

# AN INQUIRY INTO HOW GLOBALIZED ANIMAL AGRICULTURE IMPERILS ENVIRONMENTAL SECURITY (AND THEREFORE- HUMAN SECURITY)

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## Abstract

Animal agriculture or livestock farming (involving meat, dairy, and associated industries), at a macro-level, is leading to dire unintended consequences in the 21<sup>st</sup> century- being among the major causes of pollution, global warming, soil degradation, depletion of natural 'resources' like clean water, deforestation, and so on, resulting in climate change, as recent studies especially since the groundbreaking one titled *Livestock's Long Shadow* by the FAO, have revealed. The massive spike in human population and consequent rise in demands have turned the industry exceedingly unsustainable, on a global scale, having arguably surpassed the ecological carrying capacity and economic optimality, making the marginal costs overwhelmingly bigger than the marginal benefits. What was initially meant to address food security, is leading to poverty and massive food insecurity, ultimately making agriculture excessively difficult and uneconomical. Such underlying insecurities often lead to environment-related conflicts- adopting political-, ethnic-, and communal-overtones, as had happened in Rwanda, Darfur, Somalia, Ethiopia, inter alia, having resulted from unsustainable human choices and actions. Climate change-induced migration, refugee crises, and related social turmoil are indicators of *The Coming Anarchy*.

This paper aims to analyze the major adverse impacts of the industry of animal agriculture, especially on that dimension of human security, called-environmental security (or vice-versa). It would start by establishing the empirical case for the globalised industry of animal agriculture as being a major cause behind climate change and other forms of environmental insecurities, taking inspiration from case studies of mainly developing areas around the world. It highlights the massive emissions (in terms of greenhouse gas potential) emanating from animals used for agriculture, directly, as well as indirectly and associated impacts from the various auxiliary practices that contribute to environmental and human insecurity.

It will conclude by highlighting some of the possible solutions to the unsustainability- associated crises. Virtues of the evolution of economics towards steady state economics or ecological economics, as advocated by economic thinkers such as Herman Daly, John Stuart Mill, inter alios, with global cooperation, will be extolled. The author, in this paper, conservatively sides with the former camp in the Malthusians-Cornucopians (and Technocentrics) debate, by advancing arguments supporting conservation and self-restraint, although realizes the revolutionary potential in technologies and in transhumanism.

## Keywords

Animal agriculture, Human security, Human development, Environmental Security, Climate change, Anthropocentrism, Development economics, Ecological economics, Transhumanism

## Introduction - Human Security and Human Development

The ideas of human security and human development are relatively new developments in the history of global affairs. Whereas security is the subject of interest among political scientists and security experts, human development elicits the interest of economists, development scientists, and so on. Both the ideas owe their origins to the UNDP's *Human Development Report* published for the first time in 1994 (Acharya, 2014, p. 492).

Both the schools of thought advance a broad-based, deepened, human-centered, multidimensional, progressive, preventive (rather than mitigative), cosmopolitan, etc., views of security and of development. The report identifies seven categories of human security as being- Economic security, Food security, Health security, Environmental security, Personal security, Community security, and Political security (UNDP, 1994).

Mahbub ul Haq, one of the major drafters of the report, considers human security as a very comprehensive term, defining it as – “Human security is not a concern with weapons. It is a concern with human dignity. In the last analysis, it is a child who did not die, a disease that did not spread, an ethnic tension that did not explode, a dissident who was not silenced, a human spirit that was not crushed” (Acharya, 2014, p. 493). Therefore, environmental security is one of the key factors determining the success of human security.

### Environmental Security

In the post-War era, the discourses surrounding security revolved around national and international security, with security being defined mainly in military terms. However, ever since, the agenda of security has undergone substantial ‘broadening’ and ‘deepening’, with the nature of threats to security getting diversified apart from strictly military ones and the referent objects becoming more varied than the formal nation-state. Such was the evolution of the subject from the so called traditional security studies to the variegated strands within the meta-discourse called critical security studies, manifested, for instance, through the Copenhagen, the Welsh, and the Paris sub-schools, not to mention the still further advancements into post-structural discourses.

