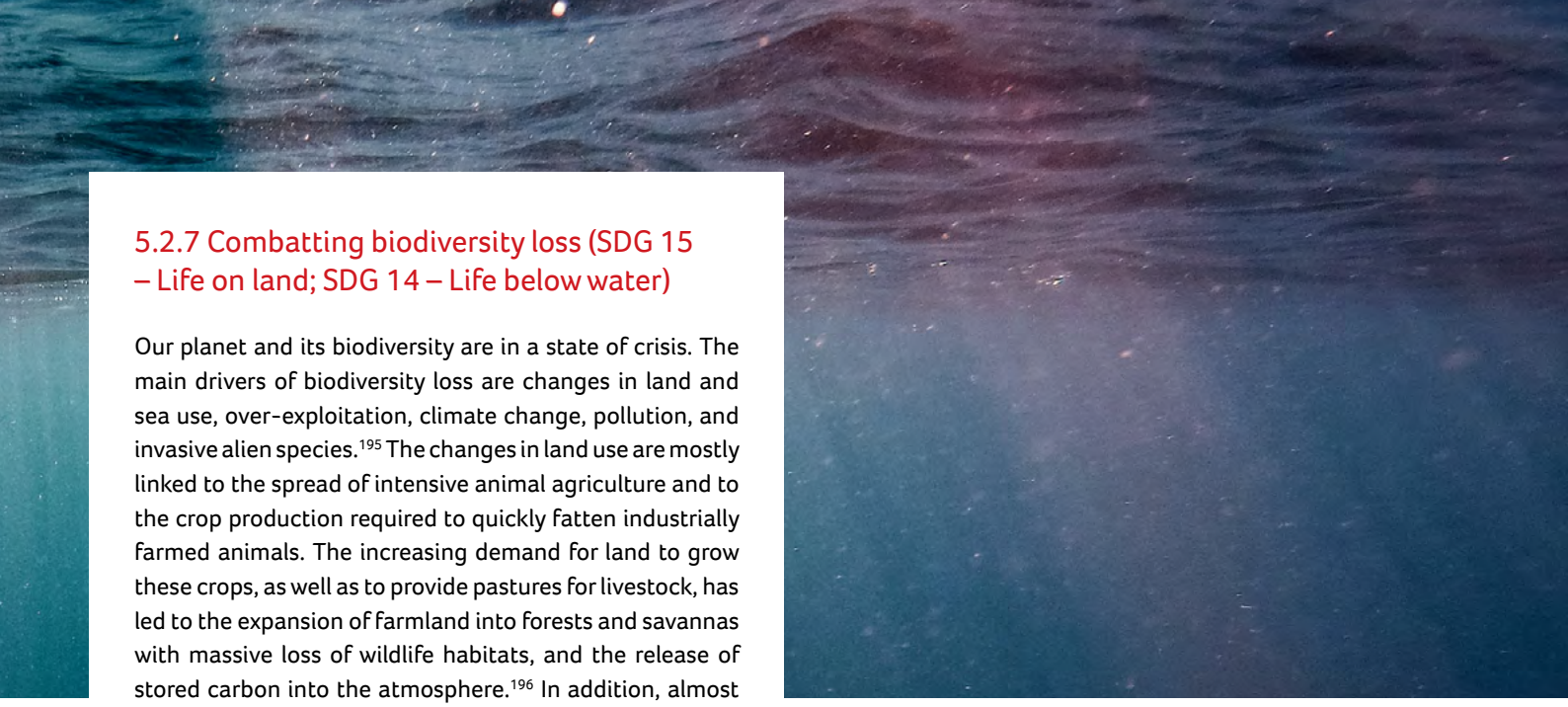
190 http://www.chinawaterrisk.org/resources/analysis-reviews/aquaculture-8-fishy-facts/

191 Eds. Sutton M.A., Howard C.M., Erisman J.W., Billen G., Bleeker A., Grennfelt P., van Grinsven H. and Grizzetti B., 2011. The European Nitrogen Assessment. Cambridge University Press.

192 https://iopscience.iop.org/article/10.1088/1748-9326/10/11/115004/meta

193 van Grinsven, H.J., Rabl, A. & de Kok, T.M. Estimation of incidence and social cost of colon cancer due to nitrate in drinking water in the EU: a tentative cost-benefit assessment. Environ Health 9, 58 (2010)

194 https://www.usgs.gov/special-topic/water-science-school/science/nitrogen-and-water?qt-science_center_objects=0#qt-science_center_objects



5.2.7 Combatting biodiversity loss (SDG 15 – Life on land; SDG 14 – Life below water)

Our planet and its biodiversity are in a state of crisis. The main drivers of biodiversity loss are changes in land and sea use, over-exploitation, climate change, pollution, and invasive alien species.[195] The changes in land use are mostly linked to the spread of intensive animal agriculture and to the crop production required to quickly fatten industrially farmed animals. The increasing demand for land to grow these crops, as well as to provide pastures for livestock, has led to the expansion of farmland into forests and savannas with massive loss of wildlife habitats, and the release of stored carbon into the atmosphere.[196] In addition, almost 75% of the Earth's surface has been altered,[197] which further limits the space in which nature can prosper.

