PRECAUTIONARY PRINCIPLE

1. Dictionary

precaution

measure taken in advance
to prevent something dangerous,
unpleasant, or inconvenient from happening.
'he had taken the precaution of seeking legal advice'

Origin
from Latin praecavere,
from prae 'before' +
cavere 'take heed, beware of'.

Copyleft:Tommaso Luzzati

2. Why precaution?

To tackle risk, uncertainty, ignorance

See also WILLETT A.H., 1901, "The economic theory of risk and insurance", Philadelphia University Press,

Events

A; B; C

Outcomes

X, Y, Z

Probability

e.g. (0,4; 0,4; 0,2)

Risk is not uncertainty

Knight

- Risk

probabilities are known

- Uncertainty,

probabilities are UNKNOWN, subjective assessment

Copyleft:Tommaso Luzzati

Risk

Knightian Uncertainty

SAVAGE and DE FINETTI (1906 – 1985) and SAVAGE (1971-1971)

Difference between risk and uncertainty vanishes

UNCERTAINTY→
individual assessment of probabilities about future events

definition of probability that identifies
the **subjective estimate** of probability itself to be
the degree of confidence or doubt
a decision maker has in the outcome.

Expected utility and RISK NEUTRALITY

- Lottery, L, gives
  W_H with probability p
  W_L with probability $(1-p)$

Expected value: $E(L)=pW_H+ (1 – p) W_L$

Expected utility: $E(U(L))=pU(W_H)+ (1 – p) U(W_L)$

RISK NEUTRALITY

indifference between playing the lottery and getting the expected amount with certainty

L indifferent to E(L)

RISK AVERSION

E(L) preferred to L

RISK PROPENSION

L preferred to E(L)

Can precaution be interpreted as risk aversion?

perhaps …

AN EXAMPLE

“It is not possible to find hard evidence that something is going to happen [...]
Now, can anyone — will be always able to say, even after the fact, that there isn't sufficient evidence,
that you don't have proof beyond a reasonable doubt.
You’ll know an event occurred, but even after it occurs,
it’s very difficult to get perfect evidence.
Our goal is not to go into **a court of law and try to prove something to somebody.** […]
It is a task of taking these disparate pieces and putting them together
so that people can make their own judgment,
it’s not for us to prove anything.
What they have to do is they have to say,
“What does a reasonable person conclude are the risks from this?”

Copyleft:Tommaso Luzzati

Are the risks greater of the U.N., for example, trying to enforce their resolution
or are the risks greater of not doing that?
Always there are risks on both sides.

Who said this?

Donald Rumsfeld
segretario della difesa US

Pentagon Briefing, Aired September 26, 2002 - 13:15 ET, CNN
Iraqi's WAR →**20th March 2003**

Such an approach is legitimate, but …

need of consistency:

using it for making a war but and also for banning pesticides or other environmental issues …

Copyleft:Tommaso Luzzati

However …

"the United States submits –

precaution is not a principle of international law …

precaution cannot even be defined"

July 29, 2004 – Executive Summary Submission of the Rebuttal Submission of the United States – WTO vs. European Communities

PRECAUTIONARY PRINCIPLE

NEED OF DEFINING
AT the INTERNATIONAL LEVEL
a level of

COMPATIBILITY

Between technological development

and the control of the risks associated to that development

Copyleft:Tommaso Luzzati

Precautionary Principle

Rio Declaration (1992) **Principle 15**

- In order to protect the environment,

the precautionary approach shall be widely applied by States

according to their capability.

- Where there are threats of serious or irreversible damage,

lack of full scientific certainty shall not be used as a reason

for postponing cost-effective **measures**

to prevent environmental degradation.

Actions should be guided by

environmental and **health** protection,

taking into account both present & future generations

ethical need of discussing about the opportunity of

manipulating the environment and life

thanks to

technological progress

Copyleft:Tommaso Luzzati

At first sight

- Precaution similar to risk aversion …

2 common attitudes

Technological optimism

-economic growth

-technology will fix

Technological pessimism

-finite resources

-limits to growth

- Is such a justaposition MEANINGFUL???
- BETTER to think in terms of **SCENARIOs**

Copyleft:Tommaso Luzzati

Possible OUTCOMES

Who is RIGHT	Policies based on OPTIMISM	Policies based on PESSIMISM
OPTIMIST	**maximum**	**moderate** opportunity costs
PESSIMIST	**disaster** no precautions	**tolerable**

INDIVIDUAL is free to RISK

Are SOCIETY DECISION MAKERS???

