

Precautionary Principle and MMT

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Dr. Zayed's Experience on different commissions of inquiry and public hearing

- ➡ MMT research program;
- ➡ Niobium mine and exposure to radon;
- ➡ Power lines and exposure to electromagnetic field;
- ➡ Highway construction and greenhouse gas emissions;
- ➡ Pesticides for forest protection and environmental contamination and human exposure.

Precaution and prevention, two principles often confounded!

- √ Precaution is related to **potential** risks while prevention is related to **known** risks (Kourilsky P, 2000).
- √ We can not prevent what we do not know.

Cartagena Protocol on Biosafety (Cartagena 2000)

- ❖ Protocol signed by 130 nations.
- ❖ The precautionary principle is defined in a large sense (includes sanitary, economic, social and cultural risks).
- ❖ Since that time, each country can take the decision to refuse to import GM Organisms.



**CARTAGENA PROTOCOL
ON BIOSAFETY**

**PROTOCOLE SUR LA
BIOSÉCURITÉ DE CARTAGENA**

<http://www.biodiv.org/biosafety>

Case study

MMT in gasoline



MMT: Methylcyclopentadienyl Manganese Tricarbonyl

- ▶ Antiknock agent in unleaded gasoline;
- ▶ Used in Canada since 1976;
- ▶ Canada : mean Mn concentration in gasoline ≈ 9 mg/L (vs. 18 mg/L permitted)



Historical background

- ❖ U.S. EPA: theoretically, atmospheric Mn concentrations could double with an intensive use of MMT;
- ❖ October 1995: by court decision, EPA granted Ethyl's waiver for the use of MMT in USA;
- ❖ Paradoxically, in 1997, the Government of Canada banned both inter-provincial trade and importation of Mn-based substances, including MMT;
- ❖ The Canadian government reworded this law in July 1998, so that manganese-based fuel additives were not included in the restrictions;

Historical background

- * There is a realistic perspective of an international use of MMT. The compound is approved for use in U.S.A. and its use is spreading to many countries (v.g. Australia);
- * In 2003, Canada adopted Bill C-258, the Automotive Pollution Reduction Act to protect human health and the environment: eliminates the gasoline additive MMT

 **India just decided to not use MMT on the basis of the precautionary principle**

Historical background

Preamble to Bill C-258

- ✧ "Whereas there is a growing body of **scientific evidence** that human health and the environment **are** harmed **or may be** harmed by gasoline containing [MMT] ...
- ✧ And whereas on the basis of the **precautionary principle**, it is imperative for the Parliament of Canada to take immediate action to protect human health..."

