

Some Common Causes, Consequences and Solutions to 3 Inter linked Crises: Financial, Energy/Climate, Ecosystems

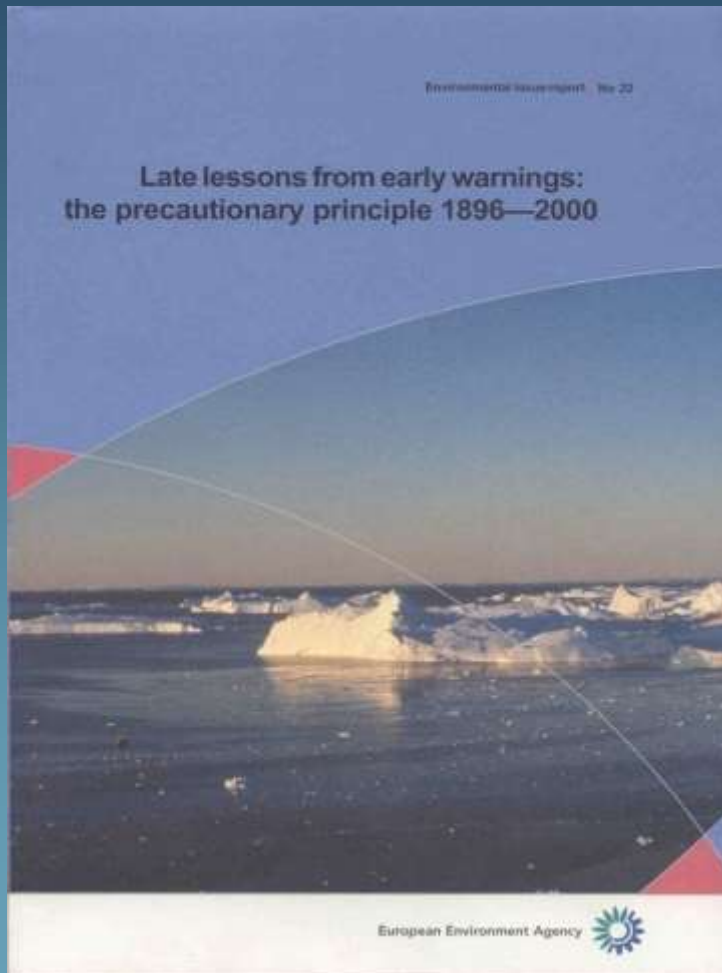
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Homo Sapiens (tragicus?) as slow learners

Two volumes

2001



2013



34 case studies

'Environmental chemicals'

- Beryllium
- PCBs
- CFCs
- TBT antifoulants
- Mercury
- Tobacco
- Perchloroethylene
- Booster biocides
- DBCP
- DDT
- Vinyl chloride
- Bisphenol A

Ecosystems

- Ecosystems resilience
- Great Lakes pollution
- **Fish stock collapse**
- Acid rain
- **Bee decline**, France
- Invasive alien species
- Floods
- **Climate change**

Transport fuel additives

- Benzene
- MBTE
- Lead

'Micro technologies'

- Nano
- **GMOs**

Animal feed additives

- BSE, 'mad cow disease'
- Beef hormones
- Antibiotics

- Asbestos

Pharmaceuticals

- Contraceptive pill
- DES

Radiations

- X-rays
- Mobile phones
- Nuclear accidents

Which innovation pathway to feed the world?

“Hungary for Innovation: from GM crops to agro-ecology”

Chapter 19 ,”Late Lessons, 2013.

Plus 8 “horizontal “ chapters..

