Flexitarianism: A more moral dietary option

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Abstract

It is morally impossible to justify the power wielded by the livestock industry. This paper describes the human, ecological and animal welfare concerns caused by excessive meat production and consumption including climate change, water depletion and degradation, land misappropriation and degradation, rainforest destruction, biodiversity & rapid species loss and the significant threats and challenges presented to human health and wellbeing. It offers flexitarianism (flexible or part-time vegetarianism) as a personal opportunity and moral responsibility to combat the destructive duplicity of the global livestock megamachine. Through a personal nutritional paradigm shift and resulting food choices individuals can reclaim the possibility of a more sustainable world and global society.

Keywords: flexitarianism; flexible vegetarianism; part time vegetarianism; moral dietary options; personal nutrition, ecological health; animal welfare; livestock; meat consumption; meat production; climate change; water depletion; water degradation; land degradation;, rainforest destruction; biodiversity; species loss; human health; sustainable world; global society

Introduction

Achieving sustainable production and consumption is essential in the transformation towards a more sustainable society. The environmental, health and animal welfare impacts of current western excessive meat production and consumption realities are irreconcilable with achieving this goal.

Many people think that meat consumption is a personal choice that doesn't harm anyone else. This may hold true when food animals are produced and consumed in quantities and using practices more in keeping with traditional animal husbandry. However, the idyllic Old MacDonald farm has long been replaced in the Western world. The massive intensification and industrialisation of animal production has created meat factory production systems (Fraser, 2005) which are having deep impact on the world and significantly threatening its short and longer-term sustainability. Meat consumption therefore should no longer be seen as an individual freedom. Industrialising livestock production, together with the economically distorting effects of vast agricultural subsidies and other environmental and economic externalities, has provided affordable meat for billions of people which is often "cheaper" than fruit and vegetables (Henning, 2011:64). Whilst seemingly a good thing, in reality, this has resulted in excessive meat consumption that has come at a devastating cost for human, animal and ecological welfare, while only a select few are benefiting from the short-term profits. The resulting consequences of mass scale industrialised meat production represent the greatest challenges that humanity has ever faced.

The global human population has been projected to increase by 40% between 2006 and 2050, and this growth, coupled with a near-doubling of per capita GDP is expected to result in the world's total meat production increasing more than 135% to about 13 animals per person per year (Elam, 2006). Some claim that this represents the road to improved food security, a better diet and the realisation of prosperity following the Western model (Henning, 2011). In 2007, 275 million tons of meat (beef, pork, chicken and lamb) were produced worldwide and this was a fourfold increase in meat production over the last half century (Halweil, 2008:1; Henning, 2011:63) through the breeding and slaughter of 60 billion animals a year (an average of 650 animals every second or about 10 animals per person per year). Statistics from the Food and Agriculture Organisation show that by 2010 this figure had increased to more than 63 billion (authors' calculations from FAO, 2012). Considering both direct and indirect effects, meat production and consumption are leading causes for climate change, water depletion and pollution, deforestation, land

degradation and desertification, loss of biodiversity, rapid species extinction, ongoing hunger and increasing ill-health, malnourishment, obesity, chronic disease, antibiotic resistance and the spread of infectious diseases and possible global epidemics (Gold, 2004; LEAD, 2006; Bittman, 2008; Goodland and Anhang, 2009; Stehfest et al., 2009; Pelletier and Tyedmers, 2010; Hamerschlag, 2011; Henning, 2011). Rather than stop the march of this devastation it appears that current western levels of meat consumption continue to be promoted and their negative impacts ignored.

This paper is a rallying call to flexitarianism (flexible or part-time vegetarianism) as an individual action to combat the geopolitical and industrial duplicity that is destroying the world and its people. This may be the most liberating, empowering, immediate, cost effective and independent choice possible for individuals throughout the developed and emerging world to mitigate climate change and widespread environmental and social destruction to regain and restore the reality of a better world. The approach we use draws on publically available data and is based on generalisation and extrapolation to offer perspective into the human and environmental consequences of current meat consumption. Despite the fact that such information is available, people are constantly bombarded by the misleading messages of the meat megamachine. This paper attempts to expose the truth in the three main areas of human health, ecological health and animal wellbeing. Based on this awareness, it then exposes the existing deceit, calls for individual action and proposes policy pathways in support of flexitarianism.

Human health

The impact of meat on human health can be seen in two distinctive areas, namely the excessive consumption of meat and the way meat is produced to meet this increasing demand. Both have negative consequences for humanity. There is a plethora of issues too vast to cover here which all point as to how dangerous current meat consumption and production have become. To validate this claim we focus on some of these threats.

Meat consumption

There are big differences in meat consumption around the world (see Table 1). Whilst life expectancies in the western world are higher, this is the result of many development related factors, such as improvements in living conditions, advances in public health and medical technologies, access to medical and healthcare, education, economic resources, high childbirth and childhood diseases survival rates (AIHW, 2011). However, despite the prolonged western life span, “about 80 percent of elderly people (over age 65) suffer from at least one chronic disease and about 50 percent suffer from two or more chronic diseases. In the face of a steady increase of life expectancy and the dramatic rise in the spread of the leading chronic diseases, it is probable that humanity will soon experience, for the first time in modern history, a widespread old age characterized by a sub-optimal average quality of life, for a significantly longer period of time” (Barilla Center, 2012:239).