The end of the Cold War has ushered a new wave of thinking and scholarship that identifies the environmental matters, especially within the so called critical discourses, as among the prime concerns while rethinking security, particularly the global repercussions of environmental damage, blaming unchained modernity for many of the contemporary challenges, and situating national and individual security within the environmental calculus (Dalby, 2002).

The report titled *Our Common Future* (1987) by World Commission on Environment and Development (often referred to as the Brundtland Commission), the United Nations ‘Earth Summit’ on Environment and Development in Rio de Janeiro (1992), Al Gore’s political-environmental campaigns of the 1990s, Robert Kaplan’s essay in the *Atlantic Monthly* titled *The Coming Anarchy*, Thomas Homer-Dixon’s works linking environmental scarcity and violence, are few among some of the most notable milestones in the development of the discourses around environmental security towards the end of the 20<sup>th</sup> Century (Dalby, 2008).

Two among the major debates in the critical tradition of security literature are- one on the environment-security nexus that thinkers like Robert Kaplan, Michael Clare, and Thomas Homer-Dixon deal with with different sets of assumptions and conclusions, and another on the ‘securitization’ of the environment on the lines of the Copenhagen School, something that experts and policy-makers often tend to do by elevating security from normal politics by claiming a situation an existential threat worthy of immediate action (rather than adopting patient and normal political deliberation), something that thinkers like Daniel Deudney have critiqued as being deficient and counterproductive an approach (Peoples & Vaughan-Williams, 2010).

Since the 1990s, the scope of environmental security has been broadened to include food security, energy security, water security, security over various other natural resources, pollution, climate security (including global warming), and many such sub-categorizations (Scott & Thapa, 2017). The 'referent object' also saw a shift from higher placed units of analyses like the nation-state or the international system to those at the lower levels like community and the individual. The level of analysis, conversely, saw an ascendance, from state-centric ones to higher ones like the environment and the biosphere as a whole. However, such an evolution of the discipline is filled with dialectical push and pull tendencies that make it anything but linear, consistent, and easygoing. The discipline of security studies, as a result of such a historical and discursive evolution, stands confused, incoherent, and somewhat lost, in the cacophony of perspectives, however, ever holistic, versatile, multidimensional, and richer in enquiry, understanding, evaluation, prediction, and prescription.

## **Animal Agriculture**

Animal agriculture or livestock farming are broad terms that involve the processes of procreating animals like that of dairy cows, pigs, beef cattle, poultry, and sheep- for producing animal products, for recreational purposes, and so on. It is often augmented by imbibing developments in science and technology like genetic manipulations; artificial hormonal regulation; industrial production, transportation, storage, and processing systems; advertising campaigns and marketing strategies; scientific feed production; prevention and mitigation of diseases; often coordinated at a regional or even global level, and so on, for the maximization of production and of profit (Maclachlan, 2016).

The sector, in the era of globalization, has adopted massive dimensions, including the intensification of animal farming, the expansion of monocultures of feed crops, along with the supporting infrastructure and practices, is today resulting in massive loss of biodiversity, public-health challenges, environmental pollution, weakening animal welfare, amplified greenhouse gas (GHG) emissions, destruction, degradation of natural 'resources' (like that of fertile land, freshwater, clean air, etc.), and so on (Brighter Green, 2019; Ranjan, 2019).

## **Animal Agriculture and Environmental Insecurity – Connections and Impacts on Human Security**

The human (or any animal's) body is an extremely inefficient, resource-consuming, and a high waste-generating machine, even less efficient at putting consumable energy and matter into productive use than most of the semi-efficient combustion engines (CSS, 2017). The brain, being the hungriest organ of the human organ-system, alone consumes about twenty percent of the energy generated (Swaminathan, 2008). Therefore, the methods of production of foods and the way those are utilized to fuel the species are something that can no longer be overlooked as merely individual choices by climate change scientists and advocates of sustainable development. Hence, it is high time that we take with a pinch of salt the questions regarding- what we eat, how it is produced, to what extent those decisions affect the environment (and the ecology, including us!), how efficiently does our body function (and if possible, how can it be enhanced, plus wastage reduced), and so on.