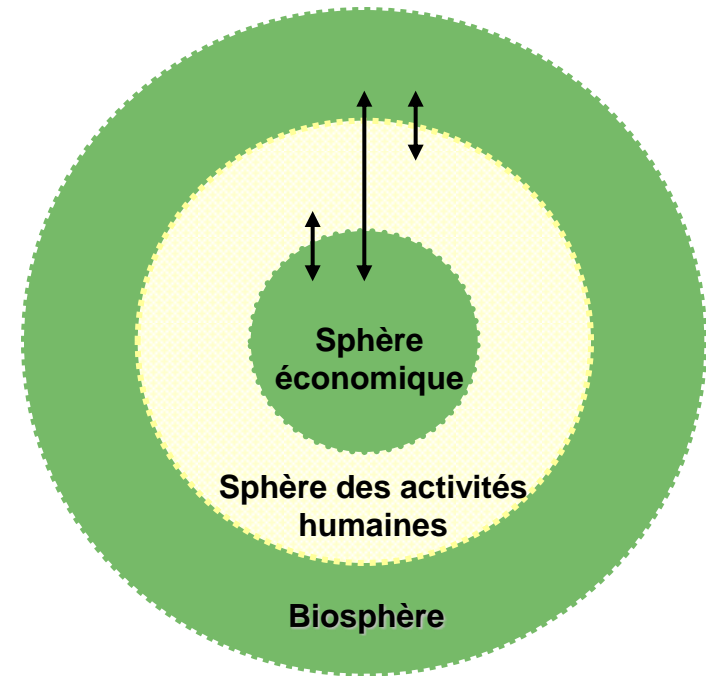
- the “**12 late lessons**” from **vol 1...**

..and in **vol 2:**

- ***the precautionary principle;***
- **false positives;**
- ***precautionary science;***
- **costs of inaction;**
- **protecting early warners & late victims;**
- **why businesses ignore early warnings;**
- **Conclusions.**

Some key differences between the Financial, Energy, EcoSystems....

- Financial and energy systems are **(hu)man made... the biosphere is not.**
- Financial crisis is visible, short term, **largely reversible** ...
Climate and biodiversity crises are generally not (yet) very visible; longer term; **mostly irreversible.**
- Financial systems are more volatile: perceptions, expectations & behaviour rapidly change the **system dynamics.**
- **All societies and economies depend on ecosystems, not vice-versa!**



René Passet, 1979

Some common underlying causes of the 3 crises

1. Imbalanced approach to **stocks and flows**
2. Ignorance of **complex systems**, e.g. thresholds, tipping points, **multi-causality** and **systemic risks**;
3. Misplaced faith in **models**;
4. **Early warnings (& late lessons) ignored**
5. **Debts and risks passed on to “distant others”**
6. **Intransparent transactions**, products and impacts
7. Misleading **market prices** that exclude many costs and risks
8. **Socially malign incentives**
9. **Not accounting for what really matters**
10. **Dominance of free market deregulatory ideology**

Early warnings & late lessons ignored:

Financial crisis:

*“This **credit bubble** based on nothing more than **expectations**, cannot be maintained forever. **There will be a crash**. People will no longer be able to pay their debts, particularly if the **values of the assets** they **start to fall** as has already happened with equities, and will shortly spread to corporate debt and personal debt.*

*Real World Economic Outlook, New **Economics Foundation**, 2003, p.29*

See also Early warnings from Bank of International Settlements; Nourbini, Stiglitz, Ahmed

Climate Change

- Arrhenius (**1896**) estimated that a doubling of the quantity of CO₂ in the atmosphere would raise the average global temperature of about 5°C.
- The National Academy of Sciences of the USA report on global warming (Charney et al., **1979**) concluded that the impact of doubled atmospheric CO₂ concentrations, would increase global mean equilibrium surface temperature increase of between 1.5°C and 4.5°C.
- Largely confirmed by IPCC in **2007 & 2014**: likely range 2.0 to 4.5°C.

