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**Danielle Nierenberg, Worldwatch Institute and Leah Garcés, World Society for the Protection of Animals (WSPA).**

2005

A summary of this report was presented at the November 2004 World Health Organization (WHO) annual meeting of the Global Forum for Health Research in Mexico City, Mexico.

*"The American Public Health Association (APHA) hereby:*

Resolves that APHA urge federal, state and local governments and public health agencies to impose a moratorium on new Concentrated Animal Feed Operations (CAFOs) until additional scientific data on the attendant risks to public health have been collected and uncertainties resolved."

2003-7 Precautionary Moratorium on New Concentrated Animal Feed Operations, American Public Health Association, 2003 Policy Statement.<sup>59</sup>

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## ABOUT THE AUTHORS

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List of Acronyms

- BASE** – Bovine Amyloidotic Spongiform Encephalopathy
- BSE** – Bovine Spongiform Encephalopathy or Mad Cow Disease
- CJD** – Creutzfeld-Jakob Disease
- vCJD** – Variant Creutzfeld-Jakob Disease
- DES** – Diethyl stilbestrol
- FAO** – Food and Agriculture Organization
- FEV** – Forced Expiratory Volume
- IGF-1** – Insuline-like Growth Factor-1
- PCBs** – Polychlorinated Bi-Phenyls
- POPs** – Persistent Organic Pollutants
- rBST** – Recombinant Bovine Growth Hormone
- TODS** – Toxic Organic Dust Syndrome
- TSEs** – Transmissable Spongiform Encephalopathies
- WHO** – World Health Organization

Foreword\*

“Industrial animal agriculture, the next global health crisis?, is a call for attention from the World Society for Protection of Animals (WSPA). With this document, WSPA seeks to alert the World Health Organization (WHO) and other public health institutes to, “take immediate steps to reverse the growth of industrial animal agriculture, especially in regions where this production is set to dominate”, (i.e. Asia, Latin America and Africa). As a virologist involved in research at a National Public Health Institute, I have read this draft report with great interest. I see merit in this report, in that it lists a number of important health issues arising from the ever increasing demand for animal protein and the direct consequence of this, namely the increasing scale of industrial animal agriculture. My direct involvement is with zoonotic infections, i.e. infections that can jump from animals to humans. During a recent expert consultation of the WHO\*, several recommendations were drafted which are relevant for this topic. The WHO called for involvement of non-traditional partners in improving preparedness for human health hazards arising from the animal world.

The mission of WSPA differs from that of the institutes that it addresses, and therefore, support for recommendations for action will not necessarily be shared. What is important, however, is to not discard the underlying message, namely, a joint concern for the consequences of the increasing demand for animal protein on human and animal health. That should be a good starting point for discussion.

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Abstract

The research studied the exponential growth of often unregulated industrial animal agriculture in developing countries, leading to negative impacts on human health. According to the International Food Policy Research Institute (IFPRI), countries in Latin America, Asia and Africa will be the world's leading producers of animal products by 2020, with industrial animal agriculture likely to be the predominant production method. With little regulation presently in place to control inputs or outputs of industrial animal farming, the results for the health of communities are of great concern.

In these regions, many industrial animal farms are located right outside of, or even within some of the world’s most densely populated and fastest growing cities, where they can pollute the water, air and land. Little work related to industrial animal agriculture is currently being conducted to analyse the effects on poorer countries’ populations. Research in more affluent countries such as the United Kingdom and United States has already raised concerns in the scientific literature over the public health affects of industrial animal farming, including infectious disease, antibiotic resistance, and the pollution of drinking water, air and land, resulting in serious disease outbreaks and other health concerns. The study highlights a lack of research, monitoring and controlling systems in many countries.

The United Nations’ Millennium Development Goals include ensuring environmental sustainability. Industrial animal farming can lead to serious contamination of water, if left unregulated. One of the goals, is to reduce by half, the proportion of people without access to safe drinking water. Industrial animal farming often has damaging effects on safe drinking water. This is but one of the health issues put forward in this report as a gap in research priority in some developing countries.

The health issues discussed in the study are well known. The conclusion that they stem from industrial animal farming has not been clearly recognised. This report is a call to action for the WHO and public health institutes to use their influence, to advise policy makers to prioritise the reversal of the growth of industrial animal agriculture, in order to prevent its potentially serious human health ramifications.



# 1. Introduction

After World War II, the world's richest countries responded to the growing demand for meat by raising large numbers of livestock in outdoor and enclosed spaces: the era of industrial animal agriculture had begun. Antibiotics, growth promoters, and an unnatural diet of grain based feeds became, and still are, important inputs in cattle feedlots, chicken houses and pig farms. As a result, world meat production has risen more than fivefold since 1960.<sup>1</sup>

However, industrial animal farms are not without their problems. Industrial animal agriculture, as documented, produces substantial amounts of manure, which in turn can pollute the air and water.<sup>2</sup> Animals kept on industrial animal farms are given large amounts of antibiotics to treat disease and promote growth from birth until slaughter. The overuse of antibiotics in farm animals has been related to the rise of antibiotic resistant bacteria.<sup>3</sup> Other direct and indirect effects of producing meat via industrial animal farming include increasing cases of foodborne illness, emerging animal diseases that can spread to humans, and non-communicable diseases such as obesity, diabetes and heart disease.

According to the International Food Policy Research Institute (IFPRI), countries in Latin America, Asia and Africa will be the world's leading producers of animal products by 2020 and much of that meat will be produced in industrial systems.<sup>4</sup> According to the United Nations' Food and Agriculture Organization (FAO), Asia has the fastest developing livestock sector, followed by Latin America and the Caribbean.<sup>5</sup> Consumption of animal products is also set to increase the most in these regions over the next 15 years. (See Table 1.)<sup>4</sup> By 2020, people in developing countries will consume more than 39 kilograms per person – twice as much as they did in the 1980s. People in 'industrial' countries, however, will continue to consume the majority of meat – 100 kilograms a year by 2020, the equivalent of a side of beef, 50 chickens, and one pig.<sup>6</sup>

By 2020, people in developing countries will consume more than 39 kilograms per person – twice as much as they did in the 1980s.



TABLE 1: Meat consumption by region in 1993 and projected consumption in 2020 (kilograms per person per year)			
Region	1993	2020	% increase
China	33	60	45
Other East Asia	44	67	34
India	4	6	25
Other South Asia	7	10	30
Southeast Asia	15	24	38
Latin America	46	59	22
West Asia/North Africa	20	24	8
Sub-Saharan Africa	9	11	18
Developing World	21	30	29
Developed World	76	83	8
World	34	39	13

Source: 'Livestock to 2020: The Next Food Revolution', Delgado C., et al. (International Food Policy Research Institute, Washington DC, 1999).

Today, industrial animal farms are located all over the world – from Argentina and Brazil, to China and India, to South Africa and Eastern Europe. Forty-three percent of the cattle raised for beef in the world come from feedlots.<sup>7</sup> In this system they are often fed an unnatural diet of grain and antibiotics that encourages rapid weight gain and prevents disease from racing through the crowded facilities. More than half of the world's pork and poultry are raised in industrial animal farms. Industrialised countries dominate production, but developing countries are rapidly expanding and intensifying their production systems.<sup>7</sup>

In these regions, many industrial animal farms are located beside, or sometimes within, some of the world's most densely populated and fastest growing cities, where they can pollute the water, the air and the land.<sup>19</sup> A 2005 publication by the UN Food and Agriculture Organization's Livestock Environment and Development Initiative stated:

Under growing and urbanizing demand, livestock production is rapidly evolving in South, East and South-east Asia, with both an increase of production and a shift to intensive production systems. These changes infer impacts on the environment, on public health

and on rural development. Environmental impacts are mainly associated with a mismanagement of animal excreta, leading to pollution of surface water, ground water and soils by nutrients, organic matter, and heavy metals.<sup>19</sup>

With little regulation presently in place to control inputs or outputs of industrial animal farming, the potential consequences on the health of communities is of great concern. Little work is currently being conducted to analyse the public health effects in developing countries related to industrial animal agriculture. Research in more affluent countries such as the United Kingdom and the United States has raised concerns in scientific literature about infectious disease, antibiotic resistance, pollution to land and drinking water, resulting in serious disease outbreaks and other health concerns as a result of inputs and outputs of industrial animal farming.