The Food and Agriculture Organization's revolutionary groundbreaking report titled *Livestock Long Shadow* is an extremely comprehensive document that factually analyses the impact of animal agriculture on the various dimensions of environmental and human security. It establishes livestock as a "major player in global environmental issues", analyzing the factors shaping the livestock sector; establishing the trends within the livestock sector; analyzing the trends in livestock-related land use; studying the "hotspots of land degradation"; inquiring on the role of livestock sector in climate change and air pollution (including its role in the carbon and nitrogen cycles); studying its role in water depletion and pollution (and the changes made to the hydrological cycle); evaluating its impact on biodiversity; before concluding by scrutinizing the multidimensional policy challenges and the possible options for addressing the environmental challenges (FAO, 2006).

*Cowspiracy- The Sustainability Secret* is a critically acclaimed documentary that also analyses the multifarious environmental (and subsequently human) impact the globalised industry of animal agriculture inflicts, also arguing about a possible nexus among environmental organization, governmental, non- and inter-governmental specialized agencies and (vested) interest groups, that possibly leads to the filtering of uncomfortable

facts, claiming it as “the film that environmental organizations don't want you to see!”(A.U.M, 2014).

Some of the noteworthy facts, the company behind the documentary, compiles from a vast pool of literary and research resources, of special interest to this paper, include-

- Animal agriculture is accountable for 18 percent of all greenhouse gas emissions, more than the collective exhaust from the transportation sector, which is responsible for 13% of all emission of greenhouse gases.
- Livestock and their byproducts generate a minimum of 32,000 million tons of carbon dioxide (CO<sub>2</sub>) annually, which accounts for 51% of all greenhouse gas emissions caused worldwide.
- Cows release 150 billion gallons of methane daily. On a 20 year timescale, methane is 25-100 times more destructive than carbon dioxide, having a global warming potential that, on a 20-year timescale, is 86 times that of CO<sub>2</sub>.
- In the context of nitrous oxide, animal agriculture is accountable for 65% of all anthropogenic emissions. It is a greenhouse gas having a global warming potential that is 296 times that of carbon dioxide, and that remains in the atmosphere for 150 years.
- Greenhouse gas emissions caused by activities in the agricultural sector are projected to increase by 80% by 2050.
- Humans will exceed their 565 gigatonnes CO<sub>2</sub> limit by 2030, all from raising animals, even without the use of fossil fuels.
- 56% of the water in the US is used for growing feed crops for consumption by livestock.
- Currently, 20%-33% of all freshwater consumed in the world is caused by Animal Agriculture.
- Livestock or feed produced for it occupies 1/3 of the ice-free land on Earth.
- Livestock farming is the major cause behind the extinction of species, water pollution, ocean dead zones, and habitat destruction.
- With livestock sector being the leading cause, 1/3 of the planet is desertified.
- A farm with 2,500 dairy cows generates a similar quantity of waste as a city of 411,000 humans.
- 3/4 of the fisheries worldwide are depleted or exploited.
- Fishless oceans could become a possibility by 2048.
- Annually, much as 40% or about 63 billion pounds of fish trapped worldwide are discarded.
- As much as 5 pounds of needless marine species are trapped and discarded as by-kill for each 1 pound of fish caught.
- Animal agriculture has caused up to 91% of the destruction.
- Ten thousand years ago, wild animals constituted 99% of biomass (i.e. zoomass). Today, however, humans and the animals raised by humans as food make upto 98% of the zoomass.
- On a daily basis, a person who consumes a plant-based diet saves 45 pounds of grain, 1,100 gallons of water, 20 lbs CO<sub>2</sub> equivalent, 30 sq ft of forested land, and the life of one animal.

(A.U.M., 2014)

Livestock industry is already reported to constitute 30 percent of the agricultural GDP in the developing world, and almost 40 percent of the world's agricultural GDP, having become one of the fastest-growing subsectors in agriculture (The World Bank, 2009). Fostered by growth of population, urbanization, and increased income, the demand for animal-sourced food products in developing countries is rapidly increasing, for instance, the demand for poultry meat, over the last five decades, has shown constant increment at around three times the rate of population growth (Michel, 2012; The World Bank, 2009).

