Committee: Ecology & Environment

Topic: Meat Consumption

Definitions/Key Terms:

Environmental Value System

A worldview or paradigm that shapes the way an individual, or group of people, perceives and evaluates environmental issues, influenced by cultural, religious, economic and socio-political contexts. Ecocentrism, Anthropocentrism, and Technocentrism are all examples of EVS's.

Ecocentrism

A term used in ecological political philosophy to denote a nature-centered, as opposed to human-centered, system of values. The justification for ecocentrism usually consists in an ontological belief and subsequent ethical claim.

Anthropocentrism

The belief that human beings are the most important entity in the universe. Anthropocentrism interprets or regards the world in terms of human values and experiences.

Technocentrism

A value system that is centered on technology and its ability to control and protect the environment. Technocentrics argue that technology can address ecological problems through its problem-solving ability, efficiency, and its managerial means.

Food System

Includes all processes and infrastructure involved in feeding a population: growing, harvesting, processing, packaging, transporting, marketing, consumption, and disposal of food and food-related items. It also includes the inputs needed and outputs generated at each of these steps.

Food Security

A situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Pastoral System

A non-nomadic form of pastoralism in which the livestock farmer has some form of ownership of the land used, giving the farmer more economic incentive to improve the land.

Introduction:

Ethical vegetarian concerns have become more widespread in developed countries, particularly because of the spread of factory farming, more open and graphic documentation of what human meat-eating

entails for the animal, and environmental consciousness. Some proponents of meat-eating argue that the current mass demand for meat has to be satisfied with a mass-production system, regardless of the welfare of animals. Less radical proponents argue that practices like well-managed free-range rearing and the consumption of hunted animals, particularly from species whose natural predators have been significantly eliminated, could satisfy the demand for mass-produced meat. Reducing the worldwide massive food waste would also contribute to reduce meat waste and therefore save animals.
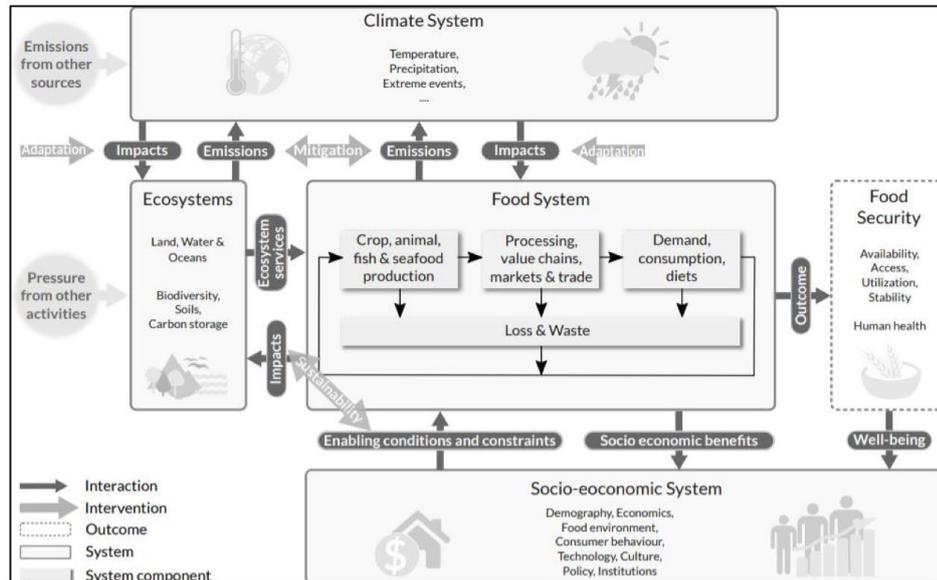
The Animal Rights Movement seeks an end to the rigid moral and legal distinction drawn between human and non-human animals, an end to the status of animals as property, and an end to their use in the research, food, clothing, and entertainment industries.

As well as morality, meat consumption poses a threat to the environment too. As outlined in the Paris Climate Agreement of 2015, if more of the world's population reduce their meat consumption and move towards plant-based diets, the planet's ability to battle climate change could be drastically improved.

