



We always find a better way



Quality and the Seven Environmental Challenges of the Planet

World Quality Forum - Budapest



INTERNATIONAL
ACADEMY for
QUALITY

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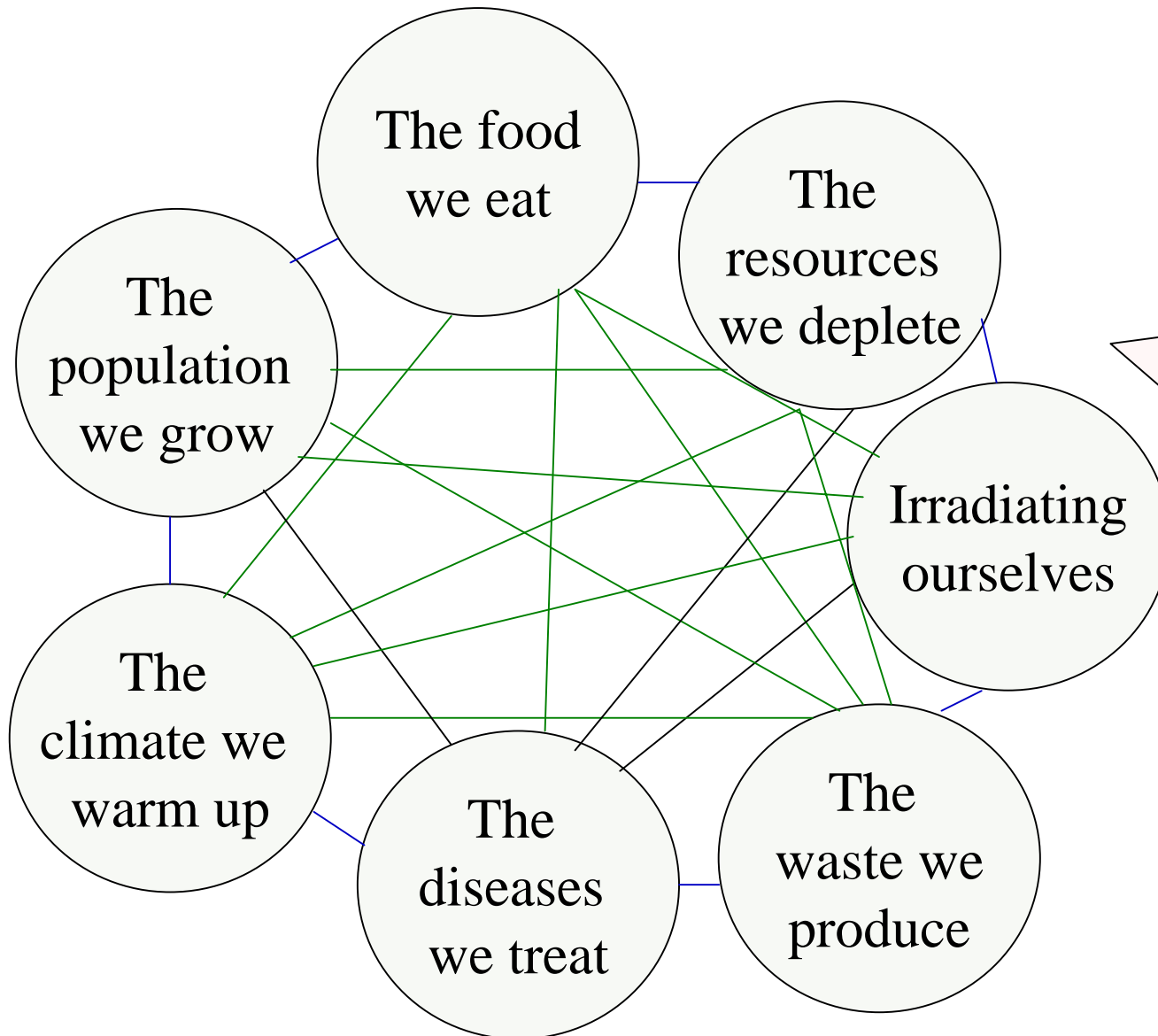
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Seven Interconnected Global Challenges



