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Invited Article

Paradigms of Man-Nature Association: An Ecological Perspective

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ABSTRACT

13.7 billion years ago, an extremely enigmatic phenomenon happened, which is known as The Big Bang. On a 4.5 billion years old planet, man is one of the recent additions to its vast biodiversity: nature's own and the only creation, which has become the biggest threat to her today. The paper traces the journey of human progression, attempting to highlight the underpinning philosophies that governed this man-nature association during its various stages. It talks about how during each phase, these systems of ideas have influenced human actions, which in turn have resulted in visible and categorical impacts on ecological processes and on the other hand, the ever-expanding development, in the form of a built environment comprising cities, industries and other settlements of sorts. These knowledge systems have indeed been the foundation of the type of life that each of these eras witnessed. The paper highlights the key questions that stood tall in front of these societies and how their choice of solution shaped their fate. Just like those times, there are a set of very serious and critical questions that we too are faced today with, the questions of human existence, and the questions of human sustenance to which answers shall have to be provided by the contemporary human community. The choice of these answers shall only determine the possibility and quality of the future of human civilisation. The paper discusses the way in which specific philosophical systems in different eras and places, became drivers of specific types of development, from the epistemological lens of ecology and sustainability.

Keywords: Man-nature association, ecology, philosophies, knowledge systems, human existence

BACKGROUND

The world has been constantly experiencing shifts in natural processes since the height of the last glacial maximum of the Pleistocene (ice-age) which existed around 1.8 million to 11,500 years ago. This post-glacial climate has been assumed to be stable in terms of fluctuations, but the reality is that it has been demonstrating sudden descents into cold phases and long periods of intense drought. Notable fluctuations have been observed in the frequency and intensity of recurrent phenomena like El Niño/La Niña variations in Pacific-sea temperatures. But these changes have been non-uniform in nature, displaying regional differences in their incidence. These changes in turn have an impact on other biotic and abiotic factors of these regions. As a consequence, there has been a continuous response by living organisms whose populations

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have grown or fallen or have changed their distributions (Figure 1). There are known to be five great extinctions until now and we, as research suggests, are heading to the sixth mass extinction at a very fast pace (Bryson, 2003). Through an illustrative diagram, Simmons (2008) has explained how the growth in human numbers and the changes in the economy over a period of the last 1000 years have increased the environmental issues including the quantities of gases emitted to the atmosphere and we are more than aware of this already. But a very important point to ponder upon is that, these curves not only highlight environmental issues, but also symbolise the cultural perspectives in which increasing prosperity and outturn of resources are regarded as normal and the emphasis is being laid on sustaining rates of growth rather than level out the curves. This is a major issue that needs attention in contemporary times. It shall be worthwhile to understand how we have reached this state of affairs from the time we were born as a specie on this earth. The upcoming sections shall attempt to understand each stage of human development with reference to evolving philosophies leading to a specific type of development in terms of settlements and infrastructure along with the consequent impact on ecology, landscape, and environment. These dynamics in each era have been the actual cause of the quality of life being witnessed by their people.

Figure 1: Late Pleistocene landscape in northern Spain with woolly mammoths, equids, woolly rhinoceros, and European cave lions with a reindeer carcass.

Source: *https://commons.wikimedia.org/wiki/File:Ice_age_fauna_of_northern_Spain_-_Mauricio_Antón.jpg (CC BY-SA)*

THE HUNTING-GATHERING SOCIETIES AND THEIR WORLD

Lifestyle

These are the societies who lived in the sub-continent around two million years ago. The name has been derived from the way in which they acquired food, the two prominent ways being hunting wild animals, fish and birds and gathering fruit, roots, leaves, stalks and eggs. They would keep moving from place to place in search of food. The earliest human societies enjoyed the abundant resources of the planet. This was the time when the resources were plenty and the human population was limited.