The FAO report, *Livestock's Long Shadow* (2006), establishes that the livestock sector is responsible for 18 percent (as compared to the transportation sector that is responsible for 14 percent) of greenhouse gas emissions measured in carbon dioxide equivalent; and accounts for 9 percent of anthropogenic carbon dioxide emissions (FAO, 2006; US EPA, 2017). Findings from studies like this one are quite deviant from conventional wisdom among the majority of national and international environmental organizations, that is, that the electricity, transportation, and industrial sectors are the largest contributors to emissions of greenhouse gases.

Feed production (that includes expansion of pasture and feed crops into forests accounting for 9 percent of the sector's emissions) and processing, and the enteric fermentation<sup>1</sup> from ruminants are reportedly the two major sources of emissions, constituting 45 and 39 percent of emissions in the sector, respectively, followed by manure storage and processing, representing 10 percent (FAO, 2013). The remaining proportion can be attributed to the processing and transportation of animal products and the burning up of fossil fuel along the sector supply chains that account for about 20 percent of emissions from the sector (FAO, 2013).

About 44 percent of the sector's emissions are in the form of methane, with the remaining part being almost equally shared between nitrous oxide (29 percent) and carbon dioxide (27 percent) (FAO, 2013). Methane emitted from the breakdown of fertilizers and from animal manure, has a Global Warming Potential<sup>2</sup> of 28-36 over 100 years and lasts about a decade on average, which is much less time than that of carbon dioxide, but absorbs much more energy than it does, and has some indirect effects, for instance, the fact that methane is a precursor to ozone, and ozone is itself a greenhouse gas (US EPA, 2017).

Moreover, the sector emits 65 percent of anthropogenic nitrous oxide, the great majority from manure and close to two-thirds (64 percent) of anthropogenic ammonia emissions that contribute considerably to acid rain and acidification of ecosystems (US EPA, 2017). Nitrous oxide is up to 310 times more powerful than carbon dioxide is in absorbing heat (UNFCCC, 2019).

The livestock sector also contributes about 68 percent of the agriculture share of ammonia, mainly from deposited and applied manure resulting in air and environmental pollution (mainly eutrophication and odor too) (FAO, 2006).

Respiration by livestock contributes to a minor portion of the net emission of carbon, as, a major portion gets released through other indirect means- like the burning of fossil fuels for producing mineral fertilizers to be used in the production of feed, the use of such fuels for the production, transportation, refrigeration and so on of animal products (FAO, 2006).

There are various studies that confirm that the unsustainable practices in the agricultural sector (primarily livestock) are responsible for eutrophication, that in turn is responsible for immense changes in ocean biomes, capable of inducing long term impacts on climate (WRI, 2019).

The livestock sector accounts for 50 percent to 85 percent of total human-made ammonia volatilization<sup>3</sup> in the United States that makes the soil nitrogen-deficient, hence infertile and also pollutes run-off and groundwater (FAO, 2006; Buchholz & Killpack).

Forests spanning half the size of England are lost each year, and possibly all of the world's rain forests may completely vanish in a hundred years at the current rate of deforestation (National Geographic, 2019). About one-third of all global agricultural land is either highly or moderately degraded, with the arid regions like Sahel, South and South East Asia, the Mediterranean region, etc. being the most vulnerable (Lane, 2014).

There are various studies that claim that agriculture is the leading cause of deforestation, giving examples from Cerrado, Chaco, Atlantic Forests, Amazon rainforests, and so on. A World Bank report concluded that the major cause of deforestation in Amazon Rainforest is cattle ranching, after observing a "lack of knowledge" and 'consensus' in the governmental and social domain regarding the causes of the same, and concluded that private benefits from the sector are less than social costs (Margulis, 2004).

The contribution of forests in mitigating climate change and pollution is well known. Forests are an important pillar in environmental security. As the major sources of oxygen and of food (as the primary producers), the loss of vegetation has a serious ramification to environmental security. Deforestation is directly and indirectly linked to climate change, having a spiral effect of leading to more deforestation resulting in a reduction in the supply of oxygen and absorption or of GHGs; depriving forests of portions of canopy, which block the Sun's rays during the day,

<sup>1</sup> It is the process by which livestock produce methane through digestion (Cousineau, 2016).