The Living Planet Index (LPI), which measures biodiversity abundance levels based on 14,152 monitored populations of 3,706 vertebrate species, shows a persistent downward trend. Between 1970 and 2016, there has been a 68% overall decline in the numbers of species of fish, mammals, birds and reptiles worldwide.[198]

Animals are a vital element of the Earth's ecosystems and of 'the environment'. Living systems keep the air breathable and the water drinkable, and provide nutritious food. To keep offering these vital services, they need to retain their complexity, diversity and resilience. Biodiversity also plays an important role in ecosystem processes by providing regulating, cultural and supporting services. Appreciation of the world's natural resources is becoming increasingly recognised as valuable to humankind's sustainable development. The welfare of farm animals, and the kind of production systems in which they are kept, has an impact on biodiversity and habitat conservation. Livestock production is said to be 'the single most powerful driver of habitat loss on Earth'[199] and 80% of terrestrial birds and mammal species currently considered as threatened are challenged by habitat loss driven by agricultural activities.[200] In 2013, about 58% of marine stocks were fully exploited – a significant proportion of which is processed into high-protein feed for pigs and chickens – with no potential for increased production. A decrease in livestock population and/or the use of an alternative source of feed, such as seaweed and algae, in these sectors, can therefore do much to prevent further depletion of marine stocks. Biodiversity loss is also linked to the degradation of nature. Poor land management, such as deforestation, overgrazing, and unsustainable farming, are among the main causes of soil degradation in the European Union.[201] Desertification is also a growing threat. These phenomena have considerable environmental and economic consequences.

China has also seen changes to its land due to its economic development, with desertification and increased land and air pollution.[202] China has a fragile ecosystem, as reports revealed that 60% of Chinese land is labelled as fragile and 90% of pasture land is under threat of desertification.[203] Soil erosion is also a concern in Inner Mongolia, which represents 30% of China's grain production. There, soil thickness declined by 62.5%, from 80 to 30 cm, over the past 60 years. This phenomenon is due to extensive farming, overuse of fertilisers, and deforestation.[204]

[195] IPBES (2019), Summary for policymakers, pp. 17-19, B.10-B.14; European Environment Agency (2019), The European environment – state and outlook 2020.

[196] Policy Brief 03: Cattle ranching and deforestation. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-a0262e.pdf. Accessed 7 August, 2018; Machinova, B., Feeley, K.J., and Ripple, W.J. Biodiversity conservation: The key is reducing meat consumption. Science of the Total Environment. 2015. Vol 536. P. 219-431.https://www.sciencedirect.com/science/article/pii/S0048969715303697

[197] IPBES (2019), Summary for policymakers, p. 4, A4.

[198] WWF, Living Planet Report, 2020

[199] Machovina et al (2015) quoted in Greenpeace, Less is More, 2018, p.25

[200] Tilman in Greenpeace, Less is More, 2018, p.28

[201] European Environment Agency (2019), EEA Signals 2019: Land and Soil in Europe.

[202] McBeath, Jenifer Huang and McBeath, Jerry. (2010) Environmental Change and Food Security in China. New York: Springer, p.45

[203] Ibid.

[204] Ibid., 54.

Desertification and the impact it has on arable land – which is important in terms of animal feed – has sparked an intense debate among experts on China's capacity to feed its population.[205] Many agree that China can sustain its population at its current level of production. However, the outlook is far more challenging, and, if the population increases to 1.6 billion by 2030, it becomes unlikely that China would be able to meet its population's demands.[206] Environmental challenges that could lead to further desertification, land degradation, deforestation and pollution, would even further compromise China's food security and biodiversity. The European Union also considers biodiversity, and therefore nature restoration, as 'crucial for safeguarding EU and global food security'.[207]

The cost of inaction on biodiversity loss is high and anticipated to increase.[208] According to EU official documents, 'the world lost an estimated EUR 3.5–18.5 trillion per year in ecosystem services from 1997 to 2011 owing to land-cover change, and an estimated EUR 5.5–10.5 trillion per year from land degradation'.[209] These costs are linked to reduced crop yields and fish catches, increased economic losses from flooding and other natural disasters, and the loss of potential new sources of medicine.[210]

To the contrary, biodiversity conservation can have direct economic benefits for many sectors, as mentioned in the EU Biodiversity Strategy to 2030. Protecting coastal wetlands could, for instance, reduce flood damages and therefore save the insurance sector around EUR 50 billion per year.[211] The European Union sees investing in nature as an important part of its post COVID-19 recovery: these investments, including in climate-friendly agriculture, are 'recognised to be among the five most important fiscal recovery policies, which offer high economic multipliers and positive climate impact'.[212] It will be important for the European Union to tap into this potential to ensure prosperity, sustainability and resilience in the recovery.

China has made significant progress on environmental issues at home. Over the past decade, the central government has established thousands of natural reserves and parks, and is drawing up ecological 'red lines' to restrict human and industrial activity over about one quarter of the country.

China's intention to host the COP15 of the Convention on Biological Diversity (CBD) is one additional sign that China is getting more serious on this topic. Biodiversity plays an important role in climate change mitigation, which is another key area of importance for China and the European Union. The latter has also recently published a new strategy on Biodiversity, which recognises the importance of ensuring coherence between this policy field and its new Farm to Fork food policy, and the coming reform of the Common Agricultural Policy (CAP). change through innovations

[205] http://www.earth-policy.org/blog/who_will_feed_china/

[206] McBeath, p.82

[207] European Commission, Biodiversity 2030, May 2020 - https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/EU-biodiversity-strategy-2030_en

[208] Organisation for Economic Co-operation and Development (OECD) (2019), Biodiversity: Finance and the Economic and Business Case for Action.

