TERRA INFIRMA

AN EARTH IN NEED OF CARE

LANDMARKS IN THE HISTORY OF SUSTAINABILITY

Wipro's 5th Sustainability Report is published annually in accordance with the GRI (Global Reporting Initiative) framework, one of the most widely accepted of its kind. Wipro believes that being an integral part of society, with our legacy of values and good governance practices, we as a corporation must play an active role in furthering the cause of sustainability. We view Sustainability Reporting as an important catalyst in the process of seeding and reinforcing sustainability into every aspect of the organisation. Reporting on an organisation's sustainability performance is a powerful indicator of its culture of transparency and its sensitivity to larger societal and ecological issues. To know more about Wipro's five year journey in sustainability, do refer to our Chairman, Azim Premji's letter at the end of the book.

On the road to a sustainable future, the lessons of the past are a valuable compass. **'Terra Infirma- An Earth in Need of Care'** manifests Wipro's commitment to sustainability education and communication of a more holistic kind for the general public, which goes beyond mere information on environmental protection, and towards altering life choices and values to reflect societal transformation and a sustainable future. It is a book that seeks to uncover the protagonists, milestones and initiatives in the history of sustainability; the history that has crystallised and catalysed the grand idea that we need to live in consonance with our world in order for it (and us) to survive. And so, by acknowledging the past, we accumulate knowledge and understanding of the path we must tread, the direction we must follow, the horizons we must trek towards, for sustainable life in times to come.

Disclaimer: This handbook attempts to cover some key landmarks in the history of sustainability but does not claim to be a comprehensive listing in any way. Some important milestones might have been left out of the list due to constraints like brevity and accessibility.

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Cover Image: Byrd Glacier, Antarctica, a 24 km wide, 161 km long ice stream. January 11, 2000. *Source: NASA*

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LANDMARKS IN THE HISTORY OF SUSTAINABILITY

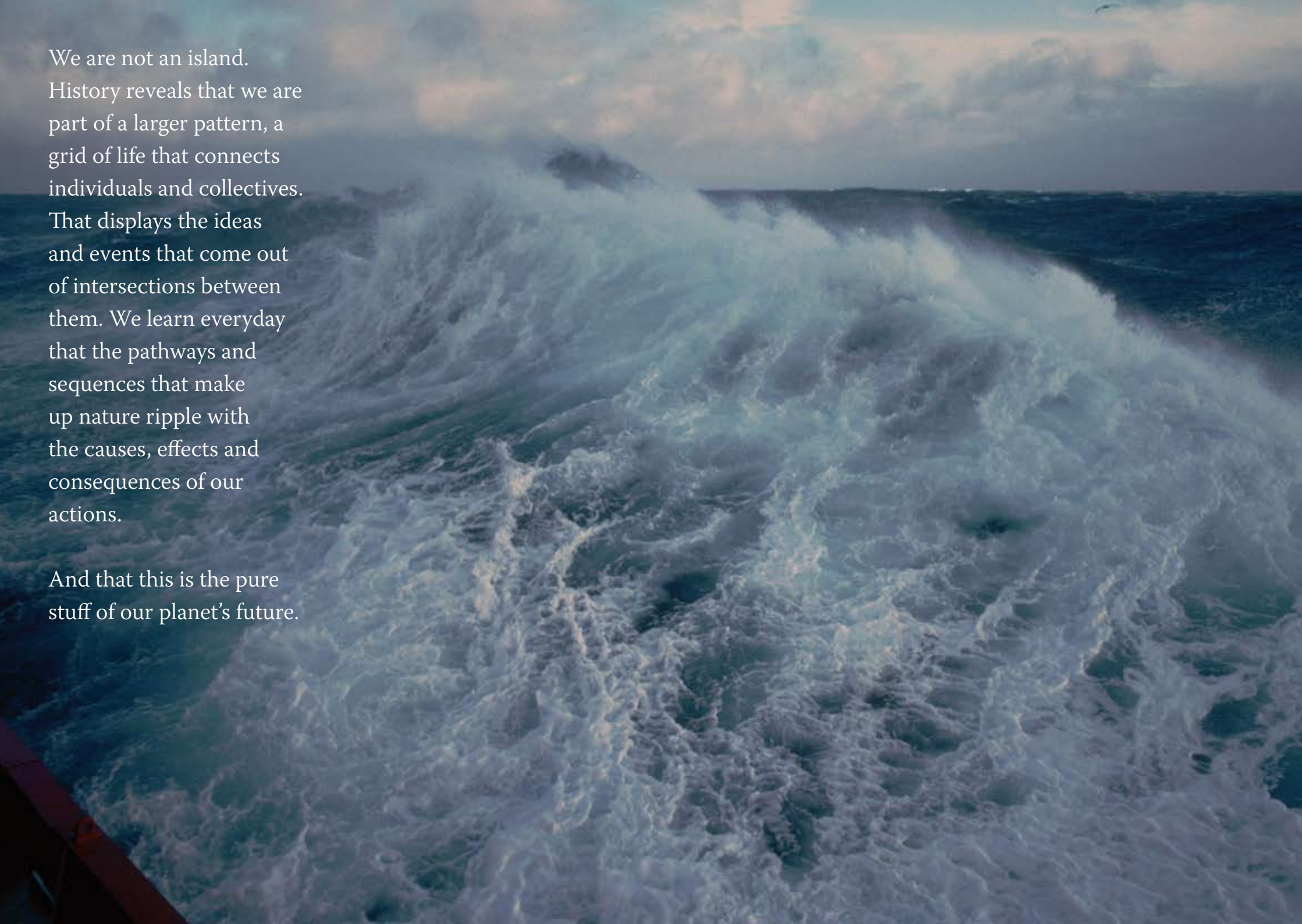
Earthrise, 1968. One of the most influential environmental photographs of all time, this color image taken by the Apollo 8 team simultaneously captures the Earth's bold vitality and its fragility.

"The voyage of discovery lies not in finding new landscapes, but in having new eyes."

Marcel Proust

CONTENTS

Our ancestors had a healthy respect for the forces of nature. They lived off the land, were sustained by it. And so they worshipped it and lived in harmony with it, using just as much as they needed. We now use hundreds of times the amount of resources that we need to survive. Somewhere, the seesaw has dipped, an imbalance caused. Yet environmentalism has been around since Aristotle, sparked off in later centuries by the Darwinians like Humboldt, and Ernst Haeckel, who invented the term ecology to describe the study of organisms and their relationship with their environment. Self-sufficiency and the concept of a life in tune with the natural world have consistently appeared through time, from Thoreau's experiment at Walden Pond, to Gandhian economics which speaks of community management of precious natural resources. In contemporary times, the idea of sustainability has permeated tentatively through layers of social conscience, finding a place in economic theory and practice, inspiring people and movements, becoming the subject matter of media and communication, and featuring on the agendas of governments and companies, reflected in legislations and international treaties. And yet, there is a gap. Careful tracking of our ecological footprint tells us that sustainability must become an integral thread in the fabric of our thinking and living, the weft of our every action woven through with the warp of environmental protection. David Orr asserts that all education must be environmental, teaching students that they are not separate from nature, but an inherent piece of the pattern of life on Earth. This handbook seeks to inform and document the landmarks along the path the sustainability movement has taken, keeping an eye on the increasing understanding that environmentalism is no longer a choice... it is an imperative for human survival.



We are not an island. History reveals that we are part of a larger pattern, a grid of life that connects individuals and collectives. That displays the ideas and events that come out of intersections between them. We learn everyday that the pathways and sequences that make up nature ripple with the causes, effects and consequences of our actions.

And that this is the pure stuff of our planet's future.

Landmarks in the History of Sustainability*

"Birds are sensitive indicators of the health of the environment and sustainability, reflecting trends in biodiversity, being responsive to change, high in food chains, and inexpensive to survey." www.birdlife.org

"I turned to the teeming small creatures that can be held between the thumb and forefinger: the little things that compose the foundation of our ecosystems, the little things, as I like to say, who run the world." EO WILSON

*Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

AS DEFINED BY THE BRUNDTLAND REPORT

ORGANISATION
CONFERENCE
LEGISLATION
BOOKS / ACADEMIC

1830-1880
1880-1930
1930-1980
1980-2030

I

1798-1826 Thomas Robert Malthus, **An Essay on the Principle of Population,** pg 22

1854 Henry Thoreau, **Walden or Life In The Woods,** pg 20

1951 J.C. Kumarappa, **Gandhian Economic Thought,** pg 33

1968 Club of Rome, **Limits to Growth,** pg 28

1973 E.F. Schumacher, **Small Is Beautiful,** pg 35

1977 Herman Daly, **Man-made Capital and Natural Capital,** pg 36

1999 Herman Daly, **Ecological Economists,** pg 36

II

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1891 **Forest Reserve Act, USA**, pg 57

1892 John Muir, **Sierra Club,** pg 46

1905 - Active to date **National Audubon Society,** pg 51

1927 **Indian Forest Act,** pg 55

1949 Aldo Leopold, **A Sand County Almanac,** pg 49

2005 E.O. Wilson **Biodiversity Foundation,** pg 52

1905 to present **National Audubon Society**

1892 to present **Sierra Club**

III

1961 Lewis Mumford, **Urban Ecology,** pg 81

1962 Rachel Carson, **Silent Spring,** pg 62

1963 **Clean Air Act, USA,** pg 64

1968 Garret Hardin, **Tragedy of the Commons,** pg 66

1970s Amory Lovins, **Renewable Energy Sources,** pg 79

1974 **Chipko Andolan,** pg 70

1975 Masanobu Fukuoka, **One Straw Revolution,** pg 76

1990 Elinor Ostrom, **Common Property Governance,** pg 68

2000 David Orr, **The Adam Joseph Lewis Centre And Oberlin Project,** pg 78

2006 **Forest Rights Act,** pg 69

IV

1969 **First Earth Day**

1973 **World Environment Day**

1987 **The Brundtland Commission Report,** pg 89

1989 **Montreal Protocol,** pg 89

1990 **First Assessment Report,** pg 90

1992 **Rio Summit,** pg 90

1997 **Kyoto Protocol created,** pg 91

2000 **UN Millenium Development Goals,** pg 91

2005-14 **UN DESD (Decade Of Sustainable Development),** pg 92

I.

UTOPIAS OF SUFFICIENCY

PHILOSOPHY, THEORY AND PRACTICE

As a modern civilisation, we are obsessed with 'bigger is better'; striving for material growth and defining success in terms of how much we earn and how much we spend. There are some ideas out there, though, that overturn this preoccupation with economics, that advocate simpler living, 'less is more' and environmentally sound lifestyle choices. Radical, idealistic and often forcing a subversion of the status quo, these ideas and the thinkers/doers behind them cut swathes across economics, environment and politics. These concepts have something in common: they are underscored by humanism, and curiously, have emerged in theory and practice in pockets all over the world, in diverse cultures, from natural farming in Japan to community governance of resources in Sweden, from sustainable agriculture in tribal societies in north east India to 18th century philosophers who foretold humankind's burdening of the Earth. They collectively and individually question our conditioning towards economic growth at the cost of the squandering of our natural capital, leading us to a point in the evolution of our species where we are rapidly losing control of our environment.

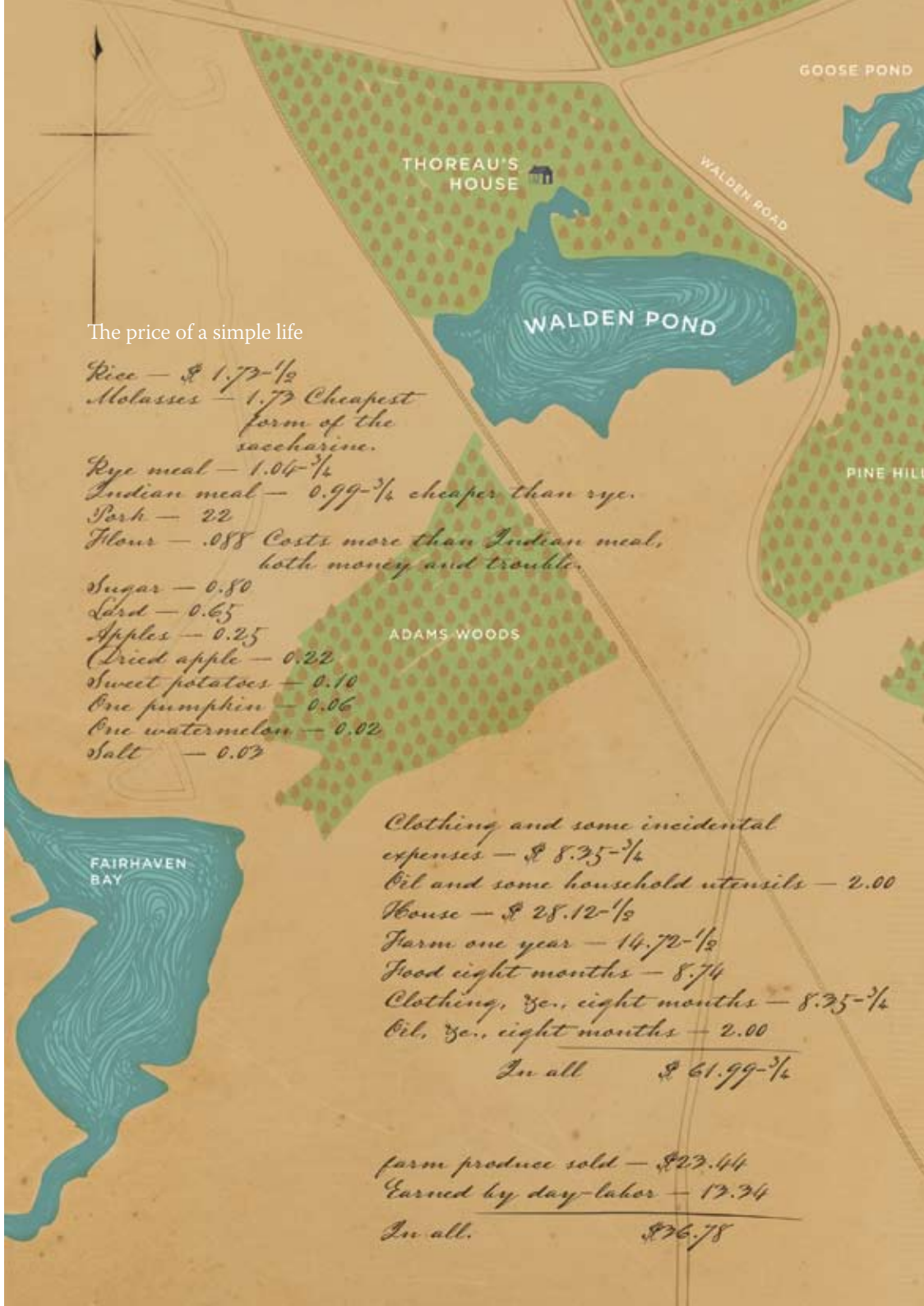
"It would be some advantage to live in a primitive and frontier life, though in the midst of an outward civilization, if only to learn what are the gross necessaries of life and what methods have been taken to obtain them; ... For the improvements of ages have had but little influence on the essential laws of man's existence: as our skeletons, probably are not to be distinguished from those of our ancestors."