Philosophy

In the context of changes in the attitude of the humans and hence change in the human and nature association, with the passage of time, E. A. Gutkind identified the association in this

stage as I-Thou, characterised by fear of the unpredictable forces of nature with an accompanying desire for security. Hence, Man chose to remain in sync with the larger forces of nature owing to 1. Fear of the unknown, 2. Limited capacity and wisdom.

Expression

The first landscapes consciously conceived by humans appear between 30,000 and 10,000 BC. The climax of instinctive man of this era, as he may be called, is experienced in the cave arts of France and Spain (Jellicoe & Jellicoe, 1987). Parallelly, India has examples of Bhimbetka and Kurnool Caves which belong to the palaeolithic times (Figure 2).

Figure 2: The landscape depicted through herds of animals in cave paintings at Bhimbetka rock shelter.

Source: https://commons.wikimedia.org/wiki/File:Cave_Painting_at_Bhimbetika_Rock_Shelter.jpg (CC BY-SA)

BEGINNING OF AGRICULTURE AND EMERGENCE OF CITY

Lifestyle

From a population that was completely hunter-gatherer and based on food collection from the wild, agriculture became dominant after about 8000 BC. A climatic shift was experienced in the world around 12,000 BC and relatively warmer conditions started to prevail. This led to the development of different types of grasses, which in turn led to increase in the populations of grazing animals. Several grasses including wheat, barley and rice grew naturally in various parts of the world. This was the time when humans started to devote almost all of their time to tame these animals for various uses and started manipulating plant species leading to a revolution in the way humans lived – The Agricultural Revolution (Harari, 2011). Farming became the way of life. Nomadic life started to settle down in land parcels around the banks of great rivers of the world: the Tigris and Euphrates Nile, Amazon and Indus rivers, which marked the onset of city-life. The great civilisations of Mesopotamia, Egypt and Indus Valley emerged during this time (Figure 3). Around the same time, metallurgy was invented. Metals were generally found far from agricultural sites. Transporting metals to agriculture sites

resulted in diffusion of ideas, which formed the first form of trade, known as barter system (Nulkar, 2022).

Figure 3: The great river valley civilisation of Mesopotamia

Source: [https://commons.wikimedia.org/wiki/File:Mesopotamia_1200_BC.jpg (CC BY-SA)](https://commons.wikimedia.org/wiki/File:Mesopotamia_1200_BC.jpg)

Philosophy

Farming was a brilliant discovery for mankind. But this entailed a cost.

Agriculture required open space with ample sunlight and for this, forests were burnt down and cleared for plantation. The original diversity in a piece of land made way to the few species suitable for human consumption. Over the next few hundred years, agriculture flourished with ingenious methods of irrigation. Rivers were diverted to canals to feed farms. This started to change the riparian zones of rivers. So, very soon, farming which had emerged as a brilliant discovery of humankind started being recognised as an agency of change at the ecosystem level (Nulkar, 2022). This attitude led to an insensitive way of looking at the environment and ecology leading to exploitation and consequent death. Hence, the expansion of cultivated land at the expense of forests and wetlands for agricultural practices was considered the first instance of large-scale assault on the environment by some ecologists.

Many new rules of behaviour and great systems of thought originated during this time. This is the reason, why it has been referred to as 'Axial Age' in the history of human kind. As explained by Hughes (2001), from a few centuries BC to a few centuries AD, many of these systems were formed, thus changing and evolving the humanity's worldviews, which further can be placed in three broad categories. The first group evolved within the context of the traditional views which they inherited from the earlier societies. From the recorded history, it is evident that in India, from the Vedic period, people started worshipping the forces of nature as sacred personifications, such as fire, sky, Sun, and air. Similarly, in Japanese tradition, religious beliefs and symbolism played a major role in influencing landscapes and garden forms. The gardens were designed to facilitate relaxation and meditation. The later Zen dry

garden is a perfect reflection of a monk's life, imbued with simplicity and austerity, leading, to spiritual enlightenment (Figure 4).