[209] European Commission, Biodiversity 2030, May 2020 - https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/EU-biodiversity-strategy-2030_en

[210] Organisation for Economic Co-operation and Development (OECD) (2019), Biodiversity: Finance and the Economic and Business Case for Action.

[211] Barbier et al. (2018), How to pay for saving biodiversity, Science 04 May 2018: Vol. 360, Issue 6388

[212] Hepburn et al. (2020), Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?, Smith School Working Paper 20-02.

6 ANIMAL WELFARE OPPORTUNITIES THROUGH INNOVATION AND BEST PRACTICES

Industrial innovation has enjoyed a period of rapid growth in the People's Republic of China. Powered by Chinese government policy, and government commitment to providing vast capital to indigenous (Chinese-led) innovations, a fundamental shift has occurred in which science and technology have become increasingly influential and a critical force in economic growth.[213] To cement the role of innovation in the nation, the Chinese Government has underpinned its current five-year plan with the concept. Presenting key focal points serving as a keystone of social and economic development, China's five-year plans garner support from all sectors in the nation in a collaborative way often unseen in other regions of the world. The first word in the list of focuses under China's current five-year plan is 'innovation'.

English translation of excerpts from the 13th Five-Year Plan (2016–2020) of the People's Republic of China (simplified Chinese: 五年计划; traditional Chinese: 五年計劃; pinyin: Wǔnián Jìhuà);[214]

- 'Innovation: Move up in the value chain by abandoning old heavy industry and building up bases of modern information-intensive infrastructure'
- 'Achieve significant results in innovation-driven development'

[213] Thraen, J. J, Mastering innovation in China, 2015. Springer Press.

[214] Central Committee of the Communist Party of China, The 13th five year plan for economic and social development of the People's Republic of China. Translated by Compilation and Translation Bureau, Beijing, China. 2016. Accessed 28/05/20, Available from: https://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/CHINA%29%20The%2013th%20Five-Year%20Plan%20%282016-2020%29.pdf

In line with the affirmed focus on innovation, China has generated what is arguably an unrivalled ability to envision and enact the upscaling of industries. As a cornerstone of Chinese industry, the agricultural sector, and notably animal industries, has seen significant attention. This capacity for large-scale agricultural innovation in China – coupled with a focus on agricultural growth – sees the country producing more animals than any other country in the world; approximately 39% of all farmed animals on earth are raised in China alone.[215] Half of Chinese farms are still small scale, with fewer than 500 pigs, but the bulk of the output is generated by the other 50% which are much larger.

While this continued trend towards upscaling of animal agriculture poses the threat of continued intensification with detrimental risks to animal welfare, it also brings opportunities for the opposite. That is, to instead move towards systems that continue to be economically productive, while addressing animal welfare concerns in an innovative way. With unrivalled capacity, Chinese industry has uncapped potential to address any problem that becomes the subject of focus. For many people, the question of whether 'animal welfare' is actually an area of focus for China remains. For those interested in investigating this question deeply, the answer is heartening.

In two recent academic studies, groups of livestock leaders around China (and other Asian nations) were questioned about their perception of the benefits to addressing animal welfare concerns in their businesses, and their solutions to addressing some key animal welfare concerns.[216],[217] In summary, they listed many benefits, and presented many solutions. Not only did this research demonstrate that leaders in the livestock industry in China are increasingly aware of animal welfare as a concept, but that they are also increasingly seeing value in addressing it in locally suitable ways, i.e. with Chinese innovation, research and development.

6.1 SCIENTIFIC INNOVATION

Another recent academic study hypothesised that the perceived lack of Chinese interest in animal welfare could be partly due to a lack of externally accessible accurate information about the country[218]. This was thought to be, in large part, attributable to a language barrier, and a lack of priority in making Chinese knowledge and capacity known to regions outside of China.

[215] FAOSTAT. Data: China. 2017. Accessed 01/03/2019, Available from: http://www.fao.org/.

[216] Sinclair, M., C. Fryer, and C.J.C. Phillips, The Benefits of Improving Animal Welfare from the Perspective of Livestock Stakeholders across Asia. Animals, 2019. 9(4): p. 123.

[217] Sinclair, M. and C.J.C. Phillips, International livestock leaders' perceptions of the importance of, and solutions for, animal welfare issues. Animals, 2019. 9(6): p. 319.

[218] Sinclair, M., et al., Animal welfare science in China: A review of Chinese literature. Animals, 2020.

To test this, the researchers searched Chinese academic and scientific databases, using Chinese terms related to animal welfare in agriculture. As they had predicted, the results were encouraging. Between 2008 and 2018, 854 academic studies were published with a specific focus on the welfare of pigs and chickens (the most numerous terrestrial species farmed in China) in different stages of farming.[219] The message was clear: Chinese industry does have an interest in animal welfare, and a capacity to address animal welfare concerns scientifically.

The opportunity exists to further support an increase in knowledge transfer of animal welfare science both into China, and from China to the rest of the world, by having works readily translated. This could be the object of a specific EU-China project under the next 'Horizon Europe' research programme.