<sup>2</sup>The relative measurement of the amount of heat a greenhouse gas traps in the atmosphere, in comparison to CO<sub>2</sub> (all measured in 100 years timeframe).

<sup>3</sup>, the escape of nitrogen from the soil or floodwater as ammonia gas; causes loss of urea and the ammonium form of nitrogen fertilizer from floodwater or saturated soil surfaces (Buchholz & Killpack, 2018).

and hold in heat at night thus leading to more extreme temperature swings that can be harmful to plants and animals (even leading to mass extinction of species); desertification; disruptions in the water cycle etc. ( National Geographic Society, 2016).

Environmental insecurity also creates conditions in which personal-, community-, political-, and economic-security become difficult to achieve, creating fertile grounds for inter-human conflicts and even wars.

Various case studies done on the wars or conflicts in African states like Burkina Faso, Côte d'Ivoire, Ghana, have pointed to the fact that there were very limited common pool of resources (especially cultivable land), to which groups of people laid claim to, with their social identities based on occupation (generally as farmers or herders), on which ethnic identities were constructed (Cabot, 2017). There, resource-insecurity, exacerbated by environmental insecurity led to various flare-ups. For instance, the names of the two protagonist groups in the Rwandan genocide, the 'Hutu' and 'Tutsi' respectively mean "people who farm" and "people who own cattle" to whom demographic and ecological changes were unwelcome guests, that contributed in major ways, among other causes, to cause the massacre (Cabot, 2017).

Darfur is considered a classic case of climate change conflicts where the transformation of the ecological zones and the ongoing decline in rangeland quality, historical loss of precipitation (30% over last 80 years- which is forecasted to go up to 70% in the most vulnerable areas of Africa, like the Sahel region), desertification, compounded by human and livestock growth (400% growth in Northern and Central Sudan alone since the 1960s), were underlying causes of violence (Cabot, 2017; AMIS-UNEP, 2007).

Environmental insecurity and resource constraints make the inhabitants (especially pastoralists) of such African countries often stray into neighboring states and become the victims of national security calculations of other states, where they get counted as infiltrators, or in the better case, environmental migrants and refugees, although the latter too have hardly any legal protection under international law (UN News Centre, 2014).

Homer-Dixon says, ethnic clashes and civil strife are generally the most probable ones to occur although he opines that environmental problems are 'neither a necessary nor a sufficient cause' but are most likely to be indirect causes of ethnic clashes and civil strife within states, as exemplified by conflicts in South Africa, Mexico, Pakistan, India, and China (Vaughan-Williams & Peoples, 2010) .

Predominantly in weak and fragile states with poorly performing institutions and systems of government, climate change is also likely to overwhelm local capacities to adapt to changing environmental conditions and will thus reinforce the trend towards general instability, increased vulnerability to poverty and social deprivation, water depletion, air pollution, and, possibly, rising sea levels in critical, overcrowded regions (e.g. like the Nile Delta and Bangladesh as Kaplan cites)—developments that will prompt mass migrations and, in turn, incite group conflicts and thus putting human security at serious risk (Kaplan, 1994; WBGU 2007).

Robert Kaplan had argued that global population growth would worsen the impacts of diseases, conflict, and instability because of environmental degeneration, the effects of which, he claimed, were already visible in parts of West Africa, which is the 'the national-security issue of early twenty-first century', which is what is seen in the case studies (Vaughan-Williams & Peoples, 2010).

Animal agriculture adds to the multidimensionality of conflicts and in many cases emerges to be the major cause of environmental damage, resulting in deprivational and conflictual situations for humans. Moreover, climate change could intensify prevailing crises such as drought, water scarcity, and soil degradation, aggravate land-use conflicts, and prompt further environmentally induced migration (WBGU, 2007).

Daniel Deudney says, "We need to bring nature back in...We have to stop separating politics from the physical world—the climate, public health, and the environment", critically commenting on the 'social-social' theory<sup>4</sup> which Homer-Dixon is critical of, which would result in massive vengeance by nature resulting in implausible security implications as Kaplan warns (Kaplan, 1994).

<sup>4</sup> With its roots in the Industrial Revolution, it assumes there are only social causes for social and political changes, rather than natural causes, too (Kaplan, 1994).