WALDEN, HENRY THOREAU

WALDEN OR LIFE IN THE WOODS
1854

What happens when a man removes himself from the trappings of life in society? When he resorts to depending on no one but his own labour and ingenuity for his survival in the wilderness? When nature – and what he can make of it – is his sole recourse? The journey is surely one of spiritual self discovery, of a deep reliance on one's own resourcefulness, of a return to a simpler way of being. The experiment undertaken by Henry David Thoreau in 1854 for two years by Walden Pond in the woods of Massachusetts has inspired movements and philosophers, from Gandhi to Ginsberg. Immersing himself in nature, Thoreau learned much, outlined in his book Walden, leaving a legacy that has become the bedrock of ecological thinking, of humankind's harmonious engagement with the natural world. Thoreau has inspired generations of those who have chosen to submit themselves to a simpler set of circumstances, uncluttering life as it were, like the Voluntary Simplicity movement.

Samuel Alexander wrote, "when an economy grows so large that it reaches or exceeds the threshold point beyond which any further growth is 'uneconomic' (i.e. socially or ecologically counterproductive), property rights should no longer be defined and defended in order to grow the economy." In this ideal world, growth or richness would not be defined by the GDP, but by subjective well being and sincerity in living. Property rights would be divided to protect the environment or perhaps eradicate poverty instead of making a few richer.



Reverend Thomas Robert Malthus (1766-1834)
was Professor of History and Political Economy at the East India Company's College

THE PRINCIPLE OF POPULATION 1798

"The power of population is so superior to the power of the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction, and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague advance in terrific array, and sweep off their thousands and tens of thousands. Should success be still incomplete, gigantic inevitable famine stalks in the rear, and with one mighty blow levels the population with the food of the world."

Malthus T.R., 1798. An Essay on the Principle of Population. Chapter VII p61

Even Malthus, the 18th century thinker and economist would be surprised to see where humankind has landed itself, having bequeathed to itself an Earth burdened with the heaviest ecological footprint in the history of its existence, consuming resources, generating pollution, with no end in sight. Whereas Malthus believed that population growth stood in the way of the Utopian State, in the 20th century, a team of scientists from MIT foretold a possible ideal society where humans might achieve their ultimate potential, if only they would understand the 'Limits to Growth' of this gentle planet we live on.

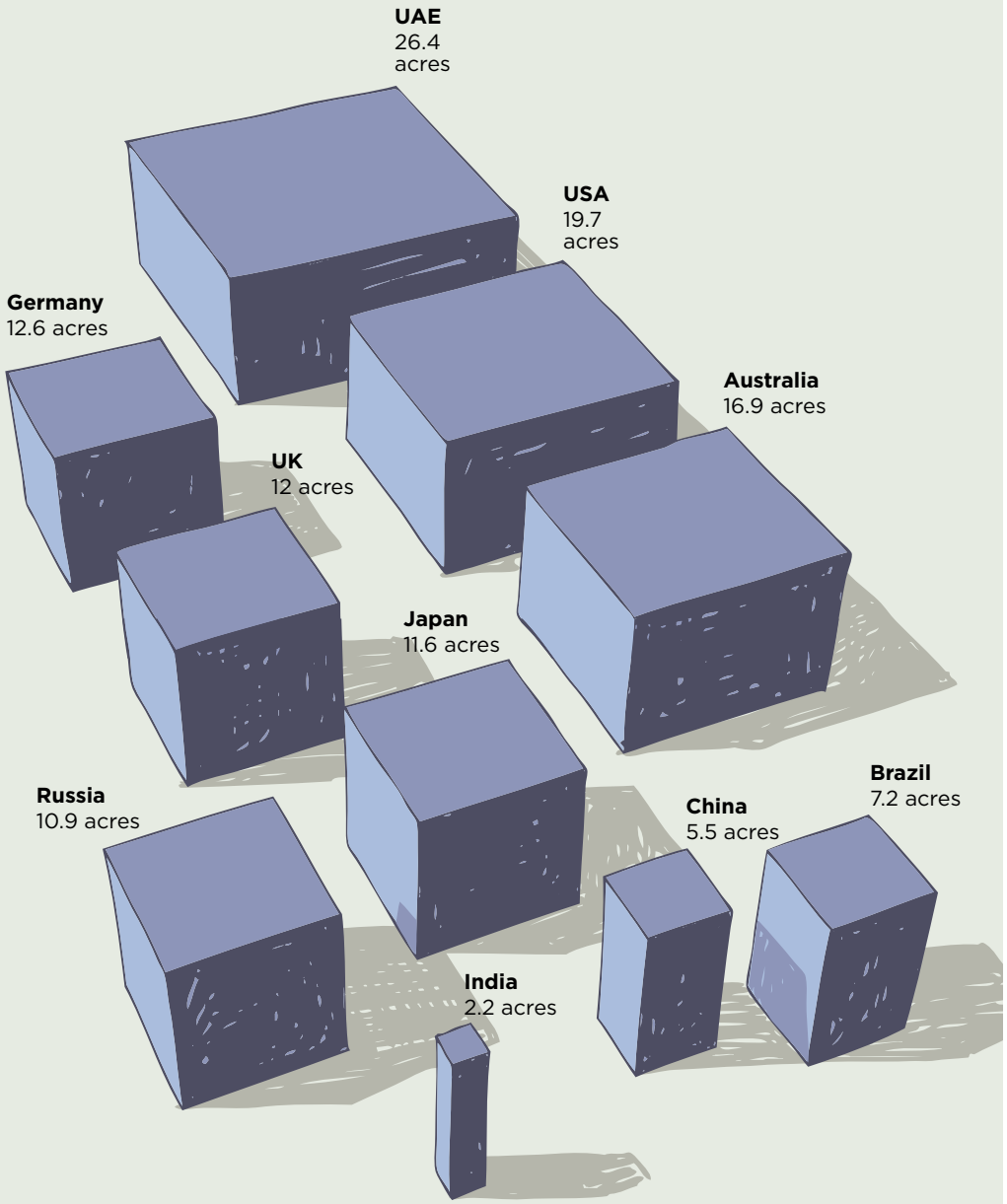
A WHOLE NEW WORLD

Malthus' pessimism was thwarted by humankind's industrial and technological advances, our discoveries of precious resources like coal and oil. For a while, we went about our lives, assured that our bounties of land and food would not be overtaken by our numbers. Medicine and science prolonged our lives, rising incomes allowed us to escape the Malthusian trap. But did we really escape?

In the last few decades, our tank of resources is nearing empty and global warming has resulted from unfettered abuse of carbon energy. The human ecological footprint has grown (using Malthus's terminology) geometrically. Our everyday activities, from making a cup of coffee to commuting to work are impacting our habitat, and that of the other inhabitants of the Earth: plants and animals. Agriculture is one of the worst culprits, leaching off the good from the land, deforesting millions of hectares, yet unable to stop hunger and famine, although food production is going up and up. And we are now 6.5 billion of us, sharing all the 'biologically productive' land on the Earth. Ideally, each of us has an average of 4.5 acres* that we can put our personal footprint on: to grow our food, meet our material needs and absorb all waste. But we are using frighteningly more than this number. Malthus is beginning to be quoted again, an oracular phoenix rising from the ashes of human shortsightedness.

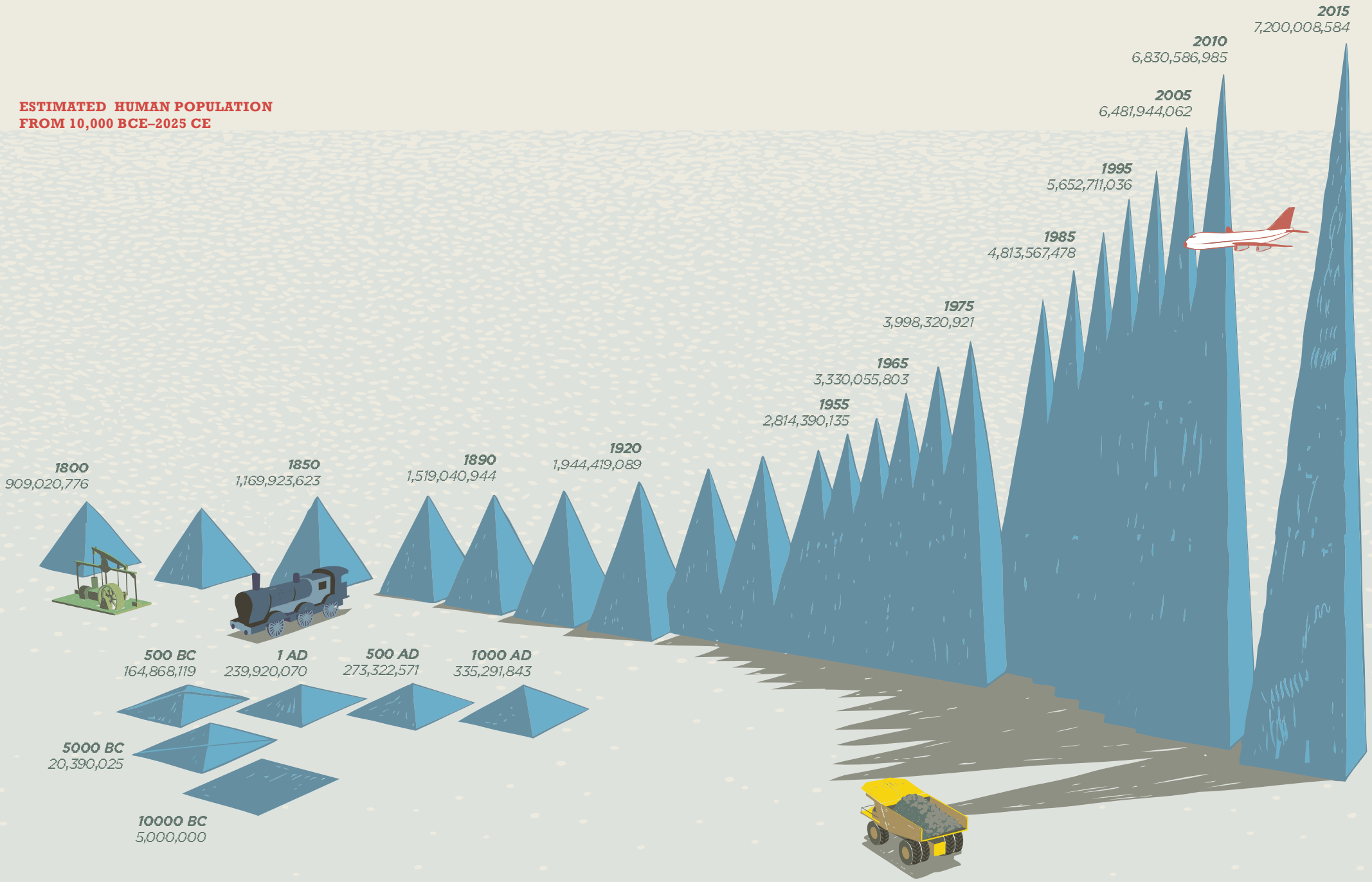
Cutting back on the use of our limited resources, observers feel, is only part of the solution. Cutting down our population is the other part: stabilising our numbers in a deliberate, thought-through, scientific way. MK Gandhi told us that the world was not enough to fulfill our greed. But we are a point where we must question simply, "Is the world enough?" For although in some parts of the world the footprint has evened off, in 30 years when our population has doubled, we will be seriously short of ecological space. And then 30 years later, when we have doubled again, we will need a new type of world: where we have to cut back, perforce.

A PER CAPITA LOOK AT OUR WORLD'S ECOLOGICAL FOOTPRINT



** This graphic shows a country wise ecological footprint per person. Eco-footprint measures how much area of natural resources human population requires to produce the products it consumes and to absorb its wastes under prevailing conditions.*

ESTIMATED HUMAN POPULATION FROM 10,000 BCE–2025 CE



More than 9000 births an hour, and 80 million a year…

LIMITS TO GROWTH 1972

One of the first references to the idea (if not in those exact words) of the ecological footprint, was in a 1972 book called The Limits to Growth commissioned by the Club of Rome. A study by a group of MIT scientists*, the book essentially warned the world that if the ecological footprint of mankind continued to grow at the same rate as it had been, in terms of population, industry, agriculture, use of natural resources and the waste produced from all these, the Earth would not be able to sustain itself and would go into what the study termed 'overshoot'.

However, because Limits to Growth used the word 'growth' instead of say, "environmental impact", (terminology nowhere on the horizon at the time) its message was grossly misunderstood by most of the millions who bought a copy. People began to think that perhaps Malthus wasn't the only doomsday prophet. They perceived the message of Limits to Growth to mean that growth of all kinds, mainly economic growth, would come to an end. Actually, the book was saying something totally different; and if we had listened then, perhaps we would not be at the edge of the ecological precipice we are at now.

What Limits to Growth really said was this: that the human footprint would likely overshoot planetary limits because of delays in global decision-making. Having reached an optimum point of growth, humankind would start discussing and debating its imminent reality (expanding its footprint all the while). By the time a decision would be reached, an overshoot of Earth's physical limits would have catapulted the global footprint to an unsustainable level. From this point on the only solution would be to contract: reduce the rate at which we use our resources and cut back on emissions, either through deliberate or managed decline, or through a market/natural collapse (forcing a reduced population and industrial capacity). Makes Malthus seems sunny in comparison, doesn't it? But this study was more optimistic than Malthus. It used systems models to predict humankind's next 100 years, envisaging certain scenarios – and although two of these were overshoot and collapse, there was a third. This was a scenario of economic and ecological stability, where every individual could satisfy his or her full potential and have their basic needs met: but only if growth patterns were altered, and soon.

Uncannily enough, Limits to Growth made certain predictions in 1972 about the first third of the 21st century that are coming true: about the scarcity of resources and environmental damage. Because the 70's were an era of great technological advancements, it was believed that technology would solve such problems. Looking at our resource scenario today, we know technology can only go so far. The rest is really up to us. Because, as the statistics tell us, we are already in overshoot.