Seven challenges, not just climate warming

1. The Dubious Food We Eat

- Pesticides in food and ground water
- Antibiotics and hormones fed to livestock
- Fertilizer use, and nutritional and soil depletion
- Salt, chemicals in processed foods
- Thermal & chemical treatment of edible oils
- Refined sugar, flour
- No living enzymes, even in juices



The purpose of food-processing industry is to improve **shelf life**.

2. The Resources We Deplete

- Soil – loss of top soil and salinization
- Rain forests, disappearing fast
- Genetic diversity – accelerated extinction
- Marine life – over-fishing
- Fossil fuels – still lukewarm to substitutes
- Minerals – some believe they will last for ever
- Fresh water – depletion and contamination of fresh water



Our GDP calculation is unaffected by our depletion of irreplaceable resources of the planet

3. The Waste We Produce

- Hazardous waste
- Municipal waste
- Industrial solid waste
- E-waste
- Gaseous waste
- Medical waste, including infectious waste
- Nuclear waste

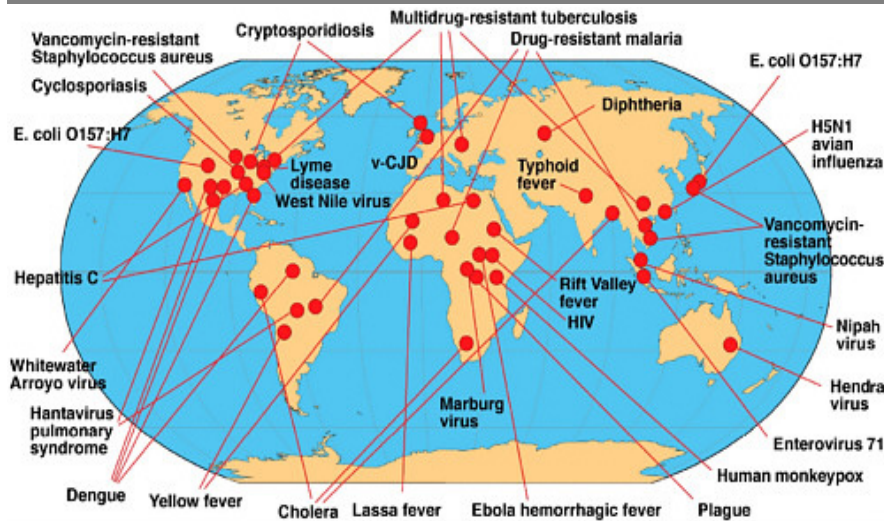
500000 chemicals - many with
“**Toxicity unknown.**” Two-thirds of all
hazardous waste are chemicals

Air, water and Soil pollution



4. The Diseases We Treat

Common infectious diseases mainly afflict the poor, the new ones may hit anyone



Degenerative diseases – heart disease, diabetes, cancer, allergies, obesity...

Global cancer rates could increase by 50% to 15 million by 2020 - W.H.O

About 800 million classified hungry by UN.

One in four will experience mental illness – W.H.O

“... going back to 1913, ... cancer ... was very rare but it has become more frequent since... it is obvious to connect ... increase of cancer with the increased use of salt by the natives.