Figure 4: Zen Garden, Ryoan-Ji, Kyoto

Source: https://commons.wikimedia.org/wiki/File:Stone_Garden,_Ryoan-Ji,_Kyoto_in_Spring- panoramio.jpg (CC BY-SA)

The second group of world systems propagated the ideology of oneness and equality. The believers respected the life and existence of all living creatures in the same way as of humans. These religious philosophies had great reformers such as Mahavira (Jainism), Siddhartha Gautama (Buddhism), and Lao Tsu (Taoism) as their exponents.

The third group of worldviews agreed that there is only one God who has created the universe, the earth, and all living beings, out of which Humans, considered God's representatives on Earth, have dominion over all others. This supremacy gives the humans the authority to use and consume the resources. The whole idea of dominion over others proved as 'a preventive against heedless exploitation of the created world' (Hughes, 2001). A glaring example of how this philosophy played its role in the decline of a powerful empire, is that of the Romans. Around 2nd to 4th Century AD, the Romans were extremely powerful and ruled large tracts of land (Figure 5). Their lifestyle, living environment and their life processes were high consumers of energy, which in a way also indicated their wealth and glory. But unfortunately, this did not last enough, and surprisingly, the cause lies in their attitude towards the environment and ecology. The high levels of consumption lead to high levels of resource utilisation and degradation of natural resources and systems. This led to deforestation and erosion.

Like many other ways to demonstrate man's power, the beast fight was a major sport that Romans enjoyed. Large carnivores were brought from the wild and fights were organised for recreation. Gradually, the populations of these animals deteriorated in the wild. This impacted the ecology in an irreparable manner because of the disruption of food chains. These animals used to predate on the large number of rodents and other animals which consumed crops. Now, due to their population decline, these second order animal population grew

disproportionately high, thus posing enormous pressure on agricultural production. And this was a major cause of the decline of the powerful Romans. The famous historian, B.D. Shaw stated, "the tens of thousands of animals purposefully hunted down for the arena were, of course, a small proportion of the total that yielded to more mundane processes such as the systematic destruction of their habitat by the expansion of agricultural settlements." Another example of a societal collapse as explained by Diamond (2005) is the Maya civilisation where apart from repeated climatic changes of intense droughts the inhabitants themselves did great damage to their environment, especially by deforestation and soil erosion.

Figure 5: The Roman Empire in 117 AD

Source: https://commons.wikimedia.org/wiki/File:RomanEmpire_117.svg (CC BY-SA)

Expression

This phase witnessed emergence of cities around the banks of great rivers of the world: the Tigris and Euphrates Nile, Amazon and Indus rivers. This marked the onset of city-life. The great civilizations of Mesopotamia, Egypt and Indus Valley were flourishing and setting up new norms of living.

THE PRE-INDUSTRIAL AGE AND MERCANTILE CAPITALISM

Lifestyle

After the fall of the Romans, Europe slipped into what is known as the dark ages. The idea of landscape and design of open space and garden was completely changing meaning with time, e.g. in medieval European cities: inward looking cloisters gardens became prevalent, where fruit cultivation was done and flowers were grown. Dark age is actually the period that saw the least in terms of art and architecture. You know why this time period is called the dark ages, because Cities in medieval ages shrank within walls and the palace, church and the market place became important. The landscape was a privilege only for the rich and the

royalty. Disease, Religious fanaticism, and crusades were seen all over (Gallion, 1986). Indian Medieval cities showed a similar morphology and ethic.

Ecologically, from the fifth to the tenth centuries, the Earth as a whole was, however, still full of life in many thriving ecosystems. The land masses were covered with dense forests and agriculture was practiced in a controlled manner. Very soon, the trend started changing. The population was increasing at a fast pace and hence the requirements too. Built-up areas were spreading fast, forests were receding, leading to environmental issues of deforestation, erosions, flooding etc. Certain societies were learning skills that would in future times become more effective. Preparations for rapid modern changes were actually made in these Middle Ages. Parallelly, Feudalism was an established way of life in large parts of Europe. The height of which gave rise to the enclosure movement, which further led to the onset of Industrial revolution.