One of the main reasons for this is that the West is significantly exceeding the recommended healthy levels of meat consumption (see Table 1). Studies by recognised international health related organisations repeatedly confirm the link between meat consumption and a wide range of serious non-communicable diseases, the most prominent being cancer. The American Institute for Cancer Research (AICR), the World Cancer Research Foundation (WCRF), the World Health Organisation’s International Agency for Research on Cancer (IARC) and the European Prospective Investigation into Cancer and Nutrition (EPIC) repeatedly confirm the negative connection between the consumption of red and processed meat and various cancers, particularly bowel cancer (Groenen et al., 1976; Jakszyn and González, 2006; WCRF/AICR, 2007; AICR, 2010; Ferlay et al., 2010; WCRF, 2011a). The findings from the EPIC study, the largest study of diet and health ever undertaken, are based on over half a million people recruited in ten European countries, Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden and the United Kingdom (Riboli and Lambert, 2002; AICR, 2012). Other studies have also conclusively linked cancers of the oesophagus, liver, lung, stomach, bladder and prostrate to red and

processed meat consumption (Cross et al. 2007, 2011; Ferrucci, 2010). Obesity, hypertension, diabetes, heart disease, stroke, cancers, rheumatoid arthritis, multiple sclerosis, lupus, gallstones, atherosclerosis, verticulitis, food-borne illnesses, osteoporosis, immune system disorders, allergies and asthma are just some of the many other costly, debilitating and potentially life-threatening illnesses conclusively linked to excessive meat consumption, the incidence of which plummets when more traditional plant-based diets persist (Appleby, 1999; Monday, 1999; Gardner and Halweil, 2000; Popkin, 2001, 2009; WHO, 2003; LEAD, 2006; Cross et al., 2007; Fox, 2007; WCRF/AICR, 2007; Moritz, 2009; Henning, 2011; Stone, 2011; USDA, 2011; WCRF, 2011a, WCRF, 2011b). A 2011 update by the AICR/WCRF reinforces that people should eat no more than 500g of red meat per week and calls for complete avoidance of processed meat (bacon, ham, salami, sausages, deli meats and some burgers) (WCRF, 2011a).

Table 1. Meat consumption, 2007

	Per Capita Average Annual Consumption (kg)	Per Capita Average Weekly Consumption (kg)	Per Capita Average Daily Consumption (g)
Recommended*	<26.0	<0.500	<71
Luxembourg	136.73	2.629	376
USA	122.79	2.361	337
Australia	122.70	2.360	337
Spain	111.56	2.145	306
Denmark	98.20	1.888	270
Italy	92.65	1.782	255
United Kingdom	85.51	1.644	235
Brazil	80.49	1.548	221
Greece	75.73	1.456	208
Russia	60.88	1.171	167
South Korea	55.85	1.074	153
Saudi Arabia	54.03	1.039	148
China	53.45	1.028	147
Malaysia	48.99	0.942	135
South Africa	48.87	0.940	134
Japan	46.13	0.887	127
Bulgaria	45.32	0.872	125
Libya	27.84	0.535	76
North Korea	14.68	0.282	40
Pakistan	13.42	0.258	37
Sri Lanka	6.82	0.131	19
Malawi	5.90	0.113	16
Rwanda	5.64	0.108	15
Congo, Democratic Republic of	4.61	0.088	13
Bangladesh	3.62	0.069	10
India	3.26	0.062	9
Global	46.6	0.896	128
*Studies show meat consumption is nutritionally unnecessary. If it is consumed, the WCRF/AICR and UK government and others, recommend for health reasons that no more than .5kg per week (26kg per annum) be			

consumed.

Source: Food and Agriculture Organization of the United Nations (FAO) (2010) Livestock and Fish Primary Equivalent, 02 June 2010, FAOSTAT on-line statistical service, FAO, Rome, http://faostat.fao.org/site/291/default.aspx (accessed 1 November 2010).

Given the credibility of these research findings, one would expect people to be aware of the risks from excessive meat consumption and the health implications from such easily preventable causes. Yet the pervasive and insidious influence of the livestock sector backed up by government has ensured this isn't happening and meat continues to be promoted as a healthy, necessary food source (USDA, 2012; Healthy Food Guide, 2012; Russel, 2009). The result is an increasingly sick Western population, a horrifying prophecy that today's children may not outlive their parents (Stone, 2011).

This situation is also being exported. It is sad testimony to the great disparity in wealth that, perhaps for the first time in human history, there are more overfed (1 billion) than hungry (800 million) individuals in the world (LEAD, 2006:6; Henning, 2011:68). Ironically due to the global duplicity and spread of western hegemony, throughout the emerging world people climbing out of poverty are shifting from traditional diets of grains, vegetables pulses, roots and tubers to high meat consumption. Consequently non-communicable nutrition-related diseases are overtaking communicable disease (Goodland, 2001; Stamoulis et al., 2004; Karelina and Fritschel, 2011). For example, the rate of increase of global cancer is now more than 4 times faster than the spread of HIV (WCRF 2011a). The developing world represents new and growing markets for the meat industry and the global livestock mega machine is now focused on these people. Is it ethical to replace poverty and hunger in ways that cause diseases of affluence and environmental destruction? What is urgently needed is not simply finding ways to live longer but finding ways to live longer and healthier without the onset of non-communicable and chronic diseases (Barella Center, 2012).

Meat production

The promotion of meat consumption has completely changed animal husbandry. Antibiotics, growth hormones and genetic modifications have become the basis for industrial livestock production. The consequences for humanity are ominous and include a global "epidemic" of antibiotic resistant infections (Spellberg et al., 2008; Chee-Sanford et al., 2009; Price at al., 2012). Warning studies were presented to government as early as 1969 (FDA, 2010:4). A 1997 World Health Organisation study reported that all uses of antimicrobials lead to the selection of resistant forms of bacteria (WHO, 1997:5). In 2004, the US Government Accountability Office confirmed antibiotic-resistant bacteria have been transferred from animals to humans through meat production (FDA, 2010:11). Despite calls by the world's medical community to cease the non-therapeutic use of antibiotics, over half of all antibiotics produced worldwide are now administered non-therapeutically to meat-animals (LEAD, 2006:273) and for the US this figure is 90% (Center for a Livable Future, 2010). The response so far has been a commitment to "working with animal drug sponsors… the animal agricultural community and all other interested stakeholders… minimising disruption to the animal agriculture industry…" (FDA, 2010:17). It is not hard to see whose interests are being protected.