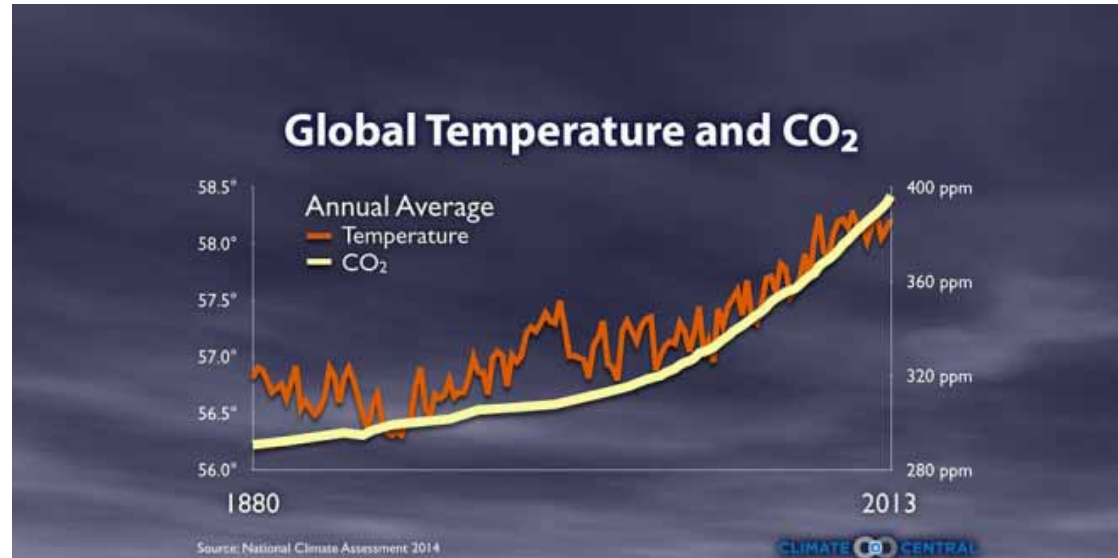
-Albert Schweitzer, in Gabon

5. The Climate We Warm Up

The average global air temperature near the Earth's surface has increased 0.87 degrees Celsius since 1880

Effects of warming:

- Rising Sea levels
- More hurricanes
- More floods and droughts
- Fresh water scarcity
- More infectious diseases
- Forest cover loss



Correlation of CO2 ppm with global temperatures

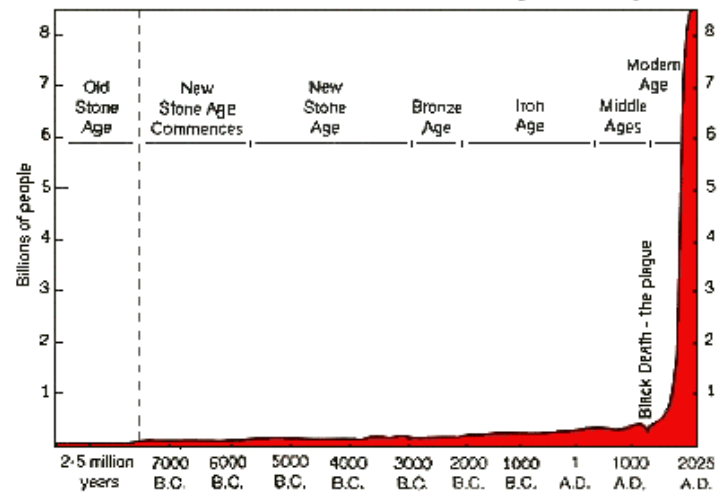


6. The Population We Grow

7 billion going on 10

Population impacts each challenge

World Population Growth Through History



- Pressure on food availability
- Accelerated depletion of resources
- Generation of more waste,
- Risk of more diseases
- Consumption of more energy

Targeting illiteracy and infant mortality by simple means are two of the best countermeasures

A New Definition for Quality

Current definitions of quality
tend to **minimize**

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

e.g. soil degradation,
water contamination

e.g. cell phone
radiation, effect of GM
foods

e.g. depletion of
resources, climate
warming

New definition of Quality

Fulfill stated, implied and latent needs of customers in a manner that preserves the earth not only for future generations of humans but for all living beings.