This report is a literature review on the human health implications of industrial animal agriculture, and raises considerable concern for Asia, Africa and Latin America, where industrial animal farming is burgeoning.

43% of the cattle raised for beef in the world come from feedlots. In this system they are often fed an unnatural diet of grain and antibiotics



## 2. What is a Factory Farm?

Industrial farming is a system of raising animals, using intensive 'production line' methods that maximise the amount of meat produced, while minimising costs. Industrial animal agriculture is characterised by high stocking densities and/or close confinement, forced growth rates, high mechanisation, and low labour requirements. Examples include battery cages for laying hens, and veal crates for calf rearing. Latterly, the term has been extended to include farming practices that involve the use of transgenic farm animals.<sup>8</sup>

### 2.1 Chickens

Three quarters of the world's 4,700 million egg-laying hens are confined in battery cages, which may contain as many as nine other birds.<sup>9</sup> Their cages, stacked one on top of another, allow for little movement. Each year over 44 billion 'broiler' chickens are reared for meat, worldwide. Although not confined in cages, broilers are often crammed in barren, dimly lit sheds where they grow at accelerated rates. Chickens raised in industrial animal farms often suffer from lameness, and many die of heart attacks because their hearts are not strong enough to support their disproportioned bodies.<sup>9</sup>

### 2.2 Pigs

Half of the world's 2.5 billion pigs are raised in industrial animal farms. Sows raised in industrial animal farms often spend most of their time crammed into narrow crates where they are unable to turn around, nest, root, or exhibit other natural behaviours. These stressed animals are often artificially inseminated and give birth to several litters of piglets during their lifetimes.<sup>10</sup>

### 2.3 Cattle

Most cattle begin their lives on pasture, but to increase weight before slaughter, most spend the last weeks of their lives in crowded feedlots, where they receive an unnatural diet of grain. Because of the crowded and unsanitary conditions, they often arrive at slaughterhouses covered in faeces.<sup>11</sup>



# 3. Zoonoses:

## Food-borne gastrointestinal disease

Millions of people suffer each year from foodborne diseases. These diseases are either infectious or toxic in nature and are caused by agents that enter the body through the ingestion of food.

Every person is at risk of foodborne disease, but because the symptoms usually involve bodily functions that most people would like to ignore, foodborne illnesses are often undiagnosed or not reported, making it hard to know their true magnitude. What food safety experts do know is that foodborne illness is one of the most widespread health problems worldwide and it could be an astounding 300-350 times more frequent than reported, according to the World Health Organization (WHO).<sup>38</sup> In the United States, foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalisations, and 5,000 deaths each year. Known pathogens account for an estimated 14 million illnesses, 60,000 hospitalisations, and 1,800 deaths.<sup>39</sup>

Developing nations bear the greatest burden of cost and illness because of the presence of a wide range of parasites, toxins, and biological hazards and the lack of surveillance, prevention and treatment measures – all of which can leave the poor in a chronic cycle of infection.<sup>40</sup> There are few data on the incidence of foodborne illness in most of the world's poorest countries, and even fewer about how much of it might be related to eating unsafe meat. WHO estimates that more than 1.5 billion episodes of diarrhoea occur each year in children under the age of five, from ingesting tainted food and water, leading to more than 3 million deaths. For all ages, experts believe that 70% of diarrhoeal disease may be caused by food.<sup>40</sup>

According to the FAO, the trend toward increased commercialisation and intensification of livestock production is leading to a variety of food safety problems.<sup>41</sup> Overcrowded, often unsanitary conditions and poor waste treatment in industrial animal farms facilitate and exacerbate the rapid movement of animal diseases and foodborne infections. *E. coli* O157:H7, for instance, is spread from animals to humans when people eat food contaminated by manure. Animals raised in crowded conditions, says Dr. Ian Langford of the University of East Anglia, encourage the growth and spread of micro-organisms in meat because they often arrive at slaughterhouses covered in faeces. "The problem", according to Dr. Langford, "isn't with the consumer looking after the food well enough, but...in the food production process".<sup>42</sup>

A study in England and Wales published in 2005 looked at the 'vehicles', or carriers, of foodborne disease infecting humans. It compared a variety of foods, from shellfish to fruit to chicken. The study concluded:

- that foodborne infection due to chicken was consistently responsible for more disease, while disease linked to plant based foods had a minor impact on the population;
- the risk of contracting foodborne illness from chicken is 5,000 times more likely when compared to cooked vegetables or fruit;

The problem isn't with the consumer not looking after the food well enough, but...in the food production process



In the United States, foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalisations, and 5,000 deaths each year.

- red meat (beef, lamb, and pork) contributed heavily to deaths, despite lower levels of risk;
- reducing the impact of foodborne disease is mainly dependent on controlling the contamination of chicken.<sup>129</sup>

This study was conducted in England and Wales, where industrial animal farming is the predominant method of production. Campylobacter, pathogenic *E. coli*, and *Salmonella* are the factors most frequently associated with contaminated meat and animal products and will be looked at in some detail.

### 3.1 Pathogenic *Escherichia coli*

*E. coli* O157:H7 was discovered in 1982 and has quickly become a major foodborne disease, causing bloody diarrhoea, renal failure, and death, particularly among children and the elderly.<sup>43</sup> Most outbreaks of *Escherichia coli* (*E. coli*) O157:H7, a virulent and potentially lethal strain of *E. coli*, have been associated with contaminated beef and with the rise of rapid automated slaughter practices and industrial feedlot systems as the means of raising cattle.<sup>44</sup> *E. coli* infects meat when it is contaminated with the contents of the gut (faeces) of slaughtered animals. Industrial animal agriculture often requires high throughput slaughter lines. The speed of these slaughter lines can result in gut spillage, as well as poor animal welfare. Infection by *E. coli* O157:H7 causes bloody diarrhoea, renal failure, and death, particularly among children and the elderly. The WHO estimates that pathogenic *E. coli* is responsible for up to 25% of cases of diarrhoea among children in the developing world.<sup>44</sup>

In the United States, thirteen large packing houses now slaughter most of the beef for consumption. This unprecedented centralised system of slaughter and the rise of huge feedlots may provide the means for this pathogen to become widely dispersed in the US food supply.<sup>36</sup> *E. coli* infects meat when contents of the gut (manure) come into contact with meat. Industrial animal agriculture often requires a rapid slaughtering method that can result in gut spillage, not to mention the potential for poor animal welfare. For example, a single worker in a major slaughterhouse in the United States may eviscerate sixty cattle an hour. This slaughterhouse reported the hourly spillage rate at the 'gut table' to be as high 20 percent.<sup>36</sup>

### 3.2 Campylobacter

Campylobacters are the most common bacterial causes of gastroenteritis in both developed and developing countries.<sup>44</sup> Out of the numerous strains of Campylobacter

that are found in nature, there is one strain that is responsible for 91% of human Campylobacter related illness: *Campylobacter jejuni* (*C. jejuni*).<sup>46</sup> The incidence of human Campylobacter infections in industrialised countries has been steadily increasing for many years. In the United States, for instance, Campylobacter is the most common foodborne infection. The precise reasons for its rise are unknown, but industrial farming methods are thought to exacerbate the problem by allowing the disease to move rapidly through a flock or herd.<sup>45</sup>