** The authors of the study were Donnella Meadows, Dennis Meadows, Jorgen Randers and their team who worked on systems analysis at Jay W. Forrester's institute at MIT.*

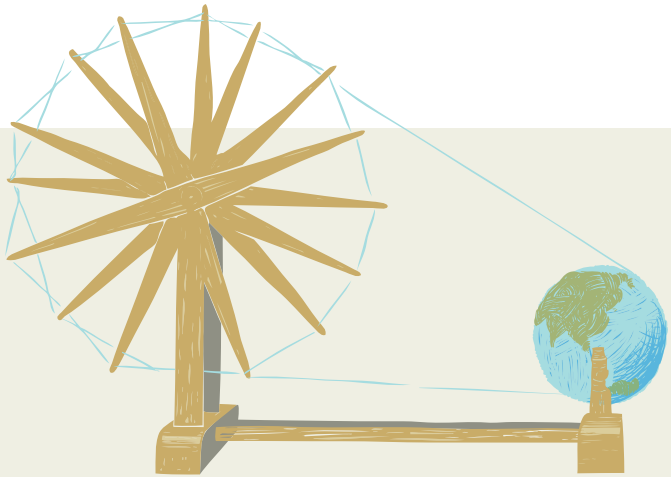
SIDEBAR 1

Club of Rome was a think tank set up in 1968. With an upper limit of 100 members, this body consists of thinkers and influential personalities from diplomacy, industry, academia and civil society, brought together by Italian industrialist Aurelio Peccei and Scottish scientist Alexander King. The members discussed measures to counteract the irresponsible use of resources and economics the nations of the world were prone to at the time. The members undertook to "raising the awareness of world leaders and major decision-makers on the crucial global issues of the future. They would offer a new and original approach in doing this, focusing on the long-term consequences of growing global interdependence and applying systems-thinking in order to understand why and how it was happening."


THE
IDEAL IS
SUFFICIENCY
NOT
SURFEIT

Humanist economists, or ecological economists as they are increasingly known, believe that it is imperative to infuse human and environmental stances into economics. E.F. Schumacher and Herman Daly are two such thinkers. They place human beings at the heart of this larger ecosystem, not as mere cogs in the economic machine and its market forces, (which presume that the Earth and its gifts will last forever or be easily replaced through technology). The humanists state that ethics and ecology must be factored into economic reckonings. The idea is simple: take only as much as we need from the Earth and no more.

This thinking is not recent. Gandhi sought to create local economies based on creative labour that were self sufficient, provided basic necessities and were welfare-oriented in nature. Gandhi, Schumacher and Daly have one more thing in common: they examine an intangible aspect, an almost spiritual one, if you will. Gandhi based his philosophy on a moral viewpoint; Schumacher on Buddhist philosophy, and Daly looks at happiness as something to be sustained along with natural resources.



Joseph Cornelius Kumarappa (1892-1960)

was an economist and Gandhian who interpreted M.K Gandhi's philosophy in economic terms in his book Gandhian Economic Thought (1951).

GANDHIAN ECONOMIC THOUGHT 1951

Kumarappa's phrase 'the economies of permanance' is equivalent to what we now call sustainable development. He said, "In studying human institutions we should never lose sight of that great teacher, Mother Nature. Anything that we may devise if it is contrary to her ways, she will ruthlessly annihilate sooner or later."

Truth and non-violence translated to social justice and political freedom, which in turn led to economic freedom, equity in the distribution of resources and a simple, self-sufficient way of life. According to Kumarappa, a labour-centric economy based on local resources and their optimum use was appropriate as an economic model for India. His highly moral brand of economics leaned towards human dignity in the place of materialism and rooting out poverty. He articulated definite thoughts on the involvement of the community in development programs, laying out progressive ideas on water conservation, over-use of fertilisers, forest protection and more, that were far ahead of his time. He suggested that government policies and departments should work in tune with a 'natural order' – for example, public finance should work to 'husband the natural resources of the land'. J.C. Kumarappa was asked by Gandhi to start and run the Swadeshi institution, the All-India Village Industries Association (AIVIA), developing and enhancing village economies.

SMALL IS

BEAUTIFUL

SMALL IS BEAUTIFUL 1973

E.F. Schumacher (1911-1977)

was one of the earliest proponents of sustainable development, and author of the seminal work "Small is Beautiful' (1973)

Schumacher wrote, "The ideal is sufficiency, not surfeit. Economic 'progress' is good only to the point of sufficiency, beyond that, it is evil, destructive, uneconomic." Schumacher's words and even some of his ideas (Burma as the ideal state, technology as the enemy of humankind) might seem archaic. But his essential doctrine – that of moving away from large industrialised societies into decentralisation, towards local government, local communities, and production by the masses, using local craft skills and labour, as opposed to mass production by technology – these have become exceedingly relevant in our times. The failure of the giant corporation to do much more than make profits, with no thought to consequence and human well being, has brought us to a point where we must re-evaluate our thinking about our future. Schumacher wanted an economics that had the human being as its centre: according to him, this was the only path to sustainability.

Creating a philosophy he called Buddhist Economics and triggered by the rise of the giant companies in his time, Schumacher's idea of economics was that it could not be viewed in isolation, but in the context of the meaning and purpose of life. Human happiness, he maintained, could not be achieved merely by the accumulation of wealth and economic growth. He brought up the term appropriate technology, which indicated easy-to-use and ecologically suitable means, usable by the community unit. He asserted that natural processes of renewing resources could not cope with the rising levels of pollution and exploitation: an ecological crisis in the making. Worse than this, he wrote, are the human and spiritual crises we are facing. We had to articulate a new economics, perhaps based on Buddhist ideas, where people were more important than goods, creative activities more important than consumption. And where the ultimate goal would be uplifting and liberation of humankind rather than wealth accumulation.

Herman Daly (Born 1938)
was credited with the invention of ecological economics, and questioned the assumptions of neoclassical economics which ignores environmental costs. He proposed that "the path of economic progress must shift from growth (quantitative expansion) to development (qualitative improvement)."

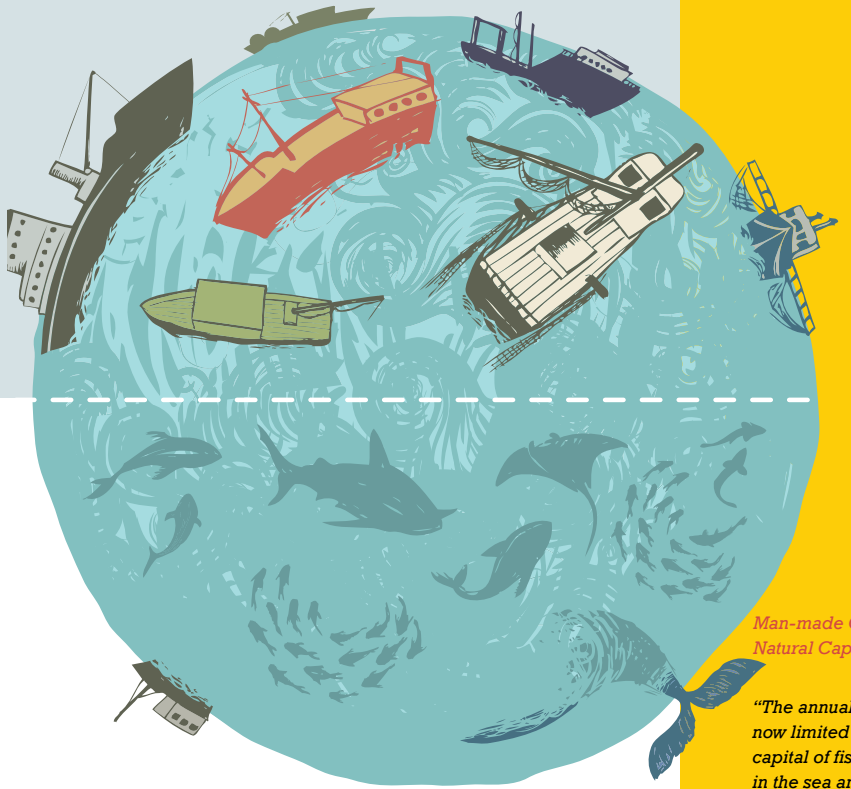
THE ECOLOGICAL ECONOMISTS

He theorised that the economy is a subset of the larger natural eco-sphere, and therefore has physical and ecological limitations related to those of the Earth. And that, unlike what mainstream economists believe, technology cannot substitute what nature gives us. Eventually, too much expansion, to a point where the ecosystem cannot keep up – cannot regenerate or absorb wastes – could spell ecological catastrophe.

He wrote, "When the economy's expansion encroaches too much on its surrounding ecosystem, we will begin to sacrifice natural capital (such as fish, minerals and fossil fuels) that is worth more than the man-made capital (such as roads, factories and appliances) added by the growth. We will then have what I call uneconomic growth, producing 'bads' faster than goods—making us poorer, not richer."

Full World Economics

The complex lives we lead have made our world increasingly 'full' – we use up more and more to maintain our populations and the consumerist, income generation activities of our everyday lives. Daly suggests that we need a new sort of economic theory to understand this new 'full' world.



SIDEBAR 2

Man-made Capital and Natural Capital

"The annual fish catch is now limited by the natural capital of fish populations in the sea and no longer by the man-made capital of fishing boats. Weak sustainability would suggest that the lack of fish can be dealt with by building more fishing boats. Strong sustainability recognises that more fishing boats are useless if there are too few fish in the ocean and insists that catches must be limited to ensure maintenance of adequate fish populations for tomorrow's fishers."

SUSTAINABILITY SPEAK

Cradle to Cradle Using an end use product as the source of a new product.

Cradle to Grave The life of a product, from creation to end use.

Counter Culture A reaction to a mainstream way of life. For example, Buckminster Fuller's Geodesic domes and their use by the Drop city denizens to control use of resources and maximise interior spaces; or the self sufficiency- based philosophy of people in Auroville, Pondicherry.

Deep Ecology A movement that looks at the living environment as equal to human beings, with an equal right to flourish and be protected. It has been the foundation of many ecological and environmental movements that subscribe to the view that the natural world has a deeper connection to our lives and happiness.

Ecological Footprint Coined by William Rees in 1992, this means the amount of strain an individual, group or country is putting on the Earth's resources. It is calculated by combining the area of natural resources used to make the products we consume and to absorb the waste from that consumption. The Water Footprint, Social Footprint and Carbon Footprint are offshoots of this larger idea.

Entropy A gradual descent into disorder or unpredictability in a system. Faster entropy is often caused by societies that consume more energy and materials, thus causing more pollution.

Equilibrium Term used in the study, 'Limits to Growth' for what is now known as sustainability. It essentially means an economy that is in tune and balanced with the ecology.

GDP vs ISEW Previously, the GDP or Gross Domestic Product was used to calculate the size of the economy, i.e. the market value of all goods and services produced in a country. The Index of Sustainable Economic Well-being on the other hand, includes non-traditional factors into the calculation, like economic, social and environmental issues, and costs associated with curbing pollution and unsustainable practices.

Growth In this case, economic growth, is measured by seeing the increase in the production of goods and services within an economy. Conventional economics uses growth to measure the success of the economy, and touts it as the answer to all major eco-socio-political issues afflicting the modern world.

Limits The planetary limitations of the Earth, beyond which it cannot regenerate itself. Once they are reached, growth will be forced to stop.

Locavore A term coined in 2005 by a group of women in San Francisco who promoted the consumption of locally grown produce from within a 100-mile radius. Since local produce does not use up fossil fuels to be transported from grower to plate, it is far more environmentally friendly, besides being more nutritious and tasting better.

Man Made Capital A traditional economic term. It indicates property, infrastructure, processes or money accumulated by a person or corporation used to produce more wealth. It does not count natural resources as capital.

Natural Capital The sum total of Earth's lands, waters and their biodiversity, ie, the ecosystem, with its own sets of goods and services which can be self-sustained. EF Schumacher introduced this term.

Overshoot Indicates the extent to which humanity's consumption exceeds nature's ability to regenerate. The term was used in this context in the study 'Limits to Growth'.

Slow Beginning with a protest over the opening of a fast food restaurant, this movement advocates slowing down the pace of the different activities of life. Slow cities, slow food, slow travel, even slow design are now buzzwords among those the world over who are deviating from the path of hectic consumerism and material growth.

Steady State Economy One that has reached equilibrium, with a stable population and steady consumption, and few fluctuations in these. Its study is also known as 'full world economics' as propounded by Herman Daly.

Total Capital = Natural capital + manmade capital

Uneconomic Growth A newer term, it denotes poorly planned growth, which has the consequence of a lowered quality of life. Growth without taking the environment into consideration was considered uneconomic by Herman Daly.

Utopia An idealised world, community or society. In the context of ecology, it is a world where we have enough for our needs through a process of harmony with nature; simple living rather than overconsumption; with meaningful work and leisure.

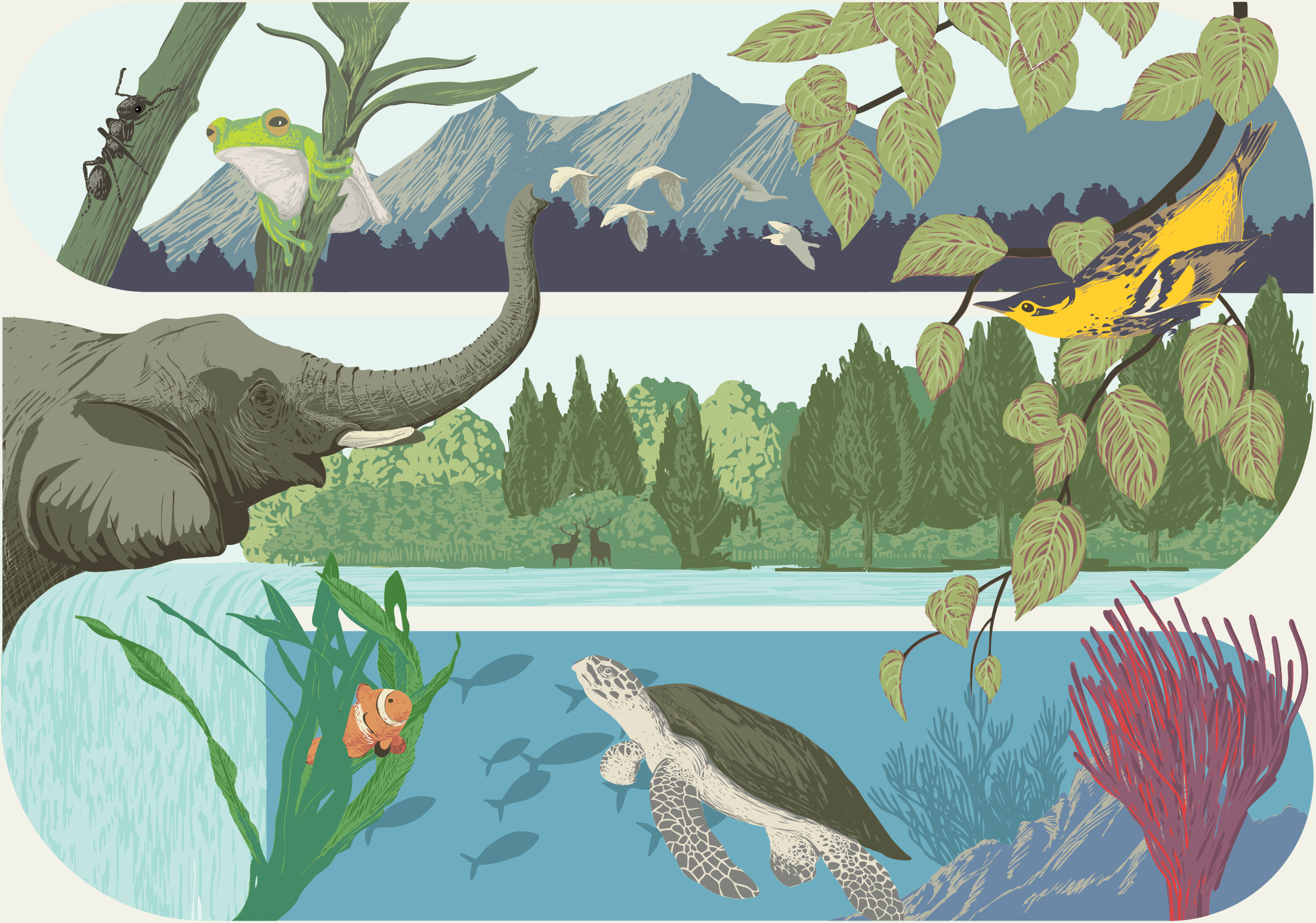
II.

