



H o P E *through* Quality

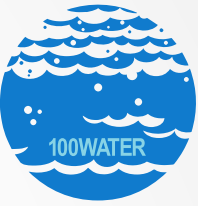
Health of Planet Earth

Quality Earth Forum
Indian Society for Quality

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Online
23 April 2022

Integrating Quality and Sustainability



Showing that

Quality Management must embrace sustainability as a vital part of its practice

Sustainability must embrace Quality approaches to achieve its aims

Quality and Sustainability professions must reciprocally engage each other

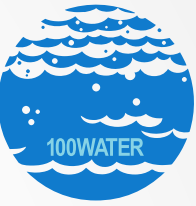
Objectives of the Program

Learn about

1. The types of concerns regarding the health of planet earth, and their sources
2. Approaches to countermeasures to prevent harm, such that humanity can thrive
3. Quality-based management approaches to preserve the health of the planet



For Whom

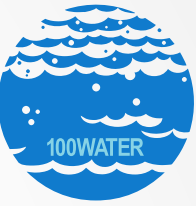


For everyone concerned with the challenges in keeping our planet healthy and humanity thriving.



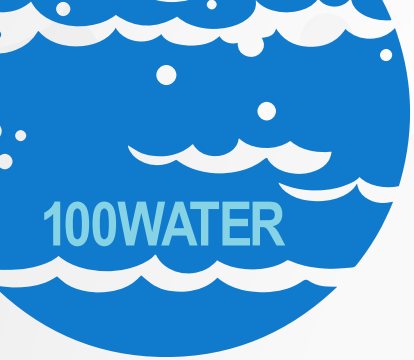
For academics, students, administrators, managers, civil society activists, and professionals in the fields of quality management and/or environment, ecology, sustainability

Contents



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 - Improvement methods; types of projects
 - The Quality Sustainability Award for projects
 - Proposed: An Immersion Program



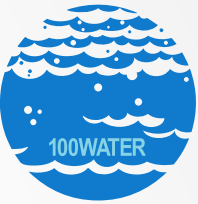


HOPE

Health of Planet Earth

The Meaning of HoPE

Sustainability: A Short Background



1713: Hans Carl von **Carlowitz**, who formulated ideas for the ‘sustainable use’ of the forest: only so much wood should be cut as could be regrown through planned reforestation projects.

[Hans Carl von Carlowitz and “Sustainability” | Environment & Society Portal \(environmentandsociety.org\)](https://environmentandsociety.org/1713/Hans-Carl-von-Carlowitz-and-Sustainability/)

The Concept of Sustainable Development – United Nations

1987: Brundtland
Commission

Our Common Future: ‘Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs’.

Emphasized needs of the poor

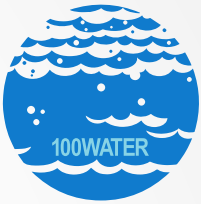
2015: Sustainable
Development Goals

UNDP: 17 Sustainable Development Goals with targets for 2030

2015: Paris Agreement

UNFCCC: To cut emission of greenhouse gases. U.S. withdrawal. 2021 U.S. re-joining

Sustainability Concepts: The Triple Bottom Line



1994: John Elkington proposes the triple bottom line

The Elkington Model is now better known under the triad of pillars: economic, environmental, and social

Three Pillars



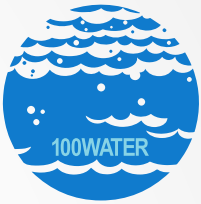
2018: Elkington **recalls** this term, like an automobile recall – because corporates had used the model to their own advantage.

“Clearly, the Triple Bottom Line has failed to bury the single bottom line paradigm.”



Environmental, Social, and Governance
A triad popular with investors and analysts

The Seventeen SDGs for Year 2015 - UNDP



**SUSTAINABLE
DEVELOPMENT GOALS**
17 GOALS TO TRANSFORM OUR WORLD

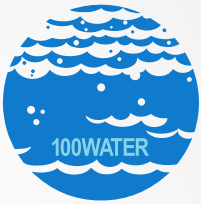
170 countries

Sustainable
Development, concept
expanded to cover a
broad social reform
agenda People, Planet,
Prosperity, Peace, and
Partnerships

169 targets



HoPE Elements of SDGs



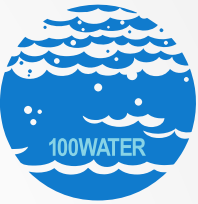
- ✓ 6. Clean water and sanitation
- ✓ 7. Affordable and clean energy
- ✓ 9. Industry, Innovation and Infrastructure
- ✓ 11. Sustainable Cities and Communities
- ✓ 12. Responsible consumption and production
- ✓ 13. Climate action
- ✓ 14. Life below water
- ✓ 15. Life on land

- By concentrating on **HoPE** elements only, sharper actions may be possible
- **Pandemics** and lifestyle diseases need clear action.
- Also, consumption of renewable and non-renewable resources and the effects of **chemicalization**

History might show that the third decade of the 21st century, 2021-2030, as the most decisive decade for action to keep the planet in liveable state for humans



The United Nations Global Compact (UNGC)



Year 2000: **United Nations Pact** to encourage businesses and firms worldwide to adopt sustainable and **socially responsible** policies
Over 17000 member companies (384 Indian companies)

Ten Principles – three of them regarding Environment

Principle 7: Businesses should support a precautionary approach to environmental challenges

Principle 8: Undertake initiatives to promote greater environmental responsibility

Principle 9: Encourage the development and diffusion of environmentally friendly technologies

Science-based Greenhouse Gas Emission Reduction Targets

1558 companies

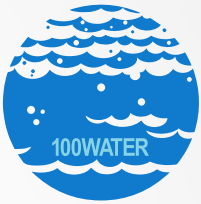


United Nations
Global Compact

Meaning of the Term Sustainability, or
The Regeneration of HoPE
A Possible Definition in a Global Sense

Regeneration of HoPE
is the philosophy, art, science and technology
of enabling humanity to thrive
while keeping the planet stable and wholesome

Thriving Humanity: What could it Mean?



Humanity cannot go back to caves.
Technology won't be stopped
Our solutions must enable humanity to thrive
Only in a healthy planet can we flourish

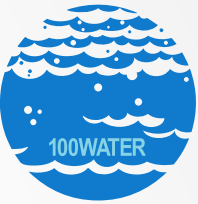


Thriving Humanity

- 1. Peace:** Human rights; civil liberties; freedom from crime, terror, war; freedom of expression
- 2. Health:** Safe and nutritious food; freedom from hazards; lifespan; access to sickness care; physical culture; mental well-being
- 3. Education:** Access to quality formal education; learning, discourse; Intellectual, scientific or artistic activity
- 4. Standard of Living:** Freedom from poverty; tolerable inequality of income; access to technological advances and innovation
- 5. A World with a Future:** Diverse and attractive habitats; Freedom from threats such as pollution, running out of resources, or effects of man-made climate warming

Need a new Thriving Humanity Index

Defining Stable and Wholesome Planet



By wholesome planet we mean the biosphere (ecosphere)

Biosphere: The system of all living beings on the earth and their interactions with the lithosphere, cryosphere, hydrosphere and atmosphere

Wholesome means healthy – a planet that is very liveable

Our concerns are of humans, and for humans, but with the recognition that humans are one integral part of the biosphere, not separate from it

By stable planet we mean conditions with only mild variation and are conducive to the biosphere

Criteria: temperature, biodiversity, resource availability, pollution, wastes not passing the tolerating capacity of the biosphere

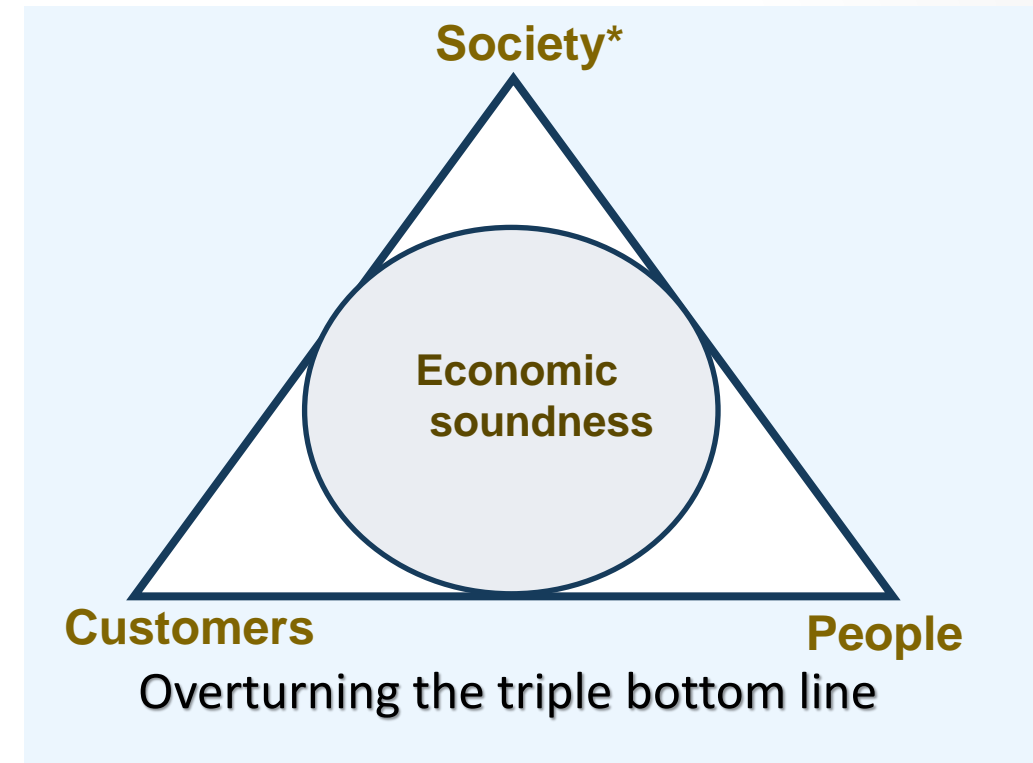


Meaning of Thriving Business – the Quality Way

Meaning of the Term Thriving Business:
A Possible Definition from a Quality perspective

A business may be said to be thriving
when it always delivers satisfaction
for its customers,
its people
and the society,
while maintaining economic soundness

*Being a trustworthy company to Society - not harming the planet, providing employment, and good governance



HoPE and ISQ Mission



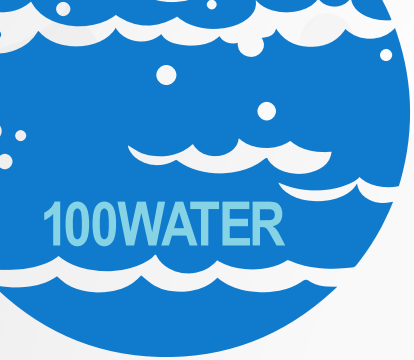
The **Quality Earth Forum** of ISQ focuses on environmental or planet earth concerns
The concerns are that **sustaining of the earth's living and non-living resources is a prerequisite for the continued existence of humans**

Hence, the ISQ Mission

Contribute to the thriving of humanity in a healthy planet

The word sustainability is caught up in confused meanings. We need a new name.
Hence, a new term

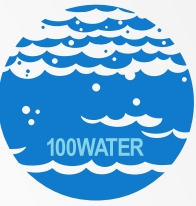
H O P E
Health of Planet Earth



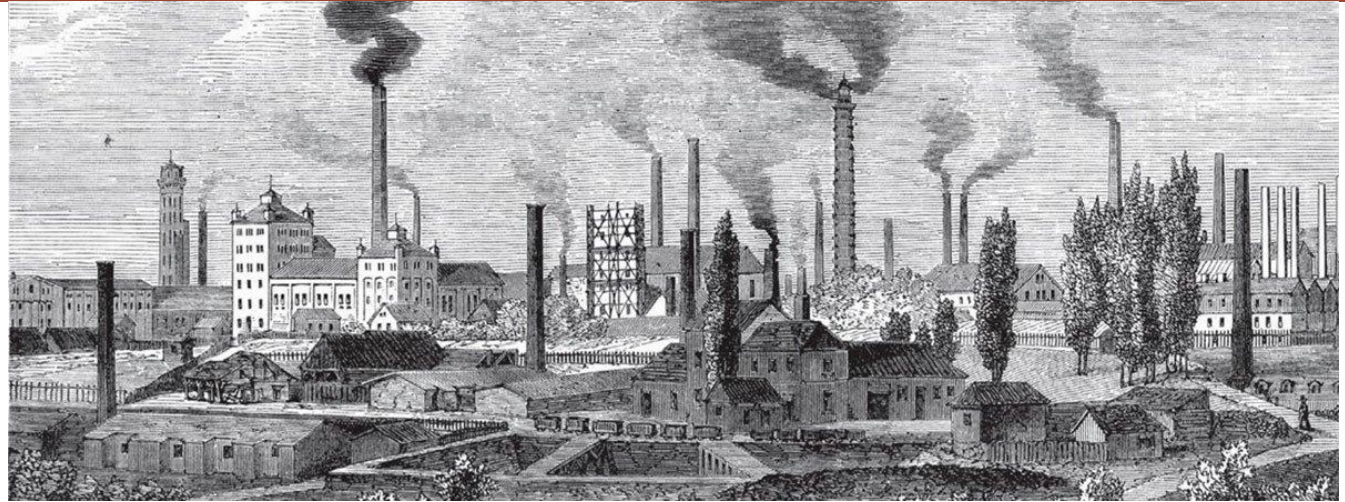
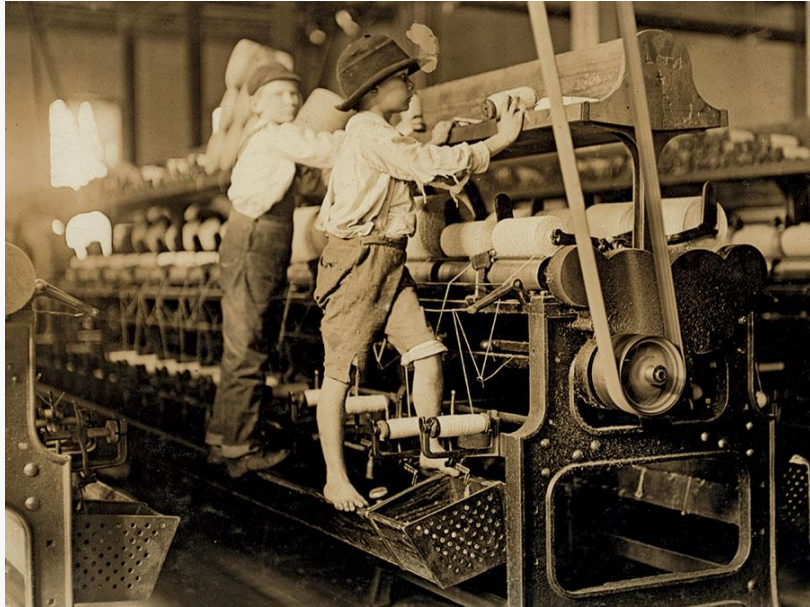
The State of the Planet



Industrial Revolution: A Turning Point

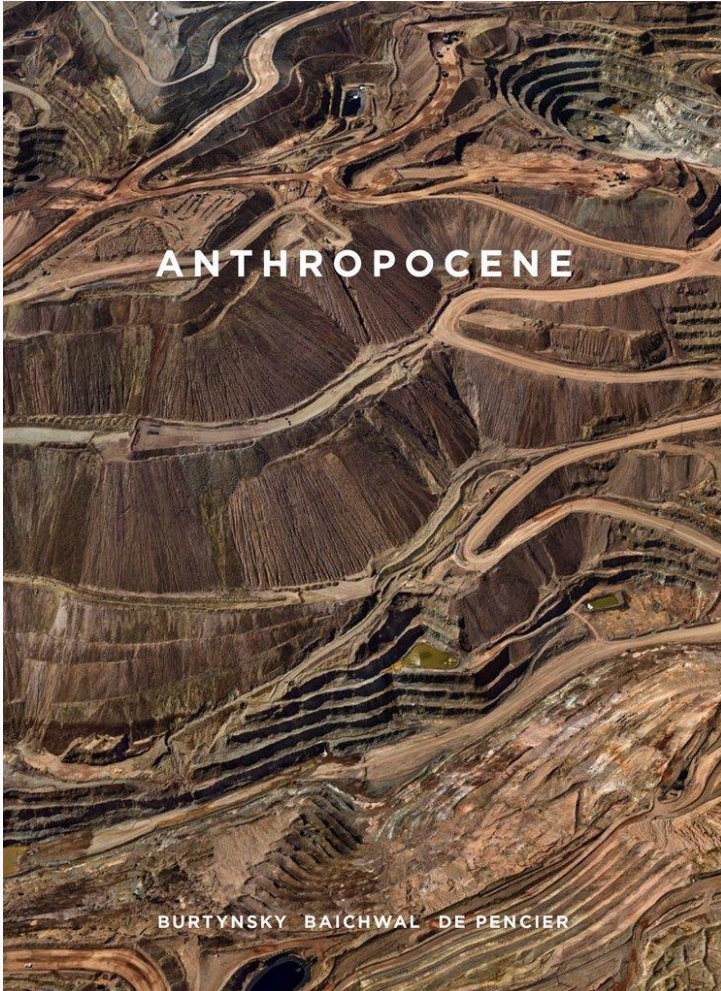
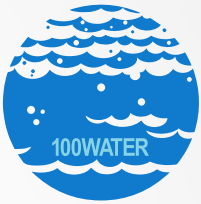


The Industrial Revolution, 250 years ago, marked a turning point in Earth's ecology and the relationship of humanity with its environment. It changed lifestyles.