Campylobacter spp. are found in many animals: chickens, turkeys, beef cattle, dairy cows, sheep, pigs, dogs, cats and wild birds. A recent review published in the Institute of Food Technologists established that avian species are the most common host of the bacteria.<sup>45</sup> Campylobacter has a strong avian connection because birds have a higher body temperature in which bacteria grow especially well.<sup>46</sup> Campylobacter requires a moist, warm environment and usually dies within hours if such an environment is not provided.<sup>45</sup> One study reported that Campylobacter spp. may be found in up to 90% of broiler (meat) chickens flocks, 100% of turkeys and 88% of domestic ducks.<sup>47</sup> Another study reported that prevalence of Campylobacter spp. in market age broiler chickens has varied between studies from 20% – 80%.<sup>48</sup>

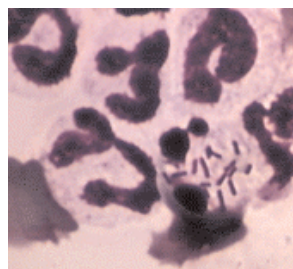
A UK government survey in August 2001 revealed that two thirds of fresh chickens in British supermarkets and butchers shops are infected with food poisoning bacteria. Laboratory checks showed 63% of samples were contaminated by the Campylobacter bug, which is responsible for approximately three-quarters of confirmed food poisoning cases.<sup>49,50</sup> About 100,000 food poisoning cases are reported each year, of which 75,000 are confirmed by laboratory tests in the UK. Of these, approximately 60,000 are due to Campylobacter, and 13,000 to *Salmonella*.<sup>51</sup> The true level of infection could be seven times the confirmed number for Campylobacter and three times for *Salmonella*, according to some medical estimates.<sup>51</sup> One study has estimated 281,826 cases of Campylobacter spp. in England and Wales alone in 1995.<sup>52</sup> In 1999 the number of cases of food poisoning from Campylobacter exceeded those of *Salmonella* in the European Union for the first time.<sup>53</sup> In the EU, some 170,000 Campylobacter poisonings are reported annually.<sup>53</sup> The actual number of cases is likely to be as much as seven times higher, according to a prominent health expert, at 1.19 million, as the majority of poisonings go unreported to health authorities.<sup>51</sup>

In the United States, where under-reporting has been taken into account, the 1.96 million foodborne human cases of Campylobacter each year are said to be responsible for 700 million to 1,400 million dollars per annum lost in productivity, and 99 deaths.<sup>54, 55</sup>



Infection by *E. coli* O157:H7 causes bloody diarrhoea, renal failure, and death, particularly among children and the elderly





Studies indicate that litter, used to cover the floor of broiler sheds on a farm, can provide a reservoir of *C. jejuni*. A recent Danish study concluded that stored used litter acts as a continuous source of *C. jejuni* for the broiler flock raised on farms.<sup>56</sup> While clean litter itself is not thought to be a source of *C. jejuni*, it is common practice in industrial animal farms to store dirty broiler litter, which might be a source of *C. jejuni* bacteria, until it can be used as fertiliser.<sup>57</sup>

Within the broiler shed, the litter covering the floor is not usually changed at all during the flock's short 42-day lifespan. Badly managed litter often becomes wet and ridden with faeces – *Campylobacter* finds an ideal environment.<sup>57</sup> Because litter is not changed, once *Campylobacter* is introduced into a shed, broilers are likely to come in contact with *Campylobacter* infected faeces.

Poultry growers sometimes reuse litter for two or more 'grow-out' cycles, that is for two or more flocks. This has also been identified by researchers as a practice that may play a major role in transmitting *Campylobacter jejuni*.<sup>58</sup>

A UK government survey in August 2001 revealed that two thirds of fresh chickens in British supermarkets and butchers shops are infected with food poisoning bacteria

### 3.3 Salmonella

*Salmonella* is a leading cause of foodborne disease. It is spread primarily through eggs, poultry meat and milk. As in the case of *Campylobacter*, moist litter that is often present in a broiler shed, for example, is likely to contribute to the cultivation and growth of *Salmonella*.<sup>43</sup> Industrial animal farms can disperse *Salmonella* widely into the environment, polluting surface soil and rivers.<sup>44</sup> *Salmonella enteritidis* can infect eggs in hens' ovaries and cause fever and diarrhoea in humans. *Salmonella* DT104 is spread by cattle and is often resistant to almost every available antibiotic.<sup>44</sup>

Of particular concern is the increasing number of human *Salmonella* infections that are resistant to antibiotics, in part as a result of the misuse and overuse of antibiotics in industrial animal farming. One strain of *S. Typhimurium* has emerged as resistant to five drugs: ampicillin, chloramphenicol, streptomycin, sulfolnamides, and tetracycline.<sup>59</sup> This strain has become the predominant strain in many countries, including the United States, United Kingdom, Germany and France. Studies have indicated that this drug resistance may be associated with increased rates of death and illness.<sup>59</sup>

Studies indicate that litter, used to cover the floor of broiler sheds on a farm, can provide a reservoir of *C. jejuni*.

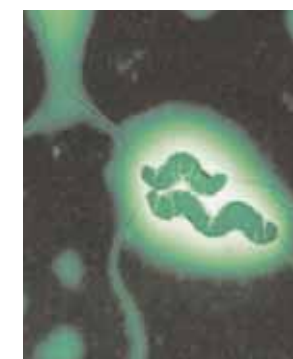
### 3.4 Other concerns

Live transport of animals can also increase the incidence of foodborne illness. Forty-four million live cattle, sheep and pigs are traded across the world each year.<sup>60</sup> They travel by truck, rail and even by sea, which can cause animals undue stress and lead to problems later on. For example, a recent study found that transporting beef cattle from feedlots to slaughterhouses and packing plants increases the prevalence of *Salmonella* on hides and in faeces.<sup>60</sup> A 2001 study in the United Kingdom also found that heat induced stress during the summer months in industrial animal farms also increases susceptibility to illness among animals and higher cases of foodborne illness in people.<sup>61</sup>

### 3.5 Summary and conclusion

WSPA urges the World Health Organization and other public health institutes to monitor and make recommendations to ensure the control of foodborne diseases associated with industrial animal farming. On public health as well as animal welfare grounds, WSPA recommends that industrial animal farming is phased out in favour of more humane and sustainable methods of food production.

Alternative methods to industrial animal agriculture include systems such as free-range or organic methods where animals are given more space, less antibiotics, and where outputs have less negative impact on the water and land. Indoor systems can also be used to give animals the space and environment needed to express natural behaviours and meet their welfare needs.



# 4. Other zoonoses

Shortly before 2004, the first case of Bovine Spongiform Encephalopathy (BSE) was reported in the United States, and experts suspect other cases will follow.

Industrial animal agriculture has acted as a 'launch pad' for zoonotic diseases.

Around the same time, researchers released a study warning that high levels of polychlorinated bi-phenyls (PCBs) are present in farmed salmon. During the first few months of 2004, newspaper headlines and television news reported on avian flu spreading across Asia. 45 individuals have died in the recent outbreak of avian flu. The rapid and seemingly uncontrollable spread of this disease has not only caused major welfare problems as result of inhumane emergency slaughter methods for affected poultry flocks, but severe distress for farmers and millions of dollars in damages. Industrial animal agriculture has acted as a 'launch pad' for zoonotic diseases such as Bovine Spongiform Encephalopathy (BSE), avian flu and Nipah virus.