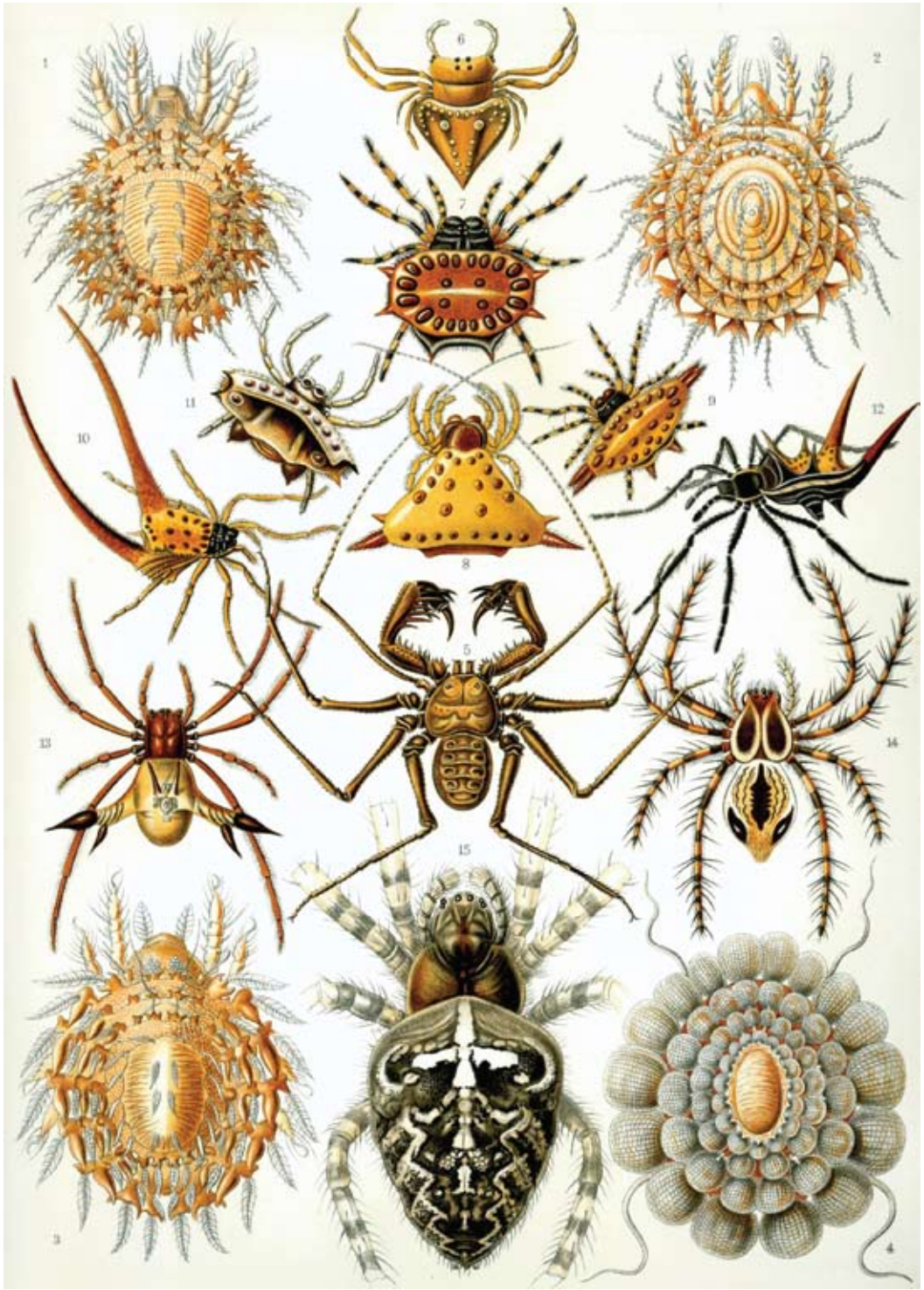
PROPHETS OF THE WILDERNESS

MAN'S RELATIONSHIP WITH NATURE

Thoreau's Walden was a pioneering idea, bringing into focus man's interdependent ties with nature. However, humankind's self-proclaimed emperorship of Earth had been steadily reducing the value we assigned to other species and the environment. We were beginning to take nature for granted. Fortunately, there were others in the Thoreauvian tradition: enlightened conservationists working tirelessly, with scientific rigour and a passion for the natural world, to bring back our understanding of the vital need for that relationship. To underscore what our forefathers had known: that the environment has intrinsic value, not just to fulfill our needs, but in and of itself. Their efforts, writing and activism advocating ecological reform in different areas, have forced governments and people to take notice. From reserving forests and game management theories to education, from shoreline conservation to battling industrial hazards affecting wildlife, their thinking has brought access and understanding to the common man that nature's preservation is, indeed, directly linked to our own.

The interactions between the land, soil, water, plants and animals form an intricate web, its strands spreading outwards, then doubling back on itself before spinning off into a different direction, yet always connected by the fragile threads of life. Humans sometimes forget these connections, isolated and absorbed as we are in our everyday economics of survival and profitability. We need gentle reminders of what we are doing to our world – 'our' being the operative word. Humans and nature: we're all in this together.



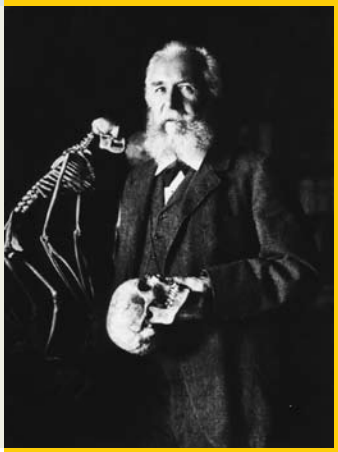


ERNST HAECKEL AND ECOLOGY 1866

Ecology

(from Greek: οικος, "house/environment"; -λογία, "study of") is the scientific study of the relationships that living organisms have with each other and with their natural environment.

Ecology as a science has become crucially important in a world where humans are racing with nature, and unfortunately winning. By helping us understand that evolutionary change happens due to ecological interactions between us and our environments, ecology shines a light on where we are going in our future.



Ernst Haeckel (1834–1919) *who coined many terms in biology including the word ecology, was an eminent German biologist, naturalist, philosopher, physician, professor and artist who discovered, described and named thousands of new species.*

THE SIERRA CLUB
1892

John Muir was the founder of the Sierra Club, one of the first major groups of individuals that came together to preserve nature and the wild. Infused with his ideas on ecological awareness and protection, it is now one of the largest and most effective environmental protection organisations in the US. Over the next few decades, this group of dedicated and influential people would help change policies degrading the ecosystems of the world. The Sierra Club epitomises and executes John Muir's vision in a sizeable way: a vision that has complete relevance more than a century later.

John Muir
(1838-1914)
Explorer extraordinaire. Intrepid adventurer. Father of National Parks. Wilderness Prophet. Citizen of the Universe. Conservationist, Naturalist. Founder and President of The Sierra Club which had a poetic mission: "to make the mountains glad".

The Sierra Club has ridden the wave of conservation for more than a 100 years. It now has more than a million members. They have set up new National Parks, enlarged and protected older ones and created a National Wilderness Preservation System. They have protested rivers being dammed and nuclear reactors being built. They have published books on nature and stopped the Grand Canyon from being flooded, fielding off IRS investigations because they stepped on the wrong toes. They supported the new legislations that sought to protect the environment: the Clean Air Act, the Toxic Substances Control Act and more. Their backing can make the US president feel safer in office and their campaigns have saved Alaskan lands from ruin.

"Thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the mountains is going home; that wildness is a necessity; and that mountain parks and reservations are useful not only as fountains of timber and irrigating rivers, but as fountains of life."

Our National Parks, (1901), chapter 1, page 1.

CONSERVATION IS A STATE OF HARMONY BETWEEN MEN AND LAND

THE SAND COUNTY ALMANAC 1949

Aldo Leopold
(1887 – 1948)

was one of the first conservationists of our modern era, devoted to the field of forestry and wildlife. In his book A Sand County Almanac (which was published posthumously in 1949), he coined the term Land Ethic. This book, through science, history, humour, and prose, extended a philosophical idea into the realm of ecology. It put a moral responsibility on the human race to protect its environment; to recognise that we are ecological beings and to develop an ecological conscience.

Aldo Leopold defined the Land Ethic as an "ethic dealing with human's relation to land and to the animals and plants which grow upon it." His plea was that humans must learn to live in harmony with the land. Expanding the definition of community to include soil, water, plants and animals, collectively calling them 'land', he rejected the idea of land being treated only as an economic factor meant for use and exploitation by humans. Leopold stated, "A land ethic changes the role of homo sapiens from conqueror of the land-community to plain member and citizen of it." By doing an ecological interpretation of history, it was clear to him that so-called economic events were actually 'biotic' interactions between man and his environment.

Leopold encouraged humankind to revel in the personal connection we have to the land and understand that our welfare is closely linked to the health of our environment.

'The Shack' (above) was the site of Aldo Leopold's brave experiment to understand man's equation with nature. He moved his family to the farm, a fairly poor piece of land, to try and make it prosper. They lived a basic existence off the fruits of nature in true Thoreauvian fashion, creating a garden and planting thousands of trees. Nowadays, the Aldo Leopold Foundation's projects happen at The Shack, where people can learn to evolve their ecological conscience.

American Flamingo, The Birds of America

THE AUDOBON SOCIETY 1905

Inspired by James Audobon, an ornithological group called the National Audobon Society was begun by George Bird Grinell in 1886. The protection of birds and their eggs still features on the agenda of this major conservation organisation through collaborations with scientists and academicians as well as a highly successful online database called eBird developed in association with Cornell University for bird observation. Over the years, the Society has moved into other areas: the promotion of renewable energy, the protection of coastlines and core habitats in the US as well as spearheading the fight to stop whaling. Audobon staff and members aided the creation of US environmental laws such as the Clean Air, Clean Water, and Endangered Species Acts. The Society played an active part in rescuing birds affected by the British Petroleum oil spill in the Gulf of Mexico, as well as being on the forefront of the demand that BP oil spill penalties be used to rebuild the Gulf Coast.

Trumpeteer Swan, The Birds of America

John James Audubon (1785 – 1851) *was a famous ornithologist and naturalist who wrote and beautifully illustrated the classic book, Birds of America. The work consists of hand-coloured, life-size prints, made from engraved plates, measuring around 39 by 26 inches. It includes images of six now-extinct birds: Carolina Parakeet, Passenger Pigeon, Labrador Duck, Great Auk, Esquimaux Curlew, and Pinnated Grouse.*

SIDEBAR 4

Species Under Threat Globally

Endangered or vulnerable

No. of species evaluated

Critically endangered (where known)

21% of 5,490 Mammals

28% of 1,678 Reptiles

37% of 3,120 Freshwater Fish

12% of 9,998 Birds

70% of 12,151 Plants

35% of 7,615 Invertebrates

30% of 6,285 Amphibians

THE E.O. WILSON BIODIVERSITY FOUNDATION

Edward O. Wilson (born 1929) is one of the world's foremost biologists and conservationists, and is also a Pulitzer-winning writer. He is the world's leading authority on ants, and one of the biggest champions of the Earth's vast and complex biodiversity. Enriched by E.O. Wilson's commitment and breadth of knowledge, the Foundation was started in 2005. Using new media and modern tools of dissemination, it seeks to spread word globally about the crucial need to preserve our biological heritage. It's a non-profit initiative that evolves education, technology and business strategies to accomplish its goals. The Foundation has also undertaken to revive, preserve and strengthen natural life at the Gorongosa Preserve in Mozambique through a series of programmes. A digital textbook created by the Foundation called Life on Earth crosses the boundaries of two-dimensional teaching. The idea is to make biology and the study of biodiversity exciting and accessible, let young people understand how important each species on Earth is, and how bereft the world would be without that multitude of life.

Since life first began on Earth almost 4 billion years ago, there have been five major extinctions. The sixth is happening right now—and it is caused by humans. You may well ask, so what? The E.O. Wilson website has an answer:

"Why should we care? Let me count the ways. New sources of scientific information will be lost. Vast potential biological wealth will be destroyed. Still undeveloped medicines, crops, pharmaceuticals, timber fibers, pulp, soil-restoring vegetation, petroleum substitutes, and other products and amenities will never come to light. It is fashionable in some quarters to wave aside the small and obscure, the bugs and weeds, forgetting that an obscure moth from Latin America saved Australia's pastureland from overgrowth by cactus, that the rosy periwinkle provided the cure for Hodgkin's disease and childhood lymphocytic leukemia, that the bark of the Pacific yew offers hope for victims of ovarian and breast cancer, that a chemical from the saliva of leeches dissolves blood clots during surgery, and so on down a roster already grown long and illustrious despite the limited research addressed to it."

LAWS OF THE FOREST

Governments historically have sought to restrict use of certain areas of forests and wild lands. The original purposes for which these laws were made and forests reserved naturally differed from nation to nation, in the context of the political developments of the time. The State taking ownership of such vast tracts of land and its produce opens up an arena fraught with questions and conflicts.