Profound impact on
human development, health and longevity, social improvements and the effect on
natural resources, public health, energy usage and sanitation

But... We are now in Anthropocene...



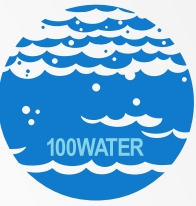
Humans have destabilized the ecosphere of the planet

During Holocene, the epoch that lasted nearly 12,000 years till the 1950s, the temperature of the earth stayed within a degree Celsius

Our times are now called the **Anthropocene** epoch named by Paul Józef Crutzen (2006), the Nobel Prize winning Dutch atmospheric chemist

An epoch in which humans rather than natural forces are the primary drivers of planetary change. Data shows human impact to have started spiking from 1950

The Wake-up Call: 1960s

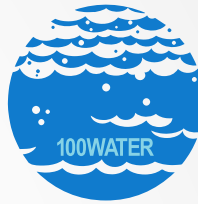


Rachel Carson's meticulous scientific documentation in her 1962 book *Silent Spring* turned the tide for environment, causing not just the ban of DDT by many countries, but also the enactment of a string of laws.

“Detect injury before symptoms appear - we will not know for a generation or two what the effects will be

“The first necessity is the elimination of tolerances on...
highly toxic chemicals.”

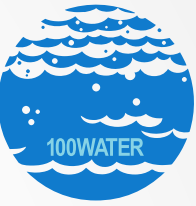
The World in 2022



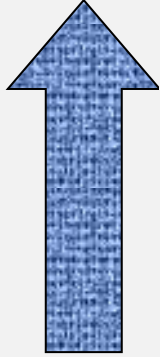
- Human population **7.9 billion**, up from **2.6** in 1950, 2050 projection **9.7**, 2100: **10.9 billion**
- World **GDP up 7 times** since 1950 – consumption up of energy, fertilizers, water, paper, transportation, steel, cement ...
- Global **life expectancy up** from ~48 in 1950 to ~70 today. Illiteracy down from 64 to 14 percent
- The biggest pandemic since 1918
- Revolutionary change in data and communication, bio and nano technologies
- Internet, smart phones, connected world, dematerialized books, music, photos, movies...
- Hybrid, electric and hydrogen fuel cell cars, hyperloop in the horizon
- AI, machine learning, Big Data, IoT. 3-D printing, drones, robotics
- Online retailing, banking, journalism, education, health care, counselling, conferences; work-from-home...
- Rise of renewable energy
- Extreme electronics in cars, fridges, washing machines...

**From an environmental point of
view there is no time left!**

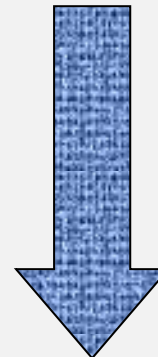
State of Humanity Today: Never had it so Good?



Nutrition
Human Rights
Lifespan
Education
Luxuries

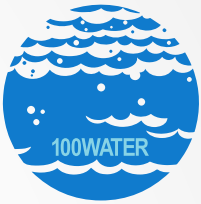


Forced Labour
Slavery
People killed
Infectious diseases
Poverty



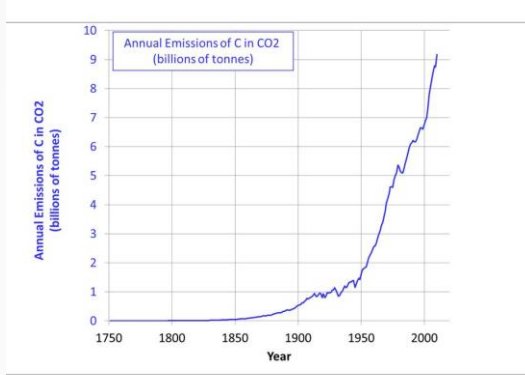
1948: Universal Declaration of Human Rights
1972: Stockholm Declaration on Environment
1987: Brundtland Commission on Sustainability and Development
2000: Millennium Development Goals
2000: United Nations Global Compact
2015: The 2030 agenda for Sustainable Development, SDGs
2015: Paris Agreement on Climate Change

It's a Problem of Exponential Growth



Nothing in the universe can bear continuing growth

Example: Hyacinth in a pond



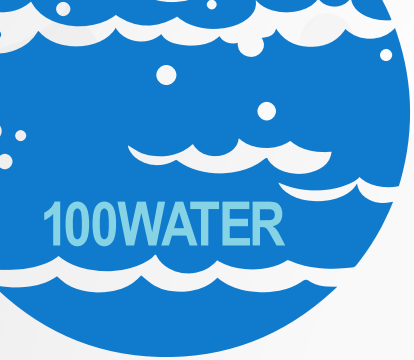
If population grows at 1% per year, in 250 years it will have multiplied 12 times to 10,000 crores!

Is there enough of solar energy?

Energy consumption has been growing 2.9% per year since year 1800

If energy consumption grows 2.3% per year now, at 20% efficiency conversion, we will need the entire solar energy falling on land – in 250 years

Exponential growth deceives us. We don't get to notice it until it is too late



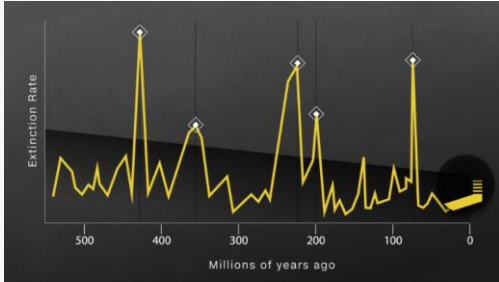
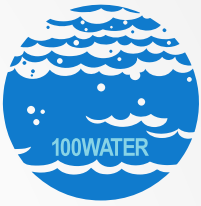
How Healthy Is Our Planet?



The Five Phenomena

1. Bio-extinction
2. Climate warming
3. Lifestyle diseases
4. Pollution of air, land and water bodies
5. Resource scarcity for the future

1. Bio-extinction



Five mass extinctions in the history of the earth – the last one killed dinosaurs



Biodiversity includes genetic differences within each species.



The **sixth** mass extinction? Caused by humans? Rate of extinction 100 times normal in some cases?

► 37000 species threatened with extinction (*critically endangered, endangered and vulnerable*)

Source: IUCN

► One-fifth of livestock breeds at risk of extinction

46000 strains of rice cultivated in China in 1950s down to 1000 in 2006

Examples of Species Extinct in 21st Century

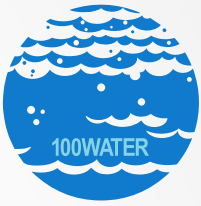
- The Baiji Dolphin
- West African Black Rhino
- The Golden Toad
- Spix's Macaw



The 2020 global Living Planet Index shows an average 68% fall in monitored vertebrate species populations between 1970 and 2016. Any decline in the population of species is a precursor to their extinction, as survival is correlated to population.

Source: World Wildlife Fund

Biodiversity and the Amazon



The Amazon is home to 22% of vascular plant species, 14% of birds, 9% of mammals, 8% of amphibians and 18% of fishes that inhabit the Tropics.

In parts of the Andes and Amazonian lowlands, a single gram of soil may contain more than 1,000 genetically distinct fungi species.

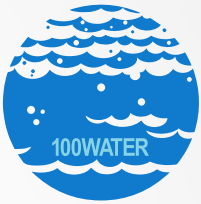
More tree species are found in 10,000 m² area of Amazon Rainforest than in all of Europe

Approximately 17% of Amazonian forests have been converted to other land uses, and an additional 17% have been degraded.

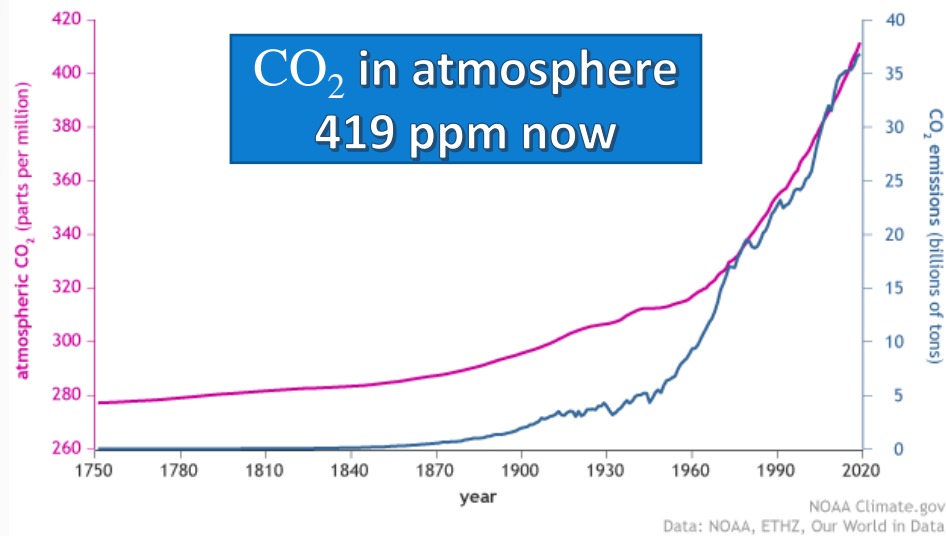


Of the more than 15,000 Amazonian tree species, 36%-57% are likely to qualify as globally threatened under the International Union for Conservation of Nature (IUCN)

2. Climate warming



CO₂ in the atmosphere and annual emissions (1750-2019)



Temperatures may not fall for a thousand years after atmospheric CO₂ ceases to rise. One fifth of CO₂ emitted today will still be there 100,000 years from now.

Greenhouse Gases:

Carbon dioxide: Take as unit of Greenhouse effect

Methane: 25 times Greenhouse effect

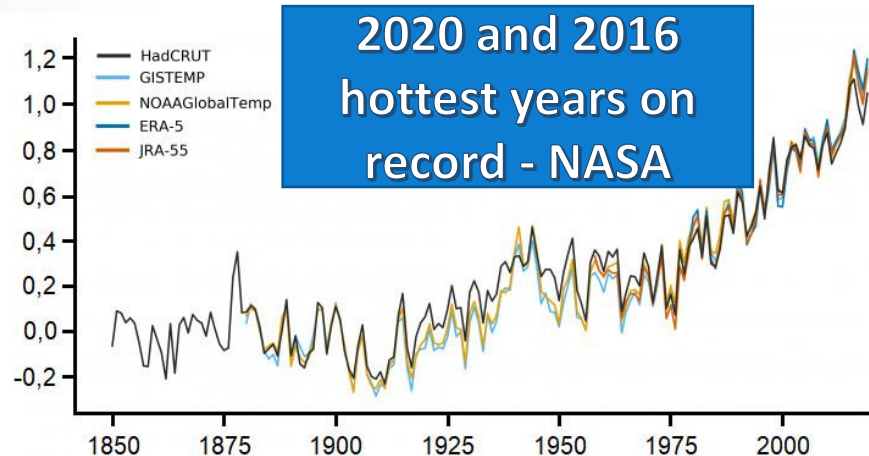
Nitrous Oxides: 300 times

Fluorinated gases: 1,000-10,000

CO₂ equivalent gases released per year: **51 billion tonnes**

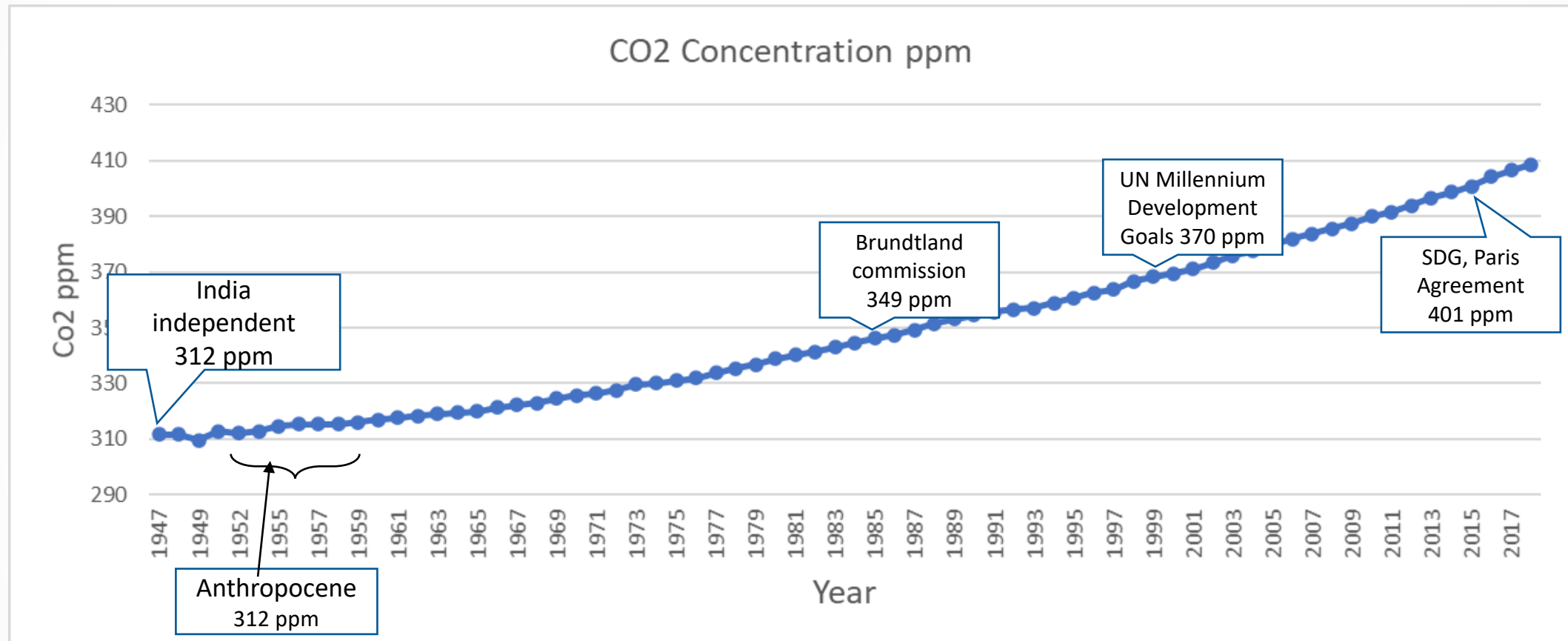
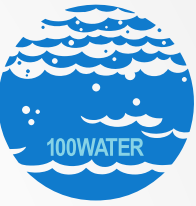
Effects of climate warming:

Droughts, floods, cyclones, rising sea levels, melting glaciers, ocean acidification, coral reef degradation, wildfires, heatwaves



Steel (1.8 T of CO₂ per Tonne of steel) and cement one T per tonne)

The Rise and Rise of CO2 Concentration



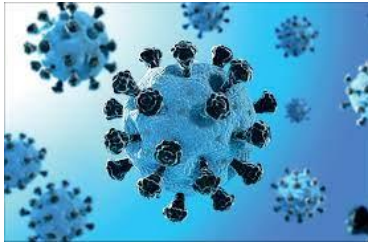
Rate of increase is far from slowing down

3. Diseases



Some Infectious Diseases

Covid 19 – the biggest pandemic in a 100 years. Origins in Wuhan, China



Eradication of small pox,
Suppression of polio, plague, cholera
Diseases still around:

- Malaria
- Dengue
- Chikungunya
- Measles
- AIDS
- Ebola
- Bird Flu
- Swine Flu
- Sars
- Zika
- Nipah

Risk from proximity to animals

Some Lifestyle and Pollution-related Diseases

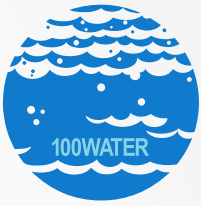
Heart disease	17 million deaths a year
Cancer	15 million new cases and 8 million deaths per year
Diabetes	Afflicts some 370 million
Allergies	Increasing - affect 30 percent of adults and 40 percent of children in the United States
Obesity	13 percent of adults over eighteen in 2014
Neurological & mental disorders	Affect around 450 million currently, and will afflict one in four people in the world at some point in their lives

Connection to chemicals, heavy metals? Chemicals in food?

“Based upon my own experience, going back to 1913, I can say, if cancer occurred at all then, it was very rare but that it has become more frequent since... it is obvious to connect the fact of increase of cancer with the increased use of salt by the natives.