The breeding of genetically modified and uniform, sickness-prone, antibiotic maintained animals in the overcrowded, stressful, faeces-infested, artificially lit conditions of factory farms promotes growth and mutation of pathogens creating perfect environments for rapid selection and amplification of pathogens and an increasing risk for disease entrance and/or dissemination. For example, the H1N1 swine flu outbreak originated at a hog factory farm in North Carolina spreading all over the world (Saffran Foer, 2009; Nordgren, 2011). By contributing to the spread of antibiotic resistant infections, the increase of infectious, chronic and new diseases, mass production and overconsumption of meat now constitutes one

of the single greatest threats to public health (Henning, 2011:66). Despite the evidence of the dangers to humanity, no mitigating measures have occurred to date because the livestock–pharmaceutical industry alliance is more powerful than the global alliance of public-health professionals. Eating meat, albeit unwittingly, funds and perpetuates the hold and influence of these powerful interests.

There is something morally reprehensible, almost culpable, about directing antibiotics to healthy animals bred and kept alive only for a short while to supply the West's insatiable appetite for meat. Whilst billions of animals are kept "healthy" in unhealthy meat production factories, the world's population faces a possible future where we are forced to accept the loss of antibiotics as a tool to prevent human suffering (Safran Foer, 2009).

Another reality of meat production is that animals now detract far more from the total global food supply than they provide (Henning, 2011). Western countries feed grains to meat animals instead of feeding people which is an inefficient way of producing calories (Saffran Foer, 2009) and compromises global food security (Yotopoulos, 1985). In 2008/2009 approximately 2.27 billion tonnes of cereals were produced globally (FAO, 2009), over one third of which are used to feed livestock (FAO, 2006) while nearly a billion humans suffer in hunger (FAO, 2009). If the grain currently used to feed livestock were reallocated to people, there could be an immediate end to world hunger and food security into the foreseeable future without any additional ecological resource requirements. As it stands, while there is 60 billion grain eating livestock, overpopulation should not be blamed for global undernutrition, hunger or environmental problems. Concerns regarding dependency, distribution and corruption are justified, but in a world with increasingly stressed ecosystems, a rapidly growing human population and political unrest caused by high and distorted food prices (Pinheiro, 2010), it is difficult to morally justify this profligate use of edible nutrition (Henning, 2011:69) and the argument for reduced meat consumption becomes ever more lucid.

It seems the choice is simple: cheap meat or global human health – we can't have both. Consuming factory-produced meat is unethical. Whilst citizens around the world rightfully believe that governments and related agencies have been established and are responsible for policing in the name of the greater, common good, this is not the case. The duplicity of the dangerous alliance, the seemingly unstoppable megamachine of relationships between politics, pharmaceuticals and the livestock sector ensures that governments fail in their obligation to safeguard the health of their civilians. There is no indication this will change soon. Individuals however can take back power and immediately take action.

Ecological health

The impact of meat consumption on the global ecological health is immense and again, we only focus on a limited number of aspects, namely the connections between livestock and climate change, water, land use, rainforests and biodiversity. It is not possible to consume quantities of meat and consider oneself to be an environmentalist; as Singer (2002:167) said: "We are, quite literally, gambling with the future of our planet – for the sake of hamburgers".

Climate change

Climate change looms as one of the biggest environmental crises in human history (Gold, 2004:4) and human-induced emission of greenhouse gases cause global warming (IPCC, 2007). The lifecycle and supply chain of livestock products is the largest contributor of Greenhouse Gas (GHG) emissions worldwide (Goodland and Anhang, 2009). Already the impacts of climate change are disruptive (Min et al., 2001; Pall et al., 2011; Dummer et al., 2011) and the next five years are likely to be the world's last real chance to combat climate change before climate disruption is projected to become irreversibly catastrophic (IEA, 2011; The Climate Institute, 2011). Shifting to alternatives to fossil fuel energies is most commonly discussed as the solution but replacing them and any related infrastructure with renewable alternatives will require decades to implement (Goodland, 2010b). Reduction in meat consumption can happen right now.

The climate impacts of meat production have been officially known for at least a decade. In 2001, the Australian Greenhouse Office reported that the Australian livestock subsector was the nation's largest source of GHG emissions (Hegarty, 2001). In 2006, the FAO calculated global meat supply emissions were 18% of total annual worldwide GHG emissions (LEAD 2006). By 2009, calculations by the Worldwatch Institute showed that, despite being recognised as the biggest anthropogenic contributor to global GHG emissions, the climate impact of the global livestock sector was vastly underestimated and in fact accounted for at least 51% of all annual worldwide anthropogenic GHG emissions (Goodland and Anhang, 2009). A Canadian Study released in 2010 warns of a "livestock greenhouse gas boom" – where soaring international production of livestock could, by 2050, release enough carbon into the atmosphere to "single-handedly exceed 'safe' levels of climate change: the livestock sector's emissions alone, if continuing on the current demand, supply trajectory, could send temperatures above the 2 degrees Celsius rise optimistically said to be the threshold above which climate change will be dangerously destabilising" (Pelletier and Tyedmers, 2010:3). Many of these reports suggest reduced meat consumption and production as a viable and urgent measure of climate change mitigation (Audsley et al., 2009; Garnett, 2009; MacMillan and Durrant, 2009; Stehfest et al., 2009; Pelletier and Tyedmers, 2010; Wirsenius et al., 2011).