Climate change not only is caused greatly by animal agriculture but also leads to climatic and weather conditions marked by droughts, uneven rainfall leading to land damage, desertification, and other forms of pollution, hence making it difficult for the agriculture to continue at its pace or increase production, leading to spirals where sustainability becomes increasingly difficult. It can activate domestic and international distributional conflicts and aggravate problems already difficult to cope, such as state failure, destruction of social order, and escalating violence (WBGU, 2007).

The land use patterns, modes of agricultural production, as proven earlier, are indispensable dimensions of environmental concerns, which are not only related to issues concerning human security, but also are increasingly deterministic of national security, both being complementary to each other if secured through sustainable means. Hence, there is compelling need to establish and appreciate the facts related to animal agriculture by states and citizens and analyze its role in causing environmental insecurity, to efficiently explore the path for mitigation and if possible, a reversal of ongoing damage.

## Conclusion

The United Nations Climate Change Conference CoP 21 Agreement in Paris (2015) was a major move by the international community to collectively respond to the threats emanating from climate change, aiming to limit the rise in global temperatures well under two degree Celsius (and if possible by even half a Celsius lesser) above pre-industrial levels, in this century (UNFCCC, 2015). It had mandated every party to plan, communicate, and to uphold successive Intended Nationally Determined Contributions (INDCs) that it intends to realize by undertaking domestic mitigation measures to achieve them, making it a states-friendly bottom-up approach to increase responsible cooperation (UNFCCC, 2019). However, Christiana Figueres, the then Executive Secretary of UNFCCC, when the Paris deal was struck, had told *The New Yorker*, "If anyone comes to Paris and has a eureka moment—'Oh, my God, the I.N.D.C.s do not take us to two degrees!'—I will chop the head off whoever publishes that. Because I've been saying this for a year and a half", expressing deep skepticism in the processes and possible outcomes of the deal, citing a range of challenges that nations are yet to respond to or in fact, in many cases are avoiding (Kolbert, 2015).

It is a well-known fact that most of the climate change mitigation agreements, like the one in Paris, are destined to fail in achieving most of the targets, being mediocre alternatives to ideal as well as practical solutions. It is because, among other reasons, that they have based their calculations and strategies on conventional sources of pollutants like an automobile, manufacturing, and energy-producing industries, and have not devoted much necessary time and political will on exploring the possibilities of analyzing the implications of and sites of interventions in the farming sector. Many experts, like in the documentary – *Cowspiracy-The Sustainability Secret*, have gone to the extent of holding the unholy commercial nexuses among commercial animal-based products manufacturers, nongovernmental environmental organizations, and even various governments, to obscure the facts associated with the environment-related fallouts caused by animal agriculture, and to generate public opinion towards

The special report by the Intergovernmental Panel for Climate Change titled *Global Warming of 1.5 °C* released in 2018 calls for even further special measures to contain climate change, the ramifications of which would be very difficult to bare (IPCC, 2018). It calls with 'high confidence' for coordinated shifting of individual dietary choices towards "foods with lower emissions and requirements for land, along with reduced food loss and waste, could reduce emissions and increase adaptation options" (IPCC, 2018, p. 316). It notes that livestock are responsible for more greenhouse gas emissions (in the processes of feed production, animal waste, enteric fermentation, land-use change, transport of livestock and processing) than all other sources of food, with cattle (raised for milk and beef) accountable for two-thirds of the statistics (IPCC, 2018, p. 327).

Given the established fact that a person on a plant-based diet generates the corresponding of 50% less carbon dioxide, 1/13<sup>th</sup> the water, 1/18<sup>th</sup> the land, and 1/11<sup>th</sup> the oil, as compared to a meat-eater for her food (approximate figures), it would be worthwhile to call for a maximum possible shift towards plant based-diets (A.U.M., 2014). It would require all the efforts that are generally required to implement any such global change—from generation of awareness at the local levels for impacting behavioral changes, to sensitization and coordination of political leadership, to

setting up of effective international and non-governmental organizations, to strengthening, implementing, regulating, and adjudicating laws, norms, and so on.