Different Types of Meat:

- *Processed meat:* These products are usually from conventionally raised cows, then go through various processing methods. Examples include sausages and bacon.
- *Conventional red meat:* Conventional red meats are fairly unprocessed, but the cows are usually factory farmed. Meats that are red when raw are defined as red meats. This includes lamb, beef, pork and some others.
- *White meat:* Meats that are white when cooked are defined as white meats. This includes meat from poultry like chicken and turkey.
- *Grass-fed, organic meat:* This meat comes from animals that have been naturally fed and raised organically, without drugs and hormones. They also don't have any artificial chemicals added.Food systems are a considerable contributor to greenhouse gas emissions, and thus climate change. In turn, climate change has complex interactions with food systems, leading to food insecurity through impacts on food availability, access, utilisation and stability.

Climate System
Temperature, Precipitation, Extreme events, ...

Emissions from other sources

Adaptation | Impacts | Emissions | Mitigation | Emissions | Impacts | Adaptation

Ecosystems
Land, Water & Oceans
Biodiversity, Soils, Carbon storage

Ecosystem services

Pressure from other activities

Impacts

Sustainability

Food System
Crop, animal, fish & seafood production → Processing, value chains, markets & trade → Demand, consumption, diets
Loss & Waste

Outcome

Food Security
Availability, Access, Utilization, Stability
Human health

Enabling conditions and constraints | Socio economic benefits | Well-being

Socio-eoconomic System
Demography, Economics, Food environment, Consumer behaviour, Technology, Culture, Policy, Institutions

Interaction
Intervention
Outcome
System
System component

Key Issues:

Ethical Arguments

In *Animal Liberation*, Peter Singer (Professor at Princeton University and the University of Melbourne) argued that, because non-human animals feel, they should be treated according to utilitarian ethics. Singer's work has since been widely built upon by philosophers, both those who agree and those who do not, and it has been applied by animal rights advocates as well as by ethical vegetarians and vegans.

Ethical vegetarians say that the reasons for not hurting or killing animals are similar to the reasons for not hurting or killing humans. They argue that killing an animal, like killing a human, can only be justified in extreme circumstances; consuming a living creature just for its taste, for convenience, or out of habit is not justifiable. Some ethicists have added that humans, unlike other animals, are morally conscious of their behavior and have a choice; this is why there are laws governing human behavior, and why it is subject to moral standards.

Health Effects

When assessing the impact of meat consumption on health, it is important to make a distinction between different kinds of meat. For example, grass-fed and organic meat is nutritionally different than factory-farmed, processed meat. Red meat is very nutritious, especially if it comes from animals that have been naturally fed and raised. It's a great source of protein, iron, B12, zinc, creatine and various other nutrients. This being said, red meat is also associated with greater risk of cardiovascular disease, diabetes, and bowel cancer. Meat also contains high levels of saturated fat that increases cholesterol levels in the blood, which can lead to heart disease. Some studies however, suggest that this is only the case with processed meat, not unprocessed red meat.

Environmental Effects of Meat Consumption

It is extremely difficult to separate out the different impacts of different farming models and types. Many measurements look at agricultural impact without making a distinction between arable vs livestock, or industrial vs small farms.

The main environmental issues across the board however include:

- *Water use:* On some estimates, farming accounts for about 70% of water used in the world today, but a 2013 study found that it uses up to 92% of our freshwater, with nearly one-third of that related to animal products.
- *Water pollution:* Eutrophication is caused by excesses of nutrients and organic matter (animal faeces, leftover feed and crop residues) – which cause algae and plants to grow excessively and use up all the oxygen in the body of waste at the expense of other species. Pesticide pollution can kill weeds and insects away from the agricultural area, with impacts that may be felt all the way up the food chain.
- *Land use and deforestation:* According to the FAO, livestock is the world's largest user of land resources they say "with grazing land and cropland dedicated to the production of feed representing almost 80% of all agricultural land. Feed crops are grown in one-third of total cropland, while the total land area occupied by pasture is equivalent to 26% of the ice-free terrestrial surface".
- *Climate change:* (specifics indicated in 'Key Statistics' section)

