Effect of Human Diet on Biodiversity and Environment

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Abstract:

This paper deals with the ecological problem of biodiversity loss. The anatomical evidences of flesh eating and herbivorous animals is represented their digestive system is described and human health is discussed along with the effect to biodiversity loss.

Keywords:

Human diet, biodiversity loss , conservation of life, ecological problem . food consumption, environmental pressures, dietary pattern,

I INTRODUCTION

Biodiversity loss is increasing around the world. The global rate of species extinction today is of all time higher range. The global food system is the primary driver of this trend. Over the past 50 years, the conversion of natural ecosystems for crop production or pasture has been the principal cause of habitat loss, in turn reducing biodiversity. [1,2] Our food system has been shaped over past decades by the 'cheaper food' paradigm. Policies and economic structures have aimed to produce ever more food at ever lower cost. Intensified agricultural production degrades soils and ecosystems, driving down the productive capacity of land and necessitating even more intensive food production to keep pace with demand. Growing global consumption of cheaper calories and resource-intensive foods aggravates these pressures. Current food production depends heavily on the use of inputs such as fertilizer, pesticides, energy, land and water, and on unsustainable practices such as mono cropping and heavy tilling. This has reduced the variety of landscapes and habitats, threatening or destroying the breeding, feeding and/or nesting of birds, mammals, insects and microbial organisms, and crowding out many native plant species. — As a major contributor to global greenhouse gas emissions, our food system is also driving climate change, which further degrades habitats and causes species to disperse to new locations. In turn, this brings new species into contact and competition with each other, and creates new opportunities for the emergence of infectious disease. Without reform of our food system, biodiversity loss will continue to accelerate. Further destruction of ecosystems and habitats will threaten our ability to sustain human populations. Reform will rely on these ways-[3,4]

Firstly, global dietary patterns need to converge around diets based more on plants, owing to the disproportionate impact of animal farming on biodiversity, land use and the environment. Such a shift would also benefit the dietary health of populations around the world, and help reduce the risk of pandemics. Global food waste must be reduced significantly. Together, these measures would reduce pressure on resources including land, through reducing demand.[5,6]

Secondly, more land needs to be protected and set aside for nature. The protection of land from conversion or exploitation is the most effective way of preserving biodiversity, so we need to avoid converting land for Food system impacts on biodiversity loss Three levers for food system transformation in support of nature 3 Chatham House agriculture. Restoring native ecosystems on spared agricultural land offers the opportunity to increase biodiversity. [7,8]

Thirdly, we need to farm in a more nature-friendly, biodiversity-supporting way, limiting the use of inputs and replacing monoculture with polyculture farming practices. — These three levers are in part interdependent. Most notably, the protection and setting aside of land for nature and the shift to nature-friendly farming both depend on dietary change, and will become increasingly difficult to achieve if continued growth in food demand exerts ever-growing pressure on land resources.[9,10]

Dietary change and a reduction in food waste are critical to breaking the system lock-ins that have driven the intensification of agriculture and the continued conversion of native ecosystems to crop production and pasture.[11]

Humanity relies on the earth's natural systems to regulate the environment and maintain a habitable planet. Biodiversity in any given region creates ecosystems of interacting individual organisms, across many species, that collectively contribute to and support key planetary processes. For example, terrestrial and marine ecosystems remove more than half (60 per cent) of carbon emissions from the atmosphere every year, and thus play a crucial role in regulating the earth's surface temperature. Ecosystems help buffer the impacts of adverse weather and provide resilience to climate change. The earth's naturally occurring ecological processes sustain the quality of the air, water and soils that humanity depends on. In addition to providing basic life-enabling conditions, ecosystems are a source of many products vital for survival, including food, fuel, fibre, medicines and shelter. Together, the above processes and goods are known as 'ecosystem services' or 'nature's contributions to people'[12,13].