6.2 SYSTEM INNOVATION – RETHINKING AGRICULTURE

6.2.1 Chinese Ecological Agriculture

Commitment to 'greening' China in a bid to become more environmentally friendly and conservation-focused has contributed to the development of a holistic system of farming called 'Chinese Ecological Agriculture' (CEA). This Chinese concept, which originated in the early 1980s, is considered as an alternative path that is 'derived from taking into account the environmental impacts of conventional agricultural practices and the limitations of traditional agriculture in providing enough food to a growing population'. This approach represents, in fact, an evolution of such traditional farming, using modern science and technology, proposing adjustments to both traditional and conventional systems.[220]

Most closely related to the notion of 'sustainable agriculture' in the west, 'ecological agriculture' also informally includes animal welfare. Indeed, good animal welfare is linked to this concept: improving health, nutrition and natural conditions for animals fosters productivity and profits, and is perceived to increase food quality, including taste.[221] Designed to feed into the delivery of the objectives of the five-year-plan, the 'eco-culture', or 'ecological agriculture' development is firmly cemented in innovation. One example includes the development of 'fermentation bedding', which is an environmentally friendly, economically viable and sustainable bedding that also brings a higher degree of comfort to animals being farmed.[222]

Opportunity exists to promote the development of animal welfare in China in line with this larger Chinese system of 'ecological agriculture', and to harness a momentum of innovation that already exists on the Chinese mainland.

[219] Sinclair, M., et al., Animal welfare science in China: A review of Chinese literature. Animals, 2020.

[220] Tian Shi, Ecological agriculture in China: Bridging the gap between rhetoric and practice of sustainability, 2002

[221] Sinclair, M., et al., Animal welfare science in China: A review of Chinese literature. Animals, 2020.

[222] Cheng, X, Innovative approach to utilizing agro-organic wastes and Chinese ecological agriculture. Transactions of the Chinese Society of Agricultural Engineering, 2002, 18 (5) pp.1-6.

6.2.2 Circular and regenerative agriculture and animal welfare

Case study – 'Re-rooting the Dutch Food System: from more to better'

The Netherlands is a small EU country with an enormous agricultural output,[223] driven by relentless focus on research and innovation. Wageningen University & Research, one of the top-ranked universities in the Netherlands, is also the world's best in the field of Agriculture & Forestry, according to the QS World University Rankings.[224] In recent years, scientists from the university have started to develop a wider and new reflection on the regenerative and nourishing food systems that can be built by 2050.

In 2020, a team of farmers, representatives of nature and agricultural organisations, and scientists of Wageningen University & Research, led by Imke de Boer (Professor of Animal Production Systems) and Evelien de Olde (researcher Animal Production Systems), presented their food vision[225] for their area of choice 'the Netherlands', and identified which changes are needed to get there. Central to this vision is the important concept that humans and animals should no longer compete for resources. Farmed animals can have a role in a truly sustainable food system insofar as they can use resources that are not directly useful for humans, such as marginal grassland. Farmers will also have to be stewards of the land: farm income will be generated by combining milk and meat production from resilient, less productive breeds, with nature and landscape conservation. In the words of the authors, 'the production and consumption of animal products will be determined by the availability of by-products which are inedible to humans, grass resources and the carrying capacity of the ecosystem'. Such a system, in which animal numbers will be much lower than at present, will ensure that all animals are farmed with care, paying full respect to their behavioural and ethological requirements, while contributing to regenerating local ecosystems and ensuring a fair income for farmers.

Consumption patterns will also change and will become more local, based on seasonal and fresh food, thus reducing carbon emissions from transport and packaging, and supporting thriving communities. People will be encouraged to cook their meals. This vision, which is called 'Re-rooting the Dutch Food System: from more to better',[226] won the prestigious Food Systems Vision Prize launched by the Rockefeller Foundation.

[223] https://www.nationalgeographic.com/magazine/2017/09/holland-agriculture-sustainable-farming/

[224] https://www.topuniversities.com/universities/wageningen-university-research

[225] https://www.wur.nl/en/show-longread/Re-rooting-the-Dutch-food-system-from-more-to-better.htm

[226] https://www.wur.nl/upload_mm/3/3/3/38a7c8a7-4b51-477b-95da-1b15b8df96f8_3%20Article%20vision%202050.pdf

Case study – Kipster, a carbon-neutral chicken production

Producing eggs and meat in an economically viable way, with as low an environmental impact as possible, while ensuring the needs of the birds are catered for. This is the thinking behind Kipster,[227] an innovative Dutch chicken farming system with two production units (and counting) and that has already exported its model to the United States. At a time when intensive animal agriculture is accused of impeding the achievement of many Sustainable Development Goals (SDGs), Kipster presents an alternative model of food production, with positive impacts on several other SDGs and with commercial success.

In regular egg production, millions of day-old male chicks end up macerated or gassed each day, to be then turned into pet food. The fundamental principle of Kipster is that male chicks are not killed, but raised for meat. The welfare of laying hens is improved by simple but key innovations, like ample space, an inner garden, the provision of natural light, ample inside space and outside runs, and the use of an adapted breed that is not prone to feather pecking, thus eliminating the practice of beak trimming, which is standard in conventional systems. Hens are kept in living quarters that allow them to fully express their natural behaviour: space to move and flap their wings, soil to scratch in, perches and branches to perch on, and the chance to take a quiet nap. Faced with the persistent threat of avian influenza, improving the welfare of the animals contributes to strengthening their health, making the production more resilient and reducing the risk of spreading zoonoses (SDG 3).

Each production stream has also been designed in a very sustainable way. Extraction fans remove up to 95% of fine particles from the air and ensure there is no harm to the health of people living nearby (SDG 3). Laying hens are kept in natural daylight, which helps save energy, and the farm produces twice as much electricity as it needs from its 1,078 solar panels (SDG 7). Last but not least, on most intensive farms, animals are reared on food that people could eat (corn, maize, soy etc.), which is highly inefficient. At Kipster, chickens turn scraps and waste from the food industry into something edible, like pre-industrialisation farms (SDG 2).