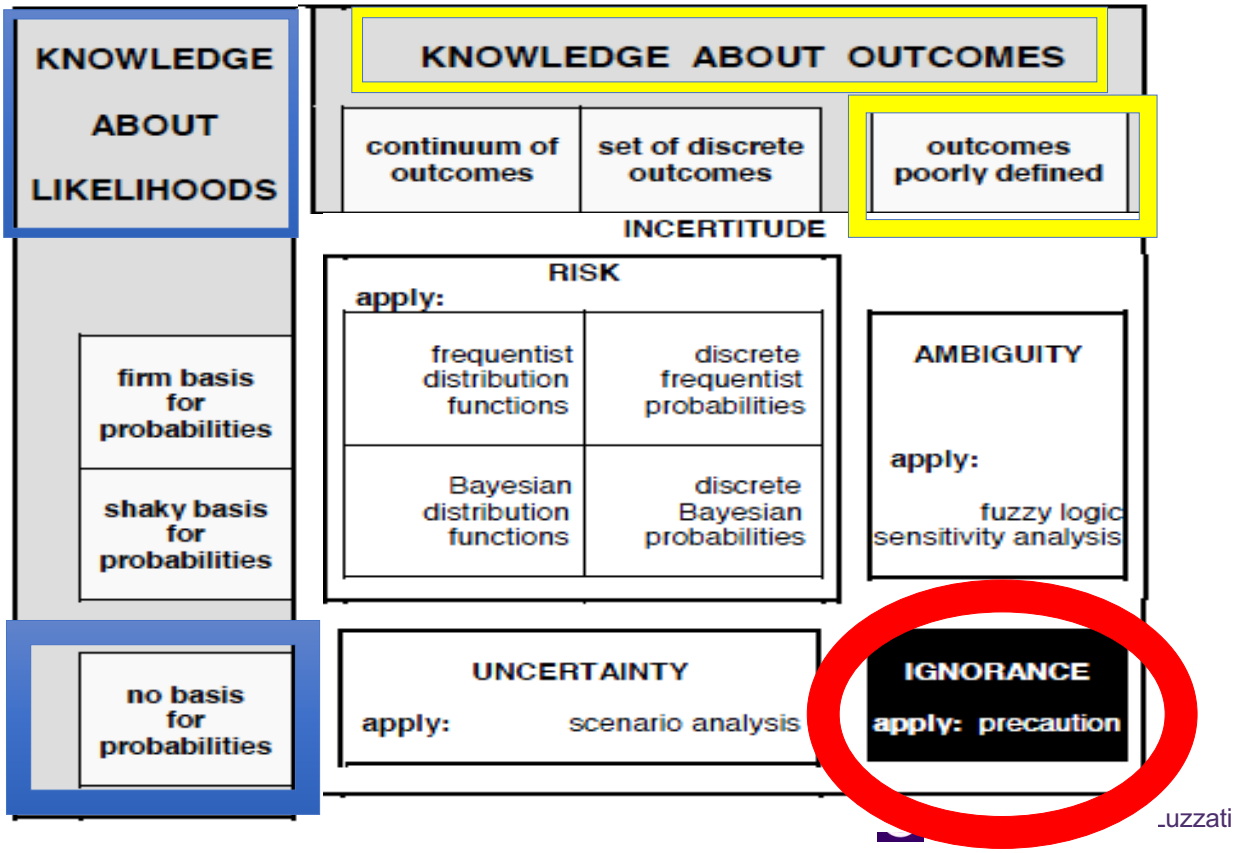
A Mother/Father????

Table from COSTANZA 1989

PRECAUTION is more than risk aversion

Copyleft:Tommaso Luzzati

FROM RISK TO ….



IGNORANCE is unavoidably part of SCIENCE:

The TOP EXPERT …

The top EXPERT

In December 1903, the Royal Swedish Academy of Sciences awarded Pierre Curie, Marie Curie, and Henri Becquerel the Nobel Prize in Physics, "in recognition of the extraordinary services they have rendered by their joint researches on the radiation phenomena discovered by Professor Henri Becquerel."

Curie died in 1934, aged 66
due to aplastic anemia
brought on by exposure to radiation

while carrying test tubes of radium in her pockets during research …

WE often DO NOT KNOW
in detail,
however we also KNOW …

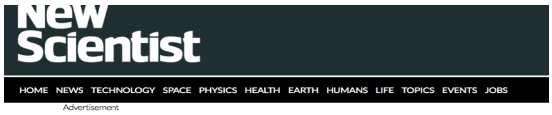
- COVID-19 → epidemics in general & SARS-cov 2002
- MAD COW
- ECOLOGY LAWS by Barry Commoner

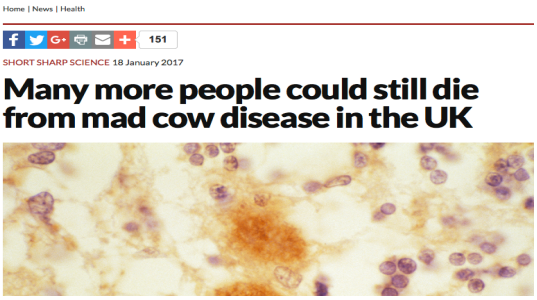
Copyleft:Tommaso Luzzati

Bovine Spongiform Encephalopathy (BSE), **mad-cow disease**, fatal neurodegenerative disease in cattle

BSE has a long incubation period, about 30 months to 8 years

In humans: new variant Creutzfeldt–Jakob disease (vCJD or nvCJD), IT KILLED





https://www.newscientist.com/article/2118418-many-more-people-could-still-die-from-mad-cow-disease-in-the-uk/

Journal reference: *New England Journal of Medicine* , DOI: 10.1056/NEJMc1610003

ECONOMIC LOSSESS!!!