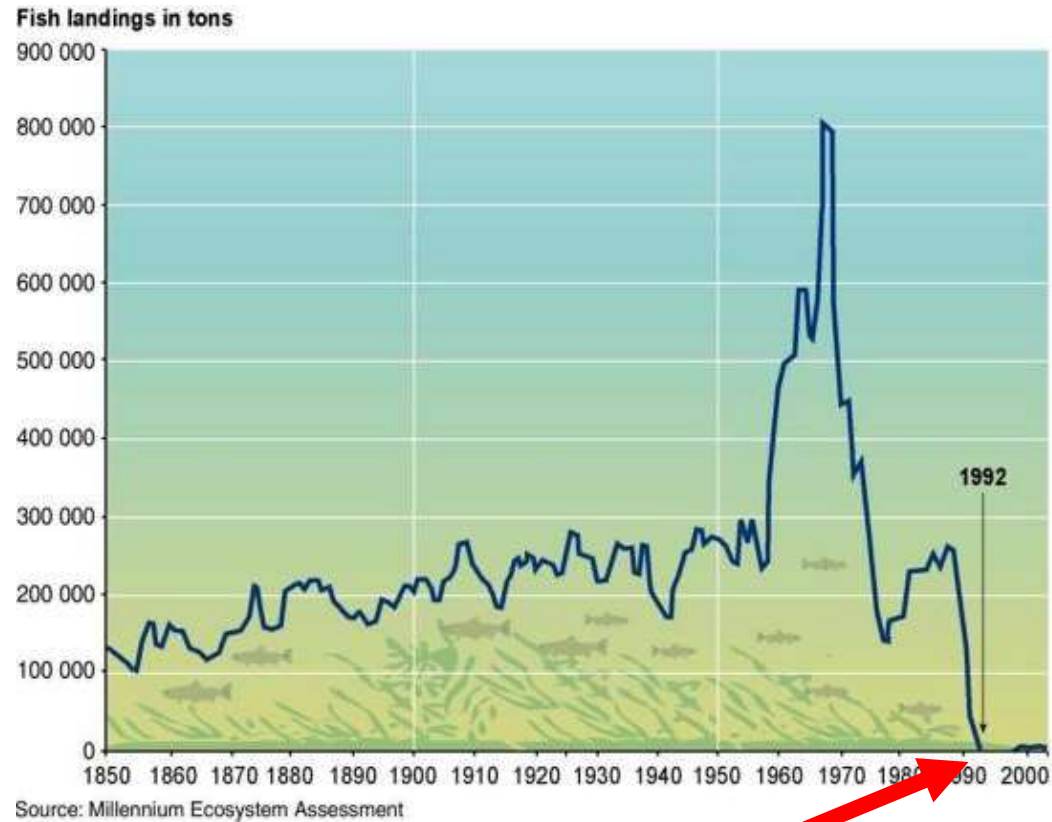


Fish Ecosystems: an early warning

The Newfoundland Cod fishery **is being overfished (Keates, 1986) ...**

...dismissed by Canadian Dept of Fisheries & Oceans as **“biased pseudoscience written to support a political agenda”**.

MacGarvin, “Fisheries: Taking Stock”, in Late Lessons from Early Warnings (EEA, 2001)



1992

Early Warning scientists personally harassed for their “inconvenient truths”

- **Snow** on Cholera
- **Selikoff** on asbestos
- **Hendersen, Byers, Patterson, Needleman** on leaded petrol
- **Henry Lai, Hardell** on RF radiation
- **Putzei, Chapella, Seralini** on GMOs
- **Dr Hosakawa** on Minamata
- **Schneiderman** on Climate Change
- others from **Bees research**
- **Onur Hamzaoglu** on industrial pollution in Turkey
- **Dr Stockman** in Ibsen’s “**An Enemy of the People**”

(See case study chapters & “**Justice for early warners & late victims**”, Cranor, in “Late Lessons” EEA , 2013)

Honeybee decline and neonicotinoid pesticides

1994: early warnings of bee deaths etc from beekeepers after first use of Gaucho[®] pesticide .

1995 – 1999: Bayer, AFSSA, beekeepers: public campaigns & research programmes

1999: uses Precautionary Principle, the Minister of Agriculture **temporarily bans Gaucho in sunflower seed-dressing** (permanent 2004)

1999 – 2004: bee losses continue: sunflower and maize grow together? effects from maize seed-dressing + persistency in soils?