Trends in biodiversity loss Despite increasing recognition of the crucial role of biodiversity in maintaining human and planetary health, biodiversity is declining faster than at any time in human history, and perhaps as fast as during any mass extinction. Especially over the past 50 years, biodiversity has been severely compromised and altered at an unprecedented rate. The global rate of species extinction is at least tens and possibly hundreds of times higher than the average rate over the past 10 million years. Around a quarter of species in most animal and plant groups are already under threat from extinction, and around 1 million more species face extinction within decades. In total, the extent and condition of natural ecosystems have declined on average by around 50 per cent relative to their earliest estimated states. Since 1970, the population sizes of mammals, birds, fish, amphibians and reptiles have declined by an estimated average of 68 per cent.Despite the increasingly urgent need to reduce biodiversity loss, recent attempts to aty loss applies within agriculture as well as to wildlife: many domesticated plant and animal species that have historically been food sources are becoming less widely consumed. This loss of genetic diversity makes food systems less resilient to threats, including pests, pathogens, extreme weather and climate change, thereby threatening global food security.[14,15]

II FOOD SYSTEM AS A DRIVER OF BIDIVERSITY LOSS

The production of food is the primary cause of biodiversity loss globally. On land, the conversion of land for agriculture and the intensification of agriculture reduce the quality and quantity of habitat available. Food production also has negative impacts on freshwater wildlife (through water extraction and the reduction in water quality resulting from soil and farm chemical run-off). Downstream pollution, especially from fertilizers, also damages marine systems. The wildlife of marine systems is also heavily affected by fishing and in various ways by fish and shellfish farming. Over the past 50 years, the biggest driver of habitat loss has been the conversion of natural ecosystems for crop production or pasture. The area of land occupied by agriculture has increased by around 5.5 times since 1600 and is still increasing. Currently, cropping and animal husbandry occupy about 50 per cent of the world's habitable land.[16]

III WHY IS VEGETARIAN DIET BETTER?

Our body was given to us by mother nature and soon we will return it back to her and in the time we have its our duty to keep it healthy bustling with energy and vitality.We need to eat food that is:-Living, -Wholesome, and Plant based.Food is not just food, it is consciousness.There is evidence that suggests that our body was made to eat vegetarian food.

Table 1 Differences between Carnivore and herbivore.

CARNIVORE	HERBIVORE
Teeth are canine and long	Teeth are flat
Claws with big long nails	Long fingers and flat nails
Night vision to hunt at night	Cannot see at night
Short intestines	Very long intestine (9 times body length)
High flexibility of body	Less flexibility of body

The above comparison in table 1 shows that human body is primarily vegetarian ,not meant to eat meat., These factors (explored in more depth in the following chapters) limit the ability of wildlife to live in a farmed environment. Indirectly, the food system also drives biodiversity loss through its contribution to

climate change.
The global food system is responsible for more greenhouse gas (GHG) emissions than any otheraspect of our lives. Climate change affects biodiversity by changing habitat suitability. This causes sensitive species to die out, or promptsthem to move to new locations as other species move in. As natural ecosystems lose and gain species in response to climate change, the resilience of whole ecosystems is affected.[17]

All in all, our food system is the major factor underpinning reductions inthe population sizes of wild species of animals and plants, and the erosion of biodiversity, from the local level to the global level.

IV FOOD SYSTEM CAUSE OF GLOBAL PANDAMIC:COVID 19

The impacts of animal farming, and of removing and fragmenting natural habitats, are not limited to biodiversity loss – the wider risks tohuman health have been brought into sharp focus by the COVID-19 pandemic. COVID-19 is a 'zoonotic' disease, meaning that it originatedin non-human animals and passed over to humans. It is the latest in a series of emerging infectious diseases (EIDs) to have reached epidemicor pandemic levels over recent decades; the majority of these EIDs have come from wild or farmed animals. Novel zoonoses are a predictable consequence of new and close contact between species caused by conversion of agricultural land into natural ecosystems. Coupled with the disruptive impacts of climate change, these forces destabilize ecosystems and give rise to new mixing between wild animals (including predators and prey, as well as their pests, parasitesand pathogens), farmed animals and humans, allowing pathogens to move between species in new ways. For example, pathogens are increasingly jumping the species barrier into humans from wild animals, 'bush meat' and farmed animals. The impacts of COVID-19 – both those experienced already, and those expected to follow as the pandemic evolves – demonstrate the magnitude, range and severity of the potential fallout from new interrelationships between humans and the food system, and from our intrusion on natural ecosystems. All this demonstrates that the risks to human well-being and natural ecosystems from our current food system are already being realized.[18]