Technologies can play a major role in making food more environmentally sustainable. Mock meats, mock eggs, plant-derived 'milks' etc. which are prepared synthetically in the laboratories or from plant-sources, but taste equivalent to or similar to their animal-derived counterparts, could be promoted. Moreover, science and technologies can play a vital role in identifying more sustainable foods and production practices. Furthermore, in the longer run, transhumanist technologies, which enhance the human conditions by making technological enhancements to the human body and brain, could be adopted to make the biological system more efficient in processing matter and energy (Ranjan, 2019). One could possibly imagine a situation when technology could be leveraged to convert and harness solar and other forms of renewable sources of energy directly for human consumption, rather than the natural route of first converting such renewable sources to chemical energy in the form of biomass and zoomass, then undertake mechanical and chemical conversion through consumption in the food webs.

It would also be appropriate to call for more comprehensive changes in other sectors of the economy. For instance, the growth-based conventional models in economics should give way to more sustainable alternatives of like Steady State Economics (or Ecological Economics) like the way theoretically conceptualized by John Stuart Mill, Nicholas Georgescu-Roegen, and most significantly- Herman Daly (CASSE, 2018).

The move towards human security and human development has ushered a new era of understanding processes and phenomena related to the social world. It calls for a human-centric perspective to review matters of security and development. The realization of human security is largely contingent on its relations to the environment and ecology. These are the macro-level factors that do not respect national borders, economic and ethnocentric distinctions, and so on. Therefore, considerations of environmental or ecological security must be at the centre of human security discourses.

Although, conventional thinkers associated with human security tend to undertake an anthropocentric view considering environmental security just as one of the components of human security, they miss out the holistic picture in which human security, insofar as the natural environment still predominates the artificial environment, is in fact, contingent on environmental security. Where the structure and the system still preponderate the agent, any approach to make some relevant changes should be structural and systemic in focus, rather than agent-centered.

The Anthropocene, although is human-driven, through the meta-ideology of anthropocentrism, to make human life more secure and sublime, has not really delivered substantially encouraging outcomes to the majority of humans, notwithstanding creating hapless insecurity for other earthlings (Ranjan, 2019). Even if one does not adopt a complete ecocentric or biocentric approach, significant decentering of analysis from the privileged individuated human subject is necessary to address problems of a complex and holistic nature. It therefore would make sense to capitalize the momentum of disciplinary evolution, generated by the move towards various schools of critical security studies (most of which accept all or some categories of humans as the referent objects) to further seek to broaden, deepen, and render more relevant- the discourses around security, by including other sentient beings and the broader ecology into security calculations. Therefore, to achieve appropriate levels of human security and development, which is intricately reliant on environmental security, it is necessary to take steps to contain developments (especially anthropogenic) that afflict environmental security.

A very ambitious and detailed empirical study, *inter alia*, by researchers at Oxford and from Switzerland, points out that the various processes associated with the various stages of production, processing, transportation, storage, packaging, consumption, and so on of food, have a remarkable impact on environmental security, thus calling for macro-level changes in agricultural policies, practices, and norms to micro-level alterations in individual dietary choices and attitudes (Poore & Nemecek, 2018). Among many conclusions the study draws, one of the major ones (and of interest to this study) is that - "meat, aquaculture, eggs and dairy use about 83 percent of the world's farmland and contribute 56 to 58 percent of food-related emissions, though they provide only 18 percent of calories", and, that - "shifting from current diets to a diet without animal products would cut greenhouse gas emissions by nearly half (or 61 percent in the US whose average citizen consumes more animal-based



products), or about 6.6 billion metric tons” (Gustin, 2018).

As contended in this paper, the globalised industry of animal agriculture badly affects environmental security, which has dire ramifications on the security of humans around the world. Coupled with the consequences the industry has on other dimensions of human security viz. food security, resource security, economic security, community security, personal security, and so on, globalized animal agriculture needs a holistic and micro- as well as macro-level overhauling (Ranjan, 2019). It requires making infinitesimal adjustments like making day-to-day dietary choices (by picking up plant-based options over animal-based ones), to making changes in the economic and political policies and discourses of governments, to the renovation of global priorities and norms in tune with more sustainable, egalitarian, equitable, and ethical principles, all of which most probably logically point towards making revolutionary modifications to the industry of animal agriculture.

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