Climate Change Impacts on Food Availability

Livestock systems are impacted by climate change mainly through increasing temperatures and precipitation variation, as well as atmospheric carbon dioxide (CO_2) concentration and a combination of these factors. Impacts in livestock systems include:
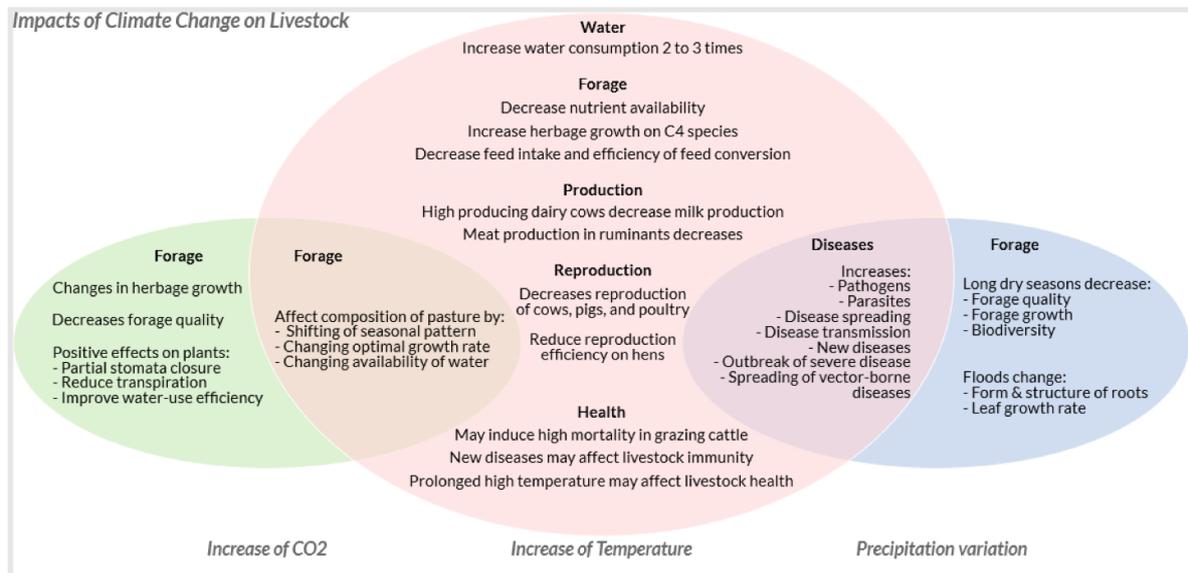
- changes in pasture productivity
- lower animal growth rates and productivity
- damaged reproductive functions
- increased pests and diseases
- loss of biodiversity

Temperature affects most of the critical factors of livestock production, such as water availability, animal production and reproduction, and animal health (mostly through heat stress.) In Kenya, some 1.8 million extra cattle could be lost by 2030 because of increased drought frequency, the value of the lost animals and production foregone amounting to USD 630 million.

Livestock diseases are mostly affected by increases in temperature and precipitation. Impacts will differ for different livestock systems and for different regions. Vulnerability of pastoral systems to climate change is very high, and mixed systems and industrial or landless livestock systems could encounter several risk factors mainly due to variability of grain availability and cost, and low adaptability of animal genotypes.

Pastoral system vulnerability is also exacerbated by non-climate factors (land tenure issues, sedentarisation programs, changes in traditional institutions, invasive species, lack of markets, and conflicts.)

However despite this, global trade of crop and animal-sourced food has increased by around 5 times between 1961 and 2013 (FAOSTAT 2018). During this period, global food availability has increased from 2200 kcal/cap/day to 2884 kcal/cap/day, making a transition from a food deficit to a food surplus situation.

Impacts of Climate Change on Livestock

Water
Increase water consumption 2 to 3 times

Forage
Decrease nutrient availability
Increase herbage growth on C4 species
Decrease feed intake and efficiency of feed conversion

Production
High producing dairy cows decrease milk production
Meat production in ruminants decreases

Diseases

Forage

Reproduction
Decreases reproduction of cows, pigs, and poultry
Reduce reproduction efficiency on hens

Forage
Changes in herbage growth
Decreases forage quality
Positive effects on plants:
- Partial stomata closure
- Reduce transpiration
- Improve water-use efficiency

Forage
Affect composition of pasture by:
- Shifting of seasonal pattern
- Changing optimal growth rate
- Changing availability of water