Estimates show that a 25% reduction in global consumption of livestock products worldwide would yield the 12.5% reduction in global anthropogenic GHG emissions (Goodland, 2010a) that delegates tried, but failed, to negotiate in 2009 at the UN Climate Conference in Copenhagen. Yet, despite the massive opportunity for mitigating climate change offered by a reduction in meat consumption in the developed and emerging world, this option has "fallen through the cracks" (Hegarty, 2001:3) and "one of the gravest threats to the long-term sustainability of humankind remains all but ignored" (Gold, 2004:5). Politicians in developed countries have a long history of supporting their farmers and the global livestock industry has significant influence in every sphere including academic research, agricultural policy development and government regulation and enforcement (Nestle, 1999; Campbell and Campbell, 2006; Bittman, 2007; Cross et al., 2007; Dixon et al., 2007; Fox, 2007; Moritz, 2009; Russel, 2009; Safran Foer, 2009; Stone, 2011). Resultantly, almost all attention given to livestock sector GHG emissions to date focuses on technical, biological and technological best practices which may reduce overall emissions and environmental harmful impacts, but ultimately will not be sufficient (Goodland, 2010b; Nordgren, 2011). Financially, a "low-meat" or completely meatless diet will reduce monetary costs of climate change mitigation by 2050 by between 70% and more than 80% (Stehfest et al., 2009:96).

Clearly, personal choices and actions can make a significant contribution to rapid GHG reductions and climate change abatement. Whilst some people may have difficulty believing that eating or abstaining from meat will have any impact on climate (see Table 2), overwhelming evidence shows the most valuable, meaningful, fast and inexpensive action that individuals can take to prevent the impending, irreversible tragedies of global warming is to eat less meat and to consume alternatives to livestock products (Myers, 1984; Campbell and Campbell, 2006; LEAD, 2006; Singer and Mason, 2006; Stern, 2006; Bittman, 2007; Goodland and Anhang, 2009; Safran Foer, 2009; Stehfest et al., 2009, Godfrey et al., 2010, Goodland, 2010a, 2010b; Pelletier and Tyedmer, 2010; FAO, 2011; Fazeni and Steinmueller, 2011; Hamerschlag, 2011; Nordgren, 2011; Stone, 2011).

Table 2. Meat consumption impacts based on beef

	1 kg beef	1 quarter pounder burger (113g beef burger patty)	Annual impact of an average Australian/American's meat consumption
CO2 generated [kg]	35	4	4305
Equivalent to			21525 km with a mid-size car
Freshwater required [l]	100000	11340	12300000
Equivalent to	455 days of an Australian's water use	52 days of an Australian's water use	
	55 years of an average Bangladeshi's water use	6 years of a Bangladeshi's water use	
Grain required [kg]	11	1.2	
Equivalent to			Feeding 8 people on a grain diet
Rainforest levelled [sqm]	50	6	6205
Biodiversity lost from rainforest beef		25 plant species, 100 insect species, >24 birds, mammals nd reptiles	
Manure generated [kg]	40	4.5	4920

Source: Authors' calculations based on data from: Australian Bureau of Statistics http://www.abs.gov.au/ (accessed 4 May 2012); **Department of Environment**, Food and Agriculture Organization of the United Nations http://www.fao.org/corp/statistics/en/ (accessed 4 May 2012); Food and Rural Affairs http://www.defra.gov.uk (accessed 20 January 2010); Denslow, J. & Padoch, C. (1988) *People of the Tropical Rainforest* (Berkeley, CA: University of California Press); Millston, E. & Lang, T. (2003) *The Atlas of Food* (London: Earthscan); Mombiot, G. (2006) *Heat* (New York: Penguin Books); Pimentel, D. & Pimentel, M. (2003) Sustainability of Meat-based and Plant-Based Diets and the Environment, *American Journal of Clinical Nutrition*, 78: 660s–63s; Vidal, J. (2010) 10 ways vegetarianism can help save the planet, http://www.guardian.co.uk/lifeandstyle/2010/jul/18/vegetarianism-save-planet-environment (accessed 25 December 2011); Watkins, K. (2006) *Human*

Development Report 2006. Beyond scarcity: Power, poverty and the global water crisis (Palgrave Macmillan, New York: United Nations Development Programme).

Note: As livestock production systems vastly differ across regions, all figures used are the average points of results reported by others. For example, estimates of quantity of grain required to produce 1 kg of beef vary between 6 kg, e.g. Beef Cattle Community (2008), http://www.extension.org/pages/35850/on-average-how-many-pounds-of-corn-make-one-pound-of-beef-assuming-an-all-grain-diet-from-backgroundi (accessed 30 April 2012), and 16 kg, e.g. U.S. Department of Agriculture's Economic Research Service in Goodall, J. (2005) *Harvest for Hope* (New York: Warner Books); hence we have used 11 kg.

Water depletion and degradation

The livestock sector accounts for 10% of global human water use, mostly for irrigation of feed crops (Deutsch et al., 2010). Overall, it is estimated that producing one kilogram of animal protein needs 100 times more water than producing one kilogram of grain protein for human consumption (Pimentel and Pimentel, 2003; National Geographic, 2010). This is an inefficient use of an increasingly scare environmental resource without which life cannot continue. Around the world, as water is increasingly diverted to growing feedstock for meat animals instead of crops for direct consumption, millions of wells are drying up (Monday, 1999) and already stretched freshwater stocks are being polluted during meat production. The meat industry is the largest single sectoral source of water pollution. Animal wastes, antibiotics, hormones, chemicals, fertilisers and pesticides used for feed crops, and sediments from eroded pastures result in eutrophication or ”dead zones” in fresh and marine water bodies, destroyed ecosystems such as coral reefs, massive fish kills and human illness (LEAD, 2006; Henning, 2011). Soil compaction resulting in reduced infiltration, degraded watercourse banks, drying up of floodplains and lowering water tables is also directly attributable to livestock farming practices (LEAD, 2006).

According to Henning (2011:71), “given that eating meat is nutritionally unnecessary and detracts more from the global supply of food than it provides, not only is the inefficient and wasteful use of increasingly scarce freshwater ecologically unsustainable, it is morally unacceptable to continue to preference the acquired taste of meat over the need for life-giving freshwater”. As populations in water scarce regions, such as Australia continue to grow, governments should, morally and ethically cut these deficits by shifting water to grow food for people not livestock. Instead, the livestock megamachine continues to promote itself through highly selective data, incomplete life cycle assessment-based methodologies and deceptive analysis (Ridoutt et al., 2011). As the calls for reducing meat consumption gather momentum, we are likely to see more and more of such behaviour which strongly resembles climate change scepticism.

