## The four Poles of the compass to manage the challenges without losing sight of the north!



Green Factor

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3rd pole: Evaluate the level of acceptable SAFETY

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# Safety evaluation implies by definition the comparison between hazard and risk





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3<sup>rd</sup> pole : the choice of a safety level



 Safety is defined as a level of risk which is <u>chosen</u> to be considered by the civil society as "<u>acceptable</u>".



 the decision setting a risk as <u>acceptable is not (only)</u> <u>based on science</u> and medical considerations:

it is also a political decision



#### Safety and acceptable risk

- Besides toxicity thresholds, regulatory decisions on safety have to include a series of other variables:
  - Technological performance available;
  - Social and economical constraints;
  - Conciliation between advantages and drawbacks,...

But also:

- Cultural and/or ethical;
- Political/democratic and "emotional" choices.

Safety is thus not defined only in *absolute* terms



### Safety through prevention

#### Controlling a risk most often involves preventive measures:

Examples:

- Disinfection of people, of water, of places,;
- Use conditions of hazardous products and their labeling; ;
- *Protective equipment, restriction of use;*
- Physical means such as seat belts, fire extinguishers in homes; ...;
- Retention basin under the oil tanks, safety caps on the bottles of dangerous products, etc ...
- These innumerable measures allow often to benefit from the advantages of the applications by limiting the disadvantages to an "acceptable" maximum.



## Criteria of *acceptable safety* for management decisions vary with the situations

For example, the difference between :

- Exposure of kids and adults;
- Exposure of skilled workers and neighbors of a plant;
- Potential side effects of pharmaceutical drugs and safety of food ingredients;
- Safety of automobile and airplane transport;
- Drinking water quality and drinking alcohol;
- Speed restrictions for road driving and for car racing;
- DDT use in Northern and tropical countries;
- War and peace situations;



Personal use



**Professional use** 





#### Facing uncertainty ...

- Some kinds of hazards may still resist to fully <u>quantifiable</u> hazard and risk assessment:
  - Some viruses (*H5N1 or H1N1, corona, …);*
  - Greenhouse gases and climate change;
  - Some GMOs ;

....

- Some nanomaterials;
- Endocrine disruptors;
- Some electromagnetic fields







... taking some precaution.

"To prevent rather than to cure"

"Approach" (USA) or "Principle" (UE) ?

> No common definition;

- introduced formally in some Treaties (UE,) or in Constitutions (France);
- **E.U.** Guidelines for its practical application



### The Precautionary Principle (EU legislation)

"When <u>sufficiently established elements</u> suggest that an activity is <u>seriously</u> expected to potentially produce <u>irreversible</u> damage to health or the environment,

measures should be taken even if the <u>definite proof</u> or the causal link is not yet <u>formally</u> established with <u>absolute certainty</u>"





#### From precaution ...

- Objective: to "<u>manage uncertainty</u>" and give the means to decide and act politically when there is no expert consensus about the level of risk .
- Challenge: practically, the decisions should be proportional to the expected risk





#### ... to proportion

- A <u>Proportionality Principle</u> is also written in the texts (ex: penalties vs offense seriousness) ..
- The EU guidelines on the application of the Precautionary Principle recommend explicitly to <u>make the balance</u> <u>between</u>:





### A proportion in precaution





- Relatively to <u>the risk itself</u>: *infectious, physical, chemical, environmental, economical,* ..;

- Relatively to its systemic consequences.

The challenge is to evaluate if the consequences of a *disproportionate precaution* would not be <u>as "*undesirable*" than</u> <u>the risk tself</u>:

- life conditions, mobility of emergency services, water, energy food, pharmaceuticals distribution, ...
- Transportation, access to critical services, economical impact,...

Which implies *a balance* between:

**Precaution and Proportion** 



A proportion in *substitution* 

A "*substitution principle*" also tends to be introduced into the texts ...

The substitution of an agent (*physical, chemical, biological*) having "undesirable" properties is only legitimate if:

- The "undesirable" properties of the agent are not equally "desirable" (essential); ex: oxygen !;
- Adverse <u>effects</u> linked to these properties actually have a significant probability (*risk*) of occurrence: specific uses of chemical substances, pesticides, pharmaceuticals, radiations, but also ... alcohol and tobacco ...



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