This was also the time when Europe witnessed mercantilism as the major political and economic movement. The next shift resulted from the formation of the first global economy after Europeans arrived in America in 1492. This was the onset of the Mercantile Capitalism marked by the Great Columbian Exchange, which was the widespread transfer of plants, animals, precious metals, commodities, culture, human populations, technology, (and above all) diseases, and (of course) ideas between the New World (the Americas) in the Western Hemisphere, and the Old World (Afro-Eurasia) in the Eastern Hemisphere. This age is mentioned in history as the age of discovery.

Expression

In terms of landscape, now, the medieval city was drastically opening up physically to embrace the norms of the renaissance. The moats were removed and the city witnessed the emergence of large-scale plazas, piazzas and open spaces. The built-unbuilt demarcation was getting blurred as new architecture and landscape typologies were now prevalent. Examples like great St. Peters Piazza, the revamp of many cities like Paris by Haussmann, new garden typologies like grand Versailles, new forms of architecture and vibrant and lively nature-capturing interiors were seen (Figure 6). For art and architecture and landscape, this has been one of the most flourishing times in the human history.

Figure 6: Saint Peter's Square, Rome, Vatican, Italy

Source: https://commons.wikimedia.org/wiki/File:Rome,_Vatican,_Italy,_Saint_Peter%27s_Square_as_seen_from_Michelangelo_dome.jpg (CC BY-SA)

In India, at this time, we come across a very significant landscape typology i.e.. The Islamic Landscapes and The Mughal Gardens. During 16th and 17th centuries, there were largely 2 variants: pleasure garden and tomb garden. The Humayun's tomb, located in Delhi, is a tomb garden. The most well-known example is the Taj Mahal which is quite recent in this typology. Later on, we see gardens, overlaid on the hilly terrains of Kashmir, and taking another form based out of the context and topography of the place, which were called the paradise gardens (Boults & Sullivan, 2010). Ecologically, the native forests were once again altered to create the fruit gardens and water regimes were altered to create the playful channels, fountains, chadars etc. It is another example, where the conceptual philosophy of a belief system, dictated the landscape in a big way.

THE PERILS OF THE INDUSTRIAL WORLD

Lifestyle

The 18th century witnessed a new change in the context of man-environment agenda, which is the Industrial Revolution. This was the 'Age of Reason." The philosophical foundation for science was being laid in all spheres of life. The Industrial Revolution began with its major impacts on human society, increased urbanisation, including faster transport, more pollution, and scarring of the landscape. The industry started relying on fossil fuels heavily for the production of energy and many other newer inventions. The western nations which were ahead in terms of development witnessed the Industrialisation ahead of the other Asian and African countries. The European economy dominated the nations of the rest of the world, many of which served as colonies for them. The raw material was brought from these colonies, processed into manufactured goods and then sold everywhere around the world, including the colonies themselves. On the ecological front, industrialised powers made huge impact on the ecologies of the lacking nations in terms of raw material and energy.

Expression

The Urban picture was evolving fast. Before this, cities were small, there was a natural way the inner cities developed because peri-urban setting would handle few things. But now, the labour force started to stay close to the industries and the formation of factory towns with slum-like conditions led to disease and pandemics. The glory of renaissance was lost to the grim of industrial cities.

Figure 7: Central Park, Manhattan, New York City

Source: https://commons.wikimedia.org/wiki/File:New_York_City-Manhattan-Central_Park_(Gentry).jpg (CC BY-SA)

As an answer to the unhealthy living conditions in this time, Urban planners like Sir Ebenezer Howard started finding models like Garden City movement: a utopian city which could house people in harmony with nature (Gallion, 1986). Another great contribution in the field of Urban Landscape, was of Frederick Law Olmstead. The central park in the U.S. was the first of this type designed by F.L. Olmstead followed by many such open spaces which were available to people at large (Figure 7). This is seen as a major shift, where landscapes and gardens were now being viewed as public property and the hold of royalty and church on these spaces got transferred to the common people (Jellicoe & Jellicoe, 1987).