Through duplicity the freshwater global commons are being destroyed. Some schools of thought even predict that the resultant scarcity will lead to water wars and conflicts in the future (Rahaman, 2012). In the face of such unethical theft, individuals again have the choice to adopt a flexitarian lifestyle to disassociate themselves and make a meaningful and important contribution to protecting and saving global water.

Land misappropriation and degradation

Being the single largest anthropogenic user of land, the livestock sector occupies 30% of the land surface of the planet, exploits at least 26% of the world’s ice-free, terrestrial surface for grazing, 33% of all arable land is dedicated to feed crop production and in all accounts for 70% of all agricultural land use (FAO, 2006). Cereals are thus shifted from direct human consumption to indirect consumption of meat, an inefficient food conversion process where a significant “shrinkage” of cereals occurs (Yotopoulos, 1985) and world poverty is perpetuated. Both the clearing and subsequent cultivation of land for pasture or feed crops is of great concern (Henning, 2011:72) causing desertification, decreased vegetation, reduction of available water, reduction of crop yields, increased salinity and erosion of soil (IPCC, 2007) as well as invasion by alien species. The value and quality of the land used for meat animals is significantly compromised or destroyed as a habitat or natural resource for alternative purposes. Such misappropriation and resulting degradation may be largely prevented with these facts made transparent prompting individuals to reject a high-meat diet.

Rainforest destruction

Referred to as the “hamburgerization of our forests” (Myers, 1984:127)**,** increasing meat demand is the biggest cause of deforestation, (Monday, 1999; LEAD, 2006). Seventy percent of previous Amazon forest is now cattle pasture and feed crops cover a large part of the remainder (LEAD, 2006). Brazil, the country with the world’s largest commercial cattle herd, loses around 1.8 million hectares a year of the Amazon

forest (Rofe, n.d). In Central America, between 2004 and 2005, an estimated 1.2 million hectares of rainforest was cut down as a result of soybean expansion for feed crops (FAO, 2011). Worldwide, the rate of deforestation for pastureland annually exceeds more than 13 million hectares, an area the size of Greece or Nicaragua (UNEP, 2003).

Forests, whilst confined to countries, are essential for the survival of the global population containing 80% of the world's species of land vegetation, being a vital source of global oxygen supply, moderating climates, preventing floods, defending against soil erosion, recycling and purifying water, offering habitat for millions of plants and animals, providing housing, wood and cooking fuel and embodying beauty, inspiration and solace. Yet every second, an area the size of a football field is destroyed forever (LEAD, 2006). A single Standard American Diet (SAD) meal (assuming ±30% of the calorific intake is derived from meat), levels 17 sqm of rain forest (City of Cincinnati, 2008). The vegetarian alternative to this hamburger would protect enormous rainforest areas. Faced with such figures, the need for a more moral and sustainable dietary choice becomes ever more compelling.

Biodiversity

In the face of increasing environmental challenges, biodiversity is the basis for resilience (CBD, 2011). As the major driver of climate change, deforestation, land and water pollution and degradation, the livestock sector is the leading player in biodiversity reduction. Resource conflicts with pastoralists further threaten wild predators and most of the world's endangered species are suffering habitat loss where livestock are a factor (LEAD, 2006). The sheer quantities of animals being raised for human consumption are an ongoing threat. For example, livestock are identified as "a current threat" in 306 of the 825 eco-regions identified by the Worldwide Fund for Nature and 23 of Conservation International's 35 "global hotspots for biodiversity" are affected by livestock production (FAO, 2006). The importance of these hotspots is enormous. There are as many species of ants on one rainforest tree in Peru as in the British Isles; 700 species of butterflies have been counted within a 3-mile radius in an Amazon rainforest in contrast to only 321 known in Europe; the number of bird species in 1 square mile of the Amazon rainforest exceeds the total found in North America; 25 acres of Indonesian rainforest contain as many different tree species as those native to North America (Sussman, 2000:67; Gore, 1993:23). With only 1% of these tropical rainforests tested for medicinal benefits, they already supply 25% of all medicines and researchers believe these ecosystems contain the medicines of the future (Sussman, 2000:67; Gore, 1993:23). Clearly the risks of unabated meat consumption outweigh any benefits.

With estimates of human population reaching 9 billion by 2050, the current trends in meat consumption will ensure the planet's ecological health continues to deteriorate at a shocking rate. However if all humans obtained their recommended daily intake of protein from plants, e.g. soya, the swop would create a 98% reduction in predicted GHG emissions and a 94% reduction in biomass appropriation (Pelletier and Tyedmers, 2010). This will secure a more optimistic future for all, as well as a more conscious way of living and a more likely end to widespread suffering.

Animal welfare

The duplicity of the meat megamachine continues to conceal the truth when animal welfare is concerned as keeping people ignorant is a necessary pre-requisite for the existence and perpetuation of factory farming, including how animals are bred and killed for human consumption.

Producing animals

Peter Singer recognised decades ago that animals are no longer raised but produced in modern factories where specially bred stocks are maintained in confined spaces and quickly fattened to slaughter weight through a high protein diet, usually of corn and soy (Singer, 2002). According to Voiceless (2012:n.p.), "(t)hese emotionally complex, intelligent beings may never see the sun, feel the earth under their feet…or socialise as nature intended. Instead they are confined in cages… or packed together in such large

numbers they struggle to find space to move or reach their food. Baby animals are mutilated without pain relief… because it's practical, cheap and lawful to do so."