Some Technical Challenges

Technical solutions available - more or less - Examples

- Solar Energy
- Wind Energy
- Geothermal Energy
- Biogas Energy
- Nuclear Energy
- Small hydroelectric energy projects

Technical challenges remain - Examples

- Tidal Energy
- Hydrogen fuel cells
- Smart grids to handle intermittent energy
- Storage of energy
- Shipping without fossil fuels
- CO2 sequestering

Many technical challenges addressed, implementation lags



Some Human Challenges

Examples of good human response

- Montreal Protocol on refrigerant gases
- Multiple laws to cut pollution
- Eradication of smallpox, polio...



Human challenges seem harder to overcome

Examples of major human challenges ahead

- Binding agreements on capping CO2
- Conflict of environmental requirements with WTO agreements
- Responsibility for past contribution to the status
- Capping of extraction - especially Tar sands
- World wide cooperation on eradication of diseases such as malaria

Levels of Countermeasures

Countermeasures are required at multiple levels



Global



National



Regional



Neighbourhood



Provincial



Town

Village



This paper illustrates the approach to countermeasures on a global scale

Need

- Developing national leaders with global mindsets
- Enrolling those still in denial

Some Plausible Global Countermeasures

Reach international agreements to...

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

Four Chosen Countermeasures (Strategies)

1. Supplant GDP (with other measures)
2. Price carbon
3. Recast taxes, based on environment
4. Create fund based on ratios



Countermeasure: Supplant GDP

- Start with a measure called “**ea-NDP**”
- Net Domestic product subtracts depreciation from GDP
- **Ea-NDP**: subtract cost of resource depletion* and environmental degradation

(*Fossil fuels, minerals and ores, water, trees, genetic diversity)

In addition consider the following in Phase II

- Weight for distribution of income - relate to standard deviation
- Add economic value of household work
- Reduce defensive expenses - such as commuting

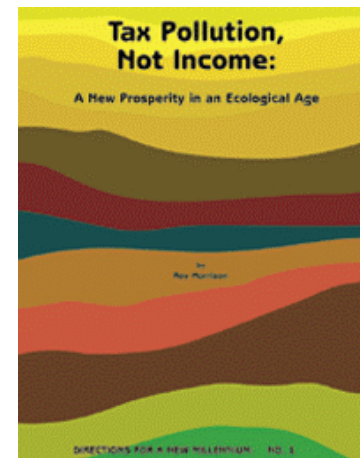
From Stiglitz et al

Countermeasure: Recast Taxes Based on Environment

In addition to price on carbon-di-oxide, agree to:

- Charge for depletion of resources - fossil fuels, minerals
- Charge for waste disposal - of non-degradable items such as plastics, chemicals..
- Tax for gaseous emissions, water pollution, pesticide use

- Tax at source
- Import duties based on the above
- Supplanting all other taxes with these



Countermeasure: Create Fund Based on Ratios

A Neo-Marshall Plan!



- Create acceptable ratios for carbon use to GDP, tree cover ratios, population growth ...
- Pay for fishing or mining from international waters or land (such as Antarctica)
- Above standard ratios pay into international fund
- Add into the international fund the carbon remittances

Overshoot the ratios and pay those who undershoot them

This too fits in with the thinking of Market Economy proponents

Analytical Hierarchy Process (AHP)

AHP is a method for breaking down a complex, unstructured situation into its component parts, arranging these parts, or variables, into a hierarchic order, assigning numerical values to subjective judgments on the relative importance of each variable; and synthesizing the judgments to determine which variables have the highest priority and should be acted upon to influence the outcome of the situation.