Diseases
Increases:
- Pathogens
- Parasites
- Disease spreading
- Disease transmission
- New diseases
- Outbreak of severe disease
- Spreading of vector-borne diseases

Forage
Long dry seasons decrease:
- Forage quality
- Forage growth
- Biodiversity

Floods change:
- Form & structure of roots
- Leaf growth rate

Health
May induce high mortality in grazing cattle
New diseases may affect livestock immunity
Prolonged high temperature may affect livestock health

Increase of CO2   *Increase of Temperature*   *Precipitation variation*

Key statistics:

- The current food system (production, transport, processing, packaging, storage, retail, consumption, loss and waste) feeds the great majority of world population and supports the livelihoods of ca. 200 million people.
- Estimated 821 million people are currently undernourished, 151 million children under 5 are stunted, 613 million women and girls aged 15 to 49 suffer from iron deficiency, and 2 billion adults are overweight or obese.
- Agriculture as an economic activity generates between 1% and 60% of national GDP in many countries, with a world average of about 4% in 2017.
- Given the current food system, the FAO estimates that there is a need to produce about 50% more food by 2050 in order to feed the increasing world population.
- Pastoralism is practiced in more than 75% of countries by between 200 and 500 million people, including nomadic communities, transhumant herders, and agro-pastoralists.
- 25-30% of total GHG (greenhouse gas) emissions are attributable to the food system. These are from agriculture and land use, storage, transport, packaging, processing, retail, and consumption. This estimate includes emissions of 10–12% from crop and livestock activities within the farm gate.
- Combined food loss and waste amount to a third of global food production. During 2010-2016, global food loss and waste equalled 8–10% of total GHG emissions from food systems and cost about USD 1 trillion per year.
- One third of the world's grain is fed to animals.
- On average, 83% of the 697 kg of food consumed per person per year, 93% of the 2884 kcal per day, and 80% of the 81 g of protein eaten per day coming from terrestrial production in 2013.
- Most livestock species have comfort zones between 10 °C-30 °C, and at temperatures above this, animals reduce their feed intake 3–5% per additional degree of temperature.

Possible Solutions:

- Diversification in the food system (e.g., implementation of integrated production systems, broad-based genetic resources, and heterogeneous diets) is a key strategy to reduce risks (medium confidence).

- Reduction of food loss and waste could lower GHG emissions and improve food security. Technical options for reduction include:
    - improved harvesting techniques
    - on-farm storage
    - Infrastructure
    - packaging
- Supply-side options include increased soil organic matter and erosion control, improved cropland, livestock, and grazing land management, and genetic improvements for tolerance to heat and drought.
- A recent study showed that managed grazing (a technique which involves moving cows around to graze) is an effective way to sequester carbon.
- Demand-side adaptation, such as adoption of healthy and sustainable diets, in conjunction with reduction in food loss and waste, can contribute to adaptation through reduction in additional land area needed for food production and associated food system vulnerabilities.
- Indigenous and local knowledge can contribute to enhancing food system resilience.

Recent International Precedent:

To reach the temperature goal put forward in the Paris Agreement of pursuing efforts to limit warming to 1.5°C by 2050, representatives from 196 countries signed the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement in December 2015. Under the Paris Agreement, the parties are expected to put forward their best efforts through nationally determined contributions and to strengthen these efforts in the years ahead. Article 2 of the Agreement makes clear the agreement is within "the context of sustainable development" and states actions should be "in a manner that does not threaten food production" to ensure food security.

Many countries have included food systems in their mitigation and adaptation plans as found in their NDCs for the Paris Agreement. Richards et al. analysed 160 Party submissions (2015) and found that 103 include agricultural mitigation; of the 113 Parties that include adaptation in their NDCs, almost all (102) include agriculture among their adaptation priorities.

However: According to Rojas-Downing (2017), an increase of 2°C by 2050 is estimated to negatively impact pasture and livestock production in arid and semiarid regions, but will positively impact humid temperate regions. Boone (2017) estimated that the mean global annual net primary production (NPP) in rangelands may decline by 10 g C m-2 yr-1 in 2050, but herbaceous NPP is likely to increase slightly (i.e., average of 3 g C m-2 yr-1)

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