INDIAN FOREST ACT 1878, 1927

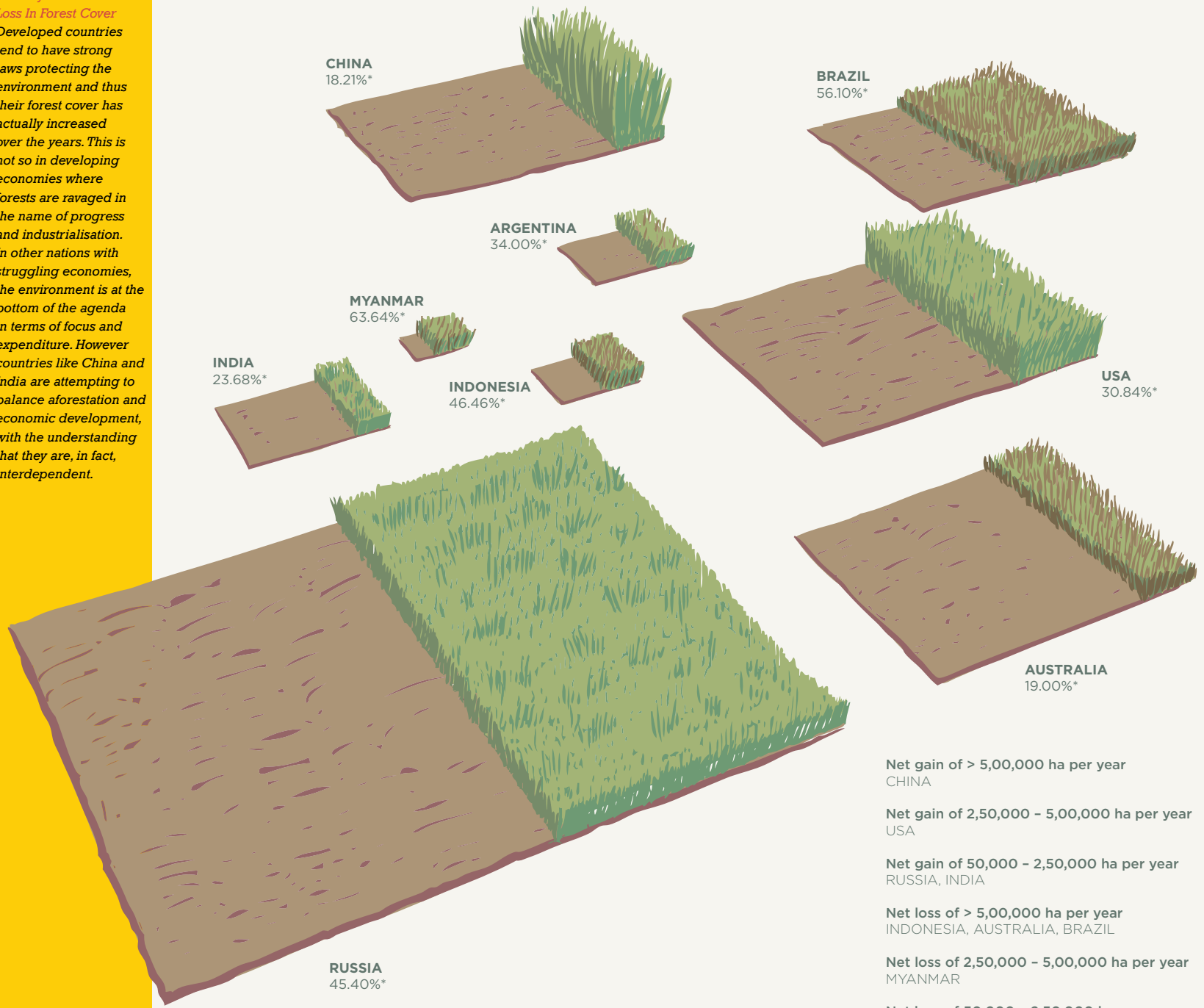
In India, the first Indian Forest Act was passed in 1878 (and amended in 1927) by the British to "consolidate and reserve the areas having forest cover, or significant wildlife, to regulate movement and transit of forest produce, and duty leviable on timber and other forest produce." The Act also divided up forest lands into Reserved, Protected and Village Forests, laying down the rules of use for each. Legal historians and environmentalists are divided on whether this act was conservationist in its bent, or merely a tool for colonial powers to gain control of timber-rich lands, wresting ownership from the tribal peoples for whom the forests were heritage, home and livelihood, and in whom customary rights to the land rested. The law was implemented by the different states of India, each of whom enacted their own forest legislation. Penalties for contravening its provisions were laid down and officers appointed for executing them.

Independent India chose to adopt this same law which merely passed on the strong control over forest lands to government officials, who in turn settled them on powerful or moneyed landlords. The tribal people, true inheritors and protectors of the forests, who possessed community knowledge of forest management and sustainable use were sidelined till several decades later. (see Forest Rights Act)

SIDEBAR 5

Countrywise Gain And Loss In Forest Cover

Developed countries tend to have strong laws protecting the environment and thus their forest cover has actually increased over the years. This is not so in developing economies where forests are ravaged in the name of progress and industrialisation. In other nations with struggling economies, the environment is at the bottom of the agenda in terms of focus and expenditure. However countries like China and India are attempting to balance aforestation and economic development, with the understanding that they are, in fact, interdependent.



* % of land area that is forest

FOREST RESERVE ACT, USA 1891

In the USA, the putting aside of lands in the public domain as National Forests began in 1891 under the aegis of the Forest Reserve Act. Over the next century, millions of hectares were added to this Reserve and a special force, the Forest Service, was established to enforce its rules. The protection and preservation of natural resources and biodiversity from human despoiling as well as natural degeneration was the primary aim of the law. It sought to maintain the productivity of the forests for future generations by prohibiting all access to these lands. Somewhere along the way, the importance of letting human beings interact with the wild was understood and appreciated for its recreational potential, and multiple use of forests was initiated and careful amendments were made allowing for its restricted use by people for activities like hiking, camping, fishing, hunting, and horse riding.

SUSTAINABILITY SPEAK

Adaptive Capacity The ability of a species to adjust, live and reproduce in relation to changes in stimuli and environmental conditions.

Biodiversity The variability among living organisms from all sources including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, among species, and of ecosystems. (definition from The Convention on Biological Diversity)

Biosphere A coming together of all the ecosystems of the world. In a nutshell, it means the total space where living things exist and relate to each other on Earth, a self regulating global ecological system. The term was coined by Eduard Seuss in 1875.

Biotic Community A group of organisms that inhabit the same region, interacting with, and interdependent on each other. A biotic community typically consists of 'producers', 'consumers' and 'decomposers'.

Ecosystem The entire community of plants and animals and the physical environment they live in, comprehensively interdependent on each other for sustenance.

Ethics Standards of right and wrong as proscribed by society in order to avoid anarchy and chaos. They comprise rights as well as duties, values and prohibitions, and are the lodestar of the moral compass of a human being.

Green Oscars Also known as the Whitley Awards, (as they were instituted by the Whitley Fund for Nature) these honour people across the world who have contributed significantly to regional or global conservation efforts. They were first given out in 1994.

Holocene The current geological period of the Earth's history. It started after the last ice age, around 12000 years ago.

Overexploitation The unsustainable and irresponsible use of natural resources including plants, animals, land, water and air for human purposes. Overuse can lead to extinction of species, a domino effect in the ecosystem.

Protected Forests Partially restricted-use forests defined by the Indian Forest Act, 1878. The State Government can demarcate them and has proprietary rights over them.

Rainforest Alliance A non-profit organisation that works to preserve biodiversity and protect ecosystems, while still ensuring sustainable livelihoods and profits for businesses and communities. The idea is that humans and the environments can both benefit, exist and prosper together.

Reserved Forests The most restricted category in the Indian Forest Act, 1878. Reserved Forests are set aside by the Government out of waste or public lands. In these areas, most uses by local people are prohibited, unless specifically allowed by a Forest Officer in the course of settlement.

Tree of Life A symbol of many cultures, religions and mythologies denoting the connections between, and common evolutionary source of all lifeforms on Earth. The Tree of Life Web Project is an effort to provide an online database of biodiversity.

Village Forests In which, according to the Indian Forest Act, 1878, the State Government may assign to 'any village community the rights of Government to or over any land which has been constituted a Reserved Forest'.

III.

LIVING WITH THE SPARROWS

CONFLICTS AND COLLABORATIONS

It is only since the major religions of the world buried the animistic ones, that human beings have stopped worshipping nature, trying to control it instead, and colliding with its force. Yet dregs of this respect remain among indigenous peoples who continue to follow the centuries-old ways of their ancestors: working and living off the produce of nature, yet re-generating its riches for future use. All through processes that are simple, non-industrial, but productive and self-sustaining: because they are in tune with nature, instead of locking horns with it.

Till very recently, the trend was to label these folks 'backward' and try to bring them into the mainstream of 'modernity'. Their common resources (homes, pastures, forests, medicinal plants, livelihoods) were taken away from them, and a framework of legal or governmental controls imposed. Fortunately in recent years, after long battles between the powerful and the dispossessed, between governments and tribal communities, between mechanisation and natural farming, we have come to recognise the value and productivity of these ancient practices.

This knowledge has now slowly begun to be applied to urban life as well. Smart cities, urban ecology and green communities have started to integrate old practices with new ideas that work across rural-urban, economic and geographical divides. None of this, however, would be possible without a surprise actor on the stage of environmental action: technology. Saving energy, generating alternate options to fossil fuels, allowing new ways of sustainable living without losing out on the comforts of 21st century existence, technology, if used well and with the right intention, can be our ecological saviour. We've got our eye on the sparrow, but we can see it so much better with a zoom lens.

SILENT SPRING
1962

Over 50 years ago, Rachel Carson's lyrical book Silent Spring eloquently made a strong case against the use of pesticides, mainly DDT. She proved, through meticulous research, that the chemicals used in pesticides kill insects, but at great cost, eventually finding their way into the fragile food chain affecting birds, animals and perhaps even humans: causing irreparable natural imbalances. Going beyond the DDT debate, she derided humankind's arrogance in thinking we could control nature. When Silent Spring was published in 1962, it spawned the idea of environmental consciousness among ordinary American people. It also challenged the agriculture and industrial practices of the time and raised many powerful hackles. However, the book was publicly supported by President John F. Kennedy, who set up a panel to examine its findings. The panel validated Carson's claims and suddenly, governments were accountable to the public about the impact their policies had on the environment, something we now take for granted.

The impact of Silent Spring has been enormous. Rachel Carson, quiet naturalist, who was herself dying of cancer, inspired generations of 'citizen-scientists' like herself: grass root organisations made up of ordinary people who believed that all life was precious and that nature could not be controlled by man without irreversible effect. Indirectly through her efforts, the Clean Air and Water Acts were enacted, Earth Day was established, and the Environmental Protection Agency founded in the US.

IT IS IRONIC TO THINK THAT MAN MIGHT DETERMINE HIS OWN FUTURE BY SOMETHING SO SEEMINGLY TRIVIAL AS THE CHOICE OF AN INSECT SPRAY.

RACHEL CARSON

THE CLEAN AIR ACT 1963

One of the earliest and most far-sighted environmental legislations was the Clean Air Act enacted by the United States Congress. It signalled an attitude shift towards regulating air quality standards and their compliance by the government, spearheaded by the writings and activism of leading conservationists and organisations including Rachel Carson, the National Audobon Society and the Sierra Club.

1963 CLEAN AIR ACT IS PASSED

1970 Amendment
Empowered the Environment Protection Agency (EPA) to set standards, regulate and enforce rules for air pollution.

Allowed 'citizen suits'. Ordinary people can file suits against violators of the law, including government agencies. (This clause has lead to some of the biggest collective action-driven breakthroughs in the sustainability movement.)

1990 Amendment
Included acid rain and the depletion of the ozone layer under its ambit, regulating the use of fluorocarbons.

Made catalytic converters and cleaner fuels mandatory to control auto emissions since the number of vehicles had increased exponentially

Made stronger, more specific goals of reducing toxins in the air.

Created higher safety standards for industries using or producing toxic chemicals.

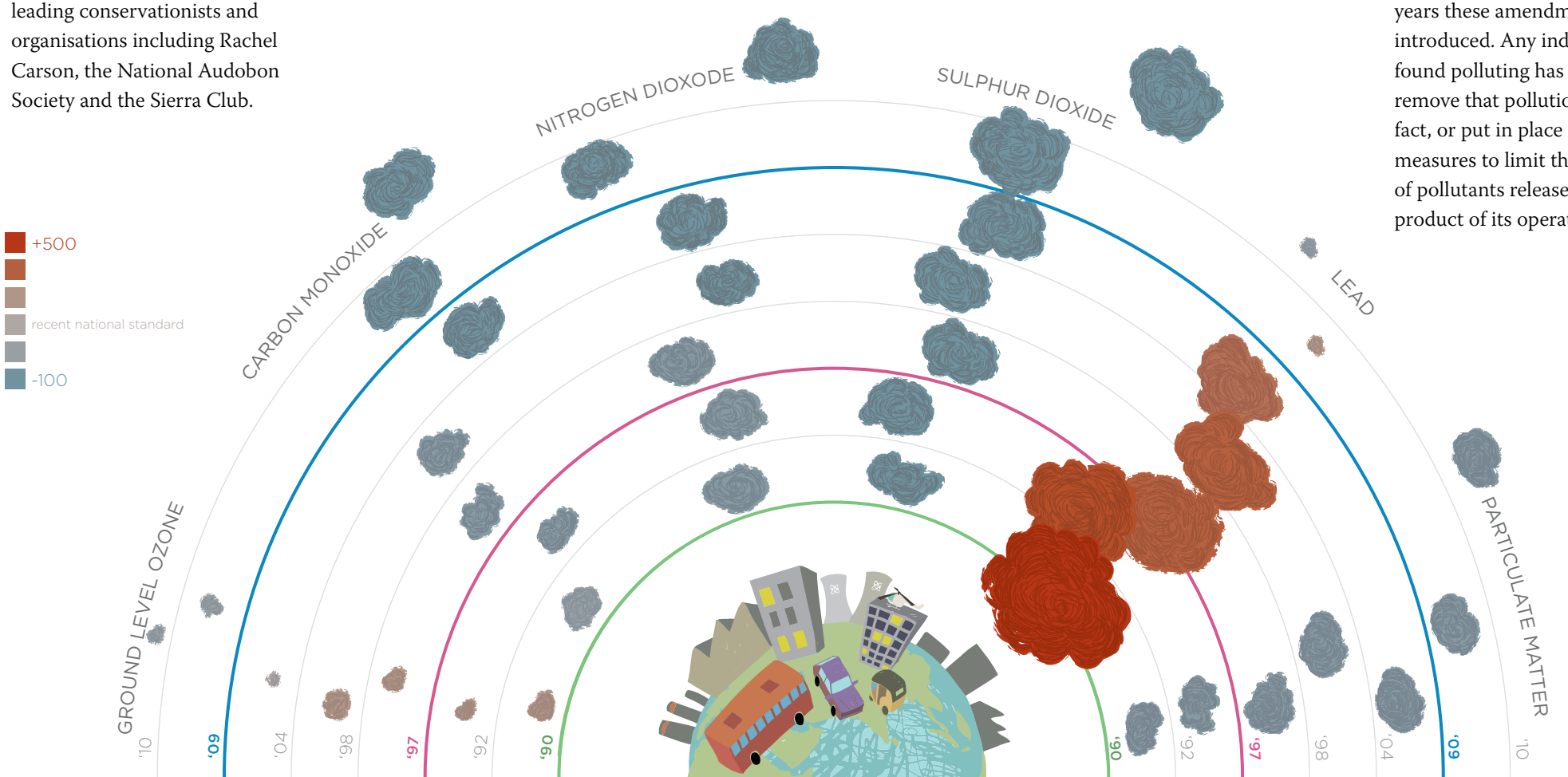
Gave enforcing agencies sharper teeth.