## 4.1 Bovine Spongiform Encephalopathy (BSE)

Bovine Spongiform Encephalopathy (BSE), or mad cow disease, is a transmissible Spongiform Encephalopathy (TSE). TSEs are characterised by spongy degeneration of the brain with severe and fatal neurological signs and symptoms. BSE is one of several different forms of transmissible brain disease affecting a number of animal species, including scrapie in sheep and goats.<sup>62</sup>

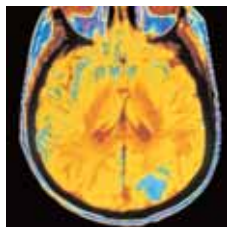
The WHO has reported that as of April 2004, 146 people in the UK have succumbed to variant Creutzfeldt-Jakob disease (vCJD), the human form of mad cow disease.<sup>63</sup> BSE, and the subsequent infection of humans with vCJD, is characterised by spongy degeneration of the brain, with severe and fatal neurological signs and symptoms. BSE can be spread to humans who eat contaminated meat. The practice of feeding rendered animal protein to cattle, which are natural herbivores, in order to cut costs, is believed to have resulted in BSE and subsequent human infection.<sup>63</sup> Since it was first reported in the United Kingdom in 1986, BSE has been detected in 34 countries.<sup>64</sup> In 2003, Canada's beef exports plummeted nearly two billion dollars because one Canadian cow was discovered to be infected with BSE.<sup>65</sup>

Although the practice of feeding meat and bone meal made from ruminants to cattle has been banned in the United Kingdom and the United States, no-one knows how many people may have eaten beef infected with BSE and it is impossible to predict how many people might eventually contract vCJD.<sup>66</sup>

Shipments of meat and bone meal from the UK before 1996 were sent all over the world. Twelve nations in Africa imported the meal, as well as the United States, and most European, Middle Eastern and Asian countries.<sup>67</sup> BSE was detected most recently in the United States in late December 2003, although the United States







The disease jumped the species barrier for the first time in 1997, killing six of the 18 people infected.

Agriculture Department had repeatedly assured the American public that proper control measures were in place to prevent an outbreak.<sup>68</sup> Recently, a new form of BSE was discovered in cattle in Italy. Unlike BSE, this new strain called BASE (Bovine Amyloidotic Spongiform Encephalopathy) has appeared in cows that show no symptoms. Researchers don't know if BASE can be spread to humans, but they suspect that it could be responsible for cases of sporadic Cruetzfeld-Jakob disease.<sup>69</sup>

Unfortunately, many nations do not have the infrastructure in place to prevent, detect, or control BSE, if an outbreak does occur. A matter for concern, therefore, are those countries lacking in regulatory measures to prevent this industrial farming feeding practice and its human health impact.

#### 4.2 Avian Flu

In Eastern and South-eastern Asia alone, an estimated 6 billion broiler chickens are reared for meat. Many of these birds are raised in proximity to rapidly growing cities.<sup>70</sup> This increasing intensity of production, along with the close proximity of these animals to where people live, raises some serious public health concerns.<sup>70</sup> According to the Food and Agriculture Organization, the spread of avian flu from Pakistan to China may have been facilitated by the rapid scaling-up of poultry and pig operations and the massive geographic concentration of livestock from industrial animal farms in Thailand, Vietnam and China.<sup>71</sup>

More than two dozen subtypes of influenza virus can infect birds, thus providing an extensive reservoir of influenza viruses potentially circulating in bird populations. To date, all outbreaks of the highly pathogenic form have been caused by influenza A viruses of subtypes H5 and H7. Highly pathogenic avian influenza strikes birds quickly and spreads very fast. Symptoms include swollen heads, reddish legs, and watery eyes – the mortality rate is almost 100%.<sup>72</sup>

In places that have high concentrations of both pigs and chickens, pigs can serve as a 'mixing vessel' for the virus, allowing it to spread to humans. The disease jumped the species barrier for the first time in 1997, killing six of the 18 people infected. Outbreaks of avian flu in densely populated chicken farms during the past five years have led to massive culls of millions of chickens.<sup>73</sup>

At the end of February 2003, an outbreak of highly pathogenic avian influenza A virus subtype H7N7 occurred in commercial poultry farms in the Netherlands. A study found an unexpectedly high number of transmissions of avian influenza A virus

The seemingly uncontrollable spread of this disease has not only caused major welfare problems as result of inhumane emergency slaughter methods, but millions of dollars in damages.



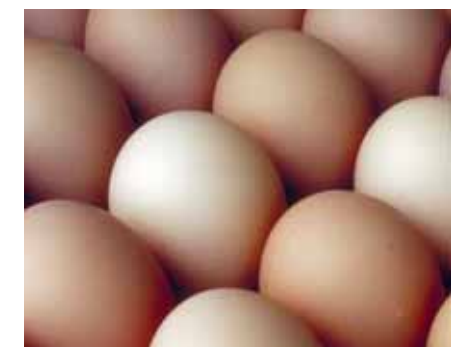
subtype H7N7 to people directly involved in handling infected poultry.<sup>74</sup> The 2003 outbreak in the Netherlands resulted in over 30 million chickens – one quarter of the country's flock being slaughtered in over 1000 commercial holdings, causing two human deaths and over US\$150 million in damages.<sup>75</sup>

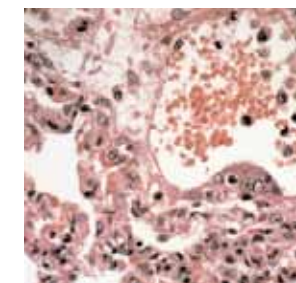
In 2004, the most pathogenic strain of avian Influenza, H5N1 hit Southeast Asia. According to the FAO, the Asian region affected by the spread of the avian flu is estimated to house approximately 7 billion chickens, approximately 40 percent of global totals. The region's share of global poultry meat output is lower at 27 percent, due to lower slaughter rates and weights than in developed countries. China and Thailand account for nearly 65 and 7 percent, respectively, of the region's estimated production of 20 million tonnes. The South-East Asia region accounts for approximately one-quarter of world poultry trade (including re-exports from Hong Kong) with China and Thailand the largest exporters. Accounting for 15 percent of global poultry shipments, these two countries are estimated to have exported almost 1.1 million tonnes in 2003, more than half of which went to Japan. To date, many of the major poultry importing countries have banned poultry imports from both countries.<sup>76</sup>

Since January 2004, avian flu has killed at least 35 people in Vietnam, a further 12 in Thailand and two in Cambodia.<sup>130</sup> Experts suspect that the outbreak has been responsible for more human deaths than have been reported.<sup>85</sup> The outbreak which was thought to have ceased in March 2004, has resumed in four countries and recently spread to Malaysia.<sup>77</sup> Costs are estimated to be in the billions of dollars for the Asian poultry industry, with over 100 million chickens slaughtered.<sup>78</sup> The Asian Development Bank has stated that the outbreak could result in "tens of billions of dollars" in damage, citing in particular the poultry industry in Thailand – worth \$1 billion in exports – and in Indonesia – worth \$7 billion in domestic production.<sup>79</sup>

In Canada, two poultry workers became ill with a less virulent strain of the flu. Costs included 17 million culled chickens, turkeys and ducks; thousands of lost jobs and an estimated US\$300 million impact on the local economy.<sup>80</sup>

Long distance transportation of live animals, and live markets, both domestically and internationally, has created the conditions for the disease to spread rapidly from province to province, country to country and even continent to continent. For example a study in Korea surveyed live poultry markets in 2003 and isolated the 9 H9N2, 6 H3N2, and 1 H6N1 influenza viruses. The H3N2 and H6N1 viruses were new to Korea and were probably variations of avian influenza viruses from south-eastern China and recent Korean H9N2 viruses.<sup>82</sup>





On a local level, the most recent spread of avian flu is likely to have a devastating economic impact on both small scale and commercial farmers. Thailand, for example, is the world's fourth largest poultry exporter and many farmers there may be forced out of business.<sup>83</sup> In addition to these public health and socioeconomic effects, avian flu could also accelerate the trend toward industrialisation of poultry operations in many of the affected countries. As a result of the outbreak, many small scale farmers have been forced to cull their animals and have little means to recuperate their business. There are concerns that funds to facilitate the 'repopulation' of poultry, may be directed to large scale agribusiness rather than more humane and sustainable alternatives. Arguably, the most effective way countries can manage the disease now, and prevent further infection, is by 'depopulating' chickens—more than 100 million birds have been killed in Asia in 2004.<sup>81</sup> However, there are concerns that funds to facilitate the 'repopulation' of poultry, will be directed to large scale intensive methods of rearing animals rather than more humane and sustainable alternatives. WSPA believes this is likely to perpetuate the public health risk.