2004 – temporary bans Gaucho on maize

2013-EU temporary ban on 3 neonicotinoids:challenged by Bayer et al at EU Court of Justice 2014/15

The EEA working definition of the Precautionary Principle based on “Late Lessons” experiences

“The PP provides justification for public policy actions in situations of **scientific complexity, uncertainty and ignorance**, where there may be a need to act in order to avoid, or reduce, potentially serious or irreversible threats to health or the environment, using an **appropriate strength of scientific evidence, taking into account the likely pros and cons of action and inaction**”.

Use of the Precautionary Principle stimulates innovation by:

- **bringing forward by years /decades the innovations** that were stimulated by the late regulatory actions
- **stimulating debate & action on wider technological & social options** for meeting needs
- saving billions in damage costs that could have been spent on innovation.

the search for the single cause..of all impacts.. at all levels!?

*“The Risk Assessment **does not allow us to demonstrate** that maize seed dressing with Gaucho can be **solely** responsible, at **national** level, for **all colony losses**, **behavioural troubles**, **honey bee mortalities**, or **general decline in honey production**”*

French Commission for Toxic Products , 2002: see “Seed dressing systemic insecticides and honeybees”, Maxim L. & van der Sluijs,J., Late Lessons from Early Warnings, EEA 2013.

or embrace **multi-causality**....

*“Gaucho...is of concern (on maize)
as **one of the explanatory
elements for the weakening of
the bee populations observed
despite the ban of Gaucho in
sunflowers.**”*

**Multifactor study of the Honeybee Colonies
Decline**, French Scientific & Technical Committee,
2003, see Late Lessons, Bees chapter

..& complexity

*“These findings suggest the **existence of epigenomic cultures in honey bee colonies as superorganisms..***

*...generating **context-dependent molecular flexibility in the brain..***

*.. the highly dynamic nature of this process orchestrates **the complex interplay between social stimuli and the genome** and ultimately determines workers’ behavioural outcomes”.*

“DNA methylation changes elicited by social stimuli in the brains of worker honey bee”
Lockett, R. Kucharski and R. Maleszka, Genes, Brain and Behavior (2012) 11: 235–242

Evolutions and revolutions in knowledge from the case studies

- From nature *or* nurture to **nature and nurture** (Leaded petrol & IQ of children)
- From **toxicology to endocrinology** (BPA; oestradiol in contraceptive pill)
- From **linear dose/response to non linear DR** (Radiations; BPA)
- From **smooth transitions** in biological/ecological systems to abrupt “**tipping points**” (Climate change; Ecosystems)
- From “dose makes the poison” to “**timing of dose makes poison**” (DES; TBT)

Exposures expand over time...

- Asbestos/DBCP/Be **producers, users, bystanders** eg insulators: plantation workers: passive smokers
- **Domestic:** wives & children of asbestos workers; passive smokers
- **Environmental:** near asbestos & lead mines and factories; teachers from asbestos; DBCP in water;
- **Consumers:** BPA
- **Next generations:** Asbestos, radiations, Mercury at Minamata, DES, PCBs
- **Target to non target species:** Goucho & Bees;; oysters from TBT; fish from the Pill;

The Nature of Harm expands over time...

- **Asbestos:** 1929 asbestosis; 1954 lung cancer; 1959 mesothelioma, 2012 throat & other cancers
- **Tobacco:** 1951 lung cancer; 2012 many cancers, foetal harm; heart disease
- **PCBs:** 1960s bird reproduction; 2012s neurological harm in children; soil contamination
- **Lead:** 1979 brain damage in children; 2012 heart disease in adults
- **Minamata:** 1950 brain damage & neurological; 1960s birth defects 1990s children's IQ & behavioural
- **DES:** 1970 vaginal cancer; 1980s reproductive problems; 2012 breast cancer; reproductive harm to DES sons; and to grandchildren

CFCs and “global experimentation”

“..neither governments nor multinational companies have a mandate for global experiments..