1997 Amendment
Focused on controlling ozones and particulates.

Motor and heavy industries were forced to learn to innovate new, greener technologies, leading to a cleaner environment altogether.

2009 Amendment
Introduced global warming into the doman of the Clean Air Act to control emissions that create heat waves and more ground level ozone pollution, as well as extreme weather events.

Through a series of enlightened amendments, this law has kept pace with the growth of industry, technology and consequent environmental issues, including global warming. The years that show the greatest drops in air pollution levels in the US coincide with the years these amendments were introduced. Any industry found polluting has to either remove that pollution after the fact, or put in place preventive measures to limit the amount of pollutants released as a by-product of its operations.



TRAGEDY OF THE COMMONS 1968

The attitude of the newly independent Indian Government towards management of the country's forests can perhaps be attributed to a thread of thinking popular at the time. Garrett Hardin, in his book Tragedy of the Commons (1968) discussed a situation that had been prevalent for centuries.

Hardin's hypothesis is applicable to a host of modern contexts in environmentalism: starting with overpopulation, and including overfishing of the Earth's oceans and rivers, clearing of the rainforests, air pollution by vehicles, burning fossil fuels, eliminating animal and plant habitats and so much more. So what's the solution if we can't be trusted to think long-term? Hardin advocated governmental control of resources (as happens with the formation of national parks and reserves) or privatising them. These are both problematic: an authoritarian model of governance means taxes on the use of resources, permits and licenses to limit their use and legally enforceable standards, for example in the case of pollution. These are often seen to lead to further exploitation. Also, they do not take into account local people losing their rights over resources they have managed for centuries, being overridden by Western/capitalist systems of environment and economics. Similarly, privatisation does not necessarily lead to sustainable practices: profit becomes a major motive, unless accompanied by measures and controls, which again involve outside forces.

"A managed commons, though it may have other defects, is not automatically subject to the tragic fate of the unmanaged commons."

Garrett Hardin

COMMON PROPERTY GOVERNANCE

Elinor Ostrom
(1933 – 2012)

was a Nobel Prizewinner, economist and political thinker, and a pioneer in the area of commons governance. Her research and writings continue to be used extensively to support the sustainability movement's thrust towards local self-governance by communities.

In her book 'Governing the Commons: The Evolution of Institutions for Collective Action', Ostrom suggested that no outsider can understand local conditions as well as the people who live them everyday. And so, the responsibility of governance, ie rules and enforcement mechanisms, as well as monitoring and sanctions, of Common Property Resources (CPR) must be left to the community itself. Although this is a time consuming, sometimes expensive process, it is richly rewarding, and much more fruitful than handing over control to outsiders, she asserted. It would be the foundation of long term, 'durable and resilient' resource management. She brings up examples of successful self-governing commons systems that have lasted for centuries, like grazing and forest use in Switzerland and Japan, and irrigation systems in Spain and the Philippines. If certain conditions are favourable, like clearly defined boundaries, simple, modifiable rules that everyone can understand, graduated sanctions, monitoring and good conflict resolution mechanisms, Ostrom asserts that Common Property Resource management can survive well and endure.

"Our wood continues to go outside and we can do nothing," one of the village women complained. "They say it's dry wood, but we know what's going on. We could have used the dry wood ourselves." Asked why Chipko cannot be revived, she replied, "What did we get out of the first one? Now they have made this area the Nanda Devi biosphere reserve and I can't even pick herbs to treat a stomach-ache."

http://www.downtoearth.org.in/node/30880 (circa 1991)

FOREST RIGHTS ACT 2006

- Grants legal recognition to the land and use rights of traditional forest dwelling communities.
- Recognises their right over forest produce, fishing, grazing etc.
- Makes a beginning towards giving communities and the public a voice in forest and wildlife conservation.
- Empowers village bodies such as gram sabhas to govern and conserve their forests. Tribal rights must be settled before any land is transferred for commercial or government purposes.

The Indian Forest Laws, enacted as they were by the British to further their own agendas, were hopelessly flawed and discriminatory to the traditional dwellers of the forests. Deprived of their livelihoods and homes, these communities became steeped in poverty, their traditional knowledge and agricultural systems marginalised. Even after Independence and revolutions such as the Chipko Movement, because of the formation of National Parks and protected forests, they could not access the forest or its produce, not even for medicinal plants, or personal use. Worse still, deforestation and exploitation of natural resources by vested interests became rampant, throwing out these guardians of the forests and their generations-old sustainable ways .

To correct this injustice, and give a way of life back to the tribal people and original dwellers of the land, an unusual and strong law was needed. The Forest Rights Act was passed in 2006 after much struggle and debate. This law was applicable to people who had resided in or depended on forests and forests lands for their livelihoods for 75 years, or were forest dwelling Scheduled Tribes.

The Act has been used for much good. However, there are still loopholes. The timber mafia and land grabs are commonplace and biodiversity is still being threatened along with people's livelihoods. There is a demand for the Forest Rights Act to be given stronger teeth to battle the corruption that has denuded the environment and disempowered whole communities for the sake of economic gain.

Besides being an integral source of livelihood, trees are culturally and emotionally connected to the ethos of many tribal peoples. In the 18th century, women of the Bishnoi tribe of Rajasthan sacrificed their lives to save their trees from being felled by the Maharaja of Jodhpur. The Chipko movement imbibed this heritage as well as Gandhian notions of ahimsa and satyagraha to protect the forests from logging and other corrupt interests.

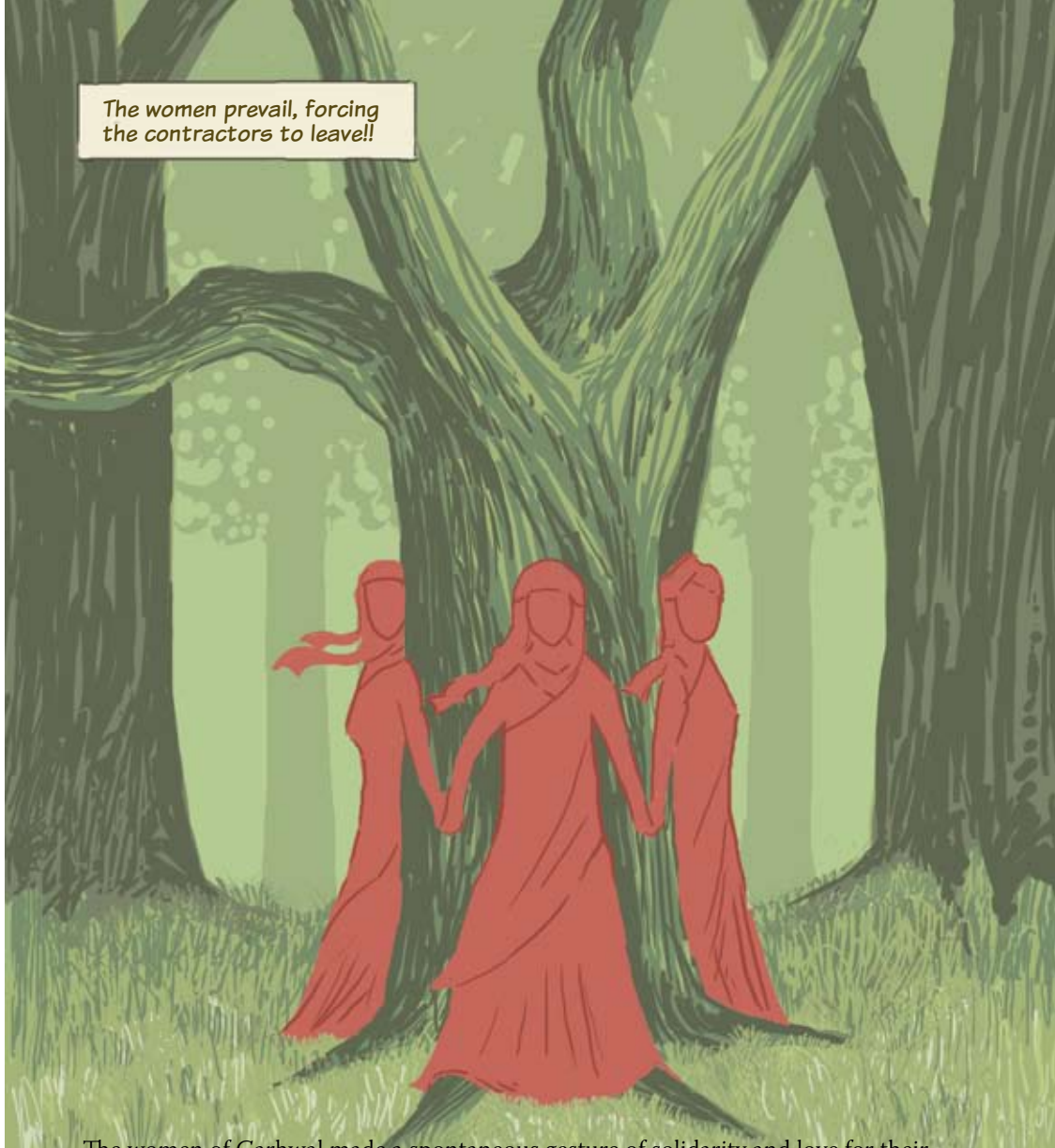
THE CHIPKO STORY

March 26th, 1974. The little village of Reni stirs from its slumber. But danger lurks nearby, rolling in on trucks filled with men and axes, men and saws...

The soil is ours, the water ours,
Ours are the forests too,
Our forefathers planted them all
Who will protect them? Me and you! *

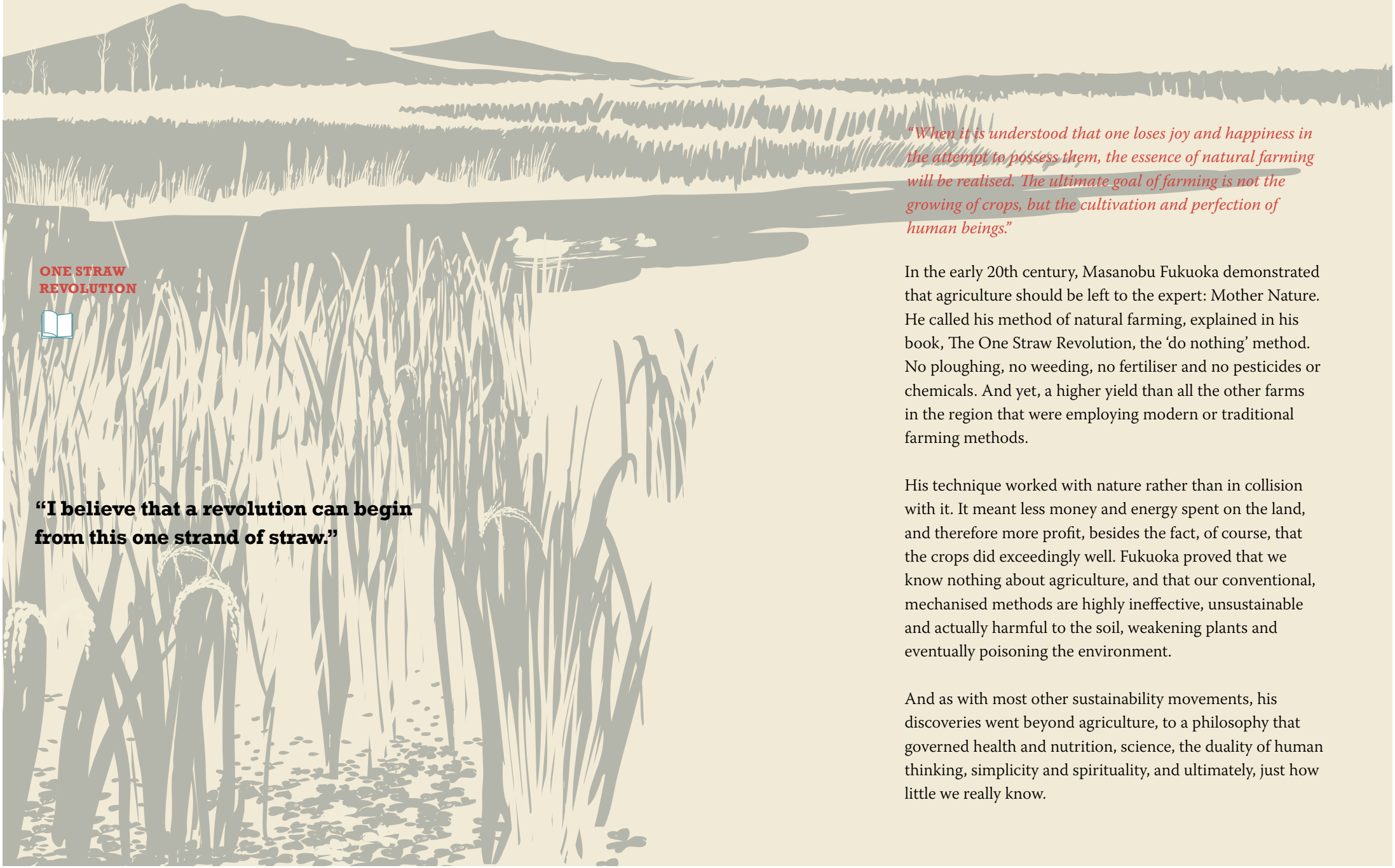

The women are about their daily chores, enjoying the early morning spring sun, the cool shade of the forest behind them. The men have been lured away to Chamoli village to discuss government compensation for acquired lands.


We have risen,
we are awake
No longer will thieves
rule our fate
No longer will others
decide for us
It is our home,
our forest at stake! *



The women of Garhwal made a spontaneous gesture of solidarity and love for their forest. They embraced their trees. (chipko means to stick). Their act became a symbol of hope that spawned an avalanche of eco activism against deforestation and conservation, forming the bedrock of the Chipko Andolan, inspiring movements across the world. With leaders like Chandi Bhatt and Sunderlal Bahuguna, and slogans like 'ecology is permanent economy' it turned political will towards forest policies that were pro-people. The wealth of the forest would be used for the people of the forest.

* *Chipko Andolan protest song, translated from the Garhwali dialect*



ONE STRAW REVOLUTION

“I believe that a revolution can begin from this one strand of straw.”

“When it is understood that one loses joy and happiness in the attempt to possess them, the essence of natural farming will be realised. The ultimate goal of farming is not the growing of crops, but the cultivation and perfection of human beings.”

In the early 20th century, Masanobu Fukuoka demonstrated that agriculture should be left to the expert: Mother Nature. He called his method of natural farming, explained in his book, The One Straw Revolution, the ‘do nothing’ method. No ploughing, no weeding, no fertiliser and no pesticides or chemicals. And yet, a higher yield than all the other farms in the region that were employing modern or traditional farming methods.