In the Netherlands, Kipster started with a first farm of one house and 24,000 birds. On the second site, there were already two houses and twice as many birds. In the United States, where costs of transport are more expensive, the starting farm has five houses and 120,000 birds. The main limit to the upscaling of the model is simply the availability of waste streams to feed the animals. For instance, in a European Union where land and waste streams are optimally used, only 6 million hens, 50 million pigs and 30 million milk cows could be raised, which represent a decrease of between 30 and 100% depending on the species.[228]

With all this, Kipster has shown that farming can transform for the best: a circular model with respect for the welfare of animals.

[227] https://www.kipster.farm/

[228] Van Hal et al, Upcycling food leftovers and grass resources through livestock: Impact of livestock system and productivity, Volume 219, 10 May 2019, p.492.

6.3 CONSUMER-DRIVEN INNOVATION

6.3.1 Consumer-engaged processing

Another innovation in the farming system that presents opportunities for animal welfare is that of consumer-engaged processing. One well-known company in China, Qinglin Food Co. Ltd., has built a theme park around their pork slaughterhouse in Haiyan, Jianxing, called 'Pig Planet'.[229] Pork consumers and members of the public can visit this park to meet and greet pigs, enjoy demonstrations of pig intelligence, enjoy pig-themed rides and merchandise, and ultimately, walk through the companies entirely transparent slaughterhouse either to monitor the slaughter of a pig they will purchase the pork from, or to generally understand the process.

The popular destination, regularly visited by families, is undoubtedly fuelled by the Chinese culture of discerning quality in their food, and a desire to understand exactly what they are purchasing and eating. Along with the importance of 'freshness', this could also contribute to the popularity of wet markets in China. This culture is in opposition to many 'western-based' cultures, who tend to prefer cognitive dissonance and disconnection from the animals that they are ultimately consuming, rather than full transparency of the process.

This facet of Chinese culture presents a unique opportunity to encourage systems that foster a transparent connection between the animals, their life and welfare, and the ultimate consumers. For reasons of connection to quality and transparency, consumers could become advocates for heightened animal welfare for the very animals they are consuming.

6.3.2 Best practices in labelling

One way to ensure consumers can drive innovation and progress in the field of farm animal welfare is by improving transparency in the production chains. A well-built labelling scheme can contribute to this objective and empower citizens. The European Union already has two method-of-production labelling schemes in place, for eggs and fish products. Under the egg-labelling scheme (2008), all 'Class A' shell eggs produced in the European Union must be labelled according to their method of production. The rules also require country-of-origin labelling on imported shell eggs and further impose a 'non-EC standards' mark for imports where there is 'no sufficient guarantee as to the equivalence of rules'. Following the introduction of this scheme, the overall number of egg-laying hens kept in alternative, non-cage systems steadily increased.[230] This is indicative of the positive impact of a higher level of transparency in the sector. EU rules also require labelling on all fish products (2013) marketed in the European Union indicating method of production, catch area, and fishing gear used, among other factors.[231,232] Information regarding the impact of this labelling scheme on consumer behaviour is not available.[233] However, a Eurobarometer study on fishery and aquaculture products provides some insight, with 73% of consumers saying they consider it important for a label to state whether a fish was farmed or caught wild.[234]

The European Union also has various other labelling schemes in place, notably on the country of origin of meat products. In addition to the country of origin, unprocessed pork, sheep, goat and poultry meat must be labelled with the country of rearing and slaughter.[235] Although not directly delivering information on the production method, the mandatory labelling of country of origin is an indication of the extra-EU origin of the product, and the country of rearing an indication of whether the imported product was subject to EU standards.[236]

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229 http://en.pigsplanet.com

230 European Parliament, The Poultry and Egg Sectors: Evaluation of the Current Market Situation and Future Prospects, p. 24, 2010, available at: https://bit.ly/2mx06Et. Since the 2008 EU Regulation on the mandatory labelling of methods of production of shell eggs, the portion of laying hens kept in alternative systems (non-caged) keeps increasing (source: Eurogroup for Animals, Optimising Laying Hen Welfare in Cage-Free Systems, p. 38, 2018, available at: https://bit.ly/2Qux4Dp).

231 Regulation 1379/2013 of 11 December 2013, OJ L 354/1, Art 35(1).

232 Ibid. Also see European Commission, A pocket guide to the EU's new fish and aquaculture consumer labels, 2014, available at https://bit.ly/2CXmtGJ (last visited 14 October 2018).

233 Commission, Feasibility Report on options for an EU ecolabel scheme for fishery and aquaculture products: Final Report, 2016, available at https://bit.ly/2mwoypm (last visited 14 October 2018), 27.

234 European Commission, Special Eurobarometer 450: EU consumer habits regarding fishery and aquaculture products, 6-7, 2017, available at https://bit.ly/2kviDQD (last visited 14 October 2018).

235 Commission Implementing Regulation (EU) No 1337/2013 laying down rules for the application of Regulation (EU) No 1169/2011 of the European Parliament and of the Council as regards the indication of the country of origin or place of provenance for fresh, chilled and frozen meat of swine, sheep, goats and poultry, Article 5.

236 Keeping in mind that imported meat must comply with E.U. standards on slaughter for sanitary purposes, as per Council Regulation 1099/2009 on the protection of animals at the time of killing, Article 12.