Albert Schweitzer, in Gabon

4. Pollution – Air, Land, Water



Air Pollution

Particulate matter, carbon monoxide, sulphur oxides, nitrogen oxides, volatile organic compounds, lead, all products of industry...**Delhi, Beijing!**



Heart and lung diseases, affects brain, kidneys, liver, nerves. Birth defects. Climate warming

Soil Contamination

- Heavy metals like chromium, lead, antimony, cadmium and zinc
- Toxic chemicals that may be carcinogenic, teratogenic or mutagenic
- Nondegradable waste – like plastics, clogging land



Contact with toxins, loss of population of species. Loss of land for agriculture and other uses

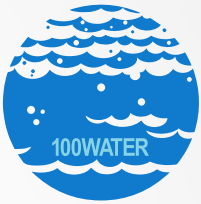
Water Pollution

Industrial wastewater, sewage as well as medical waste, and plastics find their way to water bodies
'Treated' sewage effluents have hormones and endocrine disruptors ... (Braungart & McDonough)



Infectious diseases, contact with toxins and hence related diseases, nervous disorders, birth defects, loss of species population

5. Future Resource Scarcity



Renewables

- Forests, trees
- Marine, river, lake life
- Fresh water (partly)
- Topsoil*
- Energy sources such as sunlight, wind, hydro, tidal, biomass

Renewal can be slow

In organic farming, the calculation for the carbon footprint assessment includes the carbon sequestration through the use of compost.

- ▶ 4.7 million hectares of forests is net loss per year
- ▶ 76% of marine fisheries are depleted, over exploited or fully exploited
- ▶ Fish catch peaked in 1997 at 93 million tonnes

Non-Renewables

- Fossil fuels
- Minerals
- Ores
- River sand
- For practical purposes, rain forests
- Extinct animals

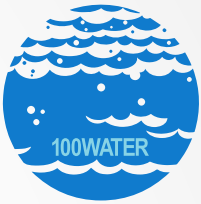
Half the topsoil of the world gone in the last 150 years

Only 60 years of topsoil left at current rate of depletion

Food after that??



Biodiversity loss hard to recover

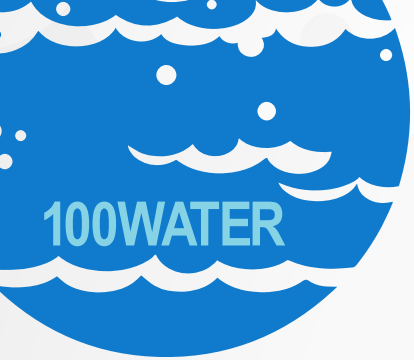


Importance of the Five Phenomena: An AHP Exercise

	Bio Extinction	Climate warming	Life style diseases	Pollution	Scarcity	
Five						
Bio Extinction	1	1/6	5 1/2	1/2	1 3/4	0.169
Climate warming	6	1	3 4/5	1/3	3 3/7	0.319
Life style diseases	1/5	1/4	1	1/4	2/9	0.049
Pollution	1 7/8	3	4	1	1 1/5	0.309
Scarcity	4/7	2/7	4 2/5	5/6	1	0.154
	9.529	4.785	18.626	2.949	7.617	1.000
Inconsistency Ratio						0.20

- Results of an Analytical Hierarchy Process (AHP) Exercise
- The group had diverse international backgrounds and grasp of the subject.
- Hence, the inconsistency ratio of 0.20 is very high and shows that this data cannot be used directly. (A maximum of 0.10 is allowed)
- This exercise should be regarded as practice only

Pollution and climate warming were the top concerns

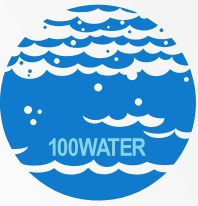


1. Release of Greenhouse gases
2. Discharge of Effluents
3. Use of non-renewable resources
4. Depletion of Renewable resources
5. Chemicalization
6. Pile up of wastes
7. Radiation



The Seven Sources of the Five Phenomena

The Seven Sources of the Five Global Phenomena 1~4



1. Greenhouse gases

- Mainly from burning of fossil fuels. CO₂ 419 ppm
- Source of climate warming, accelerated bio-extinction
- **Safe** levels under 400ppm of CO₂

2. Effluent discharge

- Of heavy metals, phosphates, oils, petrochemicals, plastics
- Land, water, air – source of diseases, pollution
- **Safe**: Rate at which 'the pollutant can be recycled, absorbed or rendered harmless...'

3. Use of non-renewables

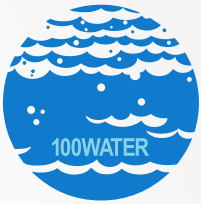
- Minerals, metal ores, fossil fuels, accessible water
- Earth's capital is given away 'free'. GDP unaffected by depletion
- **Safe**: 'Rate at which a renewable resource, used sustainably, can be substituted for it.' (Donella Meadows)



4. Depletion of renewables

- Topsoil, rain forests, marine life, genetic diversity in crisis
- 'Tragedy of the commons'
- **Safe**: Use 'no greater than the rate of regeneration of its source' (Donella Meadows)

The Seven Sources of the Five Global Phenomena 5~7



5. Chemicalization

- Over 100,000 chemicals produced, toxicities??
- Chemicals in food, cosmetics, paints, furnishings, clothes, buildings – source of bio-extinction, diseases
- **Safe:** Not known

6. Pile-up of wastes

- From mining, manufacturing, distribution, consumption
- Municipal 1.3 b T/year; nuclear, medical, synthetic - toxins
- **Safe:** If non-hazardous, at rate of natural degradation




7. Radiation

- Ultraviolet (ozone holes), nuclear, microwave (?)
- Health risk, low probability but high severity
- **Safe:** Not known



Matrix of Human Activities and Consequences

Consequences 7 Sources	Bio Extinction	Climate Warming	Diseases	Pollution	Future Scarcity
Greenhouse Gases	Small influence	Severe influence			
Discharges...	Small influence		Severe influence	Severe influence	Small influence
Loss of Non-renewables		Small influence		Moderate influence	Severe influence
Loss of Renewables	Moderate influence		Small influence	Moderate influence	Severe influence
Chemicalization	Severe influence	Small influence	Severe influence	Small influence	
Wastes		Small influence	Moderate influence	Severe influence	
Radiation	Small influence	Small influence	Moderate influence		

-  Severe influence
-  Moderate influence
-  Small influence

There is a relationship between human activities and the state of the planet

SDG 2021 Status – Low Rate of Progress

- India score: **60.1**. Rank **120** (out of 165)
- The nature of the 17 SDGs favours the rich countries for high scores



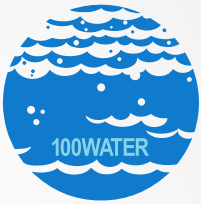
SDG No.	Linkage to HoPE	SDG Item	Percentage points change from 2015 to 2021 (World)
6	Moderate	Clean water and sanitation	0.4
7	High	Affordable and clean energy	1.1
9	Low	Industry, Innovation and infrastructure	8.6
11	Moderate	Sustainable cities and communities	1.8
12	High	Responsible consumption and production	-0.4
13	High	Climate action	0.4
14	High	Life below water	0.1
15	High	Life on land	-0.3

1970: Limits to Growth report:

An update study in 2004 projected historical data (1970 to 2000) onto the Limits to Growth study outcomes, which showed the industrial ecosystem is tracking the Base Case Scenario



Glasgow: COP26: Damp Squib



**A word count of the Climate 'Pact' reached in COP26 is telling.
The word **'Agree'** does not figure, nor does **'Planet'****

Soft verbs

- Adapt (25)
- Recognize (19)
- Welcome (11)
- Urge (10)
- Encourage (9)
- Invite (8)
- Acknowledge (6)
- Calls upon (4)
- Commit (1) – to working together
- Resolves (to strengthen) (1)
- Endorses (1)
- Reiterates (1)
- Notes with deep regret (1)
- Reaffirms (1)

- **Reparation** (0)
- Targets (2)
- Pact (2)
- **Emergency** (0)
- Nationally Determined Contributions (0)
- Finance (22)

Missing

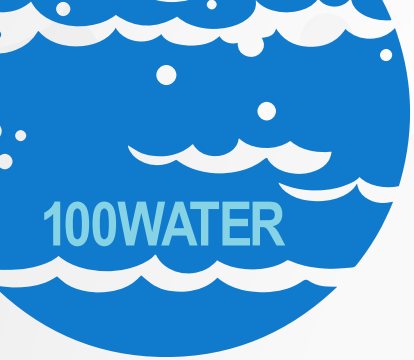
- Short term targets
- Finance commitments from nations which carry prime responsibility
- Environmental taxes or pricing

- Carbon (2)
- Methane (1)
- Greenhouse (0)
- Plastic (0)
- Topsoil (0)
- Farming (0)
- Water (0)
- Life (0)
- Biodiversity (3)
- Coal (1)
- **Oil** (0)
- Fossil fuel (1)
- Food (0)

- Solar (0)
- Wind (0)
- Energy (2)
- Environmental (3)
- Sustainable (3)
- Extinction (0)
- Forest (2)
- Net Zero (1)
- Pollution (0)
- **Renewable** (0)
- Waste (0)
- Chemical (0)

Evading hard matters

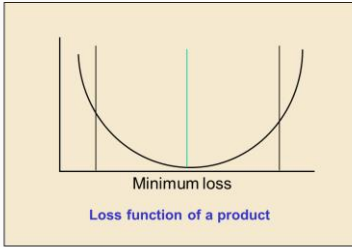
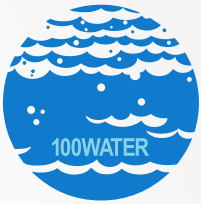
A Pact *sans* Agreement or Commitment



Harm from Products



Recognizing Harm to Society – Taguchi, Kume, Shiba



$L(y) = k(y - m)^2$, where m is the nominal value of the characteristic and $k = A/d^2$, where A is the loss caused by exceeding the specifications and d is the allowable tolerance from the nominal value that is used to determine specification limits

Genichi Taguchi:

The quality of a product is the **loss** imparted by the product to the **society** from the time product is shipped

- ❖ Garvin included this loss in his eight dimensions of quality
- ❖ Kacker extended it to loss to society during manufacturing



Social Quality – Hitoshi Kume

- The degree to which the adverse effects of a product or service in manufacturing and use fall on third parties, society and the environment. ... factors such as noise, vibration, emission, pollution ...
- The adverse impact of atmospheric pollution, destruction of the ozone layer, global pollution by chemicals, desertification and global warming is threatening the very existence of mankind

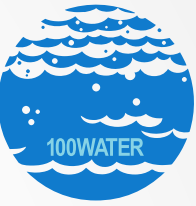


Shoji Shiba

Defined the highest stage of quality to be “**fitness to societal and global environment**”



Products and Harm: Examples



Inherently harmful products:

Cigarettes and tobacco products, alcohol, drugs, arms and ammunition

Hazardous, known side effects:

Some prescription drugs, insecticides

Certain amount of harm – accidents, pollution, disposal problems:

Vehicles, many gadgets and devices

Unintended chemical side effects:

Almost all products with chemicals in them – cosmetics, detergents...

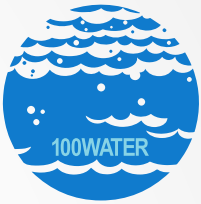
Unintended Ill-health:

Processed foods with chemicals, antibiotics and hormones in them

Disposal troubles for degrading:

All products with metal, plastics, rubber, electronics...

Example of Harm from Food: Bread



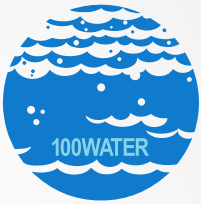
Requirements	
Consumer	Manufacturer
Taste, freshness, appearance, texture, variety	Ease of production, speed of dough rising or baking, long shelf life



- **Azodicarbonamide, Sodium stearoyl lactate (texture)**
- **Mono- and di- glycerides, Glyceryl distearates (emulsifiers)**
- **Partially dehydrogenated oil (trans fats)**
- **Calcium propionate (preservative)**
- **Potassium bromate (dough conditioner and strengthener)**
- **L-Cysteine (softening agent)**
- **Corn syrup (for dough rising – sugar)**

Did you ask for all these in bread?
How do we judge the quality of such bread?

Example of Harm from Food: Cooking Oil



Grind seeds to meal, heat, press out oil

Solvent (say, hexane) extraction of oil cake

Boil oil by steam to recover residual solvent

Heat oil to 85 deg. C. with sodium hydroxide

Recover soap

Wash, heat to 95 deg. C. for degumming

Bleach through activated carbon or clay

Pass steam at 225 deg. C. for deodorizing

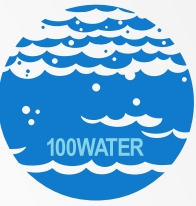
Purpose: Clear, odourless, particle free oil with long shelf life

Which of these
processes serve
customer
requirements?



Product Plus
Thermally and chemically treated
oil, but labelled as 'refined'

Waste: From Food Packaging



Bread: PVC, PET, PP, oil paper...

- Food grade?

Oil: PET Bottles and multi-layered plastic pouches, PVS, metallized polyester, PE shrinkfilm

- Biodegradability?

POLYMERS ARE FOREVER

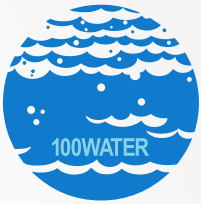
“Except for a small amount that’s been incinerated, every bit of plastic manufactured in the world for the last 50 years or so still remains”

-Tony Andrady, quoted in *The World without Us* by Alan Weisman

What is the loss to society from plastics that do not degrade, and will clog landfills, rivers and oceans?



Harm by Chemicalization: Cotton Clothing



- Spray of organophosphates to soil where cotton is planted. (Damage to human central nervous system). Rainwater runoff from such soil causes ocean dead zones
- Genetically modified Bt Cotton was to end pesticide use but, in some years, other pests immune to it have necessitated resumption of spray
- Nearly 20 percent of industrial water pollution comes from textile dyeing and treatment
- Textile retail shop: Off-gassing of formaldehyde (a carcinogen) used as a finish in cotton clothes was poisoning shop salesmen!

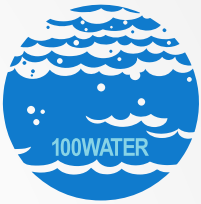


- From *The Responsible Company* – Chouinard & Stanley

- ✓ What is the quality of the clothing?
How would it compare with
- ✓ Using organic cotton
- ✓ Eliminating chemical treatments of cloth

You carry in your body traces of 200 chemicals unknown to your ancestors, some of them toxic in large amounts, others slow-acting carcinogens in small amounts

- Chouinard & Stanley



Examples of Harm in Manufacturing

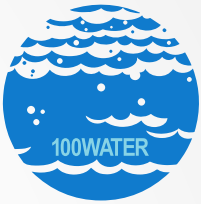
Industrial waste water runs into millions of tonnes

Issue/Process	Effect
Compressed air leakage	Energy use, depletion of resources, climate warming, pollution
Calcining limestone for cement	Release of CO ₂ , global warming

Type of waste	Treatment
Hazardous used catalyst	Incineration?
Machining oil	Waste disposal, spill, ingress to water table
Trim of vulcanized rubber belt	What do you do with rubber?



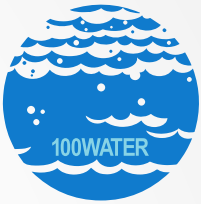
How are these designed into quality planning?



Types of Harm in a Product Lifecycle

What does the product do to Society in or after use? Does it

1. need to be incinerated?
2. need to be thrown into a landfill?
3. clog water bodies, even oceans, going into the bodies of fish?
4. resist bio-degrading in reasonable time?
5. cause hazard in use, storage or disposal?
6. pollute water or air or earth with carcinogens, teratogens or mutagens?
7. risk causing intergenerational health troubles?
8. release greenhouse gases?
9. have to be down-cycled even when 'recycling'?
10. expose us to unacceptable levels of ultraviolet, microwave or nuclear radiation?
11. probably cause accidents?
12. cause off-gassing of toxic chemicals in simply existing?
13. use excessive energy or has low efficiency?



Harm from Products and State of Planet

Global concerns Potential harm	Bio Extinction	Climate Warming	Diseases	Pollution	Future Scarcity
Need to be incinerated?	Small influence	High influence	High influence	High influence	
Need to be thrown into a landfill?		Moderate influence	Moderate influence	High influence	Moderate influence
Clog water bodies, oceans ...?	Moderate influence		Moderate influence	High influence	Moderate influence
Resist bio-degrading?			Moderate influence	High influence	Moderate influence
Pollute water, air, soil..?	High influence		High influence	High influence	
Cause health troubles?			High influence		
Release greenhouse gases?		High influence			
Need to be down-cycled?		Small influence		Small influence	Moderate influence
Expose us to radiation?	High influence		High influence		
Cause off-gassing of toxins?			High influence		
Use energy inefficiently		Moderate influence			Moderate influence



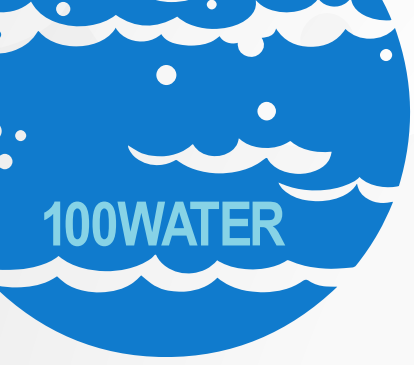
High influence



Moderate influence

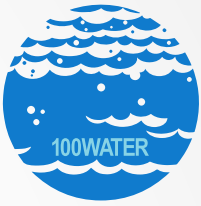


Small influence



Some Promising Environmental Approaches





Promising Approaches 1/2



1976, architect Walter Stahel: Circular economy, closed loop economy, Performance Economy – durable products, reconditioning, waste prevention. ‘The central concept of wisdom is permanence.’