In places that have high concentrations of both pigs and chickens, pigs can serve as a 'mixing vessel' for the virus, allowing it to spread to humans.

#### 4.3 Nipah Virus

Nipah virus is one of the newest zoonoses to emerge and it is a salient, but complicated, example of what can happen when big agriculture combines with the destruction of ecosystems.<sup>84</sup> Nipah was first discovered in 1997 in a small Malaysian village, which was home to one of the largest pig farms in the country. Residents living near the farm began coming down with flu-like symptoms, resulting in more than 100 deaths.<sup>84</sup> In April of 2004, Nipah struck again in Bangladesh, killing 19 people.<sup>84</sup>

Epidemiologists have found that the disease originates in bats, and is spread from bats to pigs, and finally to humans.<sup>84</sup> In 1997, forest fires in Borneo and Sumatra forced thousands of fruit bats, to go in search of food in Malaysia. Many of them began nesting in the fruit trees towering over newly established large pig farms. There the bats ate fruit, dropping their saliva and half-eaten fruit into pig stalls where

it was eaten by the pigs. Although bats are not clinically affected by Nipah, it does affect pigs and because of their genetic similarity to humans, they act as a "mixing vessel" for the virus, giving it the opportunity to mutate and spread to humans.<sup>84</sup> Scientists predict that as industrial animal agriculture continues to move into tropical environments, the risk from Nipah viruses and other diseases that can jump the species barrier, is growing.<sup>84</sup>

#### 4.4 Summary and conclusions

With humans living near and working with high concentrations of enclosed animals, the risks of disease spreading are increased. With animals for slaughter often being transported long distances, sometimes across borders, the spread of disease is further exacerbated. Of particular concern is where outbreaks have occurred in countries less equipped to monitor, control and prevent outbreaks.

Recent outbreaks suggest that the zoonotic disease consequences related to industrial animal farming should be a priority concern. WSPA urges the World Health Organization and other public health institutes to use their influence to advise policy makers against actions that will lead to the further expansion of industrial animal agriculture. Policymakers should also be advised to support humane and sustainable alternatives that are likely to minimise the risk of pandemic or local outbreaks of zoonoses.



On a local level, the most recent spread of avian flu is likely to have a devastating economic impact on both small scale and commercial farmers



# 5. Antibiotic Resistance

The widespread use of these drugs in the livestock industry is helping to breed antibiotic-resistant microbes, and making it harder to fight diseases among both animals and humans alike.

In addition to the foodborne and zoonotic diseases present in and spread by industrial animal farms, one of the most pressing public health problems caused by industrial animal production is antibiotic resistance. Of the 18,000 tonnes of antibiotics used each year for medical and agricultural purposes in the US, 12,600 tonnes are for non-therapeutic treatment, in order to promote farm animal growth.<sup>86</sup> According to the World Health Organization and FAO, the widespread use of these drugs in the livestock industry is helping to breed antibiotic-resistant microbes, and making it harder to fight diseases among both animals and humans alike.<sup>87</sup>

## 5.1 Increasing use of antibiotics and superbugs

Farm animals can receive antibiotics to prevent disease, treat disease or to promote growth. In the United States alone, more than 11 million kg (24 million pounds) per year of antibiotics is used on farm animals. These include families of drugs that are important in treating human disease, such as penicillin, tetracycline and erythromycin.<sup>88</sup>

Widespread antibiotic use is breeding 'super pathogens' – strains of drug-resistant bacteria.<sup>89</sup> Doctors in some countries appease patients with unnecessary prescriptions. Pharmacists in some countries dispense drugs with no prescription. Livestock are regularly given antibiotics. As a result, the germ fighting arsenal used to protect humans is weakening, as few, if any, new classes of antibiotic drugs are in clinical development, according to a February 2001 report in the Journal of the American Medical Association.<sup>89</sup>

Use of drugs in livestock does not require an animal to be sick before medicines are used. Antimicrobial drugs are mixed into the feed and water or injected into individual animals, to prevent illness that can result from close confinement and poor hygiene practices, and to enhance growth. Farmers also use antibiotics at low concentrations because they help to increase animal growth rates and increase efficiency, by forcing animals to grow bigger with less feed.<sup>90</sup>

Examples of antibiotic resistant bacteria being linked to industrial animal farming is readily found in the scientific literature. A pilot study in Thailand revealed a prevalence of Salmonella and E. coli resistant to antimicrobials in workers in pig and chicken farms in the northern part of the country, presumably from the overuse of antibiotics in raising livestock.<sup>96</sup> In the United States, retail pork products, as well as surface and groundwater contaminated with swine waste, and air within pig production units, have been shown to be sources of human exposure to antibiotic-





A study in South Africa revealed that meat from slaughtered 'spent' egg-laying hens was contaminated with infectious diseases that were resistant to most common antibiotics.

one of the most pressing public health problems caused by industrial animal production is antibiotic resistance.

resistant bacteria.<sup>97</sup> The South African Journal of Science reported that antimicrobial resistance of Salmonella developed in retail chicken as a result of sub-therapeutic doses of antibiotics in the poultry industry.<sup>98</sup> The problem of anti-microbial resistance has been identified in factory fish farms. The Catholic University of the North in Coquimbo, Chile, has discovered a link between intensive salmon farming and incidents of antibacterial multi-resistant bacteria, "prompting the necessity for a more restrictive attitude towards the intensive use of anti-bacterials in salmon farming..."<sup>99</sup>

Of equal concern are the use of so-called 'spent' dairy cows and 'spent' laying hens to make 'low quality' meat products, such as hamburgers and canned soup. 'Spent' refers to the animal no longer being optimally or economically productive. These animals often endure long-term dosages of antibiotics to prevent and treat diseases common to industrial conditions. For example, laying hens are kept on industrial farms for over a year, whereas broiler chickens raised for meat live for little over a month. This means laying hens will be exposed to antibiotics over a much longer period of time than broiler chickens before they are slaughtered for consumption. A study in South Africa revealed that meat from slaughtered 'spent' egg-laying hens was contaminated with infectious diseases that were resistant to most common antibiotics. The study community was found to be suffering from the infectious disease caused by bacteria identified in the hens. Of further concern, the study showed that the bacteria found in both the hens and study community were 100% resistant to most common antibiotics.<sup>95</sup>

Most of the strategies for preventing and controlling antimicrobial resistance identified in scientific literature focus on the reduction or limitation of the use of antimicrobial agents in farm animals.<sup>91</sup> The EU has recently moved to ban seven antibiotics for use in growth promotion. Four antibiotics are still permitted, though the European Commission Scientific Steering Committee has proposed to ban all growth promoters from 2006, due to concern over antibiotic resistance.<sup>92</sup> In February 2002, three major global companies –Tyson Foods, Perdue Farms and Foster Farms – voluntarily stopped the 20-year-old practice of adding antibiotics to the feed given to healthy chickens for prophylactic purposes.<sup>93</sup> Global fast food companies McDonald's, Wendy's and Popeyes no longer dose chickens with an antibiotic related to the anthrax treatment ciprofloxacin, in case this reduces ciprofloxacin's effectiveness for humans.<sup>93</sup>

Despite these actions, the use of antibiotics continues to rise globally. Antimicrobial use by poultry producers has risen 307% per bird since the 1980s. Beef cattle are given 28% more antibiotics than they were 15 years ago, and pigs are fed 15% more.<sup>94</sup>