The epizootic was caused by cattle being fed the remains of other cattle
in the form of meat and bone meal,
which caused the infectious agent to spread.

Are COWS carnivorous???
→ Herbivores
We know this … we d not know
consequences of feeding cows with meat ....

Copyleft:Tommaso Luzzati

We do not know, yet we know a lot …

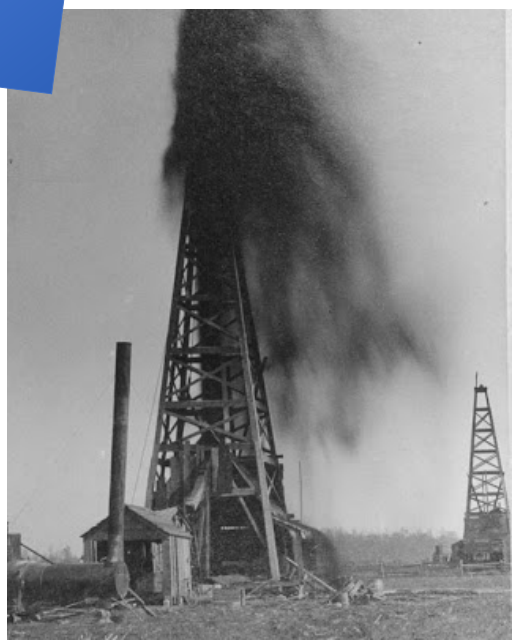
Barry Commoner (May 28, 1917 – September 30, 2012)
was an American **biologist**, college professor, and politician.
He was a leading ecologist and among the founders of the modern environmental movement.

Copyleft:Tommaso Luzzati

Nature knows best, the third (informal) law of ecology,
Commoner writes, “holds that any major man-made change in a natural system is likely to be detrimental to that system.”
During 5 billion years of evolution, living things developed an array of substances and reactions that together constitute the living biosphere.
The modern petrochemical industry, however, suddenly created thousands of new substances that did not exist in nature.
Based on the same basic patterns of carbon chemistry as natural compounds, these new substances enter readily into existing biochemical processes.
But they do so in ways that are frequently destructive to life, leading to mutations, cancer, and many different forms of death and disease.
“The absence of a particular substance from nature,” Commoner writes, “is often a sign that it is incompatible with the chemistry of life.”

XX CENTURY

The Sorcerer's Apprentice Walt Disney Cartoon Movie



TO SUMMARISE

Key Elements of the Precautionary Principle

1. potential (serious, irreversible) harm
2. uncertainty (and complexity)
3. action is warranted

Copyleft:Tommaso Luzzati

Harm

1) Serious
2) Irreversible
3) Cumulative
4) Broad spatial and temporal dimensions
5) (Easily) avoidable

Scientific uncertainty

- Uncertainty about cause or magnitude

- Uncertainty, indeterminacy, ignorance
  - Value of more data
  - Unpredictability of complex systems
  - Asking the right questions

"Proof"

• Scientific "proof" depends on the kind of study and the criteria that are agreed upon to establish proof

• What constitutes "proof" is a mixture of scientific, social, and political factors

lack of evidence of harm,
is not the same thing as
evidence of lack of harm.

Cigarettes and lung cancer—evidence for causation

- 1945—Ochsner—Incidence rises together
- 1950—Doll & Hill—case-control study
- 1953—Wynder—tar causes cancer in mice
- 1954—Follow up studies show association, and that greater exposure > greater risk
- 1990s—biological mechanism(s) described (genetic factors; mutations)

Copyleft:Tommaso Luzzati

The precautionary principle incorporates both science and ethics

- Ethics and values
  Do not harm

- Science
  What we know
  How we know
  What we don't know

Values underlying the PP

1) **Respect** - for the needs and rights of this and future generations as well as others who cannot speak for themselves
2) **Humility** - towards the natural world and our ability to understand it through science
3) **Democracy** - giving people a voice in matters that affect their lives
4) **Responsibility** - government's public trust responsibility to manage the commonwealth for this and future generations.

   Individuals' and their institutions', including industry, obligation to take responsibility for their actions in the world.

Copyleft:Tommaso Luzzati

Why the precautionary principle today?

- Assessing **cumulative, systems level or interactive effects** is difficult.
- **Surprises** have occurred too frequently (Ex. CFCs and the hole in the ozone layer).
- **Future generations** have interests and needs that are difficult to protect with some decision-making strategies
- Many current choices have **high decision stakes** because of the scale at which they are made. (Global choices have global consequences.)

the world is big and complex!