The organic label can be used to indicate that a product was produced in compliance with the EU organic regulation.[237] The organic regulation gives consumers information on sustainability, including on animal welfare, to the extent that production rules for organic animal source foods provide more stringent protection than minimum EU standards,[238] including at the time of slaughter since a 2019 European Court of Justice's ruling.[239] The organic regulation also imposes an indication on the logo showing whether or not the product originates from the European Union.[240] The revised 2021 organic regulation further requires that all imported products comply with EU organic standards with more stringent certification requirements through recognised certification bodies starting in 2026.[241]

Finally, the European Union imposes labelling requirements on all genetically modified organisms (GMOs) placed on the EU market.[242] These GMOs may only be registered provided they demonstrably have no adverse effects on 'human health, animal health or the environment',[243] making the labelling requirement an effective tool to shield the EU market from GM animal products.[244]

[237] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007, Article 44.

[238] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products Article 14 and Annex II, Part II. Production rules for livestock remained unchanged from the previous regulation, except for fish whose welfare has been recognized and integrated to a large extent, and for rabbits, who are now covered by the regulation.

[239] Case C-497/17, Oeuvre d'Assistance aux Bêtes d'Abattoir v Ministère de l'Agriculture et de l'Alimentation and Others, 2019.

[240] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labeling of organic products, Article 32

[241] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products, Article 46. Currently, organic products from third countries are allowed on the EU market under the equivalence principle or when organic standards of the exporting country are similar to EU rules. Products from third countries benefiting from recognized equivalent production methods remain exempted from certification in the new regulation (Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products, Article 47).

[242] Regulation 1829/2003 of 22 September 2003 on genetically modified food and feed, OJ L 268, Articles 12, 13 and 25; Regulation 1830/2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products from genetically modified organisms and amending Directive 2001/18/EC, OJ L 268, Article 4.

[243] Regulation 1829/2003 of 22 September 2003 on genetically modified food and feed, Article 4(1)(a).

[244] Currently, there is no Genetically-modified animal product on the E.U. market and the European Food Safety Authority has received no application to market such products on the European Union so far.

The French Animal Welfare Label system for broiler chicken. Reproduced from Groupe Casino.

Case study – The French Animal Welfare Label —

Consumers of animal products in the European Union are increasingly interested in the way in which farmed animals are reared. In many countries, animal welfare NGOs are collaborating with the food industry to provide consumers with this type of information in a reliable and transparent way by using dedicated labels. One example that is proving very successful is the French Animal Welfare Label first adopted by the Casino group and developed in collaboration with three animal welfare organisations: Compassion in World Farming (CIWF), Oeuvre d'Assistance aux Bêtes d'Abattoirs (OABA), and La Fondation Droit Animal, éthique et sciences (LFDA). The label is meant to be immediately informative for consumers by showing a score (from A to E) and a pictogram illustrating the method of production (e.g. standard, improved, with access to outdoors, etc.). See Figure XX for an example of the labels applied to poultry meat.

All operators in the production chain are included in the assessment and scored to obtain the final grade according to nearly 230 criteria that are both resource- and animal-based. This labelling system can be applied to all products, and it includes an animal welfare assessment covering the whole life cycle of the broiler chicken, from birth to rearing, collection, transport and slaughter. The auditing is carried out by independent control bodies. Each of the operators (hatchery, farm, transporter, slaughterhouse) is assessed once a year. The label for poultry meat was launched in December 2018 by the Groupe Casino and has been so well received by consumers that it has now been adopted by other retailers including LIDL, Carrefour, and Intermarché. In 2019, a working group was created with other retailers, suppliers and the active participation of INRA (the French National Institute for Agronomic Research) and it is expected that the label will soon be extended to other products and that more retailers and suppliers will adopt it. Up-to-date information can be found on the website of the initiative.[245]

[245] http://www.etiquettebienetreanimal.fr/

6.4
TECHNOLOGICAL INNOVATION

Based on over 50 years of data released by the Chinese Statistical Bureau, science and technology have substantially grown in their contribution to driving the growth and direction of agriculture in China; from 48% to a forecasted 64% in 2020.[246] This trend is expected to increase, and so will the potential to address animal welfare concerns with technological innovation.

During an afore-mentioned study with livestock leaders in China, researchers were made aware of an emerging Chinese technology that would track the lives of 'food' animals and their welfare for the end consumer.

Capitalising on the cultural preference for Chinese consumers to be intimately aware of the quality and health of their animal produce, a smartphone application was being developed that allowed buyers to purchase the animal from birth, track the animals' activities and diet, and even opt to pay additional money for 'treats', or enrichment toys.

Likewise, large Chinese umbrella companies such as Alibaba are installing complex and intuitive technology that can monitor and assess vital signs in the pigs they are raising, readily identifying illness and discomfort. This allows the farm managers to quickly address animal health issues, thereby reducing suffering and increasing comfort. Furthermore, another

Chinese technology has the ability to intricately monitor pig behaviour and health through a pig facial recognition software; again, allowing immediate attention to issues that arise, and also reducing the need for invasive and disturbing human interventions.

After scratching the surface with these innovative approaches, it is clear that Chinese technologies could reform animal welfare. Opportunity exists to further investigate these innovations in the context of animal welfare improvement, and to consider investment to ensure that the technology is continually developed with welfare in mind.

[246] Wang, Q.X., et al., Contribution level of science and technology progress on China agriculture development determined during the 10th five-year period and in 2020. Research of Agriculture Modernization, 2006. 6.