V PRINCIPAL CHANGE NEEDED FOR A MORE BIODIVERSITY SUPPORTING FOODSYSTEM -

Humanity must shift towards more plant-based diets, set aside more land as protected natural habitat, and adopt more sustainable farmingmethods.Our food system today is driving both environmental harm and deteriorations in public health. Its current design is also amplifying external risks to society, as COVID-19 has demonstrated. The pandemichas highlighted the high degree of risk concentrated in certain food supply chains, poor labour standards in food-processing plants that have accelerated the spread of the disease among workers, and the limitations of 'just-in-time' business models that have depleted emergency food stores. Moving to a food system that supports environmental and human health requires fundamentally changing consumption habits and redesigning how food production systems utilize natural resources. Reducing the conflict between humanity's requirement for food and the negative impacts of food production on biodiversity and the environment will not be achieved simply by identifying a single approach to biodiversity-friendly farming. At the same time, building the resilience of the food system to respond to'black swan' events such as COVID-19 cannot be done through 'tweak' at the margins alone. Instead, transformative change, including a realignment of the incentives that drive unsustainable practice is required both to the way we produce food and to what we consume.The successful redesign of the food system in support of biodiversity and improved public health will depend on three key points : changing our diets; setting aside land for biodiversity; and adapting how we farm.[19]

VI DIETARY CHANGE

The first key change for food system redesign is to change diets in such a way as to reduce overall demand for food, and thus reduce demand for the use of land that supports its production. Evidence of the potential for dietary change to deliver fundamental shifts in agricultureand land use has been mounting in recent years. Scientists, civil societyand policymakers are increasingly recognizing dietary change as a central pillar in food system transformation. A number of high-profile reports have begun to outline pathways through which all actors in thefood system – from financers to producers to retailers to consumers – can effect positive behavior changes in favors of healthier diets from sustainable production systems. The importance of dietary change to redesign of the food system stems from three key principles. Firstly, onaverage and at a global level, we produce more food than we need per capita. Globally, as much as a third of the edible parts of food producedfor human consumption are lost or wasted, equal to around 1.3 billion tons per year, either on the farm, in transit, through processing, or at the point of retail and consumption. Secondly, the environmental

footprint of food – its associated land use, GHG emissions, water use and biodiversity impact – varies significantly from one product to the next. In general, the largest differences occur between animal-sourced and plant-sourced foods, with the latter having smaller footprints; in some cases, substantially smaller and thirdly, demand for the most environmentally damaging foods is both high and rising, a trend partlyassociated with nutrition transitions that are increasing demand for animal products were global dietary patterns to shift to the extent that we did not waste food, over consume calories or demand excessiveamounts of the most environmentally damaging foods, this would very significantly reduce total demand for food – and hence total demand for land and other natural resources. For example, a switch from beef to beans in the diets of the entire US population could free up 692,918 km^2 equivalent to 42 per cent of US cropland for other uses such as ecosystem restoration or more nature-friendly farming. Such a shift would also contribute substantially to climate goals (in this example, meeting between 42 and 74 per cent of the US GHG reductiongoal for 2070. It would likely contribute to a range of other public goods including improved dietary quality and reduced incidence of diet-related disease associated with overconsumption of red and processed meat. Pandemic risk could also be significantly lowered by reducing animal farming.[20]

Recent studies confirm older findings show that although humans haveeaten red meat foe two million years, heavy consumption increases atherosclerosis and cancer in most populations and the culprit isn't just saturated fat or cholesterol .Our gut bacteria digest a nutrient in meat called L-carnitine. In one mouse study, digestion of L- carnitine boosted artery –clogging plaque. Research also has shown that the human immune system attacks a sugar in red meat that's called Neu5Gc,causing inflammation that's low level in the young but that eventuallycould cause cancer." Red meat is great if you want to live to 45",says Ajit Varki of the university of California ,San Diego, lead author of the Neu5Gc study.[21]