2010, Belgian entrepreneur Gunter Pauli: The Blue Economy - 21 principles to use ‘resources available in cascading systems’ and letting ‘the waste of one product become an input’ to another

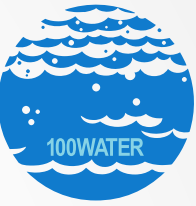


2000, 2010, Amory and Hunter Lovins, with Paul Hawken: Natural Capitalism - making natural resources more productive, replacing manufactured sales by a flow of services

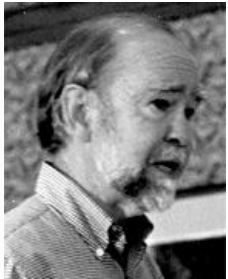


Ellen McArthur Foundation combines all these methodologies under the head ‘Circular Economy’
The Circular Economy was proposed in 2010 (European Commission 2010).

Promising Approaches 2/2



2008, Michael Braungart and William McDonough: Concept of ‘**Cradle-to-Cradle**’ designs, seeing ‘waste as a nutrient for what’s to come,’ and not as something to be disposed into a ‘grave’. **Hannover Principles** - buildings as net contributors of energy

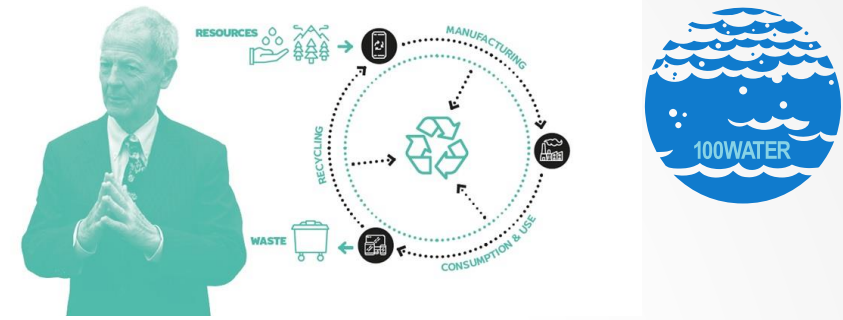


1996, John Lyle: Concept of **Regenerative Design**, step ahead of sustainable design, for building functioning human ecosystems. William McDonough worked with him.



1997, Natural Sciences writer Janine Benyus: Biomimicry – an inspirational method of mimicking nature in developing sustainable designs that are resilient.

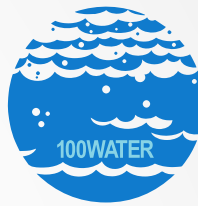
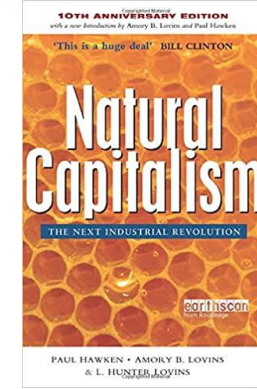
Performance Economy (Walter Stahel)



- **Resource consumption** (Factor 10. Cut by 90%) - GHG emission alone is not the issue
- **Cradle-to-cradle** design approach
- **Life-cycle management** approach, modular designs, increasing durability
- **Functional service economy**: Uncouples wealth creation from resource throughput. Toyota is recasting itself as a Mobility company
- **New Metrics**: 'Value per weight' of goods; value from renewable resources ratio, labour input per weight
- **Performance economy** changes the role of economic actors in a market economy
- **Remanufacturing** a key capability – examples: re-treading of tyres, remanufactured engines, depolymerization, devulcanization
- **Biotechnology and use of nanoscience** – enzymes (and coldzymes) work at ambient temperatures and pressures: use of bio-catalysts (not heavy metals); sugarcane derived polythene

Natural Capitalism – Living Systems Matter!

Natural Capital – Resources, living organisms, ecosystem services
GDP should not treat Natural Capital as free



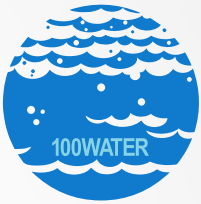
1. **Radical resource productivity** – elegant frugality - Factor Ten engineering: 90% reduction Factor Four: 75% reduction in materials
2. **Biomimetic production** – waste into value – life-temperature, low-pressure, solar powered
3. **The solutions economy** – services not just products – flow economy
4. **Reinvestment in nature** – hydrogen fuel cell, de-printable and re-printable paper...

Quality Principle: 80% of the cost is upstream – in design. All the important mistakes are made on day one

Design the piping layout first for minimum flow and temperature, (and recover heat). Fix the machine around it. Large energy savings in valves, ducts, fans, dampers, motors, wires, heat exchangers, insulation.. Motors use 60% of the world's electricity

- Present farming practices contribute to 25% of the global warming.
- Small hydroelectric plants, cogeneration of electrical power from sugarcane waste, solar water heaters ..

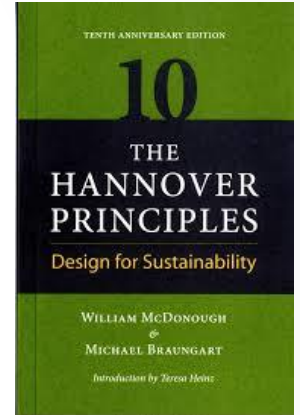
Quality Design: Green Buildings



- ❖ The concept of **Green** buildings is to make them energy neutral. But by the Hannover Principles (1992) **they should be net contributors of energy**

The first of the Hannover principles:

Insist on rights of humanity and nature to co-exist in a healthy, supportive, diverse and sustainable condition

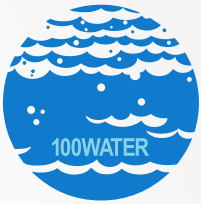


Go beyond LEED certification – even platinum, as it does not imply that consumption in lifecycle would be kept low

- ❖ Many toxic substances in virgin and recycled materials are off-gassed into closed buildings. That's not **Green**
- Eliminate the concept of waste:
Even recycled materials should not be encouraged if they are the result of a product designed for disposability

- Design of a Green Building needs integration with its site, neighbourhood, climate and culture
- Design buildings for efficiency of water, electricity, sewage and material upfront at the concept stage, accounting for their lifecycle footprints

Sustainable Cities



Reset the metrics for cities:

- Water and food imports per capita
- Fossil fuels and non-renewable energy KWh per capita
- Index of biodiversity ...



What cities do

Import water, dispose off as black water

Import food, grow very little, destroy soil

Import materials of construction

Buy out almost all of the energy needs

Use high energy transport, pollute air

Cause loss of biodiversity

What cities must do

Clean and reuse water

Grow substantial amount of food

Use local materials mainly

Be self-sufficient in energy through solar, wind, biomass...

Use electric or non-polluting vehicles, walks and cycles

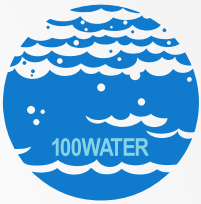
Promote biodiversity ... in parks...



Involve all residents

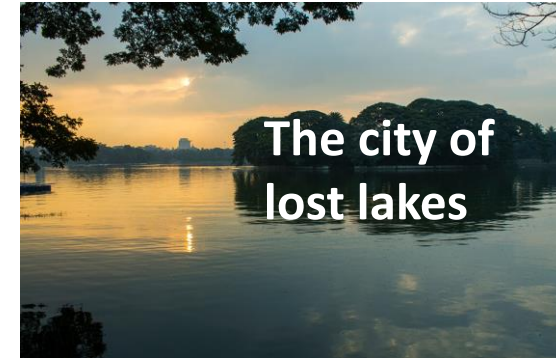


Water, Water, Everywhere...



71% The proportion of earth's surface covered with water
96.5% of earth's water is in the oceans
3% of earth's water is freshwater
1.2% (40% of freshwater) is accessible
(the rest in glaciers, icecaps, permafrost, or in depths)

Bengaluru



Cauvery
water
pumped up
950 meters

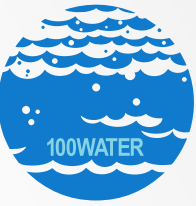
40% of water supply to cities is wasted on the way – great project for Quality professionals
40% reduction in consumption possible by simple awareness, and pricing of water
? % of our city lakes have been built over?

Water and India

Institute integrated water resources management
(UN SDG # 6).



Issue	Consequence	Required Contermeasures
18% of world population, 3% of freshwater, most rain falls in 100 hours. Susceptible to El Nino. Siltation in large dams. Cyclone damage	Feast & famine syndrome, storage inadequate for lean periods	<ul style="list-style-type: none"> • Restore tanks, ponds and wetlands, stop further building on them, allow surplus water to be stored • Create community ownership of such tanks • Promote water harvesting • Discourage/stop expensive, centralized water supply systems • Afforestation , to hold water
Water ownership is with land owner. 14 million borewells, dominated by Punjab, Haryana, U.P.	Withdrawal rate in excess of recharge rate in many states	<ul style="list-style-type: none"> • ‘All water belonged to the king’ – Chanakya • Government owns water – Israel • Regulations for borewells • Price water based on consumption
Agriculture takes 80% of all water consumed	Soil depletion from runoffs, potential desertification	<ul style="list-style-type: none"> • Promote crops as per water availability patterns • Promote millets, perennial crops... (New Revolution) • Price water based on consumption • Price electricity for farmers on consumption
High water wastage - a third or more - to leaks, overuse. Urban rivers clogged	24-hour water supply rarely available Water-borne diseases	<ul style="list-style-type: none"> • Unclog and maintain urban rivers • Meter urban household water, charge on consumption • Audit plumbing an dwater-use patterns • Prohibit private borewells in cities



Regenerative Land Use and Farming

Some Crises

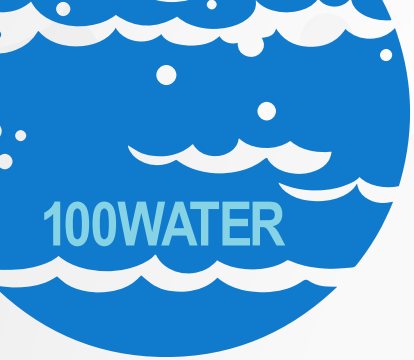
- Crises of deforestation, desertification, salinization and soil erosion – habitat loss and other landscape pathologies
- Agricultural pesticides and fertilizers pollute lakes, rivers and groundwater
- Sustainability requires ongoing regeneration of soil and its fertility
- Industrial agriculture: Using universal hybrid seeds; pushing out locally adapted varieties
- Marshes are the most efficient biomass converters
- We don't know all the species in a teaspoon of topsoil, yet we destroy it

Some Solutions

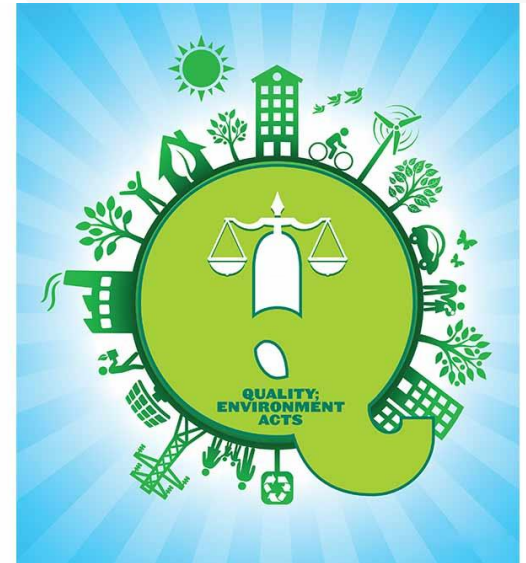
- **Permaculture:** From annuals to perennials
- **Multi-culture:** From mono culture to multiple crop varieties growing in high density
- **Pesticides:** Near elimination – multi-culture helps
- **Water:** Largely rain fed, reduced water use. Select water-appropriate crops
- **Seeds:** Scientifically develop larger grains from small-sized grains in wild varieties of cereals or millets. (That's how current large grains were developed in the first place)
- **Eating Habits:** Reduce meat-eating, far area growing grains for cattle can be reduced



Regenerate by Design



Quality and HoPE



A photograph of a city skyline obscured by thick smog or haze. In the background, several tall construction cranes are visible against a pale, overcast sky. The foreground and middle ground are filled with the silhouettes of various high-rise buildings and residential structures. The overall atmosphere is one of environmental degradation and poor air quality.

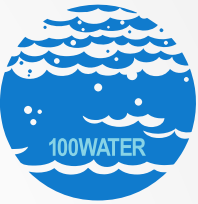
The global environmental crisis is a Quality Problem

The Orientation of Quality-based Management

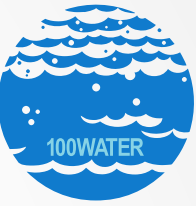
1. Principle of **customer-first** and by extension, society (Not profit first)
2. Wanting to exist in **perpetuity**
3. Involvement of **everyone** in decision-making and improvement activities
4. Continuous **alignment**, momentum, teamwork and capability-building
5. **Elimination of waste** in design and downstream as an ethos, and method
6. An ethos of systematic **improvements** upon improvements
7. Leadership attuned to the **gemba**, the workplace, the reality
8. Building long-term **partnerships**



The Scientific Ways of Quality-based Management



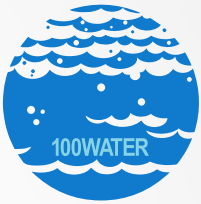
1. **PDCA** cycle as the fundamental method of maintaining, improving, developing; of all of managing
2. **Prevention methods**: Recognizing that 80% of quality and cost is decided before a single unit is produced or service delivered
3. **Problem solving** methodologies - analytical as well as design-oriented
4. **Data-based** working for common cause and special cause situations
5. Use of a range of **statistical** techniques as well as **semantic** tools to deal with qualitative data
6. The deep search for **causes** and factors
7. **Prioritization** - working on key causes of key issues
8. Always setting **challenging targets** that are meant to be achieved



The Mechanisms of Quality-based Management

1. **Policy Management** to link strategies for powerful execution through deployment across the organization
2. **Metrics** that clarify roles, align to strategy, with means to achieve them
3. **Daily Management** to sustain improvements, follow standards, prevent backslide
4. **Cross-functional management** to manage product development, quality, delivery, profits...
5. **Quality assurance** at the heart of quality-based Management
6. **Delivery control** through Lean approaches
7. **Productive maintenance**
8. **QC circles** and **Kaizen** activities
9. **Management diagnoses**

Some Characteristics of Organizations Practicing Quality



Orientation

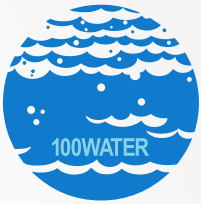
- **Of Organization:** (including all employees): to customers and to society
- **Of Management:** to employees

Observable Culture

- Everyone does consistent, continuous and thorough work - great outcomes
- Everyone is mobilized to participate, and challenge tough goals – momentum
- Everyone is listened to, opinions matter
- Resilience - to meet difficult situations
- Ability to improve continuously and steeply, and maintain them
- Ability to develop unique products and technologies that matter
- Ability to complete major projects with fast ramp-up and minimal early troubles
- Continuously rising capabilities of the entire organization

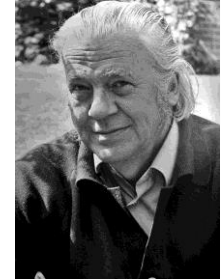
Energy, enthusiasm, teamwork, cooperation, alignment to purpose
Everyone a leader

Quality and the Precautionary Principle



... the burden of proof should lie on the man who wants to introduce change, he has to demonstrate that there cannot be any damaging consequences.