AHP also provides an effective structure for group decision making by imposing a discipline on the group's thought processes

AHP enables us to structure a system and its environment into mutually interacting parts and then to synthesize them by measuring and ranking the impact of these parts on the entire system

-Thomas L. Saaty

The Hierarchy

Challenges

Preserve Earth
Food Resources Waste Diseases Climate Population Radiation

Sub-challenges Sub-challenges Sub-challenges Sub-challenges Sub-challenges Sub-challenges Sub-challenges

Countermeasures

Redefine GDP Price carbon etc. Tax based on E Create Fund

Examples of connection



AHP – Priorities for the Seven Challenges

Preserve Planet Earth	Food Quality	Resource depletion	Waste generation	Diseases	Climate warming	Population rise	Radiation hazards	weight
Food Quality	1	2/7	7/8	1 4/5	1/4	1/4	3/8	0.061
Resource depletion	3 3/5	1	2 2/7	1 2/3	3/8	1/6	7/8	0.116
Waste generation	1 1/7	4/9	1	6	1/2	1/4	2 1/4	0.125
Diseases	5/9	3/5	1/6	1	2/9	1/4	1 2/3	0.057
Climate warming	4 1/8	2 2/3	2	4 2/3	1	1 3/5	4 1/3	0.276
Population rise	3 5/7	6 1/5	4 1/3	3 3/4	5/8	1	3 3/4	0.291
Radiation hazards	2 5/7	1 1/7	1/7	3/5	2/9	1/4	1	0.073

Surprise - population rise most important, climate change is next

Population growth not popular in the post-modernist western world, but it dominates the priorities in poor India!

AHP: Three Examples of Countermeasure Priorities

Resource Depletion	Supplant GDP	Price carbon	Environment taxation	Fund based on ratios	Weight
Supplant GDP	1	4	2/5	2/7	0.185
Price carbon	1/4	1	2/7	2/7	0.084
Environmental taxation	2 4/9	3 1/2	1	1 2/5	0.380
Fund based on ratios	3 1/2	3 1/2	5/7	1	0.351

Waste Generation	Supplant GDP	Price carbon	Environment taxation	Fund based on ratios	Weight
Supplant GDP	1	1/2	1/4	5/7	0.124
Price carbon	2	1	2	2 4/9	0.388
Environmental taxation	4	1/2	1	3	0.345
Fund based on ratios	1 2/5	2/5	1/3	1	0.143

Climate Change	Supplant GDP	Price carbon	Environment taxation	Fund based on ratios	Weight
Supplant GDP	1	1/4	2/5	1/3	0.093
Price carbon	4	1	2	2	0.428
Environmental taxation	2 4/9	1/2	1	2	0.272
Fund based on ratios	3	1/2	1/2	1	0.206

Pricing carbon is not always the top strategy. Taxing environment is important. None of the solutions can be ignored

The other matrices are available on request

Renormalizing without Population

Challenges	Weightage including Population	Weightage excluding population
The Dubious food we eat	0.061	0.086
The Resources we deplete	0.116	0.164
The Waste we produce	0.125	0.176
The Diseases we treat	0.057	0.080
The Climate we warm up	0.276	0.389
The population we grow	0.291	
Irradiating ourselves	0.073	0.103

Population growth control needs a different set of strategies

Hence the priorities of the challenges are renormalized after removing population growth from consideration.

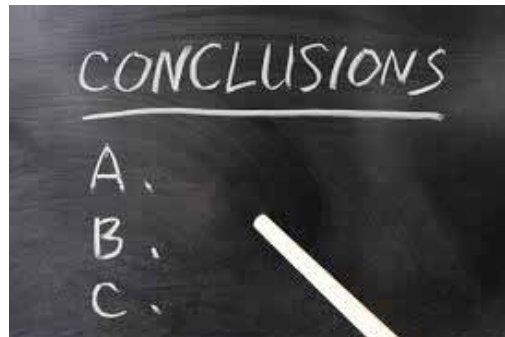
Overall Priorities of the Four Countermeasures

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

Conclusion

- The multiple, interconnected challenges facing us are really quality issues
- Quality needs a new definition and a new start
- This paper illustrates an approach to identifying challenges and prioritizing countermeasures, but the task remains for world governments and experts
- A package of strategies is required
- There is an opportunity to adopt this approach at the local and national levels
- AHP can replace contentious debates with willingness and accord



Thank You