His technique worked with nature rather than in collision with it. It meant less money and energy spent on the land, and therefore more profit, besides the fact, of course, that the crops did exceedingly well. Fukuoka proved that we know nothing about agriculture, and that our conventional, mechanised methods are highly ineffective, unsustainable and actually harmful to the soil, weakening plants and eventually poisoning the environment.

And as with most other sustainability movements, his discoveries went beyond agriculture, to a philosophy that governed health and nutrition, science, the duality of human thinking, simplicity and spirituality, and ultimately, just how little we really know.

THE OBERLIN PROJECT 1966

David Orr
(Born 1944)
is a writer, thinker, speaker and environmentalist extraordinaire, and one of the most rational and respected voices in the environmental movement today. His books have been read by millions, and his radical ideas on education for the 21st century are being taken very seriously indeed. He teaches at the Oberlin College in the US, and is an advisor to the Obama government on their green policy.

David Orr asserts that most environmental problems result from poor design: "factories that produce more waste than product; buildings that squander energy; farms that bleed soil; cities designed to sprawl..." In 1996, Orr spearheaded the building of the first fully green building on a U.S. college campus. The Adam Joseph Lewis Center for Environment Studies was born out of a vision to achieve 'full spectrum' sustainability. The result was an ecologically engineered building with solar panels on the roof; energy-efficient lighting, heating, and appliances; geothermal heating and cooling. It contained a "Living Machine" to treat and recycle the building's wastewater; a weather station and more. The interiors were made from sustainable materials like biodegradable upholstery, recycled beams and recycled plastic chairs, and low-VOC paints and adhesives. The Centre was named by the U.S. Department of Energy as "One of Thirty Milestone Buildings in the 20th Century."

At the Oberlin College where he teaches, Orr has worked with the community to develop the Oberlin Project. This is a unique initiative meant to be self sustaining many years into the future. It depends on renewable sources of energy, has a Green Arts District, a huge green belt to kickstart local farming, impetus on local businesses, efforts to achieve neutral climate and most importantly, make a space for Orr's pet project – a new and integrated approach to education, where principles of ecological awareness and environmental protection are woven into what children learn at school, college or vocational training centres in preparation for a future of scarcity. All this through a sustainable economic model, able to be replicated anywhere.

ENERGY EFFICIENCY

Amory Lovins
(born 1947)
is a champion of energy efficiency via technology. He is the Chairman and Founder of the Rocky Mountain Institute, which studied sustainability and resource-use. A scientist and writer as well as an avid environmentalist, his deep knowledge about energy has helped American industrial giants like Texas Instruments and Walmart improve their energy use practices and save money in the process.

That nature's preservation and human advancement need not be mutually exclusive, is Amory Lovin's firmly held belief. He also believes that we can maintain our standard of living with all its comforts, yet save the planet – if only we use technology the right way. His campaign for the 'soft energy path' meaning the use of technologies like geothermal, solar and biofuels etc replacing non-renewable fossil fuels like coal, has impacted the resource policies of the US and other nations from the 1970s on. He is the inventor of the Hypercar, an ultra efficient mode of transport. His new book 'Reinventing Fire' engineers a rethink of four sectors of the economy that are traditionally energy-intensive: transportation, buildings, industry and electricity. His solutions are never at the cost of economic growth, but add to it; for example, his focus on making electricity use more efficient ends up with saving enormous amounts of money. He says that tech innovations by large companies are the way forward – cutting electricity bills as well as saving the Earth. All we need, he says, is awareness of how and where to access the best energy 'buys'.

The Negawatt was a concept introduced by Amory Lovins, a theoretical unit of power measuring energy saved. The idea was that it would help cut down electricity consumption without changing energy usage, simply by making the use more efficient and modernising power sources, an idea revolutionary at the time.

"Imagine being able to save half the electricity for free and still get the same or better services!... You get the same amount of light as before, with 8 percent as much energy overall – but it looks better and you can see better... It is doing more with less."

SIDEBAR 6

Smart Cities

As human cities expanded, they seemed to lose their communal nature, becoming teeming conglomerations of commerce. Lewis Mumford was one of the earliest observers of these urban patterns, and certainly one of the first to think of urban planning and architecture in the context of social policy and ecology. Shunning the bricks and mortar, technological and economic dehumanisation of urban culture, he wrote that it "be brought into harmony with humanistic goals and aspirations." He believed the essence of cities to be formed from human relationships. Mumford propounded the idea of sustainable regional cities planned rationally and ecologically, to solve the problem of metropolitan congestion. These cities would have residential, cultural, commercial and industrial components existing in harmony with each other, and be surrounded by a green belt. The creation of 'smart cities' is a 21st century idea, but greatly influenced by the smart urbanism of thinkers like Mumford. These far-reaching ideas are crucial: in the next forty years, two-thirds of the world's population are expected to be urban dwellers.

SUSTAINABILITY SPEAK

Apatanis and Sustainable Agriculture Somewhere in the north eastern Indian state of Arunachal Pradesh, a centuries-old agricultural practice is followed that produces a more consistent and quality yield than modern farming practises. Eschewing the usual practise of jhum or shifting cultivation, the Apatani tribe combines paddy, rain fed farming with fish cultivation, leading to an energy saving and economically efficient agro ecosystem.

Arcologies and Arcosanti Buckminster Fuller's famous geodesic domes inspired a chain of artificial habitats. Arcology (a combination of the words ecology and architecture) was the theoretical basis for a project undertaken by architect Paolo Soleri to construct giant 'hyperstructures' for humans to live and work in collectively, self sufficient and environmentally friendly in nature. Arcosanti is a town in Arizona established by Soleri to demonstrate environmentally sound living that does not destroy the Earth.

Carbon Dioxide Equivalent A method to measure the impact of greenhouse gases on global warming using the amounts of carbon dioxide present as reference.

Carbon Neutral Human activities like planting trees, waste or water recycling, power conservation etc, that help cancel out the detrimental effects of greenhouse gases on the Earth's atmosphere by reducing CO2 emissions by the same amount.

Commons All the common natural resources owned by the community as a whole, not individually. Can include forests, lakes, rivers, fisheries, grazing land, the atmosphere etc.

Corporate Responsibility Taking on of social, economic or environmental responsibilities by corporations to balance the impact of their other processes on society and the planet.

Eden Project An ambitious project started in 2005 in Cornwall, UK which created artificial domes that emulate natural environments. The tropical, warm temperate, and Mediterranean environments are up and running, and open to visitors.

Environmental/ Industrial Disasters Catastrophes caused by man's interference with nature as opposed to natural disasters.

Green Buildings A structure built entirely in an environmentally friendly way, from materials used, site chosen, design, and construction processes. It is also usually energy, water and power efficient, as well as reducing pollution and waste.

Greening the Supply Chain Indicates a company or organisation that amends its supply chain practices in order to improve environmental outcomes, for example, reducing its number of suppliers.

Greenwash A term that was coined to describe token gestures made by organisations to appear environmentally responsible in the public eye.

Industrial Agriculture Mechanisation and industrialisation of agrarian practices. The method treats the farm as a factory with inputs and output, replaces manual labour and solar energy with machines and chemicals. It has been found to be vastly less effective than the old fashioned way.

Light Urbanism A light, 'off the grid' model of urbanism, located south of Rotterdam, involving making the roads and infrastructure of the estate 'lighter' allowing room for cleansing swamps and natural drainage-systems. Mobile phones and an electric grid connected to local alternative energy sources, water purification systems in each garden and more. Proposal by MVRDV and Jon Kristinsson. *Source: smartarchitecture.org*

Urban Ecology The study of living organisms and their urban environment. It delves into how human cities, nature and ecological processes can co-exist in a sustainable manner.

Water Footprint The total amount of water used for the production of goods and services consumed by a community, organisation or country.

Whole Earth Catalogue Collated by Stewart Brand, this is a directory of information and tools to help people create sustainability within their own communities.

IV.

A WORLD IN ACTION

A COLLECTIVE CONSCIOUSNESS

Ever since Rachel Carson's quiet but damning revelations, the modern world has started to tune its collective antennae towards the environment, and its protection. As the picture gets clearer, we see a multitude of committed initiatives working to right the wrongs of the last century. From tiny, individual efforts like switching to CFLs to villagers protesting big dams, from campaigns by bodies like Greenpeace with their arguably aggressive methods, to the United Nations' unique model of governmental co-operation, the world is waking up.

The activism and effort is diverse: awareness and sustainability education, lobbying governments, getting them to adhere to limits on emissions or effluents, raising funds for grassroot efforts, publishing papers, furthering technical knowledge, changing policy towards industry and development. On the other hand, the internet and social networking sites have facilitated a different sort of revolution, spreading information at breakneck speed, aligning people to causes by evocative words and pictures, (remember the image of the tribal chief weeping at the loss of his rainforest that went viral?) and simply by allowing people who think alike, or are suffering the same tribulations, to connect and share strategies to combat unsustainable practices.

We have come a long way but we're still wearing away our planet's health. Although this section mainly dwells on UN treaties, policies and programmes governing research, assessment, understanding and action, the remarkable progress made by private players must be lauded. All working together, we might stand a chance.

Okpilak Glacier, Alaska. June, 1907 and August, 2004

ONLY AFTER THE LAST TREE HAS BEEN CUT DOWN. ONLY AFTER THE LAST RIVER HAS BEEN POISONED. ONLY AFTER THE LAST FISH HAS BEEN CAUGHT. ONLY THEN WILL YOU FIND THAT MONEY CANNOT BE EATEN.

CREE INDIAN PROPHECY

The Earth has been warming up for millions of years in tiny, graded amounts, allowing life to emerge after freezing ice ages. Greenhouse gases or GHGs have played a role in keeping the temperature constant. The major percentage of these gases are absorbed and dissipated through natural processes. However, since man started on his path of industrialisation 150 years ago, levels of GHG's and carbon dioxide (the primary GHG released by man's activities) have increased by nearly 25 percent. The levels are projected to double in the next 50 years. Nature, and even its complex, efficient carbon cycle just can't keep up.

Why is this happening? It's because of our increased burning of fossil fuels, i.e. coal, oil and natural gas which we use for transport, industry, travel, food and goods production and almost every other activity we do as human beings. And so the Earth has become far warmer than it should ideally be. If this is allowed to continue unchecked, the climate on this planet will change. Agricultural cycles will alter. Human health will suffer. The seasons will shorten or lengthen. And natural catastrophes will become more and more frequent.

However, all is not lost. If we can keep emissions at the same rate for the next few decades, we might just make it. If we use efficient and renewable resources more and fossil fuels less, we might have a chance. This means technology needs to find ways, multipronged strategies to combat that which we cannot change, and provide us the energy we need to survive without sucking the Earth dry. This is anthropogenic climate change. Climate change that *we*, as a global community, have caused. We need to get together to fix it.

THE BRUNDTLAND COMMISSION REPORT, 1987

Also known as Our Common Future, this UN document will go down in world history as the source of the most widely accepted definition of sustainability:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition was important because it put economic development and the environment on the same platform for the first time, to be discussed as an internationally imperative political issue. In its findings, the report asserted the equal importance of growth and sustainability.

It also, for the first time, introduced the concept of social equity into the reckoning, bringing in differential responsibility between developed and developing nations. Its focus was alleviating the human populace, edging them into a participative prosperity.

The commission was headed by Gro Harlem Brundtland, the former Prime Minister of Norway.

THE MONTREAL PROTOCOL, 1989

In the same year, another extraordinary document was being prepared. It took cognisance of scientific discoveries about the depletion of the ozone layer, and the substances that cause the damage. 2 years later, the Montreal Protocol on Substances that Deplete the Ozone Layer (attached to the Vienna Convention for the Protection of the Ozone Layer) was adopted and signed by over 200 countries, making it one of the most successful examples of global environmental co-operation. The Protocol underwent 7 revisions after coming into force and is expected to yield very good results if its rubrics are imbibed.

The Montreal Protocol is unique because of several reasons:

- It contains a provision that allows rapid adjustments to its original provisions based on emerging scientific and economic evidence about ozone depleting substances. The adjustment

then becomes binding on all the countries that have signed the treaty. (this was such a successful idea that subsequently, the Rio Conventions borrowed it.)
- It contains a financial mechanism that enforces compliance from nations
- It ensures funding and implementation based on equitable principles
- It enables technology transfers from developed to developing nations

FIRST ASSESSMENT REPORT (FAR), 1988

In 1988, the UN began to formulate a strategy to assess, understand and deal with the climate change and environment imbalances we had caused. The Intergovernmental Panel on Climate Change (IPCC) created under the UN Environment Program, was one of the major vehicles for this, its first task being to prepare a report using scientific and socio-economic data available from governments and hundreds of international experts. The report, and the others after it, underwent an extensive review process to ensure veracity, integrity and transparency of the information contained in it.

The First Assessment Report prepared by the IPCC became a source and a foundation for the United Nations Framework Convention on Climate Change (UNFCCC) introduced at the Rio Summit, which in turn is an integral part of the UN's environmental protection plan.

RIO SUMMIT, 1992

The UN Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, was also known as the Rio Summit or the Earth Summit. The first of its kind, it was a huge conference of world leaders, policy and decision makers and environmentalists, coming together to tackle a common threat to life on Earth: human activities. The treaty sought to find ways to lessen the adverse effects of these activities on the planet.

Three conventions came out of the Rio Summit to promote what was now being called 'sustainable development', thanks to the Brundtland Commission. They were:
- The United Nations Framework Convention on Climate Change (UNFCCC)
- The UN Convention on Biological Diversity and
- The Convention to Combat Desertification

Each of these conventions were ratified by participating countries. They were also were linked to each other, and had to work in unison for any measurable results to be achieved. Agenda 21 was the other significant document that emerged from this event. Continuous monitoring of the complex dynamic of environment and economic development was on the agenda. As was funding for environmental impact programmes in developing countries. Importantly, the onus was on developed countries to take the frontline in reducing damage. The Rio Summit has had two follow up conferences: The World Summit on Sustainable Development (also called Rio+10) and the United Nations Conference on Sustainable Development (or Rio+20).

KYOTO PROTOCOL, 1997 (RATIFIED IN 2005)

The treaty that came out of the Rio Summit was legally non-binding and did not set standards or limits of greenhouse gas emissions for individual countries; it promoted sustainability, but did not enforce it. Instead it set up specific protocols within which these limits could be negotiated. One of these was the Kyoto Protocol.

This Protocol is an agreement that deals with greenhouse gas emissions and how they can be reduced. It manifests and executes a commitment by countries to stabilise emissions, setting limits for specific developed countries, based on the principles of the Rio Convention. Importantly, the protocol mainly applies to developed nations on the principle of common

but differentiated responsibility, as historically it is these nations that have contributed to depletion of the ozone layer and the resultant global warming. It puts in place verification and compliance systems to achieve results.