E.F. Schumacher, 1973



Precautionary Principle over the Years

- UN 1982: World Charter for Nature
- UN Earth Summit 1992
- UN Global Compact 2000
- European Union 2007

“lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

- Leaders both disregard data and overplay risks (for military actions) and ask for perfect scientific proof to downplay them (climate warming, cigarettes)
- Stalling a product or a course of action till its safety is confirmed could lead to a Type 1 error, the proponent's risk.
- More seriously, societal risk or Type 2 error would be to permit an unsafe product to cause irreversible damage before its dangers are discovered. Sometimes required: e.g., Emergency release of Covid-19 vaccines

Quality: New Definition and Aim

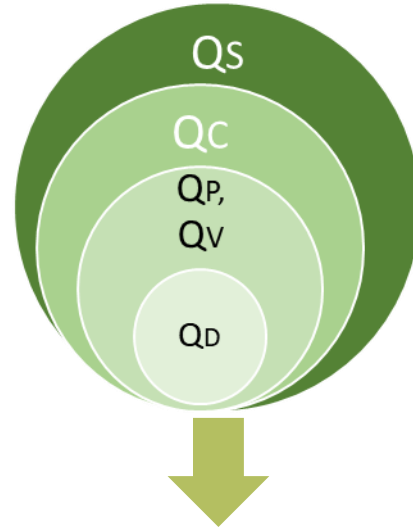
Current definitions of quality tend to

minimize

- ❖ Harm to society
- ❖ Unproven but potentially harmful effects on users
- ❖ Future impact



Expand the
Domain of
Quality



Q_D: design
Q_V: vendor
Q_P: production
Q_C: customer experience
Q_S: society



Quality:

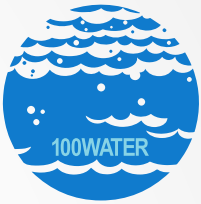
Fulfill stated, implied and latent requirements of customers and society while causing no harm.



Aim of Quality-based Management

Through quality, enable humanity to thrive in healthy planet

HoPE Dimensions in Quality Assurance of Products



Quality Design:

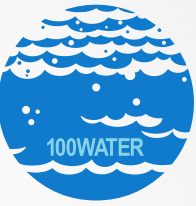
Include HoPE dimensions specific to your product from the design stage, and set targets

No.	HoPE Dimensions of Quality
1	Freedom from toxins and waste
2	Contribution to greenhouse gases
3	Amount of non-renewable resources
4	Amount of renewable resources
5	Recyclability*

- *Can the product be reused, recycled, re-manufactured or reassembled, or upgraded close to the end of life?
- Consider service economy, and cradle-to-cradle design ideas

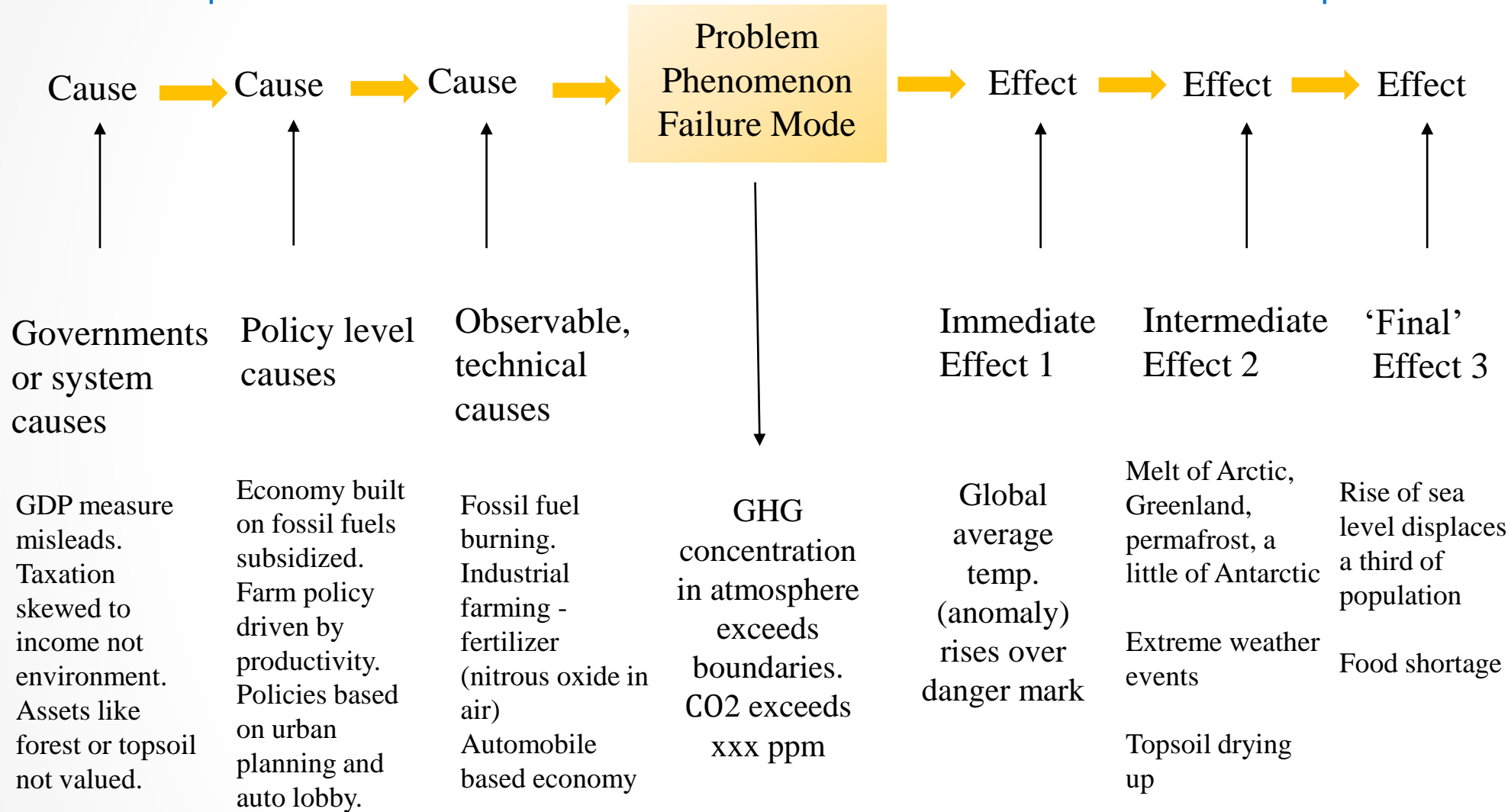
Embedding societal and planetary concerns arising from the use and disposal of products into standard quality assurance practice

Quality and HoPE



- **Past Practice:** Treat 'E' as a separate set of results, not part of 'Q'
- **Paradox:** If harm to 'E' is not part of 'Q' it means products can cause harm and still be treated as good quality
- As with any desired outcome in QCDSM, the **Quality way** has the methods to produce extraordinary results
- Excellent safety results, for example, are produced the **Quality Way**
- Best HoPE results too can be expected by applying the **Quality Way**

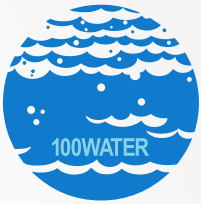
Example of Multi-level Causes: GHG Example



Acting on government level causes is also systems thinking. These are foundations of Quality-based Management

Is there an agreed target on CO2 concentration ppm?

Leverage to Improve the System: Lessons from Donella Meadows



Hierarchy of 12 leverage points: Three high leverage points

1. Redefine – or recognize afresh - the goals of the system
2. Create paradigm shifts – the worldviews from which goals, structures, rules arise
3. Where do paradigms come from? “Listen to the universe”



Donella Meadows

1941~2001

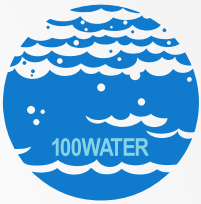
Leverage	Current Discourse on HoPE
Goals	Unclear goals and means. Negotiations between countries. Some bullying. Good faith? Arguments on strategies.
Paradigms	Asserting national supremacies and short-term interest. Fragmented thinking. ‘Technology (or market) will do it’.
Source	Mythic and mental levels of consciousness. Global, ‘Centauric’ or turquoise levels needed to solve global problems

“...Our objective today is not to lower our emissions. We are trying to maintain our way of living.”

- Criticism by Greta Thunberg



Unanticipated Consequences: The Merton Model

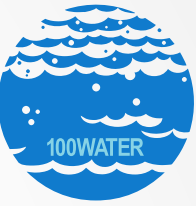


Robert Merton, 1936

The methods of
Quality work to
minimize unanticipated
consequences

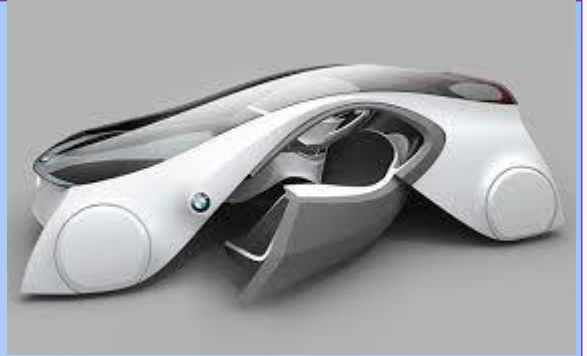
Sources of Unintended Consequences	Explanation	HoPE Issues illustrated
State of Knowledge	Lack of technology, knowledge in the world	Technologies lacking for electric storage, backup for intermittent energy generation, carbon sequestering, hydrogen steelmaking. No pathway yet for Net Zero
Error	Mistakes made, knowledge not used	Delaying actions, or acting only on climate change, avoiding hard decisions, not setting immediate targets, not communicating
Immediacy of interest	Focus on Short-term results at all costs	Continuing with economic models, fearing immediate hit on economy and growth. Delaying funds for poor countries
Ideology	Fundamental values, dogma, beliefs, theories	Neoliberal. Markets (and technology) will find a way. Growth is paramount. Preserving 'Our way'. Sow doubts about science
Self-fulfilling prophecy	Public predictions, Pygmalion effect	Predict that economy and way of life would be threatened by actions. They will be if we fail to reverse the damage to the earth.

Example – A Dream Car: Environmental Quality

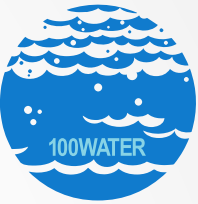


We need a car that

1. Uses no fossil fuel to run, or in its manufacture
2. Is accident proof
3. Weighs a small fraction of what current cars weigh, say, 300 Kg
4. Requires no replacement of parts - even tyres or filters
5. Uses no toxic chemicals
6. Has no materials that off-gases anything harmful
7. Can be dis-assembled, remanufactured, reassembled, and upgraded in technology as new car
8. In disposal, after parts are re-used, has only degradable or recyclable parts
9. Emits nothing worse than ambient air
10. Works almost noiseless



Example – A Dream Tyre: New Goals

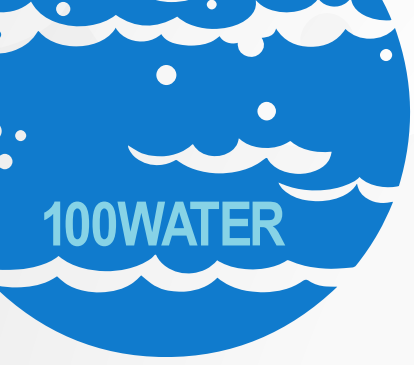


We need a tyre that

1. Will last the life of the vehicle
2. Needs no refill of air
3. Is puncture proof
4. Has a firm grip with low rolling resistance
5. Can be renewed mostly into new tyres
6. If not renewable, can be disposed off safely
7. Uses no fossil products at a rate faster than a renewable can be substituted for it
8. Uses no renewable resource at a faster rate than is regenerated
9. Causes no pollution in its manufacture
10. Is net zero in greenhouse gas emissions in manufacture



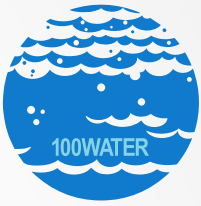
Only through Quality can we realize such radical aims



HoPE: Actions at Many Levels

100WATER

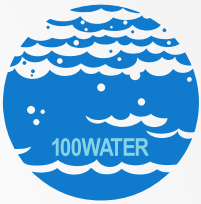
Countermeasures at Many Levels



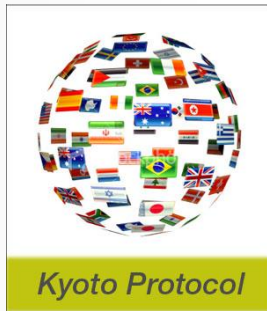
Need

- Developing national leaders with global mindsets
- Enrolling those still in denial
- Bringing planet issues to the heart of quality management

Example of Global Agreements: Climate



The Montreal Protocol, now running ahead of original schedule in phasing out chloro-fluoro carbons and other refrigerant gases that deplete ozone



The Kyoto protocol – under United Nations Framework Convention on Climate Control - that put in mechanisms for carbon trading. Since scuttled

Paris Agreement, 2015

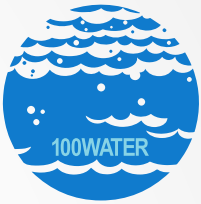
Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit to 1.5°C
Withdrawal by U.S. Now re-joined

Weaknesses of Paris Agreement

1. No binding targets
2. No responsibility for past harm. Lets developed countries off the hook
3. No agreement on environmental taxation
4. No funding for those taking positive action



Example: Climate Leadership Coalition - Finland



87 organizational and 45 personal members – companies, cities, associations, trade unions, universities and think tanks – largest climate business network in EU

Promoting Solar, Circular, Bio-economies

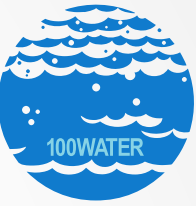
Approaches

- Decarbonizing industry
- New materials, active buildings
- New agriculture, also C sinks
- Prices, taxes and financing
- New energy, storages
- New market mechanisms, smart grid, ICT, IoT ...
- New "fuels" for transport
- Activating citizens
- Sustainable forestry, land use

Promoting Pricing Carbon

- Fossil subsidies are estimated at \$ 500 billion
- Indirect costs of climate change estimated at \$ 5000 billion
- Carbon pricing has made small beginnings already – combination of emission trading, emission reduction funds and carbon tax
- Universal carbon pricing is a necessity

Multiple technologies being developed



Calling out for Global Technologies

Some Technologies that need to be developed

Some Big Ones

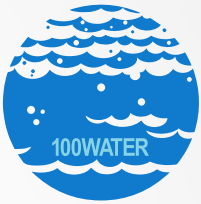
1. Storage of electricity (to cover up for intermittent sources like solar)
2. Energy from nuclear fusion
3. Aviation and shipping through renewable energy and biofuels
4. Hydrogen for steelmaking
5. Non-invasive cures for cancers
6. Efficient sequestering of carbon
7. Cold processes – avoid heating

Some others

8. Efficiency multiplier for solar energy
9. Efficient geothermal and tidal energy
10. Smart grids to optimize generation
11. Biocatalysts – avoid heavy metals
12. Bio-detergents – eliminate hazards in water
13. Bio-plastics
14. More universal Permaculture without plough, pesticides, chemical fertilizers
15. Mass-timber to partly replace steel and concrete sustainably*

* Sonti Kamesam – an Indian scientist & engineer - advocated the switch from concrete to wood some 70 years ago

Crying out for a Quality Economics



Kate Raworth *Doughnut Economics*

Pair of concentric rings. Below the inner ring – the social foundation. Beyond the outer ring – the ecological ceiling. Between those is the space in to meet the needs of all within the means of the planet.

1. Change the goal (from GDP)
2. See the big picture. Embed the economy within society and within nature, and powered by the sun
3. Nurture human nature
4. Get savvy with systems thinking. understanding the economy's dynamism by a simple pair of feedback loops
5. Design to distribute. Inequality is a design failure
6. Create to regenerate. Clean environment not a luxury. Ecological degradation is the result of degenerative industrial design. Create a circular economy
7. Be agnostic about growth. We need an economics that makes us thrive

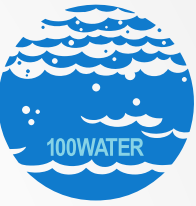
Growth versus Steady State

Donella Meadows: 'Growth is one of the stupidest purposes ever invented by any culture. We've got to have an enough.'

'...who pays the cost, and how long can it last, and what's the cost to the planet, and how much is enough?'

Herman Daly - prescient call for creating 'steady state' economics

Unblocking Progress: Ten Potential Global Agreements

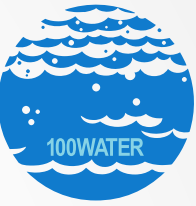


1. Mandate energy generation mix
2. Mandate energy use patterns
3. Deindustrialize farming and sickness care
- 4. Replace GDP as a measure of well being**
5. Supplement with well-being indices
- 6. Put a price on carbon**
- 7. Mandate taxes based on environment**
8. Mandate standards for forestry, water use etc.
9. Mandate new laws on packaged food, tobacco use, disclosures..
- 10. Create fund paid by countries which exceed standard ratios**



Wanted: A Neo-Marshall Plan

Reforms around GDP

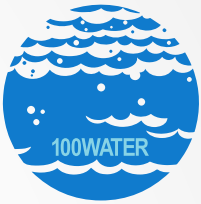


Modify economic measures through HoPE

- A measure closer to income and consumption rather than production - especially household income
- Weight for distribution of income
- Subtract depletion of resources (which should be counted as cost) (NDP)
- Subtract environmental degradation (e.g. tree cover, potential cost of cleaning rivers)

Sometimes measuring something
influences behaviour

Reforms: Environmental Taxation



- Fix universal tax rate of carbon-di-oxide equivalent at source. (In preference to carbon pricing and trading) No safe havens. Increase tax rate each year on fixed schedule
- Fix taxation rates for other pollutants similarly
- Reduce or eliminate personal income tax in compensation
- Countries contributing to carbon consumption in excess of global average per capita based on population as of a cut off year – say, 1950 – to present period (to the year of agreement) to pay into international fund that pays those below average. These 'carbon remittances' maybe paid in installments (with interest) over the next 'x' years (say, 50)
- Pay for offsets: Nations below average in tree cover and wetland area proportions to pay into international fund for payment to those with rich covers. (Brazil or Indonesia will have incentive to keep their forests)

None of these figure in the Paris Agreement or the subsequent rounds.