## 5.2 Success stories – banning the use of preventative and growth promoting antibiotics in farm animals

In some countries, successful measures have been taken to reduce the amount of antibiotics used in livestock rearing. For example, in Denmark, a ban on the use of antibiotics to promote growth has resulted in:

- A reduction of vancomycin-resistant eneterococcus prevalence in chickens from 80% to 10%
- A reduction of antibiotic resistant bacteria in pigs from 65% to 25%
- A significant reduction in the spread of salmonella from livestock to humans without antibiotics, through careful monitoring and control programs for broilers, laying hens and pigs
- A saved expenditure of US\$25.5 million in 2001.<sup>100</sup>

Organic farming also offers an alternative to the regular use of antibiotics. In this system, antibiotics are usually used only to treat disease (rather than preventatively or for growth promotion), reserving the use of medicine for when disease is detected.<sup>101</sup>

In the Philippines, a commercially successful free-range poultry farmer has rejected the use of antibiotics and uses local herbs and spices to treat disease. In this system, chilli (*Capsicum Frutescens*) is used to treat respiratory problems, stimulate appetite especially during heat stress and is used as a dewormer. Oregano (*Plechtranthus amboinicus*) is used to treat respiratory problems, and to prevent and cure coccidiosis. Paminta (black pepper, *Piper nigrum*) is used to treat fowl pox. Ginger (*Zingiver officinale*) and Sibuyas (*allium fistulosum*) are used as an antibacterial. Not only has this proved effective in preventing and treating disease, but it is said to give the meat a unique and desirable taste, contributing to its commercial success.<sup>102</sup>

## 5.3 Summary and conclusions

While some measures have been taken to curtail the use of antibiotics in some regions, use globally continues to increase. WSPA believes that as industrial animal agriculture expands in Asia, Latin America and Africa, the use of antibiotics needs to be carefully regulated. WSPA urges the World Health Organization and other public health institutes to advise policy makers to ban the use of antibiotic growth promoters in farm animals.





# 6. Toxic Chemicals

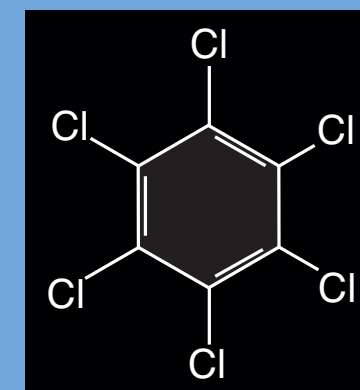
Livestock in industrial farms are often fed a mixture of high protein grains and other ingredients that help animals put on weight quickly at a low cost. These feeds are usually made from a mixture of soybeans, corn and other grains, supplemented with other ingredients.

## 6.1 PCBs, dioxins and organochlorines

Animal fat can be used to supplement feed in order to increase growth. However, animal fat may be contaminated with chemicals such as polychlorinated biphenyls (PCBs). PCBs, dioxins and organo-chlorines are part of a class of chemicals called persistent organic pollutants (POPs), which bio-accumulate in human and animal tissue, increasing in toxicity as they move up the food chain. Human exposure to POPs is associated with an increased risk of cancers; neurobehavioral impairment including learning disorders and changes in temperament; disruptions of the endocrine and immune system; reproductive deficits and sex-linked disorders; a shortened period of lactation in nursing mothers; diseases such as endometriosis; and increased incidence of diabetes.<sup>103</sup>

In Belgium in 1999, animal fat supplementing feed, in order to increase growth, contaminated over 1,500 metric tons of animal feed with toxic levels of PCBs and dioxins.<sup>104</sup> In June 1999, the dioxin crisis, caused by dioxin contaminated feed components, exploded in Belgium, resulting in withdrawal of chicken and eggs from the market. Despite these problems, however, recycling animal fat into animal feed is still allowed in many countries, particularly developing nations.<sup>104</sup> Interestingly enough, a study found that during the dioxin crisis in Belgium, *Campylobacter* infections decreased by 40% during June 1999, mainly because of the withdrawal of poultry from retail sale.<sup>105</sup>

A study in the journal *Science*, in 2004, reported that farmed salmon contained 11 times more dioxin than in wild salmon.<sup>106</sup> For PCBs, farmed salmon had an average of 36.6 parts per billion (ppb) compared to 4.75 ppb in wild salmon, as a result of feeding practices carried out by fish farms.<sup>106</sup> Farm reared salmon have also been found to have a higher concentration of potentially toxic flame



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retardants, or polybrominated diphenyl ethers (PDBEs), than wild salmon.<sup>107</sup>

## 6.2 Arsenic

Another chemical of concern – arsenic – has been found in the meat of industrially reared chickens. While inorganic arsenic is a carcinogen, organic forms of arsenic are less toxic and are used to fight animal diseases and accelerate growth in industrial animal agriculture. Chickens in the United States contain three to four times as much arsenic as other kinds of meat and poultry, according to a 2003 study by the US Department of Agriculture.<sup>108</sup>

Roxarsone is an arsenic based feed additive that is given to swine and poultry: it is given to about 70% of the chickens produced in the United States.<sup>108</sup> Most of the roxarsone is excreted in the chicken's urine and manure, but some of it is retained in their tissues, particularly the liver, in both organic and inorganic forms.<sup>109</sup> Although researchers found that the amount of arsenic consumed by people from eating chicken does not exceed the WHO's suggested limit for intake of two milligrams per kilogram of body weight, their findings show that chicken meat represents a sizeable portion of what is considered a tolerable daily intake.<sup>110</sup>

## 6.3 Hormones

Industrially reared farm animals often receive growth hormones in their diet in order to reach slaughter weight as fast as possible. Over 90% of beef cattle in the United States are either implanted or injected with hormones and one-third of the US dairy herd is given recombinant bovine growth hormone or rBST to increase milk production.<sup>111</sup>

Critics of hormone use in livestock argue that the hormones can cause cancer and other health problems in humans.<sup>113</sup> Concern about these hormones began in the 1970s when researchers discovered that the daughters of women who were given diethyl stilbestrol (DES), a synthetic hormone used to prevent miscarriage, had high rates of cancer. DES was also given to cattle and chickens to promote growth and because of its potential side effects, the US Food and Drug Association (FDA) banned the use of the drug for livestock. Other growth hormones continue to be used in food animals, and scientists have found that they increase the amount of insulin-like growth factor, 1 (IGF-1) in cow's milk. IGF-1 is a potential risk factor for breast and gastrointestinal cancers.<sup>112</sup>

Because of the concern over the human health consequences of hormone residues in meat, the European Union outlawed the use of steroid hormones. Since 1988 the EU has not allowed imports of US beef. However, there continues to be illicit use of hormones in the EU and residues of at least 35 drugs have been detected in meat samples.<sup>112</sup>

Hormones continue to be used in many industrial animal farms in other parts of the world. This is likely due to the substantial gain in the weight made per animal versus feed consumption. It costs farmers about US\$1 to US\$3 per head to either treat livestock with hormones through an implant or give it to them in their feed. In return, hormones increase animal growth by 20%, forcing animals to gain three pounds per day, while consuming 15% less feed.<sup>112</sup>



## 6.4 Summary and Conclusion:

WPSA urges the WHO and public health institutes to use their influence to advise government policymakers to prohibit the use of production enhancing hormones such as steroid hormones and rBST.

There continues to be illicit use of hormones in the EU and residues of at least 35 drugs have been detected in meat samples.





## 7. Industrial animal farms and environmental health

The contamination of rivers and streams with animal waste, the air pollution in nearby communities, and the occupational hazards on farms and in slaughterhouses, all contribute to the negative impacts that industrial animal agriculture is having on human health. The sections below outline the main health concerns related to the environment that industrial animal farms create

In the European Union, United States and Canada, industrial animal farms are often located in rural areas, away from people who might be affected by the smell and the pollution they create. But, as industrial animal farms begin to dominate in many Asian and Latin American countries, they are not necessarily spread across the countryside. Instead, many are located right outside of or even inside some of the world's most densely populated and fastest growing cities, where they can pollute the water, air and land. Furthermore, if there are lax environmental regulations, this can worsen the effects of industrial animal agriculture on the environment, for farm animals and humans.