THE CONSUMER CAPITALISM AND THE GREAT ACCELERATION

Roughly until mid-eighteenth century the most economies in the world were based on solar energy. Although such agriculture has persisted until very recently, it can be argued that a fossil-fuel based industry was the world's major economy until about 1950, when it was intensified to a different level of interaction with the rest of the globe (Simmons, 2008).

Through the evolution of human history, as mentioned above, all these eras have also witnessed another major phenomenon which is the rise in human population. From just a few million in 10,000 BC the human population has always been expanding, reaching up to six billion in 2000 AD and roughly around 7.5 billion, as of today. This continuous surge in population has been a major cause of intense pressure on resources. "The main difference between the beginning and the end of this sequence has been a transition from patchy and temporary impacts upon the energy and material flows of the ecosystems inhabited by humans to a partial obliteration of the natural world in a series of very large conurbations together with a considerable degree of alteration of the terrain. Further, the effects wrought by carbon-based industrial activity upon the oceans and atmosphere have made Homo sapiens a species with a truly global reach, leading to the present high-production consumer capitalist mode of living, that emerged lately (Simmons, 2008 ppxiv)."

After 1950, as is believed by the researchers is the dramatic, continuous and roughly simultaneous surge in growth rate across a large range of measures of human activity, technically termed as 'The Great Acceleration' (Figure 8).

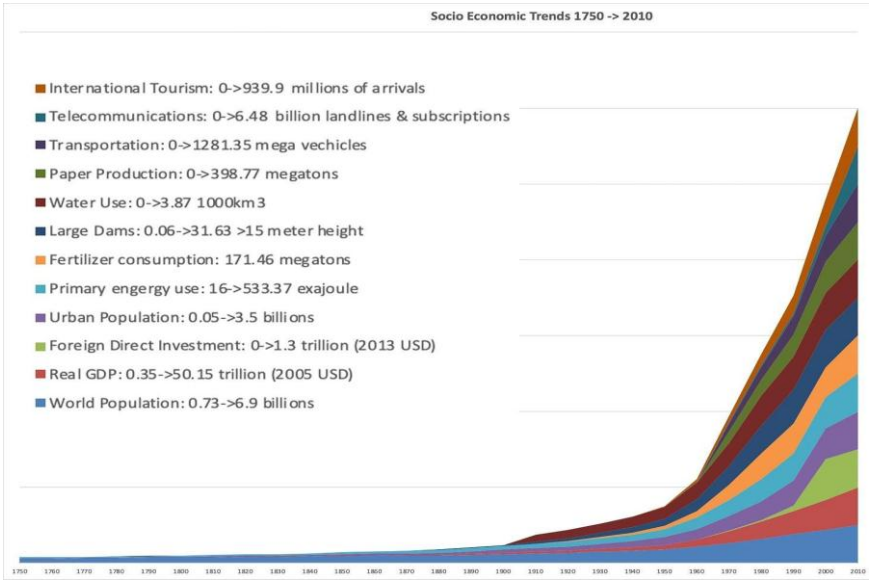

Figure 8: The Great Acceleration - Socio Economic Trends from AD 1750 to 2010

Source: *https://commons.wikimedia.org/wiki/File:Anthropocene-GreatAccelerationSocioEconomicTrends-1750-2010.png (CC BY-SA)*

Changes in human production and consumption, indicated by gross domestic product, direct foreign investment, energy consumption and telecommunications, are reflected in changes in the Earth's natural systems: climate (greenhouse gas levels, global temperature), ocean acidification, terrestrial biosphere degradation, and fish capture. Ironically, both these parameters stand directly proportional which poses a big question mark to the whole point of view of measuring economies through the lens of GDPs alone.

In continuation to the earlier revelations of the naturalists, ecologists, scientists, Urban planners, and landscape designers, another extremely respected and path-breaking research was put forward by Sir Ian McHarg, called the McHargian Ecological Analysis Method. He developed a multi layered mapping technique to combine and analyse visually the complex data sets to effectively help designers take informed decisions about any development.