Rich countries take no responsibility for taking us to the present state



Reforms: Sharing the Commons

- Pay a global tax or fund for marine fishing, fix quotas too - prevent depletion
- Treat all minerals and fossil fuels as global commons, whose withdrawal rates are agreed to. Fix global 'taxation' rate for buyers of minerals
- Create a global biodiversity fund

Circular Economy, mainly a European construct, is concerned with reuse of what is already in circulation – it does not start at mineral exploration and mining – which cannot be avoided even at zero growth of consumption

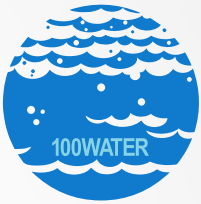


Reserves of Lithium for automobile batteries may not be enough for 100% conversion of auto population

Alternatives needed



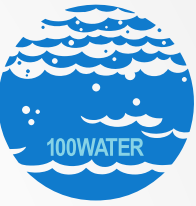
Priorities for the Global Countermeasures – AHP- 2015



Preserving Planet Earth	Food quality	Resource depletion	Waste generation	Diseases	Climate warming	Radiation Hazards	Weighted totals
	0.086	0.164	0.176	0.080	0.389	0.103	1.00
Supplant GDP	0.100	0.185	0.124	0.218	0.093	0.188	0.134
Price carbon	0.488	0.084	0.388	0.175	0.428	0.067	0.311
Environmental taxation	0.251	0.380	0.345	0.504	0.272	0.568	0.349
Fund based on ratios	0.161	0.351	0.143	0.103	0.206	0.176	0.203

Taxing environmental degradation is the top option, closely followed by pricing carbon. Creating a fund and supplanting GDP with better measures are important too

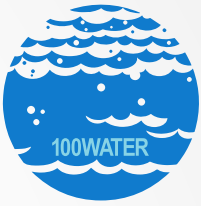
Potential National and Local Mandates



1. Promoting perennials in agriculture, reduce water and pesticide use. and mitigate soil degradation
2. Making water a national or communal property and mandating costs and standards for use
3. Applying standards and certifications for forestry
4. Compelling recycling of paper, plastics, aluminum, scrapped cars, foundry sand, tyres ...
5. Restricting the use of chemicals in food, cosmetics, detergents, clothing, building materials ...
6. Introducing taxes on waste disposal, including for imported products ...
7. Ridding pollutants from rivers and waterbodies
8. Altering building codes to use less materials, conserving as well as generating energy
9. Developing national plans for renewable energy
10. Moving towards ecocities that cut urban sprawl, reduce car use, and promote local produce

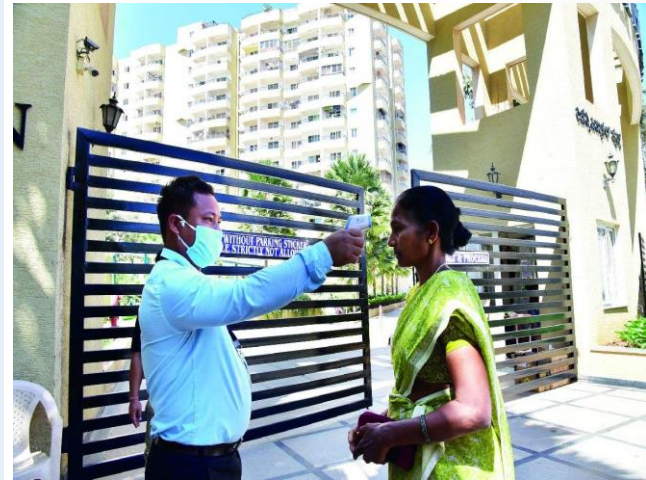


Neighbourhoods and Apartment Complexes

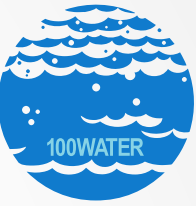


- Make walkways
- Meter water by dwelling unit, and charge
- Prohibit private borewells
- Manage schemes for collecting rainwater
- Plant, in space available, Miyawaki forests
- If available, make parks bio-diverse
- Charge for vehicle parking in public spaces
- Install digital electricity meters which display rate of consumption
- Involve all in HoPE education, especially children
- Segregate wastes. Organic waste composting; send recyclables responsibly to agencies; minimize landfill wastes
- Promote solar roofs. Else, paint roofs white
- Follow municipal laws and building codes scrupulously. Report violations

To the most
extent feasible



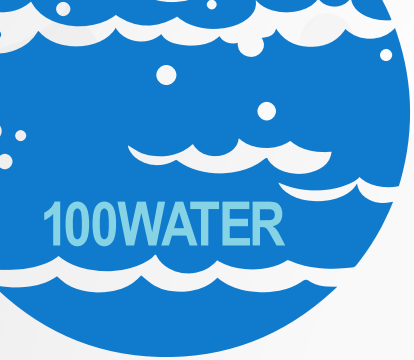
What can Individuals and Families Do?



- **Laws:** Follow national, city, panchayat, association laws and rules
- **Food:**
 - Buy organic food, even if more expensive; cold-pressed oil; milk & meats without hormones or antibiotics; eat less meat
 - Minimize processed food & beverages; aerated drinks
 - Include more millets; they need less water to cultivate
 - Grow some own food, buy locally grown food
- **Physical Culture:** Exercise, walk, run; Do Yoga
- **Clothes:** Fix your inventory of clothes. Give away used clothes in good condition as new clothes come in
- **Energy:** Buy energy efficient gadgets (Star ratings, LED lamps). Conserve. Install solar panel or solar heaters. Minimize air-conditioning
- **Resource Use:** Repair and persist with old gadgets; Buy only durable ones
- **Transport:** Walk, cycle. Pool car. Use small car. Use Metro. Work from home.
- **Education:** Learn about HoPE. Read, watch videos

To the most
extent feasible





Management Level Approaches
Strategic Development of Products and Services
Readiness for mandates on environmental issues
Readiness for closed loop economy
Efficiency Measures

Corporate Approaches to HoPE

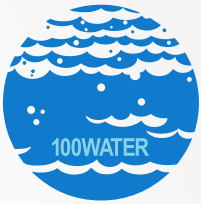
Some Management Level Approaches

Reporting	<ul style="list-style-type: none">• Global Reporting systems – example - GRI• Clarifying metrics touches off initiatives
Science-based Target Initiative	<ul style="list-style-type: none">• Launched by UN Global Compact plus three others• Focused on GHG, investor support coming in
Challenging Targets	<ul style="list-style-type: none">• Set internal targets on eco-metrics• Apply PDCA to achieve challenging targets
Quality in Design	<ul style="list-style-type: none">• Set target quality to cut life cycle costs to society• Apply statistical techniques, TRIZ, Factor Ten Design etc.
Digital Era	<ul style="list-style-type: none">• Ease into era of IoT and robotics• Automation and technology with a human face
Involve all Stakeholders	<ul style="list-style-type: none">• Ride the groundswell of public opinion• Enroll and train everyone



SCIENCE
BASED
TARGETS

Common Sustainability Metrics



Common Indicators

- Emissions of **CO₂ or equivalent** in tonnes or tonnes/unit of product
- Own generation Kwh of renewable energy
- Water bought for manufacture or service tonnes (excl. drinking) – or specific water consumption
- Effluent water released
- Average SPM, sulphur and nitrous oxides in air
- Waste sent to landfill. Also non-degradable waste sent
- Toxic waste indicators including permissible levels
- Bio-diversity indications within campuses
- Biofuels generated and used

A big strength of Quality-based Management is the ability to set appropriate metrics flowing from vision and strategy and deployed through Cross-functional, Policy and Daily Management mechanisms, together with means for achieving the objectives, supported by improvement projects



HoPE Metrics, the Quality Way

New HoPE Indicators

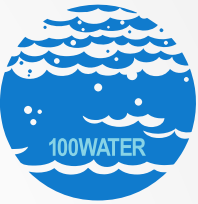
- Fossil Fuels consumed in tonnes for own generation + bought energy
- Or, Bought energy in Kwh based on fossil fuels
- Amount of CO₂ absorbed by tree plantations, tonnes/year
- Energy consumption per unit of product – manufacture and in lifecycle
- Sales value/total material weight
- Sales value/non-renewable material weight
- Manhours/weight of products sold
- Lifecycle emissions of product
- Estimated waste at product disposal to landfills – weight
- Estimated hazardous or toxic waste at product disposals – weight
- Estimated scarce metals or materials wasted at product disposal
- Product durability – years, hours running...
- Paper consumption

Strategic HoPE metrics for the more serious companies. Focus on resource consumption

Add to these metrics, innovatively



Strategic Development of Products and Services



Replace Ownership with Service

- Dematerializing trend – music, books, movies, online education, retailing...
- Service, not ownership, of cars, trucks, tyres, household durables, machine tools...

Environmental Businesses

- Afforestation, restoration of water bodies, coral reefs and degraded land, solid waste management
- Bio-fuels, public transportation, green buildings, developing of 'eco-cities', consultancies on environment

Substitutes

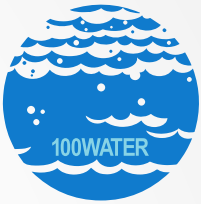
- For plastics, chemical fertilizers, pesticides...
- For chemicals in food, toiletries, detergents, clothing...

Energy

- Research, installation, marketing of renewable energy
- Solar, hydrogen fuel cells, windmills, tidal or geothermal energy...

Transportation

- End of the IC engine - battery, fuel cells
- Better IC engines – biofuels - shipping and aviation?



Readiness for Environmental Mandates

Imputed cost of harm

- Costing of wastes and discharges based on potential taxation, including carbon pricing
- Can cut cost of waste now, much more later

Certification

- Maintain or obtain certification to ISO and other certification standards
- Also, GRI and similar...

Sparing use of chemicals

- Cut back on use of any dubious chemical in manufacturing
- Remove even borderline contact or off-gassing risks

Review packaging

- Study lifecycle of packaging materials
- Switch to reusables, biodegradables...



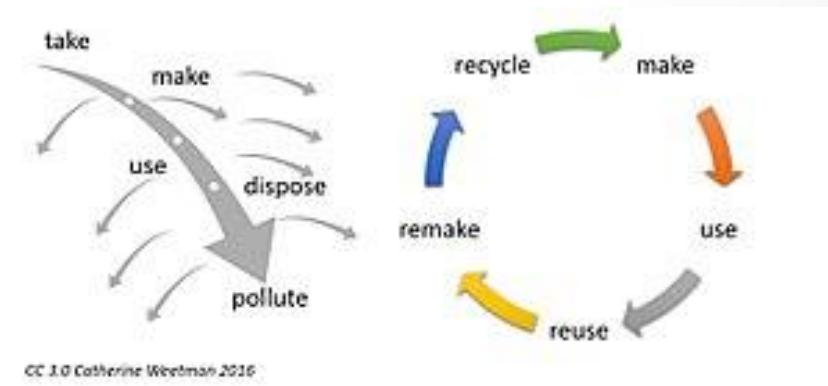
Readiness for Closed Loop Economy

Businesses for Restoration

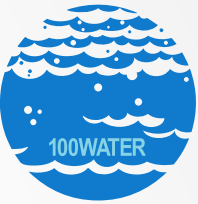
- Recycling papers, tyres (devulcanization), paper, plastics (depolymerization), ultrasound for powdering solid plastics...remanufacturing of cars, durables,

Design for closed loop

- Cradle-to-cradle designs, biomimicry, regenerative designs, or blue economy designs
- Designs for durability, recycling, reconditioning, reuse, minimization of waste and packaging



Raising Efficiency

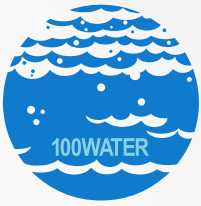


Metrics	<ul style="list-style-type: none">• Incorporate 'E' metrics as 'Q' metrics• Thus, cut eco-footprint and costs simultaneously
Eradicate <i>muda</i>	<ul style="list-style-type: none">• Bread and butter of Quality, and the digital era• Reduce energy and material consumed, rework, repair, scrap, low value adding work...
New Equipment and Facilities	<ul style="list-style-type: none">• Consider life cycle costs of new equipment• Green construction and layouts, Hannover principles
Lean even in Process Industries	<ul style="list-style-type: none">• Revisit paradigms of large scale and equipment in process industries• New ways to up yields, cut lead time and wastes
Industrial Ecology	<ul style="list-style-type: none">• Concept of resource efficiency relating to biosphere• Environment-friendly cost-reduction



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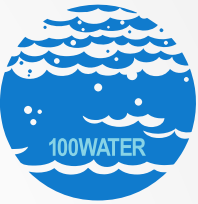
Energy: Some Obvious Technical Solutions

Examples

- Green buildings
- Energy efficient – lean, TPM based industrial equipment
- Efficient motors
- New lighting technologies
- Targeted heating
- Mitigating heat loss, heat recovery processes
- Electric rather than pneumatic equipment
- Avoiding steam heating
- Adopt cold processes
- Avoid idling losses
- Avoid peak period usage
- Balance power factor



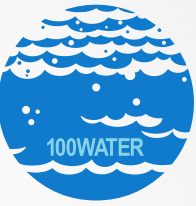
Summarizing Some Technical Approaches to HoPE



Technical Actions
<ul style="list-style-type: none">• Consider new equipment by lifetime use of resources• Construct/convert buildings to net contributors of energy• Design process equipment to function in smaller sizes• Eliminate pollution within facilities and contact with toxins• Include the 5 sustainability dimensions in Target Quality and Design Reviews• Make packing reusable, degradable• Promote carbon sinks through trees, forests, wetland creation (Offset)• No organics to landfills. Generate biogas and compost• Reduce specific water consumption, by reducing need and by treatment• Eliminate leaks of oils, refrigerants, compressed air...

Reduce specific energy consumption steeply, not just renewable energy

GHG Emissions, Scope 1, 2, 3



Scope 1

- GHG emissions from operations owned or controlled by company – e.g., boilers, furnaces, DG sets, emissions from chemical equipment, leak of refrigerants
- Biomass combustion emissions, NOX etc to be reported separately

Scope 2

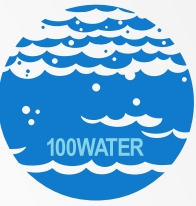
- Emissions in purchased electricity. (They occur where electricity is generated)
- Proportion of bought electricity from renewable sources can be offset?

Scope 3

- From sources not owned or controlled by company, e.g., purchased materials, product use...
- There are 15 categories. Choose what is applicable

Consider offsets – trees, topsoil regeneration, renewable energy generation...

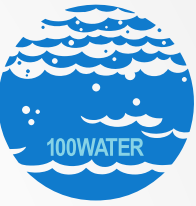
Own Comprehensive Scope 1



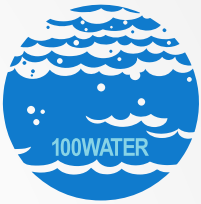
Go beyond GHGs

1. Contribution to biodiversity within own or controlled locations
2. Hazardous air pollution within facilities and in ambient air around including SPM
3. GHG emissions
4. Water pollution within facilities and in ambient air around
5. Solid wastes to landfills from owned or controlled facilities - organic, hazardous, non-degradable, degradable (Aim Zero)
6. Toxins coming into contact with workforce
7. Freshwater drawn from outside or by borewells
8. Emissions from owned vehicles – automobiles, aircrafts...

Our Own Comprehensive Scope 2



- GHG emissions of purchased electricity, as officially disclosed by generating agencies
 - Water bought
-
- Offset through generation of renewable energy for own use or for sale – e.g., wind energy generated in another location
 - Planting of trees, forests. Consider dense and diverse (multi-culture) plantations, water bodies, wetlands. Consider regeneration of topsoil. Generate biogas, compost.