### 7.1 Manure pollution

A fundamental concern for industrial style livestock farming is that large numbers of animals are often kept in a small area, leading to problems of waste disposal as well as disease potential. To give an idea of scale, the planet's population of some 2.5 billion pigs and cattle excrete more than 80 million metric tons of waste nitrogen annually. The entire human population, in comparison, produces just over 30 million metric tons.<sup>13</sup> In the United States, the amount of animal waste is 130 times greater than that of human waste, and it is not subject to the same level of waste treatment.<sup>14</sup>







Hundreds of acres of land and miles of waterways were flooded with excrement, resulting in massive fish kills and millions of dollars in cleanup costs

When the waste produced by farm animals in industrial animal farms exceeds the amount of land readily available to absorb it, manure can go from being a valuable agricultural resource to toxic waste. In North Carolina in the United States, between 1989 and 1998, the number of hogs in the state's pork industry quintupled.<sup>15</sup> This increase has been accompanied by an increase in waste that must be disposed of and much of it is stored in lagoons, or large uncovered pits.<sup>15</sup> Many of these lagoons flooded and burst when Hurricane Floyd swept through the region in 1999. Hundreds of acres of land and miles of waterways were flooded with excrement, resulting in massive fish kills and millions of dollars in cleanup costs.<sup>16</sup> Lagoons' contents are also known to leak and seep into groundwater, contaminating it with potassium and ammonium nitrate.<sup>17</sup>

Nitrate contamination of groundwater from manure can create serious risks for the public health of communities. For example, high nitrate levels in wells near animal feedlot operations have been linked to a greater risk of miscarriage in pregnant women.<sup>18</sup> In extreme cases, nitrate contamination can cause methemoglobinemia, or 'blue baby syndrome', a form of infant poisoning in which the blood's ability to transport oxygen is greatly reduced, sometimes to the point of death.<sup>18</sup>

The Chinese State Environment Protection Administration reports that industrial animal farms have become a major source of pollution. In 1995, for example, 1.7 billion metric tons of unprocessed manure was dumped into rivers that often serve as water supplies.<sup>20</sup>

This has had a negative impact on China's freshwater supply. The waste from pig and chicken farms in central China feeds into the Yangtze delta, and produces 40 times as much nitrogen as all the region's factories combined. This livestock waste has resulted in large amounts of nitrogen run-off, causing the eutrophication of surface water in the Yangtze delta. This depletes the water of vital oxygen and threatens the survival of aquatic life.<sup>20</sup> The heavy metals pollution by and of poultry and livestock from manures from intensive farming in Jiangsu Province was also investigated by the Chinese Academy of Sciences. The results of the study found high concentrations of copper, zinc, chromium, lead and cadmium, with copper concentration in manure as high as 1726.3 mg/kg.<sup>21</sup> Contamination by these heavy metals has been found to have adverse effects on embryonic development.<sup>22</sup>

Manure also contains pathogens that can cause human disease. For example, manure from industrial animal farms can contaminate the water with *E. coli*, a common pathogen present in the faeces of animals. In Michigan (USA) in 2001, samples of water downstream of a cattle feedlot contained 1,900 times the state's maximum standard for *E. coli* in surface waters. In Walkerton, Ontario, more than 1,300 residents were affected by *E. coli* poisoning, after the town's drinking water was polluted by nearby cattle operations.<sup>23</sup>

Researchers have found that some of these hormones are endocrine disrupters and can influence the reproductive systems of wildlife and humans

Other diarrhoeal diseases caused by manure include *Campylobacter*, *Yersinia enterocolitica*, *Salmonella* and *Listeria*. Manure can also contain *Streptococcus suis*, which can cause meningitis and *Brucella suis*, which causes brucellosis. Animal waste can also contain viruses, including Hepatitis E, *Toxoplasma gondii* and *Cryptosporidium*.<sup>24</sup> {See also Section on Foodborne Illness}

The waste from livestock raised in industrial animal farms also may contain a drugstore variety of pharmaceuticals, including antibiotics and hormones. As much as 75% of the antimicrobials fed to farm animals may be excreted unmetabolised in their waste, which can contaminate groundwater and soil.<sup>25</sup> Hormones fed to farm animals to promote growth leave residues in eggs, meat and dairy products and are also excreted in manure. Researchers have found that some of these hormones are endocrine disrupters and can influence the reproductive systems of wildlife and humans.<sup>26</sup> {See also Section on Antibiotics Resistance and Chemicals in Meat.} For example, researchers have found that fish exposed to the effluent from feedlots had significant damage to their reproductive systems. Male fish experienced demasculinisation, with decreased testis size and female fish had decreased oestrogen levels. The runoff from agricultural fields fertilised with manure has also been found to contain significant levels of hormones.<sup>26</sup> These endocrine disrupting chemicals could also be a threat to human health. Researchers at Tufts University, Boston, Massachusetts have found that endocrine disrupters can lead to





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increased risk of breast and ovarian cancer in women and testicular cancer and lower sperm quality and count in men.<sup>27</sup>

Because of the concern over the human health consequences of hormone residues in meat, the European Union has banned the use of steroid hormones. However, hormones continue to be used in many industrial animal farms in other parts of the world.

7.2 Air quality

Air quality can also be negatively affected by industrial animal farming. As manure decomposes it releases 160 to 400 volatile compounds, including amines, mercaptans, fatty acids, sulphides, phenols, amides and skatoles.<sup>28</sup>

Further concern for residents living near industrial animal agriculture is readily found in the scientific literature. Research conducted by Duke University in the United States has found that residents living near pig farms report more tension, depression, anger, fatigue, confusion, and less energy.<sup>29</sup> A study published in the Journal of Agricultural Safety and Health, found that residents living near industrial animal farms have higher rates of respiratory problems, nausea, fatigue, plugged ears, irritated eyes, nose and throats.<sup>30</sup> Hydrogen sulphide, the gas that rises up from manure lagoons and gives the air a rotten egg smell, can cause respiratory problems and headaches, and at high levels can cause permanent respiratory damage.<sup>31</sup> Large scale livestock farms can adversely affect the quality of life for the residents who live near them.



7.3 Summary and Conclusion

In many countries where industrial animal farming is increasingly dominating production, there are few measures in place to control and prevent the illness associated with its disease causing wastes. WSPA urges the World Health Organization and other public health institutes to advise policy makers to regulate in order to ensure that animal farming is conducted by methods which are not hazardous to the land, water and air in which communities live.

## 8. Industrial animal farms and worker health

Studies have revealed that workers on industrial animal farms suffer from a variety of work-related illnesses including mental problems, repetitive stress injuries and respiratory problems – the latter being the most extensively studied.<sup>32</sup>

Workers at industrial animal farms may work 50 to 60 hours per week indoors, resulting in long periods of exposure to high levels of respiratory toxins, including bacterial endotoxins, fungal moulds, and the manure generated gases hydrogen sulphide and ammonia.<sup>32</sup> The dust in industrial animal farms is an 'organic soup' of allergens, including insect faeces, animal and bird faeces, animal skin and hair particles, pollen, antibiotics, feed components and pesticides.<sup>32</sup> Research from the University of Iowa found that there is a dose response relationship between time spent working at industrial animal farms, and decreased Forced Expiratory Volume (FEV), which is a measure of overall pulmonary health.<sup>32</sup>