A film about meat production would be a horror movie. The power brokers of factory farming however do not want consumers knowing the truth and to this end, significantly influence academic research, agricultural policy, government regulation and enforcement (Safran Foer, 2009). This industrialisation of life has resulted in an unimaginable scale of suffering and misery: animals raised in meat factories lead very short lives of immense denial and distress. Such scale of misery currently affects 60 billion animals a year slaughtered for human consumption. The inhumanity of the breeding and slaughtering practices of this industry, which turn living animals into what is euphemistically called meat and livestock by-products, dwarfs all other animal welfare abuse and is a crime of stupefying proportions (Coetzee, 1999). This is the perhaps the hardest component of the livestock sector to discuss as it moves away from the science of measured impacts and consequences requiring instead confrontation about social sentient beings who feel terror, fear, loss, pain, playfulness, and joy, turned into grossly genetically engineered and modified, faceless living production units in the name of profit maximisation and large scale efficiencies.

Eating meat produced in today's industrialised meat factories degrades humanity and is a condition of inhumanity or inhumanness, the quality of lacking compassion or consideration for others (Farlex, n.d). Factory farming is legalised cruelty for higher profits and cheaper meat with activities legitimised by government agencies, which operate with a stark conflict of interest and little transparency (Voiceless, 2012). There is no such thing as humanely mass produced meat. One cannot make the choice to eat meat today and still consider oneself to be a humane being. In factory farms and slaughterhouses animals are handled en mass as industrial, economic units rather than sentient life forms. Inevitably, there there will be widespread suffering and inconceivable fear.

Slaughtering animals

Life in all forms demands respect and for human beings, self-aware and reflective creatures, destroying something for no good reason is, at best, the moral equivalent of vandalism (Schmidtz, 2011). Eating excessive quantities of meat is an act undertaken to meet the non-basic or luxury needs of humans and such actions should be prohibited when they aggress against the basic needs of individual animals (Sterba, 2011). According to Halweil (2008:2), 650 animals are killed every second of every day for food consumption. The mass slaughter inherent in the current and growing global livestock trade is mass vandalism on an inconceivable and unjustifiable scale given that we do not need to eat meat to survive and that current excessive meat consumption levels are detrimental to human health.

Slaughterhouses are the inevitable reality of factory farming which is a violent way to end animal life and a desensitising working environment. Even in a highly regulated country such as Australia and US, legislation and standards do not protect factory-farmed animals from being brutally killed. Footage from Australia shows young pigs exposed to extreme cruelty in their final moments, stabbed in the eyes and ears with stunning equipment, killed with sledgehammers and scalded alive (Animals Australia, 2011). A US meat inspector describes: "Cattle dragged and choked…knocking 'em four, five, ten times. Every now and then when they are stunned they come back to life, and they're up there agonising. They're supposed to be restunned but sometimes they aren't and they'll go through the skinning process alive… If people were to see this, they'd probably feel really bad about it" (Eisnitz, 1997:197).

For factory workers, slaughter is a job requiring indifference, malevolence, cruelty and violence. It should come as no surprise that in the USA slaughterhouse workers have the highest turnover rate (Campbell and Campbell, 2006). The choice is leave or become desensitised to the legally practised and socially acceptable behaviour normal in abattoirs all over the world.

Indifference to what happens in the slaughterhouses to other sentient beings is deadly for human-based morality (Singer and Mason, 2006). As the Australian 2011 newsmaker of the year Lynn White describes:

"… for the first 38 years of my life I ate animals — completely unaware of the existence of factory farms, and ignorant of what animals experienced in slaughterhouses. Becoming informed was life-changing. No-one had reminded me that eating animals was a choice… That regulations and standards didn't protect these animals from cruelty — and that even if they had — that they would still have been afraid, that they still would have suffered. The story of their final moments is so seldom known or told-yet it desperately needs it to be, because we live on, and we still have choices to make...They need us to make informed and compassionate ones" (Animals Australia, 2011).

Such actions remain largely with each individual. As humans don't need to kill other creatures in order to survive or even thrive, we need to morally justify what we do (Henning, 2011). Exercising their freedom of choice individuals are able to make a uniquely personal decision to either act humanely or inhumanely.

Perhaps it shouldn't be the consumer's responsibility to figure out what's right or wrong, cruel or kind, humane or inhumane. In a moral world, cruel or destructive practices should be illegal and we shouldn't be given the option of buying factory-farmed (Safran Foer, 2009:266). However, this is not the case and factory farming and meat consumption are encouraged through a widespread deception.

Duplicity of the meat megamachine

Meat production and consumption tell an ongoing story of domination, corruption and deceit. Significant, politically supported and ever-more powerful influence by the livestock industry is evident at every turn: in academic research, the development of nutritional guidelines and recommendations, agricultural policy development and government legislation, regulation and enforcement (Nestle, 1999). This perfidy is spreading around the world as illustrated in nutritional guidelines and the westernisation of traditional diets.

Nutritional guidelines

The global nutrition transition towards diets of more meat, less complex carbohydrates and reduced fruit and vegetable intakes has been underpinned by tensions between the global goals of trade and industry facilitation and the national and international protection of public health (Dixon et al., 2007). The US Department of Agriculture (USDA), credited with having the greatest global influence on nutrition and nutrition choices, was originally created with a dual mandate: to support and promote farmers' and agricultural interests, and advocate consumer interests through setting nutrition standards and food assistance programs. This established an inherent conflict of interest that allowed the meat and related agricultural industries to wield considerable political and economic power and influence over government policies (Simon, n.d). As a result, despite conclusive evidence of the harmful health and destructive environmental implications of excessive meat consumption and the benefits of a plant-based diet (Campbell and Campbell, 2006; Stone, 2011), people continue to be repeatedly told that more meat they eat, the healthier they'll be (Bittman, 2007; Simon, n.d.). The US government hands out massive farm subsidies to keep meat prices low, further encouraging high-risk excessive meat-based diets particularly for the socio-economically disadvantaged (Fox, 2007, Cross et al., 2007). Essentially, all US federally endorsed nutritional information (which is also exported all over the world through the mass media and global hegemonising marketing mechanisms) comes from an agency that must support and promote the livestock industry and the agricultural and pharmaceutical power base. Its megamachine will say and do whatever works to sell products, including lobbying congress to eliminate economically unfavourable regulations, co-opting food and nutrition experts by supporting professional organisations and research and expanding sales by marketing directly to children (Nestle, 1999).