6.5
PLANT-BASED MEAT AND CULTIVATED MEAT

Industrial animal agriculture is dependent on feeding human-edible crops to animals that then convert them into meat and milk. This is not an efficient way to feed the world: intensive farms require huge quantities of feed, and vast areas of land are being given over to feeding farm animals, diverting grains from people to livestock. Studies have shown that, while 36% of the world's crop calories are fed to animals, only 12% of these calories are returned for human consumption as meat or milk.[247] For every 100 calories fed to animals as cereals, just 17 to 30 enter the human food chain as meat.[248] This is insufficient and unsustainable. The earth cannot sustain humankind's demands for food if we do not find a more environmentally friendly way to feed ourselves. The UN Food and Agriculture Organization (FAO) has already warned that further use of cereals as animal feed could threaten food security by reducing the grain available for human consumption.[249] Similarly, the farming of carnivorous fish requires the production of fishmeal and oils, which remove fish that are otherwise fit for human consumption from the food chain. A 2013 report revealed that in the three Chinese provinces studied, 'virtually all carp and tilapia farmers … use manufactured feeds containing fishmeal'. This is despite the fact that these low trophic-level species are naturally herbivores.[250]

It is high time to move towards diets relying less on meat and dairy products. In that context, innovation on alternatives to meat, such as plant-based meat or cultivated meat, are attracting increasing interest.

[247] Cassidy E.M et al, 'Redefining agricultural yields: from tonnes to people nourished per hectare' (2013) University of Minnesota Environ Res Lett 8, p.1

[248] Lundqvist, J., de Fraiture, C. Molden, D., 2008. Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain. SIWI Policy Brief. SIWI. http://www.siwi.org/documents/Resources/Policy_Briefs/PB_From_Filed_to_Fork_2008.pdf; Nellemann, C., MacDevette, M., Manders, et al (2009) The environmental food crisis – The environment's role in averting future food crises. A UNEP rapid response assessment. United Nations Environment Programme, GRID-Arendal, www.unep.org/pdf/foodcrisis_lores.pdf

[249] Gerber et al 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations

[250] https://www.researchgate.net/publication/277605621_Feed_and_fishmeal_use_in_the_production_of_carp_and_tilapia_in_China

6.5.1 Plant-based meat

Plant-based meat is made from plants and designed to look and taste like conventional meat. Concerns related to health, animal welfare and sustainability are the key drivers of the exponential growth the sector has known in the past years. The COVID-19 crisis has also accelerated this trend in China, even if it remains a small market compared to the United States or the European Union.[251], [252]

Zhenmeat, the main Chinese plant-based meat company, has even recently announced the launch of two new products: a plant-based pork tenderloin and plant-based crayfish, two of the most consumed food products in China.[253] European investment in the sector of alternative proteins has surged between 2014 and 2019, jumping from EUR 100 million to EUR 600 million.[254]

6.5.2 Cultured meat

Cultured meat is meat that is obtained by growing animal tissue in culture from stem cells. As the process does not involve slaughtering, it is considered an ethical alternative to meat production. Moreover, preliminary studies show significant environmental benefits and more efficient use of resources compared to conventional meat. There are still hurdles to overcome, notably technical and regulatory-based. Technical challenges include the further development of animal-free media (at the moment , the medium used to grow cells is most often from animal origin) and the scale-up of the production process to make it cost effective. On the regulatory level, products need to go through safety assessments before entering the market.

Cultured meat is a strong opportunity for collaboration between the European Union and China. It presents a solution for multiple challenges both are facing. Firstly, it can contribute to food security. The demand for meat is not declining. Meat consumption in the European Union is expected to decrease very slightly by 2030; however, this will be compensated by higher exports due to increasing demand worldwide.[255] China is an important driver because of its rapid economic development. At the same time, the meat supply chain is very vulnerable: African Swine Fever was responsible for halving the Chinese pig herd in 2019 due to disease or elimination, which led to a doubling of pork meat prices.[256] Conventional meat production exposes nations and markets to economic risks and price volatility. Therefore, a more secure and stable system is needed, especially since the demand – and therefore the risk – will increase. As cultured meat is grown through cells in bioreactors under highly controlled conditions, it is not susceptible to infection outbreaks that threaten a livestock-based system.

Secondly, environmental degradation, land use and climate change are on the worldwide agenda. The European Union and China have both developed numerous policies on environmental protection. Cultured meat is expected to deliver substantial environmental benefits over conventional meat, including lowering eutrophication, water use and greenhouse gas emissions.[257] The most spectacular benefit is in terms of land use: 20 to 100 times less land is needed for cultured meat. Since China has 20% of the world's population and only 7% of the world's arable land, land use will become increasingly important.[258]

Cultured meat is also an economic opportunity. It originated in the European Union in 2013, the Dutch scientist Mark Post and his team were the first to develop a prototype of cultured meat. Since then, companies emerged worldwide and are now concentrated in California, Western Europe and Israel.[259] Surprisingly, China is absent in the cultured meat landscape, though there might be Chinese investments involved. Although there still are technical hurdles to overcome, consumer attitudes will ultimately determine the success of cultured meat. Multiple studies have been performed on consumer intentions, though these focus mainly on a western and even European perspective.[260] On Chinese consumers, very little research is available, although the existing literature suggests a very high potential: over 93% of populations surveyed would be willing to purchase cultured meat.[261] This strongly suggests economic opportunities for the European Union and China to increase the level of collaboration and innovation.