Researchers in the United States, Sweden, Canada, the Netherlands and Denmark found that approximately 50% of industrial pig farm workers studied, experienced one or more of the following health problems: bronchitis; occupational asthma; hyper-reactive airway disease; toxic organic dust syndrome (TODS); chronic mucous membrane irritation; or hydrogen sulphide intoxication.<sup>33</sup> A recent study at the School of Veterinary Medicine in Germany suggests that, in addition to respiratory health hazards, pig farmers may also be at risk from inhaling dust contaminated with antibiotics. This study found that 90% of dust sampled in an industrial pig farm was contaminated with antibiotics including tylosin, various tetracyclines, sulfamethazine and chloramphenicol.<sup>33</sup> Studies conducted in Canada concluded that workers engaged in the industrial pig industry, "appear prone to accelerated yearly losses in lung function and may therefore be at risk for the future development of chronic airflow limitation".<sup>34</sup> Another study conducted in Canada found that the method of production (cage-based versus floor-based) appears to influence

The dust in industrial animal farms is an 'organic soup' of allergens, including insect faeces, animal and bird faeces, animal skin and hair particles, pollen, antibiotics, feed components and pesticides.







the prevalence of respiratory symptoms and lung function in workers. The study reported that workers from cage-based operations report greater prevalence of current cough and wheeze, as well as lower lung functions. Workers from cage based facilities also reported greater prevalence of current and chronic cough and phlegm.<sup>35</sup> A study in Iran found that workers in broiler farms experience respiratory disease as a result of the endotoxins they are exposed to during work. Exposure to a combination of ammonia, dust and endotoxins on the farms resulted in increased respiratory problems for the workers.<sup>37</sup>

The workers in a modern slaughterhouse in the United States have an injury rate that is reportedly three times higher than in a typical American factory.<sup>36</sup> Whilst there is little information on the number of occupational injuries in the meat industry in developing countries, however, the similarity of the systems used, together with a lack of regulation, makes it likely that the health and

on-the-job injuries can be particularly devastating because workers may lack insurance and also workers compensation benefits. As industrial animal agriculture grows in Latin America, Asia and Africa, the health and safety of millions of workers is likely to continue to be jeopardised.

### 8.1 Summary and Conclusion

WSPA urges the World Health Organization and other public health institutes to advise policy makers to protect workers against the negative health effects of working in unsanitary conditions on industrial animal farms created by having many animals crowded into a small space.



...workers from cage-based operations report greater prevalence of current cough and wheeze, as well as lower lung functions

injury risk for workers in these countries' industrial farms and slaughterhouses are high. Equally, the speed at which workers are expected to slaughter animals in high throughput slaughterhouses puts workers at risk of injury and threatens animal welfare. Each year about one in three meatpacking workers suffer a work-related injury that requires medical attention.<sup>36</sup> There is evidence that these numbers vastly underestimate the actual numbers of injuries.<sup>36</sup> Many meatpacking workers in the United States are illegal immigrants who risk deportation if they report their injuries.<sup>36</sup> Measures should be urgently taken to ensure that workers are better protected and trained. This could benefit not only the safety of the worker but also the welfare of the animals being slaughtered.

In Asia, Latin America and Africa, there is less information on the number of occupational injuries in the meat industry. For workers in developing countries,

As industrial animal agriculture grows in Latin America, Asia and Africa, the health and safety of millions of workers is likely to continue to be jeopardised.



## 9. Indirect impacts: The rise of the fast food nation and chronic disease

Industrial animal farms are often developed in a country to provide low cost, standardised animal products to fast food restaurants, caterers or even airlines.<sup>95</sup> Therefore, the development of fast food restaurants and industrial animal farms in a country are often invariably linked: so it is worth looking more closely at indirect impacts of industrial animal farming on human health.

Between 1996 and 2001, there was a 126% increase in the number of McDonald's outlets doing business in Asia, Pacific, the Middle East and Africa.<sup>114</sup> In China, there are more than 500 McDonald's franchises and 1,200 KFCs. In 2004 alone, 275 new KFC restaurants opened.<sup>115,116</sup> In India, the fast food industry is growing by 40% per year and is expected to generate over a billion dollars in sales by 2005.<sup>117</sup>

In 2002, two-thirds of the gains in global meat consumption were in the developing world.<sup>118</sup> In 1995, in the Philippines for example, the average Filipino ate 21 kilograms of meat per year. Less than ten years later, Filipinos eat almost 30 kilograms.<sup>121</sup>

According to the WHO and the FAO, cardiovascular disease is now more prominent in India and China than in all economically developed countries put together.<sup>119</sup> The China Health Survey has found that, as a result of high intakes of fat and protein, the proportion of overweight teenagers in China has tripled in the past decade.<sup>120</sup>

The costs of these chronic diseases to a nation's health care system should not be underestimated. A study in the United Kingdom revealed that hypertension, coronary heart disease, Type 2 diabetes, osteoarthritis, cancers and strokes were costing the health system an estimated £457 million (US\$822 million) in 2002 alone, which can all be related to the increase intake of animal fat and protein.<sup>122</sup> Fast food tends to be high in animal fats. The menus offered by these restaurants typically consist of high fat and high calorie meat products, such as chicken nuggets and hamburgers. The typical meal may contain 60 grams of fat and more than 1,100 calories.<sup>123</sup> The popularity of high fat fast food is likely to be contributing to rising levels of obesity and chronic diseases worldwide. In the United States, for instance, 65% of the population is overweight or obese. According to the Center for Disease Control, obesity will soon overtake tobacco as the leading cause of death in the U.S.<sup>124</sup> Indeed, obesity is now becoming a global epidemic. More than 300 million adults are obese and 115 million people in developing countries suffer from obesity related problems, according to WHO, which warns that obesity and other chronic, diet related diseases can be a huge burden on human health.<sup>125</sup> Obesity raises the risk of heart disease, stroke, diabetes and various cancers – these four types of disease are responsible for more than half of all deaths in the industrial world.<sup>126</sup>

### 9.1 Summary and Conclusion

Asia, Latin America and Africa are likely to see a change in diets and disease burdens as industrial animal production and fast food presence increases. The World Health Organization and other public health institutes are strongly urged to advise nations to adopt healthy consumption patterns, where fast food diets and associated high levels of consumption of animal products from industrial animal farming are rejected.





# 10. Conclusion and recommendations –

## Farming for a healthy future

In a recent statement, the American Public Health Association has called for a moratorium on the construction of new industrial animal farms until more scientific data on their risks has been collected, and for more research on the environmental effects of such operations, especially in regard to exposure for infants and children.<sup>127</sup>

In 2001, a World Bank report said that as the livestock sector grows “there is a significant danger that the poor are being crowded out, the environment eroded, and global food safety and security threatened”. It promised to use a “people-centred approach” to livestock development projects that will reduce poverty, protect environmental sustainability, ensure food security and promote animal welfare.<sup>128</sup>

WSPA urges the World Health Organization and other public health institutes to ensure that policy advice does not promote or otherwise encourage the growth of industrial animal agriculture. If the potential and detrimental public health effects of industrial animal agriculture are to be avoided, the World Health Organization, public health institutes, policy makers and other key stakeholders are advised to:

- Put in place environmental and animal welfare laws in countries where they do not exist to protect the population, animals and the environment from the negative impacts of industrial animal agriculture
- Research and support humane and sustainable alternatives to industrial animal agriculture, such as free-range and organic farming, and commit to their implementation
- Begin the difficult task of resolving the negative human health impacts of industrial animal agriculture
- Improve data collection on foodborne illness and animal disease in countries where industrial animal farming is set to dominate
- Remove governmental subsidies that encourage the growth of large-scale livestock development
- Improve farmer knowledge about animal health and welfare
- Educate consumers about the health consequences of industrial animal agriculture.

The health issues discussed here are well known. The fact that they stem from industrial animal farming has not been clearly recognised by the international health or agriculture community. Many countries still lack the policy, technology and control methods to prevent the health repercussions of industrial animal agriculture.

This report is a call to action for the World Health Organization, public health institutes and policy makers to prioritise the reversal of the growth of industrial animal agriculture in order to prevent its potentially serious human health effects.





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