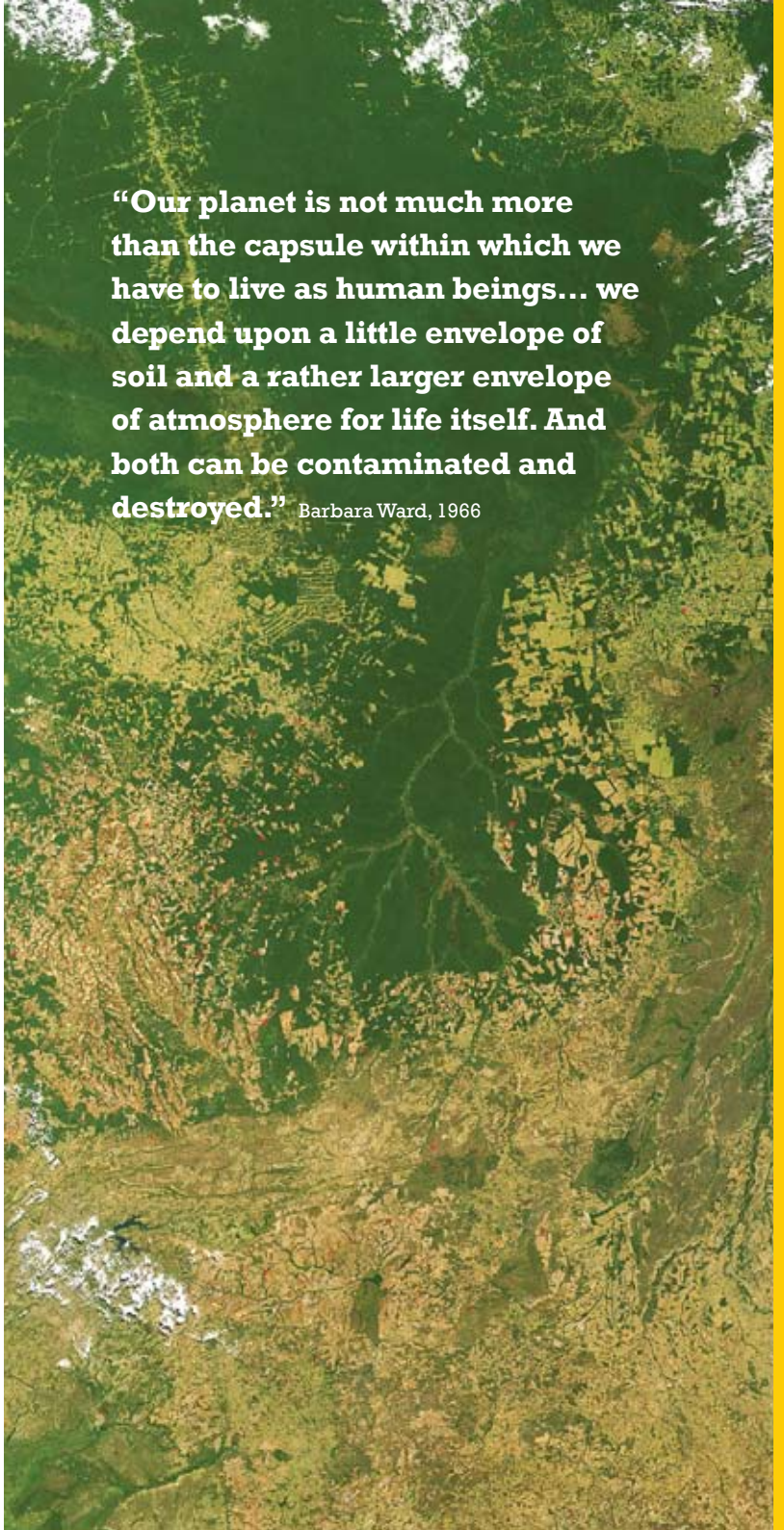
At the recent Doha Climate Talks (2012), it was agreed that the Kyoto Protocol will be binding for 7 more years. It was also agreed that after that point, the differentiation between developed and developing nations will be removed and reductions will be required commensurate to emissions from all nations.

THE MILLENNIUM DEVELOPMENT GOALS (MDGS), 2000

The UN made a list of 8 goals it wished to achieve by 2015 through the efforts of its 193 member states and other international organisations after it formulated and adopted the United Nations Millennium Declaration. These goals covered issues afflicting our world and ranging from poverty, education, gender equality, to disease erawwdication, child mortality and maternal health, as well as environmental sustainability. In 2010, a review was conducted and a global action plan was put in place to fulfill the commitments made.

UN DECADE OF SUSTAINABLE DEVELOPMENT (DESD), 2005-2014

Recognising the indispensable need for education in the struggle for sustainability, the UN declared 2005-2014 as the decade to educate all stakeholders towards achieving human development through 3 prongs: economic growth, social development, and environmental protection. This is not mere education in saving the natural world, but a wider instruction, to create policies and programmes that will instill the "values, behaviour and lifestyle required for a sustainable future and for positive societal transformation." The thrust is to change attitudes and actions of people the world over and move them towards understanding human rights, removing poverty and discrimination on any basis, respecting cultural diversity, international peace and more, and all in an equitable and inclusive manner.



SIDEBAR 7

Only One Earth.

Far ahead of her time, Barbara Ward (1914-1981) was a humanitarian and thinker, journalist and activist all rolled into one. In the 1960s she spoke about conserving the environment, the rapid growth of cities and the concept of social justice. Her work cited examples of industrial pollution, the dangers of pesticide use, deforestation and much more that is exceedingly relevant today. Her book (co-authored by René Dubos) called Only One Earth: The Care and Maintenance of a Small Planet (published in 1972) was a seminal work on the urgent need and application of sustainable development. Equity and prosperity were placed on the same level as the environment in her writings. She was a key advisor at the UN Conference on the Human Environment in Stockholm in 1972.

SUSTAINABILITY SPEAK

Biofuels An alternate and renewable source of energy produced from plants after a process of fermentation, chemical mixes etc to make a fuel for cars. Ethanol is an example of a biofuel.

Carbon Footprint The amount of carbon or greenhouse gases emitted by the activities of an individual, population or organisation, i.e, the amount of fossil fuels burned for those activities, either directly or indirectly. The activities can involve production, consumption, transport etc.

Earth Day Every year, the spring equinox is named Earth Day, a celebration of the planet and its many gifts. This tradition was started by peace activist John McConnell in 1969 and adopted by the UN. The other Earth Day is considered by some as the birthday of the environmental movement of our times. It was first celebrated on April 22nd, 1970 by peaceful rallies, protests and teach-ins on the streets, in parks, and in auditoria across the US.

Economies In Transition Countries that are moving towards free market policies, liberalisation of trade etc.

Emissions Trading Countries under the Kyoto Protocol have been set limits on emissions, but emissions trading allows them to buy excess or spare emission units from countries who don't have such high rates of carbon emissions. This has created a 'carbon market'. The European Union Emission Trading Scheme is one such marketplace.

Greenhouse Gases (GHGs) Gases present in the atmosphere like water vapour, carbon dioxide, methane, nitrous oxide, and ozone that absorb the sun's heat, thus increasing the temperature of the planet.

Just-in-time (JIT) A strategy that streamlines production and increases efficiency (thus increasing profits) by saving on inventory and carrying costs, receiving goods only as they are required and not before.

Live Earth A unique initiative to raise money and awareness on environmental issues through concerts and events by rockstars and celebrities. The first and biggest show was "Live Earth: the Concerts for a Climate in Crisis" on 07/07/07.

Ozone-Depleting Substances (ODS) Examples are CFCs, halons, carbon tetrachloride and trichloroethane etc. that have thinned or created holes in the ozone layer which protects against the sun's harmful UVB rays. Skin cancer, cataracts, plant damage etc are some of the consequences of the depletion of the ozone layer.

OECD Countries Developed countries with high income economies.

People, Planet, Profit A wider, more holistic approach to assessing the performance of an organization. Thus an organisation must be socially, economically and environmentally responsible to be seen as comprehensively successful.

Precautionary Principle If a potential action or decision by policy makers is likely to cause harm to the public, the decision maker must prove that it is not harmful.

Principle of Common but Differentiated Responsibilities Applied in the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, it states that different countries have different degrees of responsibility for climate change and emission reductions based on the commensurate contributions they have made to global warming, and also according to the economic and technical capacities they have to handle environmental problems.

Renewable Energy Energy derived from natural elements like wind, water, sunlight and geothermal sources. At last count, around 16% of global energy consumption is sourced from these.

UNEP A programme started in 1972 post the United Nations Conference on the Human Environment. It initiates and coordinates the environmental protection activities of the UN, working with countries and international organisations to fund, implement and execute policies to protect the Earth.

World Environment Day Initiated by the United Nations Environmental Programme, World Environment Day (5th June) is a call to positive action to protect the environment. Each year, a different city around the world hosts the festivities with a week-long programme. Started in 1973, when the green movement was just beginning, it has become a rallying point for hundreds of efforts to save the Earth.

LETTER FROM THE CHAIRMAN

Dear Fellow Stakeholders

Welcome to our fifth sustainability report. Our journey of the past five years in sustainability has been exciting, full of meaning and learning. It has set us on a path that we know is not easy and yet is so full of promise that we look forward to pursuing it.

2007-2012 : Wipro's leap of faith into Sustainability

When we started our corporation wide initiative in Sustainability in 2007-08, its different facets were not new to us. Our programs in community care and school education were already more than five years old, and we had been working on water and electricity conservation for over a decade. We had started these programs, driven by belief that the business sector must stop seeing itself as separate from its surrounding social context.

We systematized and deepened our work in ecology with the launch of our Sustainability initiative. This was driven by the recognition of the reality that ecological issues will be a defining force for the future. Over the last five years our range of initiatives has expanded in scope, scale and richness covering multiple dimensions across ecology, the workplace, our customers and suppliers , education and community care. The milestones of this five year journey are depicted in the infographic in the next page.

Our work has won considerable recognition globally as well as in India, among which are successive inclusions in the Dow Jones Sustainability Index, the Carbon Disclosure Leadership Index and the No:2 ranking in the Newsweek listing of the World's Greenest Companies. This is something satisfying, but it is also concerning in some measure. For we are only too aware how early we are in our journey and how much remains to be done; and therefore, if we are among the world's leaders, it can only mean that collectively, our society has a long, long way to go.

I am convinced that if government and business can effectively get to work together to address sustainability challenges, the results can be remarkable. This, of course, is easier said than done as it needs the coming together of good regulation, transparent implementation and the consensus of all stakeholders.

The government in India has, through the Companies Bill 2012, proposed a mandatory spend of 2% of profits after tax on Corporate Social Responsibility by companies of a certain size. Our belief is that good, genuine work in sustainability and social responsibility can arise only from a company's deeply held convictions and a clear vision; external factors do not help much in aiding or accelerating this.

Let me conclude by saying that we have been talking and debating the 'What' and the 'Why' of sustainability for quite some time now ; it is time to move on to the 'How' and 'When' without further delay. The theme of this year's report 'Through the looking glass of history' suggests that we have enough lessons from our past to help us do this and to navigate the future- a future that is already upon us.

With Best Wishes
Azim H Premji

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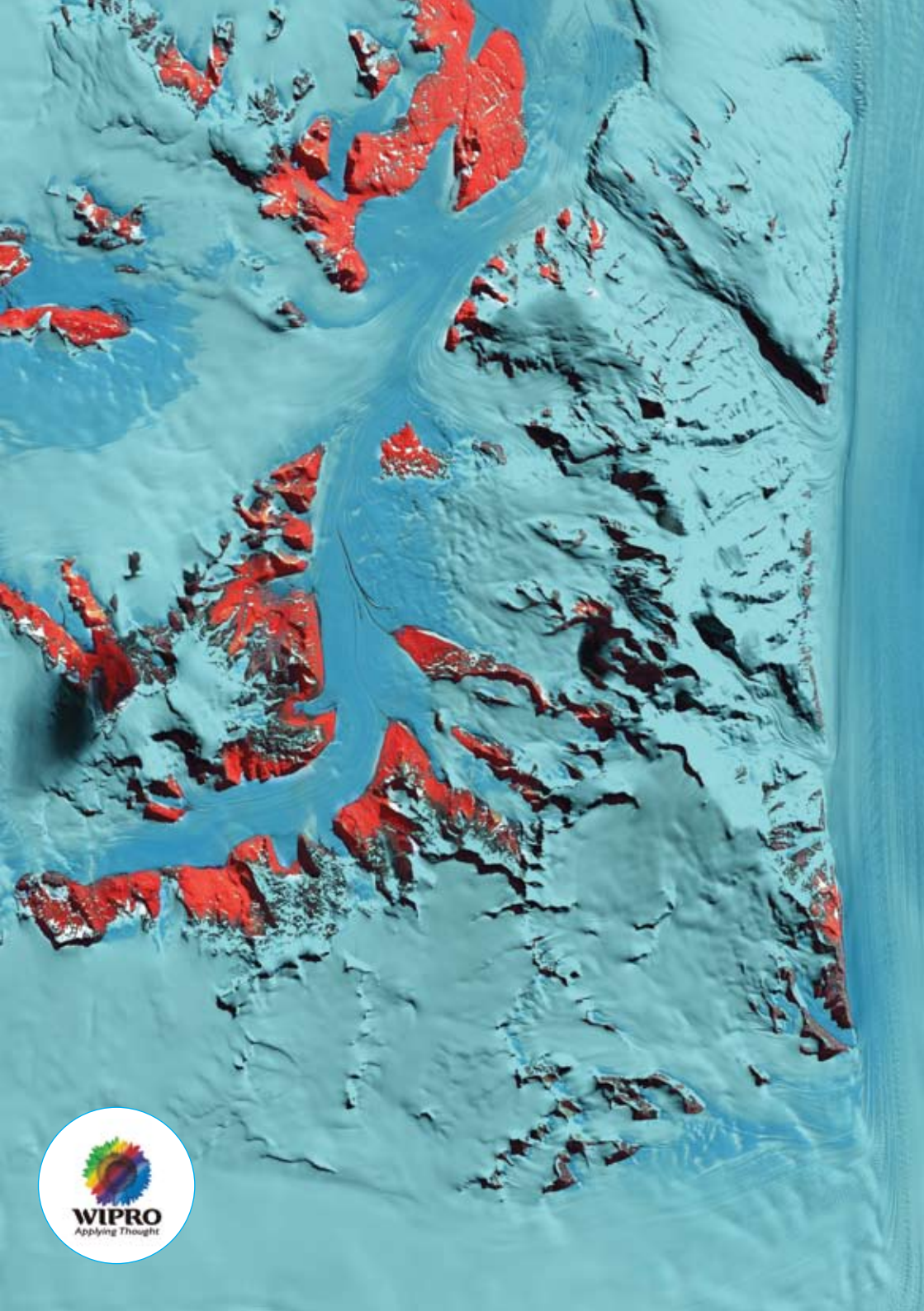
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