Despite fifty years of conclusive and credible findings showing the devastating health and environmental impacts of excessive meat consumption, and the benefits of plant-based diets, the science continues to be buried amongst political and food industry propaganda and vested interests (Moritz, 2009; Safran Foer, 2009). For example, the original food guide pyramid developed by the US Government in 1956, which promoted high meat consumption, still forms the basis of today's advice for healthy eating. MyPlate, the

most recent nutritional guidelines, recommend the original intake of meat despite the addition of two new nutritional groups (USDA, 1996, 2011). Thus it advises people to consume more food per day, not to consume less meat. This mixes science with the influence of powerful agricultural interests, which is not the recipe for healthy eating (Harvard School of Public Health, 2011). In response, Harvard School of Public Health's Healthy Eating Plate limits "red meat and… processed meats, since eating even small quantities of these on a regular basis raises the risk of heart disease, type 2 diabetes, colon cancer, and weight gain" (Harvard School of Public Health, 2011:n.p.). Meat consumption should be limited to a maximum of 500 grams a week (Campbell and Campbell, 2006; WCRF/AICR, 2007), a recommendation endorsed by the UK government (Campbell, 2011).

The absence of such limitations will result in an increasingly sick Western population and the horrifying prospect that today's children may not outlive their parents (Stone, 2011). Yet through globalisation, mass marketing, harmonisation of food standards, retailer and wholesaler consortium domination, US subsidies, and the erroneous belief that the American diet is good, there has been rapid worldwide adoption of Western-style diets (Campbell and Campbell, 2006; Goodland, 2001).

Westernisation of diets

The western cultural hegemony promotes the message: if you are rich, you eat meat, and if you are poor, you eat stable plant food like potatoes and bread (Campbell and Campbell, 2006). Such excessive and inequitable meat consumption is widely destructive and has no benefit other than the maintenance of ongoing vested political, economic and industrial interests that ensure the global livestock megamachine has significant power and influence at every turn (Nestle, 1999; Campbell and Campbell, 2006; Bittman, 2007; Cross et al., 2007; Dixon et al., 2007; Fox, 2007; Moritz, 2009; Russel, 2009; Safran Foer, 2009; Stone, 2011). Developing countries so far have avoided the impacts of chronic diseases but increasing meat consumption is predicted to have a growing negative influence on life expectancy in both developed and developing countries (AIHW, 2011).

Many look darkly at the number of babies being born in developing countries and blame this for diminishing environmental and human wellbeing whilst ignoring the ecological burden of a western diet. If we stop dislocating traditional diets and reduce meat consumption in the West, there is enough food for everyone. Overpopulation of livestock rather than people is the source of food scarcity. It is the number of meat-eating humans, or the amount of meat eaten per human, that needs to be restricted rather than the number of humans as such (Nordgren, 2011).

If the westernisation of diets continues, irreversible human and ecological consequences are likely to ensue (IEA, 2011). Those pointing fingers at overpopulation in poorer countries are those in the developed world who eat the most meat. Clearly this provides a compelling justification for a call for a personal reduction in meat consumption and a move towards a more plant-based diet to end the impending and ongoing destruction and, in so doing, to facilitate the emergence of a more sustainable, liveable world.

Call for flexitarianism

Which countries and individuals have the ability, moral obligation and responsibility to address these huge challenges for the benefit of present and future generations? Because of their consumption patterns, the developed countries have largely caused the problems and they also have abundant food options. They can afford the luxury of selective actions (Nordgren, 2011). However, in emerging countries, such as Brazil, Russia, India, China and South Africa, meat consumption is on a very rapid increase, so there should also be some action taken in these places. The FAO predicts the more than a doubling of global meat production by 2050 will occur mainly because of increasing consumption by the growing middle class (Goodland, 2001; LEAD, 2006, Campbell and Campbell, 2009; Nordgren, 2011; Singer, 2011:229).

Excessive meat consumption and related impacts are increasingly a significant feature and problem facing the emerging world.

Reducing meat consumption is not an option for poor people in poor countries. The poor do not usually eat much meat. McMichael et al. (2007) suggest a "contraction and convergence policy" – a reduction of per capita meat consumption to a certain level in developed countries and an increase in per capita meat consumption up to this level in developed countries. However, an ongoing global decrease in meat consumption is essential as is affirming the continuation of plant-based diets to avoid the huge economic and negative medical implications associated with Western ways of eating.

Clearly, in light of the current social and environmental impacts of the global meat sector, and the present and projected size of the human and livestock population and related consumption habits, the morality, humaneness and sustainability of one's diet, both now and into the future, is inversely related to the proportion of animals and animal products consumed (Henning, 2011; Singer, 2011). Adopting flexitarianism is an obvious way to start to address this with immediate effect. Voted the most useful word of 2003 by the American Dialect Society, the term encourages people to substitute meat with plant-based foods; it is also described as part-time or flexible vegetarianism (Hirsch, 2004; Berley, 2007).

The vast-scale industrial production of animals simply to please human taste buds, with all the huge concomitant human, ecological and animal welfare costs, is impossible to justify from a moral perspective (Caney, 2009; Singer, 2010; Posner and Weisbach, 2010; Nordgren, 2011):

- It is causing harm to present generations (hunger, malnutrition and diseases of overconsumption, social and environmental impacts, injustice and inequity) and violating basic rights (to clean water, food and stable climate);
- It will cause harm to future generations and violate basic human rights, such as the right to life (lack of water and extreme weather events leading to human deaths), subsistence (higher temperatures and sea level rise leading to crop failure as will lack of water and/or arable land), health (spreading of diseases), property (extreme weather events, fire and flooding leading to destruction of property) and the right not to be climate refugees;
- It is an injustice to future generations who will experience the adverse effects of environmental resource overuse and depletion as well as the associated economic burden without having caused these.