Standard 15 Categories GHG Emissions Scope 3

Upstream Scope 3 Emissions

1. Purchased goods and services
2. Capital goods
3. Fuel- and energy-related activities
(not included in scope 1 or scope 2)
4. Upstream transportation & distribution
5. Waste generated in operations
6. Business travel
7. Employee commuting
8. Upstream leased assets

Downstream Scope 3 Emissions

9. Downstream transportation & distribution
10. Processing of sold products
11. Use of sold products
12. End-of-life treatment of sold products
13. Downstream leased assets
14. Franchises
15. Investments

Example: Tata Group and Environment



Tata Business Excellence Model assessment each year based on Malcolm Baldrige Award for Group Companies



Tata Steel
2008 Winner



Tata Steel
2012 Winner

Central sustainability cell
Own additions regarding sustainability and Climate Change

- The term 'climate change' implies human causation, as in the United Nations Framework Convention on Climate Change
 - Criteria: In strategic objectives, address climate change needs of all stakeholders. Deploy down and to key suppliers and partners.
 - Improved organizational climate change performance required
- Areas of societal contributions include efforts to improve the environment and conserve natural resources
 - Reports required on carbon and water footprints, GHG emissions, energy efficiency

Example: Mahindra and Mahindra - Environment



M&M Farm Equipment Sector 2003
Winner
Swaraj Division 2012
Mahindra Powerol 2014



M&M Farm Equipment Sector 2007
Winner

Environmental Vision

- ❖ Achieve carbon neutrality
- ❖ Become water positive
- ❖ Ensure no waste to landfill
- ❖ Protect biodiversity

Examples of Waste Heat Recovery

1. From recuperator to heat pre-washer solution and air to burner
2. From compressed refrigerant to heat washing machine solution
3. Heat Pipe Technology - using flue gases to heat air for burners in paint shop

Extraction of heat from circulating lubrication oil from compressor

- 12-year-old air compressor modified, after refusal from compressor supplier. Preventive methods – FMEA, HIRA
- Integrated with GPRS cloud-based system linking compressor and washing machine (IoT)
- Patented

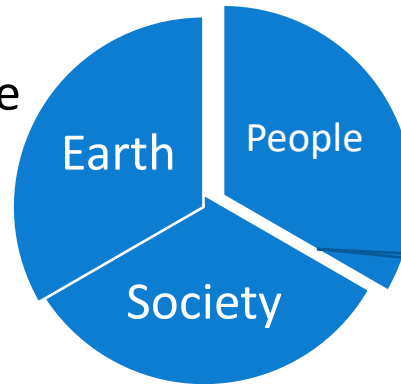
2019 prize
winning
Project

Example: Mazda (Hiroshima) and Environment



Sustainability Framework

Through conservation initiatives, create a sustainable future in which people and cars coexist with a bountiful, beautiful earth.



Enhance customer's mental well-being with the satisfaction that comes from protecting the earth...

A new triad

Realize cars and a society that offer safety and peace of mind, and create a system that enriches lives by offering unrestricted mobility to people everywhere.

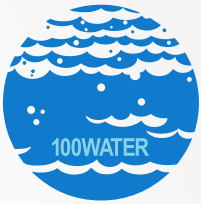
Sustainable Zoom-Zoom 2030

... we see it as our mission to bring about a beautiful earth and to enrich people's lives as well as society. We will continue to seek ways to inspire people through the value found in cars

Well-to-Wheel perspective

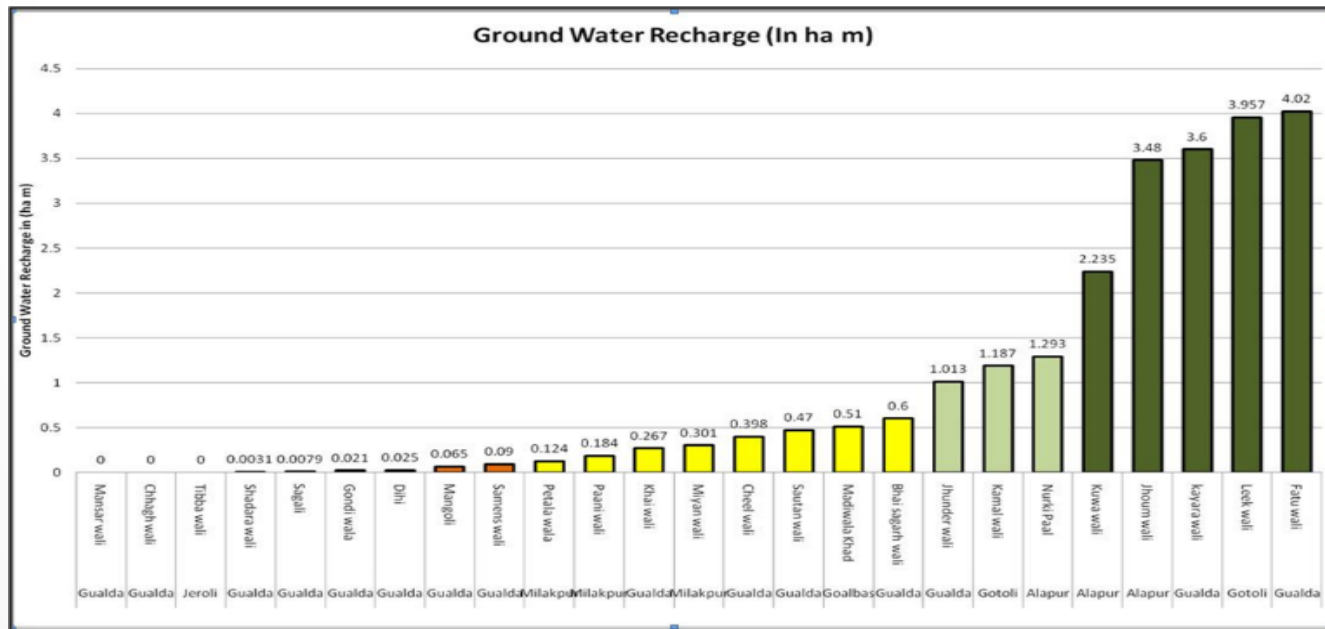
Toward CO2 reduction in entire vehicle life cycle from oil wells onwards

Sustainable Community Uplift – CSR Example



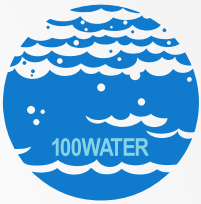
Zaidi et al - 2010 case of **SRF**, along with NGOs, to transform impoverished villages situated in degraded land

- Self-help groups of families and women – direct involvement
- 583 hectares of rutted land levelled by self-help
- 100 embankments for water created, raising the water table
- Successful plantations and fields
- Direct involvement of workers – the quality way

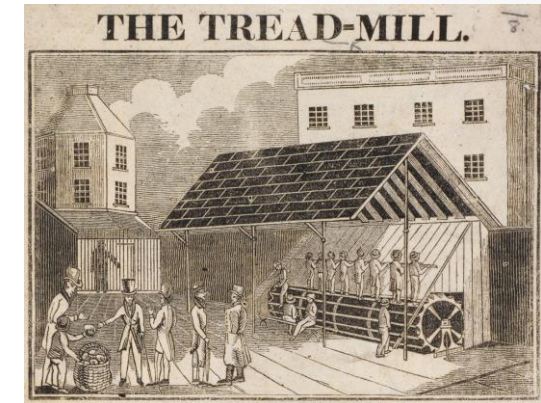


New look of the land

Breaking the Mould – Off the Treadmill



Patagonia aims to make clothes that last longer. It repairs customers' clothes. It resells your old clothes. It recycles old clothes
It uses organic cotton



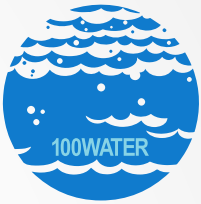
We are on a treadmill

We cannot do without

- Cars
- Smart phones
- Packaged foods
- Air travel
- Pesticides

Our cities, our technologies, our economic and political systems entrap us

Say Yes to Durability



The government proposes a vehicle scrappage policy to retire old vehicles from Indian roads. The stated purpose: reduce pollution, create job opportunities and boost demand for new vehicles. Our current paradigm forces us into the treadmill of having to scrap the old and sell new replacements, to survive



Such a policy
dashes

H  **P** **E**
Health of Planet
Earth

The Alternative:

1. Increase durability, make it easy to reuse, disassemble, recycle, remanufacture, dispose without hazard
2. Performance economy: Sell service, not product. E.g. car, washing machine...
3. Now the incentive is to increase durability, and make it easy for remanufacture
4. Revenues keep flowing from service
5. Labour per unit weight increases from such a service economy – jobs abound

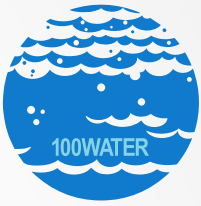
Three Corporate Stages of HoPE through Quality

Stage	Status	Quality Methods
Awareness - Operational Sustainability	<ul style="list-style-type: none"> Understand that apparent contradiction between sustainability and profitability may be false Start to reduce harm within the organization 	<ul style="list-style-type: none"> Set some environmental goals Some improvement projects including Lean principles – for energy reduction, pollution avoidance..
Adoption - Strategic sustainability	<ul style="list-style-type: none"> Incorporate sustainability in Mission/Vision Efforts to reduce harm within and to a degree in inputs and product life and disposal Possible linking to UN Global Compact and SDGs 	<ul style="list-style-type: none"> Sustainability objectives in Policy Management – such as carbon neutrality, water positiveness Strong TPM/Lean activities for waste elimination Product choices and designs move towards greater sustainability
Achievement - Holistic Sustainability	<ul style="list-style-type: none"> Primary company value Sustainability covers input materials, operations, and product use and disposal Design of buildings, machines, own generation of renewable energy 	<ul style="list-style-type: none"> Sustainability naturally incorporated in product development, operations and material/supplier selection, integrated with quality assurance Capability built up through accumulation of improvement projects Sustainability goals a natural part of everyone's role template

Adapted from Willy Vandenbrande, IAQ White Paper

From ISQ Quality Earth Forum Charter

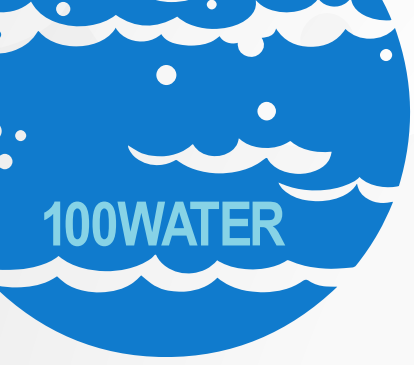
Sustainable Company Cafeteria: Example



There are opportunities to explore HoPE in all activities

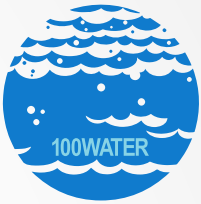


1. Maximise use of organic ingredients
2. Buy ingredients from within a radius of 100 kilometres, mostly
3. Grow some food within the factory where space is available
4. Minimize using bought out processed foods
5. Minimize refined flour and refined cooking oils
6. Reduce red meat consumption
7. Get ingredients in small lots with high frequency
8. Avoid spoilage or spills of ingredients, use them first-in-first-out
9. Discourage food waste in plates, have self-service
10. Minimize left over cooked food, or collect it when fresh, for the poor
11. Generate biogas from wet waste and make compost
12. Use water-saving dishwashers
13. Use enzyme-based detergents for dishwashing
14. Make cafeteria building green, cut energy consumption
15. Ban single-use cutlery and plastics



Improving the Regeneration of HoPE



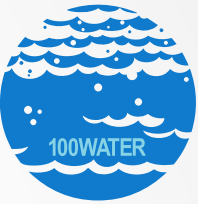


Quality Shows the Ways to Improve HoPE

- Quality introduced universal problem solving methodologies for the world
- From 1950 in Japan and from 1980s in the West, nearly all improvements in corporations have come out of improvements methods that are integral to Quality
- At the foundation are large-scale frontline kaizens and small improvements
- Built on this foundation are improvements made by skilled professionals using methods like problem-solving (analytically oriented) and task-achieving (design-oriented) QC Stories, DMAIC, DFSS methods like DMADV, DMEDI....
- For HoPE to be realized, we need millions of improvement stories from hundreds of thousands of companies, government and civic bodies, civil society institutions and educational institutions

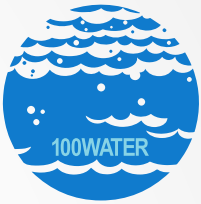
Quality has to be the driving force for HoPE

Types of Problems in Regenerating HoPE



1. **Reducing/eradicating undesirables**, increasing/improving the desirables in environmental matters – problems needing analysis of causes and working within the current system e.g. Reduce SPM in a factory area
2. Create a **new or different process or product of value to society and environment** - that is different in its basic framework from the present ways e.g. Develop a biodegradable packing in place of current plastic. Also, reducing undesirables through a new framework or system – e.g. using ultrasound in place of water, to reduce water consumption
3. Execute through PDCA a **known solution** to an environmental problem e.g. Install a more efficient STP in a new plant

HoPE Regeneration Themes – Analytical Type Examples



- Reduce water waste and consumption
- Reduce energy consumption
- Reduce material waste
- Reduce spillages, spoilages
- Reduce transportation of inward goods
- Improve fuel efficiency of furnaces, boilers, vehicles..
- Reduce SPM in air, NOx or Sulphur emissions
- Reduce use of single-use plastics
- Eliminate organic waste sent to landfills
- Reduce NOX and Sulphur emissions form power plant
- Reduce paper consumption in office
- Eliminate toxic waste

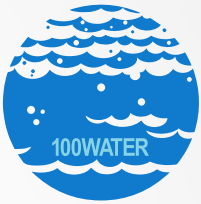


HoPE Regeneration Themes – Execution Examples

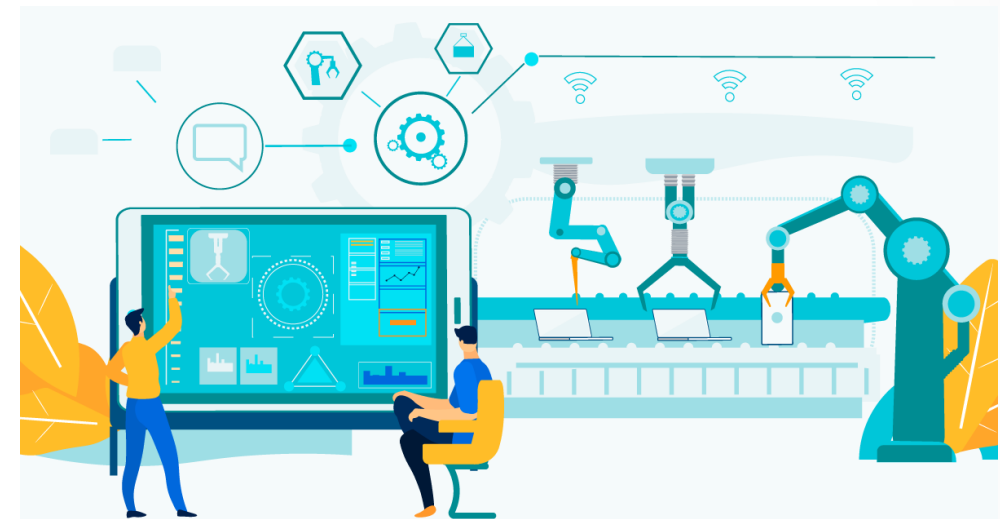
- Install VFD in motors
- Install LED and other efficient lighting systems
- Set up biogas plant next to the kitchen
- Replace Diesel by PNG
- Replace compressed air actuated gadgets with electric
- Install solar heaters on roof or available spaces
- Grow own vegetable garden or fruit orchard
- Do water harvesting
- Erect green building
- Balance power factor
- Reduce peak usage of energy

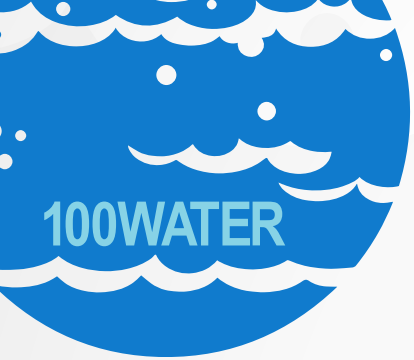


HoPE Regeneration Themes – Task-Achieving Examples



- Design fuel efficient tractors
- Find ways of bio-friendly disposal
- Reduce plastic use
- Recycle wastes in production
- Design eco-friendly products
- Design production process that is energy efficient
- Reduce resource use in products
- Find catalyst without heavy metals
- Make low volume spares by 3D printing
- Replace steam heating by other means
- Recover small heat from diverse sources
- Discover cold processes



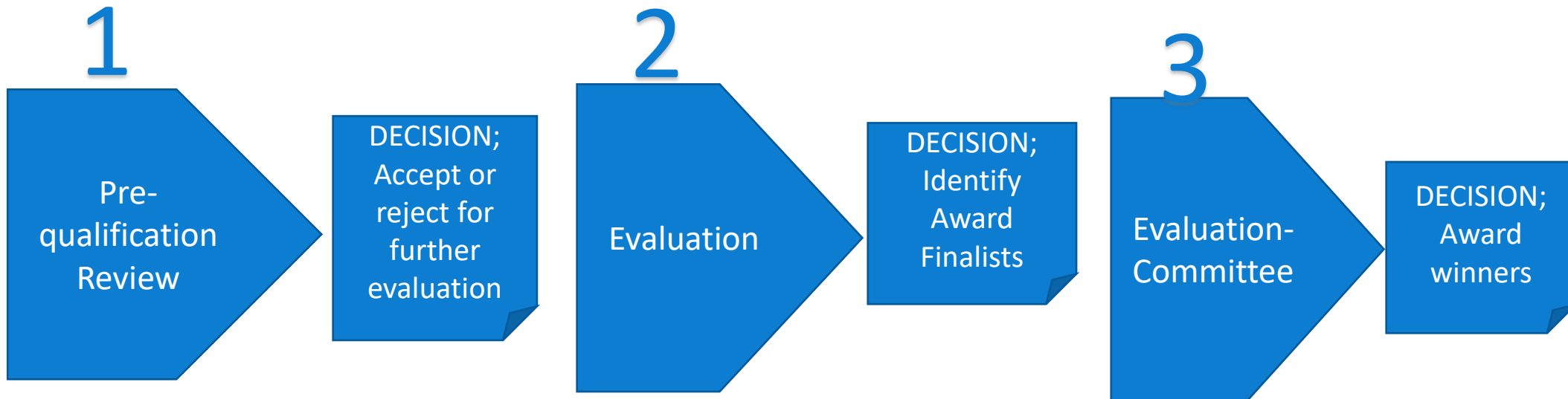


Quality
Sustainability
Award

Quality Sustainability Award

International Academy for Quality

The award recognizes improvement projects that have led to **positive results in sustainability** in line with the UN Sustainable Development Goals, through the application of **quality management principles and methodologies**