The latest clue as to why our modern diet may be making us sick comesfrom Harvard Primatologist Richard Wrangham ,who argues that the biggest revolution in the human diet came not when we started to eat meat but when we learned to cook. Wehave evolved to depend upon cooked food. If Wrangham is right ,cooking not only gave early humans the energy they needed to build bigger brains but also helped them to get more calories from food so that they could gain weight. In modern context the flip side of his hypothesis is that we may be victims of our own success. We have gotten so good at processing foods that for the first time in human evolution.[22]

It's this shift to processed foods ,taking place all over the world, that's contributing to a rising epidemic of obesity and related diseases. If mostof the world ate more local fruits and vegetables, a little meat, fish and some whole grain (as in the highly touted Mediterranean diet), and exercised an hour a day , that would be good news for our health-and for the planet.[23]

VII WHY BE THE SECONDARY CONSUMER ?

The main difference between primary secondary and tertiary consumers is that primary consumers are the herbivores that feed on plants, and secondary consumers can be either carnivores, which prey on other animals, or omnivores, which feed on both animals and plants,whereas tertiary consumers are the apex predators that feed on both secondary and primary consumers. Rabbits, consuming grass are an example of primary consumers; snakes, consuming rabbits are an example of secondary consumers while owls, consuming snakes are an example of tertiary consumers. Primary, secondary, and tertiary consumers are the three levels ofconsumers in an ecological food chain. According to the 10% law of energy transfer, primary consumers take 10% of the energy in primary producers, and secondary consumers take1% of the energy of primary producers while tertiary consumers take only 0.1% energy from primary producers i.e of the total energy produced by photosynthesis in plants aprox.8833 calorie primary consumers (herbivores) get 3368 calorie while the secondary consumers (carnivores) get 383 calorie.. So, is it better to get more energy by being herbivorous rather than eating more and getting less energy by being a carnivore? [24,25]

VIII SETTING ASIDE LAND FOR BIODIVERSITY:

The second key change for creating a more biodiversity-supporting foodsystem is to set aside land specifically for the conservation and proliferation of habitats and wildlife. Biodiversity is highest in areas of unconverted land. Even farming practices that are designed to be wildlife-friendly require some degree of modification of natural habitat.From a purely theoretical perspective, and according to a growing body of academic literature, setting aside land for biodiversity to the exclusion of other uses, including farming, and either protecting or restoring natural habitat would offer the most benefit to biodiversityacross a given landscape [26]. The value of preserving undisturbed habitats and ecosystems – both forthe sake of biodiversity

and to support natural carbon sequestration and storage – has underpinned many of the global efforts to preserve primary forest cover, particularly in the tropics. When it comes to restoring native ecosystems, the carbon sequestration potential of particular measures varies according to geographical location and the type of underlying native ecosystem being restored. For example, returning all permanent pasture worldwide to its native forest cover would store 72 giga tones of carbon (GtC), whereas returning pasture to its native grassland cover would store less than half this amount (34 GtC), even though native grassland covers three times more land area than native forest. The biggest potential for carbon sequestration through such ecosystem restoration efforts is concentrated in high-income and upper-middle-income countries, which account for 70 per cent of the carbon that would be sequestered by restoring land currently occupied by animal agriculture. The greatest gains for biodiversity will occur when we preserve or restore whole ecosystems. With some exceptions, this will typically require significant areas of land to be left or managed for nature, primarily because the extinction risk for any species grows as its population size shrinks, and because many large animals require a large area of habitat to sustain anadequate population. Human dietary shifts are thus essential in order to preserve existing native ecosystems and restore those that have been removed or degraded.[27]

IX ADOPTING THE WAY WE FARM THE LAND:

The third change for transforming the food system in support of biodiversity is to adopt more biodiversity-supporting modes of food production. One way to do this is to retain pockets of habitat for wildlife within the agricultural landscape (some of which can be on farms; others can be patches of land 'spared for nature' within the wider farming landscape). The other way is to change farming methods.There are three key avenues through which the latter can be achieved. Firstly, we can decrease the volume of inputs. Reduced-input farming has already been widely adopted in developed countries through precision agriculture. Precision agriculture involves the use of a range of technologies to target more efficient use of inputs (according to the'4 Rs' principle: the right source, in the right amount, in the right place,at the right time). [28]

Secondly, we can substitute certain inputs or practices for more sustainable alternatives: forgoing chemical and synthetic inputs as much as possible and instead using ecological processes to manage soil fertility (through crop rotations, for example), supporting natural pollination and pest control, and moving to methods such as 'no-till' farming that limit disturbance of natural processes and habitats. And thirdly, we can switch to modes of production that utilize land and other natural resources in fundamentally different ways, for example replacing conventional agriculture with agroforestry, or converting to agro-ecological approaches. Since such practices imply breaking out of many of the 'lock-ins' associated with today's system – including land tenure models, the sunk costs of large farm machinery, and the natureof the dominant supply chains – adoption remains limited to date. [29]

There are many specific ways in which agriculture can become more nature-friendly and support biodiversity (including through agro- ecological farming and regenerative farming, of which organic farming is an example). As outlined above, alternative approaches typically require the use of natural processes to support production, rather thana full substitution of synthetic inputs (nitrogen, pesticides) with natural ones to enable specialization at scale. These approaches are typically associated with enhancing diversity: of farm outputs (genetics, agroforestry), land use across space (to improve biodiversity for ecosystem services) and time (e.g. crop rotations). While some approaches may increase agricultural productivity, in general nature-friendly farming is less productive than conventional methods. For example, on a like-for-like comparison, organic farms typically yield 34per cent less than intensively managed farms. Even if farm-level incomes can be maintained via appealing to premium markets, dietarychange is still a necessary global enabler to allow widespread adoptionof nature-friendly farming without increasing the pressure to convert natural land. In essence, these three avenues – gaining efficiency, substituting artificial processes with ecological ones, and redesigning the system – are about maintaining adequate food yields while reducing environmentally damaging inputs. In other words, they are about sustainably intensifying production. While the concept of'sustainable intensification' is subject to much debate and is often usedto describe practices that are far from sustainable, the underlying principle is one that now lies behind approaches such as 'ecological intensification'[30]

Bat, Bird, Groundhog, Opossum, Raccoon, Rat, Skunk, Snake and Squirrel are trapped to eat. Bird hunters use [31] Satnoli, hunting traps, Trap Door traps, Funnel traps, Mist nets, Noose traps, Birdlime, Spot-light trapping, Baited trap etc to catch the bat and birds. Ad various type of Nets for aquatic and wild

animals.[32] To catch wild animals hunters use Cage Traps putting inside a prey. [33] There is an ecological impact of hunting of birds and animals. Natural food web could be disturbed and hunting by humans may have contributed to the extinction of several bird species. Therefore, The Wild Life (Protection) Act, 1972 is an Act passed by the Parliament of India on August 21, 1972, and later implemented on 9 September 1972. This Act was enacted for the protection of plants, birds and animal species. The Wildlife Protection Act is an umbrella Act to protect wild animals and plants. This Act contains 66 Sections which are further divided into seven chapters and six schedules. Before this Act was passed it was in the state list and so the state passed a law for wildlife protection and conservation. The Parliament passed this Act using the provisions of Article 252 of the Indian Constitution. This Act is the first legislation which gives such a comprehensive list of endangered wildlife species and which prohibited hunting of wild animals for the protection of the wildlife.[34,35,36]

X. CONCLUSION

The global food system and the subsystems (or 'food systems') are the reasons of biodiversity loss, and there is need and opportunities for food system transformation to protect biodiversity and deliver improvements across the planetary health spectrum, including to human health and well-being. Three basic ways in which it can be achieved is presented in the paper. Importance of the globe convertinginto a vegan diet is highlighted.

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