Use of the global environmental commons to satisfy excessive demands for meat constitutes an injustice to present generations and all those who will inhabit the planet after us and many ethical perspectives converge around agreement that the present generation has a moral obligation to mitigate the damage (Page, 2006; Vanderheiden, 2008; Shue, 2010; Nordgren 2011).

The individual decision about flexitarinism as an urgent action for averting imminent destruction is not a call for a complete end to all individual meat consumption or a wholly vegetarian/vegan diet (although such a radical change would be better). Immediate and ongoing results can be achieved through the more moderate response flexitarianism embodies. The important thing is to start reducing meat consumption now (Nordgren, 2011).

Possible Policy Pathways

The call for individual action requires a major change in the nutritional paradigm and as shown in other cases of excessive consumerism (Gorobets, 2011; Kennedy and Krogman, 2008; Kaufman, 2009), a number of policies can be developed to address this at personal and governmental levels. Table 3 depicts elements of this change and proposes a new ethics model in support of flexitarianism and personal empowerment.

Table 3. Old and new individual paradigm

Old individual paradigm	New individual paradigm
Meat is an important part of a healthy diet	Meat can be detrimental to health
Public funds are rightly used to support meat consumption, the livestock industry and its associates	Public funds must be directed to support plant based protein consumption and related industries
Industry and government know best and protect the wellbeing of consumers	Industry and government protect their own interests to the detriment of consumers
Don't challenge and question the food industry and its institutions; it all makes good economic sense	Challenge the food industry and its institutions; it's time for good environmental and social sense to prevail, economic benefits will follow
Choose to ignore the environmental, social, economic or animal welfare realities of meat production and consumption	Choose to be completely aware of the environmental, social, economic or animal welfare considerations of the food we consume
Westernisation is best where nutrition is concerned	Many traditional diets are nutritionally better
Food sustainability is a national or global agenda	Food sustainability relies on personal choice of aware, empowered and active individuals
People do not recognise themselves as authors of transformation; the future lies in the hands of politicians and leaders	People recognise themselves as authors of transformation; the future lies in each of our hands (or mouths)

Given the wide and powerful lobby of vested economic and political interests, reduced meat consumption, despite its multiple benefits is unlikely to be popular among meat producers and related industries, many politicians and decision-makers or even many meat consumers. It is unrealistic to expect the meat megamachine to relinquish its power or for government to take the lead. There are however a number of local policies that can be implemented at a community level to support flexitarianism. Below are some suggestions with examples:

- One meat-free day a week: The city councils of Cape Town (South Africa), Sao Paulo (Brazil), Bremen (Germany), Mechelen, Ghent and Hasselt (Belgium) have officially endorsed one meat-free day a week. Schools and numerous public venues (canteens, cafeterias, hospitals, restaurants, public sporting facilities) support this in their menu selections. "Veggie street maps" promote venues that offer vegetarian and vegan choices (Mason, 2009).
- Meat as a treat: Meat should be eaten on special occasions, only once per week or as a treat. This can be supported by labelling; for example, packaged meat could carry messages such as: "enjoy responsibly", "enjoying your meat treat as part of a balanced diet", "be meat-wise" or "for the sake of your health and the health of the planet, please enjoy in moderation".
- Nutritional recommendations: these could be made independently from industry interests, e.g. Harvard's Healthy Eating Plate. Educational information on maximum safe consumption levels could be offered on the back of packaged meat products.

- Private health insurance incentives: Like car or household insurance bonuses or incentives geared towards attracting those less likely to make claims, health funds could offer a range of bonuses to those who consume les meat. This will send powerful messages to the community and support a transition towards flexitarianism.
- Support for alternatives: Financial incentives, such as tax concessions, could be given to industries promoting meat substitutes and plant-based alternatives.
- Educational initiatives: Public education campaigns (similar to anti-cancer or anti-smoking campaigns) can be run on the dangers of excessive meat consumption. There are already active individuals (e.g. Rajendra Pachuria, Paul McCartney, Tim Lang, Al Gore) whose efforts are aligning with other initiatives, such as UK's Meat Reducers program.
- Internalising the externalities: The price of meat should reflect its true production costs, subsidies for livestock industries should be phased out and a meat tax could address current environmental and social production and consumption impacts.

Conclusion

Flexitarianism is an opportunity for individuals to liberate themselves from the global meat megamachine and in so doing to make a meaningful and immediate contribution to increased international sustainability at no extra cost, without any politically controversial government or policy regulation, intervention and without dependency on politicians, decision-makers, leaders or those seeming more powerful. To date, politicians have largely ignored the widespread and growing negative impacts caused by the livestock sector and continue to support and perpetuate excessive consumption of meat. Despite this leadership failure and inaction, there remains the need to promote and further awareness and acceptance of the critical importance of decreasing meat consumption.

Flexitarianism calls for an awareness of our personal impact on the world and an understanding that the morality of our diet is linked to the ecological and social conditions of human and nonhuman beings. Through such self-reflection we are given the opportunity to make a vital contribution to a better world through moral activism (Lee, 2005).

Conversely those choosing to continue to eat excessive quantities of meat are accomplices in perpetuating the problems associated with malnutrition, environmental destruction, climate change, poverty and the ongoing ever-growing suffering and genocide of billions of sentient beings. Through flexitarianism, within the power and reach of most individuals in developed (and to a lesser degree, in emerging) countries, lies the greatest opportunity for interspecies, intergenerational and international compassion and consideration. Liberating the planet, people and animals from the livestock industry is within reach for every person and can be achieved through the choice to reduce excessive meat consumption. Flexitarianism offers a unique liberating opportunity and an ethical dietary option. It is not simply a call for individual action for a more sustainable future but is also call for individuals to lead the way towards a greater global morality and responsibility. After all, if we cannot be reached through an appeal to the threatened conditions of our own survival, what can reach us (Lee, 2005:250)?

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