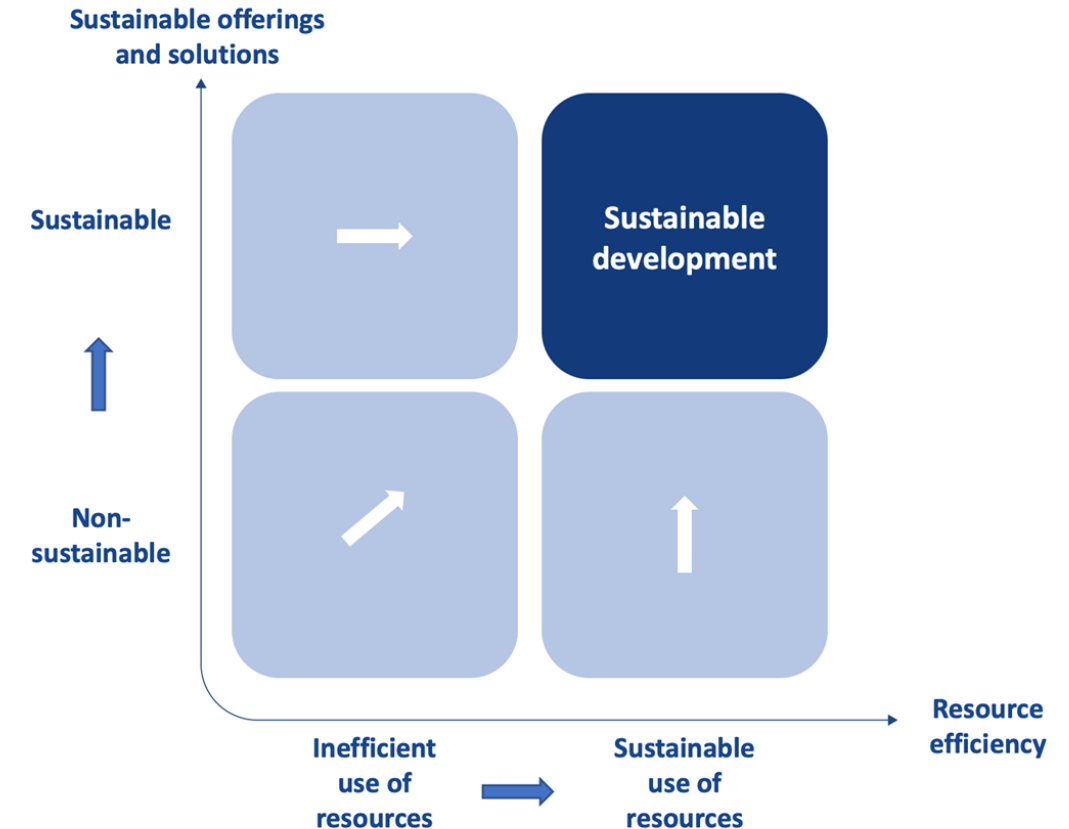
Purpose of QSA

The purpose is to share good examples of how quality management principles have been used to develop sustainable solutions and offerings while also reducing waste and optimizing the use of resources

The aim is to increase the skills to create better sustainability results and to link important knowledge and competence within the field of Quality to today's sustainability activities

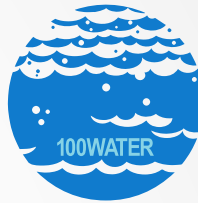
The purpose is also to create a public database of good examples linking Quality to sustainability for research, learning and benchmarking

Visit <http://iaqaward.com/> for more information.



Quality shows ways for product development that satisfy both customers and society, and ways for efficiency in use of resources in operations.

It's a win-win

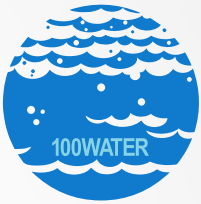


Evaluation Matrix - General Principle

		No or very little indication - contribution	Some indication - contribution	Indication - contribution	Clear Indication - significant contribution	Widespread Indication - significant contribution
Results	Impact and coherence of results achieved, in alignment with UN SDG's					
	<i>Results achieved are trustworthy and with significant impact and high-level effects on sustainable development</i>					
	<i>Clear impact on one or more UN SDGs</i>					
	Leverage of results and effects					
	<i>Project principles can be leveraged to other products, services, processes and organizations, within and outside the sector.</i>					
	<i>Project principles can benefit several stakeholders</i>					
	Importance to sustainable development					
	<i>Benefits of the project will contribute to sustainable development for a long period of time</i>					
	<i>Project results creates a benchmark for Holistic sustainable development</i>					
Approach	Use of Quality Values, Methodologies and Tools					
	<i>Project objectives and development are consistent with the Quality Body of Knowledge</i>					
	<i>Quality approach, methodologies and tools have been used to develop the project and implement the solution</i>					
	<i>Methodologies and tools were correctly used and are coherent with project objectives</i>					
	Link between Results and Approach					
	<i>Link between approach and results are clear and consistent</i>					
	Uniqueness and breakthrough					
	<i>The project represents something unique and new, a breakthrough in knowledge, in how to improve sustainability</i>					

QS Award
Evaluation
System

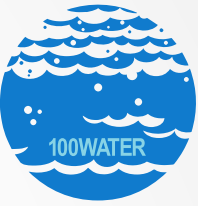
About the 2021 Contest



- ISQ received 45 applications
- After a two stage evaluation by assessment teams and an independent Jury, 12 were shortlisted for online contest of presentations
- The top six won Gold Certificates, which entitled them to enter the world contest. The other six won Silver certificates
- In the Global contest, two winners were announced, including one team from India
- (In 2020 also a team from an Indian company was one of the two winners)

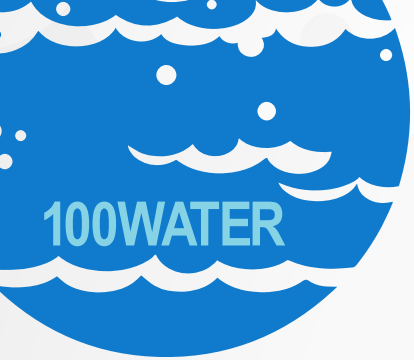


Guidance for QSA 2022



- The entries should be of improvement projects with definite start and finish dates, and team members, and this should be clear in the application. Company-wide strategic directions cannot be treated as a project.
- Each project should have been completed less than three years ago
- There is an application form with word limits. Please add tables, charts, diagrams or photo as relevant
- A one-page summary should be submitted as an attachment which may be used by IAQ for publication.
- The award is given to the team. Multiple applications from an organization are welcome
- The application of Quality philosophies, mechanisms, methods or techniques should be demonstrated
- Each application carries an application fee to be paid to ISQ. Commitment should be made to pay the fee to IAQ in the event of being selected for the international leg

Look out for the 2022
contest announcement

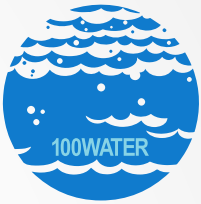


HoPE: An Immersion



100WATER

Proposed Immersion Program



Five class/online sessions + Five-day,
field based, immersion that experientially explains and uncovers
the complexity, intersections interconnectedness of

- Sustainability – as a concept & a Value
- Local manifestations of macro/global sustainability issues and challenges
- Opportunities to integrate sustainability across functions in an organization
- Individual and collective (organization/network) consciousness towards our planet

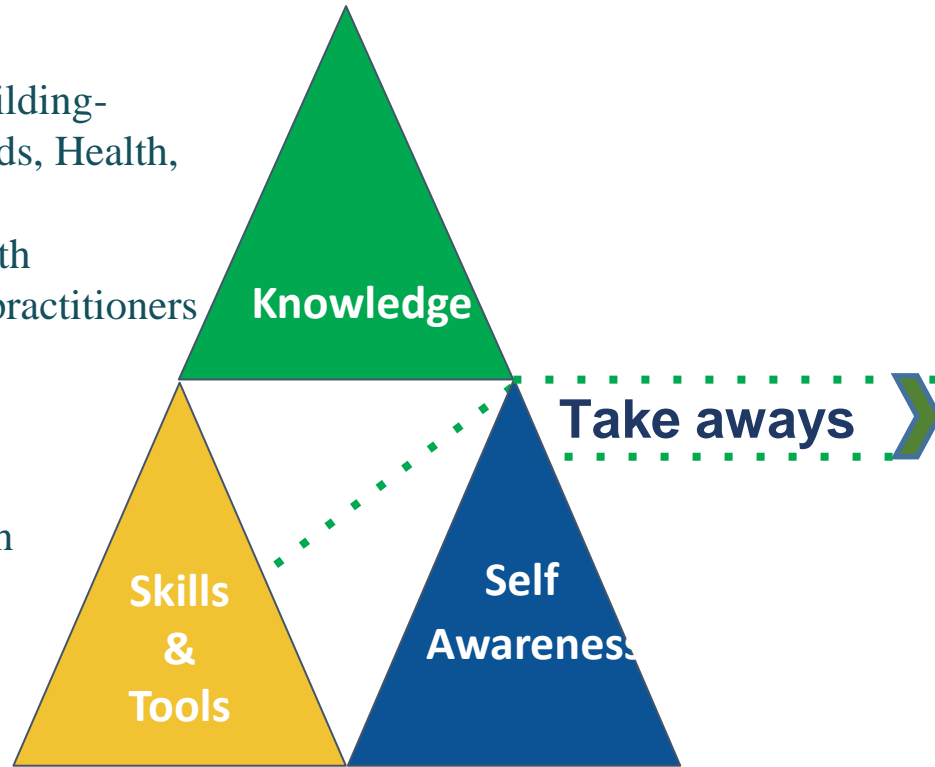
The immersion will be an intense reflective learning journey with a diverse group of professionals who have an awakened consciousness about responsibility to Heal our Planet



- **Sustainability (HoPE)** has become a key business theme at the Board level - a welcome development
- We need to go beyond technical solutions, compliance and short-term financials. We must
- internalize **sustainability (HoPE)** as a way of business, and adopt a Quality approach based on deep values and philosophies
- The proposed learning journey is a tested method of seeding the desired internal conditions required to custom-made definitions, interventions, processes and outcomes for each organization

Immersion: Approaches and Outcomes

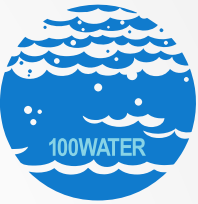
- Sustainability: Perspective building- Agriculture, Water, Livelihoods, Health, Gender, Governance
- Case studies, consultations with communities, sector experts, practitioners
- Thinking skills (Systems approach)
- Techniques and tools for participatory enquiry & research
- Art of asking right questions
- Practice listening and sensing a system
- Learning from time tested ideologies of Gandhi and Vinobha



- Connection with self: practicing listening to inner voice and soul search
- Practicing self examination through reflection of living one's values
- Enhanced self awareness: mental models & patterns, frames, managing Emotional states,
- Synthesizing contrarian views, leveraging diversity,
- Letting go

- Sustainability – go beyond 'Green & Clean'
- Design sustainability both as a personal thing and as an organizational culture
- Identify internal interferences and factors that resist radical changes
- Walk towards building Trust through a safe and reflective space
- Enrol, Engage and Inspire teams towards collaborative action
- Make deeper connections with communities in the neighbourhood, supply chain
- Make personal and collective shift from EGO system to ECO system approach

Express your Interest



- This program will be conducted through LEAD India, as a partner to Quality Earth Forum of ISQ
- We are ascertaining the interest in such a program from corporates as well as civil society, government and educational institutions – a diverse group is good for learning
- Express your preliminary interest in this immersion program 5 + 5 days (Class/online + Field) by writing to Bhawana Luthra: bhawana@leadindia.org or to Prabhakar Shettiga: prabhakar@isqnet.org
- You may also express your views about whether it should be a) Class room or online only, b) field only, or c) both class and field
- You need not make a firm commitment now – just express your interest. The program will be designed based on the interest and then information will be sent for registration, indicating the fees (which will be kept as low as possible).
- Meanwhile check if your organization can sponsor you to such a program

Leadership for Environment & Development

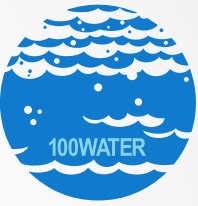


LEAD (Leadership for Environment and Development) is a global community of LEADers committed to the cause of Sustainability. With over 3000 cross-sectoral experts, LEAD's mission is to build '**Leadership for Change**' which seeks to balance Environment and Development.

The LEADers work on a wide range of local to global challenges and aspire to achieve an inclusive and sustainable world through their contributions in environmental, social and political spheres in 90 countries.

The India chapter - LEAD India - meets this mandate by creating experiential learning spaces for high impact individuals across different demographics in the country. For three decades now LEAD has helped leaders to act as bridges to the striking social, ecological and spiritual divides within society. To know more, do visit www.leadindia.org

About ISQ and QEF



ISQ

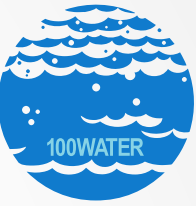
- 1996: Indian Society for Quality (ISQ) - established as a not-for-profit society as a national forum for interaction among quality professionals, business leaders, practitioners and academics
- The ISQ **Mission: Contribute to the thriving of humanity in a healthy planet**
- ISQ is the face of India in the world of quality

Quality Earth Forum

Mission: Develop knowledge and practice in the application of the philosophy, art, and science of Quality to the concerns of humanity about the state of Planet Earth

- The Forum promotes a **vision** of **Quality as a natural partner of environmental sustainability**
- Founded in April 2021, the Forum holds the Quality Sustainability contest in India, as a partner to the International Academy for Quality, and holds online knowledge sharing sessions with experts
- An in-depth Immersion program partnering with LEAD is under consideration

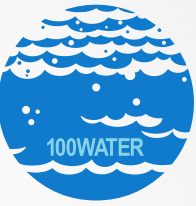
A Quality Manifesto for Thriving in a Healthy Planet



	Deliver dazzling attractive qualities , but with impeccable reliability and durability
	Do no harm: Release no toxins, radiation or waste that is hard to dispose or degrade
	Do no harm: Release no greenhouse gases in manufacture
	Do no harm: Raise efficiency in using both renewable and non-renewable resources
	Do no harm: Extend functional life, re-use, re-manufacture, re-cycle



... for the sake of Our Future



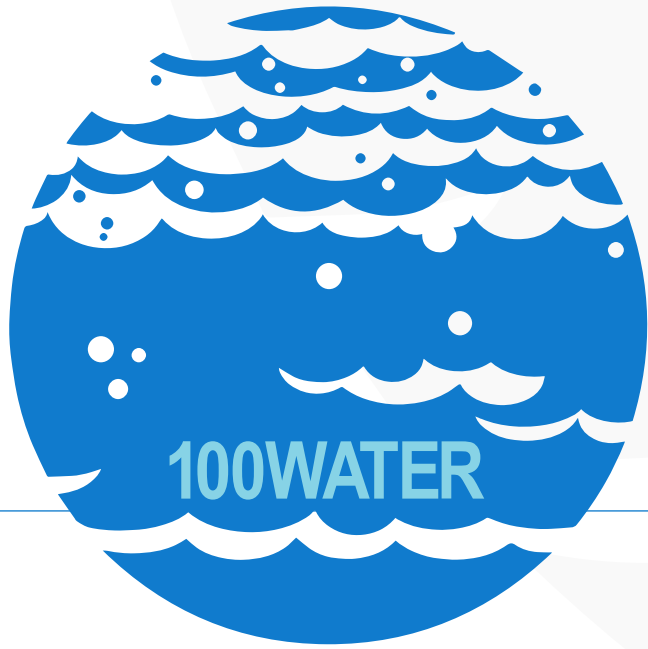
Corporate leaders mean well but are trapped in the system – the treadmill!

Threats to our well being on earth require affirmative action

Information and mobilization essential, yes, but practical action is urgent

The proven approaches of quality management can be the driving force

Think ahead,
and
act now for a better future.



*There can be no Quality without
regeneration of HoPE
There is no possibility for HoPE without
Quality*

Thank you