THE CONTEMPORARY CHAOS AND THE WAY FORWARD

We can't disagree enough that the world is in a phase of a messy chaos at the moment. Unnatural ways of viewing nature and human associations based on ecologically inappropriate drivers, we see such imagery. To provide habitat to exponentially and unrealistically growing numbers, development is encroaching not only land parcels everywhere, but also water and air. The cities have started to spill over on the seas and newer types of designs are being innovated which consume enormous energy for human sustenance.

As a result, nature is expressing her anguish in terms of melting glaciers, disappearing water bodies and life-snatching pandemics (Figure 9). The human life has become dependent on bottled water and air. "The impacts of human actions on our home planet are now so large that many scientists are declaring a new phase of Earth's history. The old forces of nature that transformed Earth many millions of years ago, including meteorites and mega-volcanoes are joined by yet another: us, the Humans. So, the big question is: Have we really entered a new geological epoch, called the Anthropocene (Lewis & Maslin, 2022)?"

Figure 9: Bubble café offering physical distancing during COVID-19 Pandemic

Source: https://commons.wikimedia.org/wiki/File:Cafe_du_Soleil_bubble_(1)_jeh.jpg (CC BY-SA 4.0)

"Globally, human activities move more soil, rock, and sediment each year than is transported by all other natural processes combined. The total amount of concrete produced by humans is

enough to cover the entire Earth's surface with a layer two millimetres thick. Micro-plastics are found in every ocean. We have cut down half of Earth's trees, losing three trillion, with extinctions becoming commonplace. Factories and farming remove as much nitrogen from the atmosphere as all of Earth's natural processes, and the climate is changing fast because of carbon dioxide emissions from fossil fuel use (Lewis and Maslin, 2022)." Beyond these grim statistics, the critical existential question is:

Will today's extraordinary intelligence, acumen and capacity

(that we have acquired since our existence, and which is unbelievably greater than at any time in our history)

be able to save us from an almost sure collapse of human civilization?

and

Are we as a community progressing in the real sense?

A careful analysis shows that each successive mode of living is reliant on greater energy use, greater information and knowledge availability, resulting in an increase in the human population and an increase in our collective agency at each step. But are we going to make the right choices as a community? Shall we at least now and quickly adopt the Eco-approach? We shall only be able to survive if we turn Eco-centric and very fast take up measures to save the planet. Environmental repair could come from the simple but profound ideas like:

At Ecosystem level

1. Allocate a part of the Earth's surface for regeneration and replenishment of natural systems
2. New strategies like re-wilding (large areas managed to allow natural processes to run) and eco- restoration (bringing back forests)

At large scale Urban Development Scale:

3. The ecological lens analysis and detailed EIAs to be carried out
4. Understand the genius loci of the site
5. Site and Environment-responsive development
6. Conserve and sustain/strengthen existing Biodiversity of the site
7. Payback to nature in terms of replenishment of resources
8. Restore, recycle, Reuse

At Society and Individual Level:

9. Involvement of communities to bring in the sense of belonging
10. Capacity Building and Outreach
11. Incorporate ecological studies at school university curricula level
12. Optimise Energy Consumption and review individual Lifestyle Choices
13. Question even the general norms of living including material aspirations and familial myths

In the last 3 to 4 decades, the disastrous and devastating impacts of environmental challenges have been realised and the last two decades have witnessed the formation of various

international and national level fora including World Nature Organization, IUCN, UNEP, WWF, NGT, and many more to take charge of the grim situation by setting up principles of development. Other measures like SDGs and many other similar efforts at all levels and scales by the Governments, professional bodies, NGOs, research communities, scientists, citizen groups, today, indicate a paradigm shift and the attitude of I-It moving towards a more ecological and conservation-based relationship seemingly I-care with the resources and natural systems.

Today, we need to pause and acknowledge the incredible power that modern society possesses but more importantly, very urgently direct it towards bringing up a positive shift with an eco-approach as the central philosophy ensuring that not only, we manage to survive ourselves but also attempt enough for an uninterrupted continuation of the most valuable journey called life.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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