*CFCs provide a stark warning..**all too often technology outstrips the science needed to assess the risks..***

Policymakers must learn to recognise when ignorance has been replaced by understanding, however rudimentary”

Joe Farman, Halocarbons and the ozone hole, Late Lessons, 2001.

Why are early warnings routinely ignored?

- Powerful economic/political stakes in *status quo*
- Unethical behaviour, e.g. greed
- “We don’t want to know” / “Don’t spoil the party”
- Early warners sidelined or silenced
- “Things are different now”
- Uncertainties lead to real and “manufactured” doubt
- Group think
- Lack of Imagination
- Limited use of scenarios

See also “Collapse”, J. Diamond, 2005 ; “The March of Folly”, B Tuchman, 1984; “Fishing for Truth”, Finlayson, 1994; “Sustainability or Collapse?”, Costanza et al 07; **“A users guide to the Crisis of Civilisation and how to save it”, Ahmed**

Some Common & Pervasive Consequences of the 3 Crises

- **Capitals** (financial, economic, social, natural) **destroyed**;
- **Inequities and injustices** exacerbated;
- Environmental, social & economic **insecurities** increased;
- **Meltdown in trust** in financial, political & scientific elites;
- Economic & political **ideological vacuums** created;
- **Opportunities now for radical ideas and practices?**

Some Common Avenues for Action

<u>GOVERNANCE</u>	<u>FINANCIAL SYSTEMS</u>	<u>ENERGY SYSTEMS</u>	<u>ECOSYSTEMS</u>
CONSUME FLOWS WHILST MAINTAINING QUALITY AND QUANTITY OF STOCKS	Conservative asset / liquidity / debt ratios	From stocks of fossil fuels to flows of renewables	Maintaining natural capital stocks while securing flows of ecosystem services
RISKS AND DEBTS INTERNALISED INTO MARKET PRICES	Realistic asset / debt pricing	Externalities internalised into prices	Externalities internalised into prices
TAX & SUBSIDY REFORMS	Tax Financial transactions, capital assets, & commodities speculation Abolish tax havens Fair and transparent corporation taxing	From taxing people to taxing energy Perverse subsidy removal	From taxing people to taxing resources and use of ecosystems services Perverse subsidy removal
TRANSPARENT TRANSACTIONS	Understandable financial products Transparent flows & stocks	Realistic market prices Consumer information /labels	Realistic market prices Consumer information /labels

Some Common Avenues for Action....

<u>GOVERNANCE</u>	<u>FINANCIAL SYSTEMS</u>	<u>ENERGY SYSTEMS</u>	<u>ECOSYSTEMS</u>
ACCOUNTING & MONITORING FOR WHAT MATTERS	Quantity and Quality		
	Realistic Assets & incomes	All costs, subsidies & Stock depletions	Ecosystem goods, Services, stock depletions. Long term monitoring
	Well-being, social equity, ecological sustainability		
LATE LESSONS FROM EARLY WARNINGS?	Evaluating evidence from systems science for causes, consequences, and actions. Precautionary actions on “inconvenient truths”. Protection & Ibsen awards for Early Warning scientists Ethical & responsible, science, innovation, business		
COMMUNITY LEVEL INITIATIVES	Micro-finance Community banks	Locally controlled distributed energy networks & Micro-energy systems	Participatory, ecosystem-based management
EMPOWERED AND ACTIVE CITIZENS	Inter disciplinary Education . Right to know. Critical thinking Public participation on strategic choices on energy, food, technologies.		
DECISION-MAKING	Case specific strengths of evidence for action Based on non-quantifiable and varying values.		

Research: how much to develop products and protect people/environments?

EU Public Research 1994-2013	“Products”	“Protection”
Nanotechnology (2002-2013)	5 billion	112 million (2%)
Biotechnology(1994-2013)	7.5billion	273 million (4%)
Information Communications Technology/EMF(2007-2013)	19 billion	18 million (0.09%)