[251] https://www.bbc.com/news/business-52391517

[252] https://www.reuters.com/article/us-health-coronavirus-asia-food-idUSKCN224047

[253] https://www.cnbc.com/2020/06/18/china-beyond-meat-rival-zhenmeat-launches-plant-based-pork-crayfish.html

[254] https://sifted.eu/articles/plant-based-meat-startups/

[255] EU Agricultural Outlook for Markets and Income 2018-2030

[256] https://www.nytimes.com/2019/12/17/business/china-pigs-african-swine-fever.html

[257] Tuomisto et al. Environmental Impacts of Cultured Meat Production. Environmental Science and Technology (2011) & Mattick et al. Anticipatory Life Cycle Analysis of In Vitro Biomass Cultivation for Cultured Meat Production in the United States. Environmental Science and Technology (2015)

[258] Rossi, Marcello. 2018. The Chinese Are Eating More Meat Than Ever Before and the Planet Can't Keep Up (2020)

[259] Choudhury et al. The Business of Cultured Meat. Trends in Biotechnology (2020)

[260] Dempsey & Bryant. Cultured meat: Do Chinese consumers have an appetite? The Cellular Agriculture Society (2020)

[261] Bryant et al. A Survey of Consumer Perceptions of Plant-Based and Clean Meat in the USA, India, and China. Frontiers in Sustainable Food Systems (2019)

7
CONCLUSIONS – TIME FOR THE EUROPEAN UNION AND CHINA TO ACT

It is increasingly recognised that animal welfare plays an important role in finding solutions to most of the global challenges our planet is currently facing. In addition, public awareness of animal welfare is growing. Over the past years, the world has been painfully reminded of its fragility: climate-related disasters, forest fires in the Amazon, Australia and Siberia, the African Swine Fever, and most recently, the COVID-19 pandemic. All these crises have impacted people, as well as animals. In 2019, the wildfires in Australia destroyed over 2,300 homes and took the lives of over a billion animals.[262] The same year, fires in the Amazon rainforest, notably in Bolivia, burned at least 2.3 million animals.[263] In August 2018, the African Swine Fever swept through China, decimating the swine population by half, causing a critical shortage of pork.[264]

At the heart of many of these challenges lies an unsustainable food production system that lacks resilience. Improving animal welfare, using existing science and innovations, as well as moving towards more sustainable production and consumption patterns that rely less on meat and dairy products, can help prevent these situations in the future. For instance, the African Swine Flu only proliferates in overcrowded intensive livestock systems[265] and climate change – fuelled by deforestation that is in turn mostly driven by the production of meat and dairy products – has exacerbated Australia's and Brazil's wildfires to an unprecedented scale.

Improving animal welfare and the sustainability of food production systems will have long-lasting benefits that largely offset the immediate costs. As a reminder, in 2010, the World Bank estimated the direct economic cost of zoonotic diseases over the past decade to be USD 20 billion (with further indirect losses estimated at over USD 200 billion)[266] and the European Union already considers that antimicrobial resistance costs it roughly EUR 1.5 billion per year in healthcare costs and productivity losses.[267] As stated by the European Union's Animal Health Strategy (2007–2013), 'prevention is better than cure'.[268] It is high time for both the European Union and China to embrace animal welfare and become global leaders in its pursuit as part of preventive measures to avert avoidable situations, such as zoonotic diseases.

[262] https://www.nytimes.com/2020/01/11/world/australia/fires-animals.html

[263] https://www.cbsnews.com/news/amazon-wildfires-brazil-spurns-20-million-aid-offer-from-g-7-nations-today-2019-08-27/

[264] https://www.forbes.com/sites/quora/2019/10/22/what-ripple-effects-do-events-like-swine-flu-have-on-agriculture/#5bc2a84f3d98

[265] Ibid.

[266] World Bank. 2010. 'People, Pathogens and Our Planet : Volume one : towards a one health approach for controlling zoonotic diseases'.

[267] DG SANTE website on Antimicrobial resistance - https://ec.europa.eu/health/amr/antimicrobial-resistance_en.

[268] https://ec.europa.eu/food/sites/food/files/animals/docs/ah_policy_strategy_2007-13_en.pdf

7.1 RECOMMENDATIONS

- The European Union could improve its animal welfare standards, relying on the most recent animal welfare science. It could also develop standards for species which are currently left unprotected. China could also build up on the work led by ICCAW and CAS to establish mandatory animal welfare standards.

- The EU and China could explicitly refer to animal welfare in the coming EU-China 2025 Cooperation Agenda, notably in the section related to cooperation around public health.

- Animal Welfare could be explicitly mentioned in the EU-China agricultural dialogue, as a dimension of sustainable farming. Programmes put in place under such dialogue, like exchange of young farmers, could also pay specific attention to the topic.

- The EU and China could establish a joint expert working group on future food policies including sustainable and higher welfare livestock production as well as animal welfare and humane and sustainable protein innovation. For example

- The EU and China could develop cooperation among researchers, notably on pig, fish and broiler welfare, to develop guidelines that would allow producers to provide enhance animal welfare, taking into account the specificities of each context

- In the future EU-China investment agreement, the Parties could require EU businesses to respect EU-equivalent standards when investing in animal agriculture.

- The provisions on investment and sustainable development in the EU-China Investment agreement could include the OIE Aquatic and Terrestrial Codes in the list of international commitments the Parties commit to respect

- The EU and China could aim at establishing a Memorandum of Understanding between DG SANTE and its counterpart in China to develop a more structured cooperation on animal welfare, possibly in the context of the fight against antimicrobial resistance.

- The EU and China could cooperate to better address wildlife trade. Partners could discuss best practices, such as the use of positive lists.


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