What we know about MMT Combustion Products

- ✓ Mn Phosphate
- ✓ Mn Sulfate
- ✓ Mn Oxide
- ✓ Mn Mixture - Phosphate/Sulfate

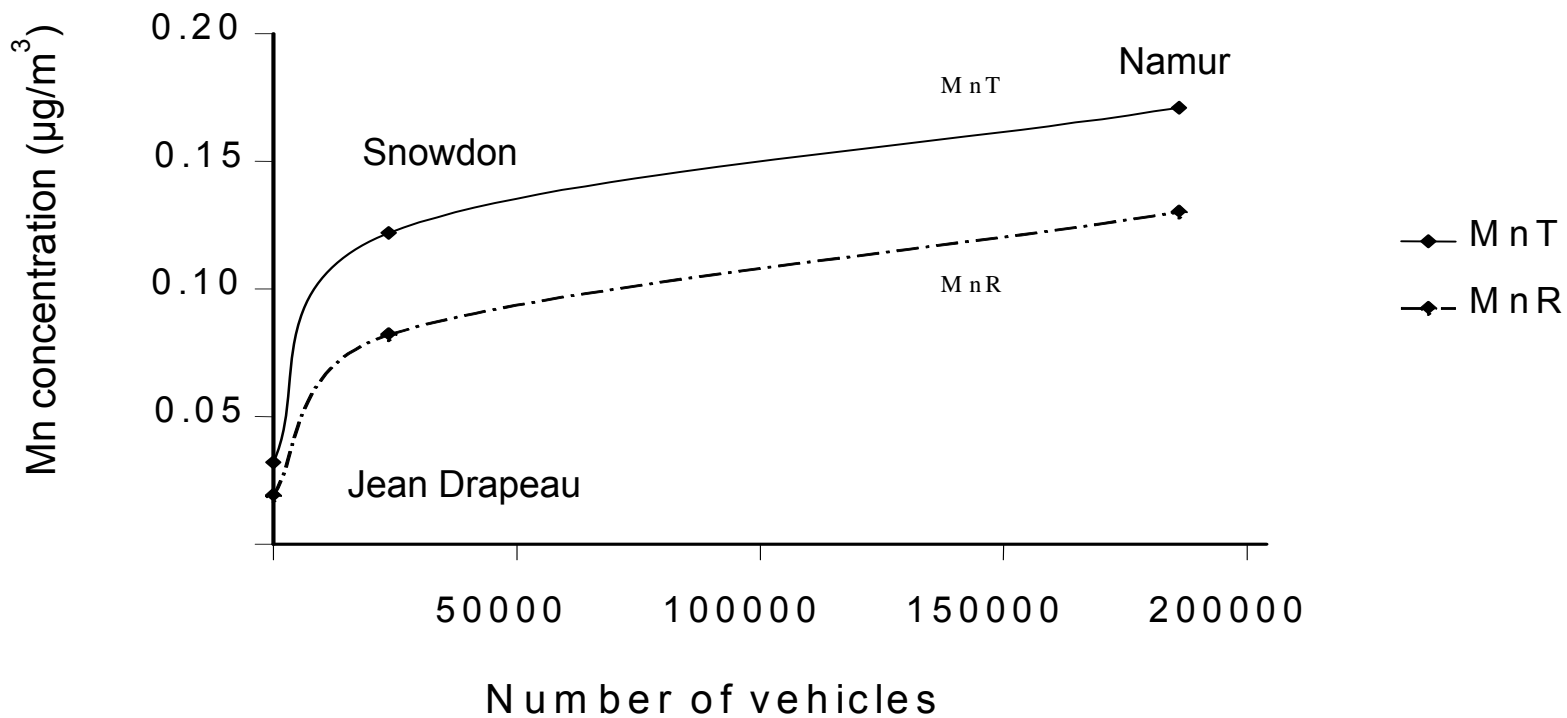
Combustion products are in the form of airborne particles with mass median diameter range between 0.2 to 0.4 μm

What we know about environmental contamination

- ✓ Correlation between atmospheric Mn and traffic densities ($0.025 - 0.069 \mu\text{g}/\text{m}^3$);
- ✓ Atmospheric MnR concentration regularly exceeds USEPA RfC = $0.05 \mu\text{g}/\text{m}^3$;
- ✓ About 100 000 kg/y of Mn from MMT source is emitted in the Canadian environment;
- ✓ MMT is unstable in light and does not degrade as rapidly as claimed;
- ✓ Cars using MMT emit more CO and NO_x;
- ✓ 6 to 45 % of the Mn consumed is emitted.

What we know about environmental contamination

Manganese concentration in three underground subway stations in relation to nearby automobile traffic density

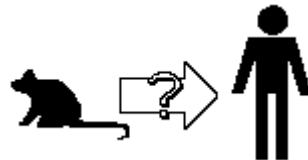


What we don't know

- Incomplete knowledge of environmental fate of MMT and associated chronic human exposure
- No reference concentration (RfC) for MMT
- Actual impact of MMT on CO and NO_x emissions
- Relative contribution of MMT to atmospheric Mn and resulting human exposure

What we don't know

- Health risk related to environmental chronic exposure to MMT-derived Mn
- The economic impact of MMT
- Toxicity related to different Mn species resulting from MMT combustion
- Toxicity related to particle size, focussing on nanoparticles
- Specific toxicity related to the olfactory route
- Extrapolation

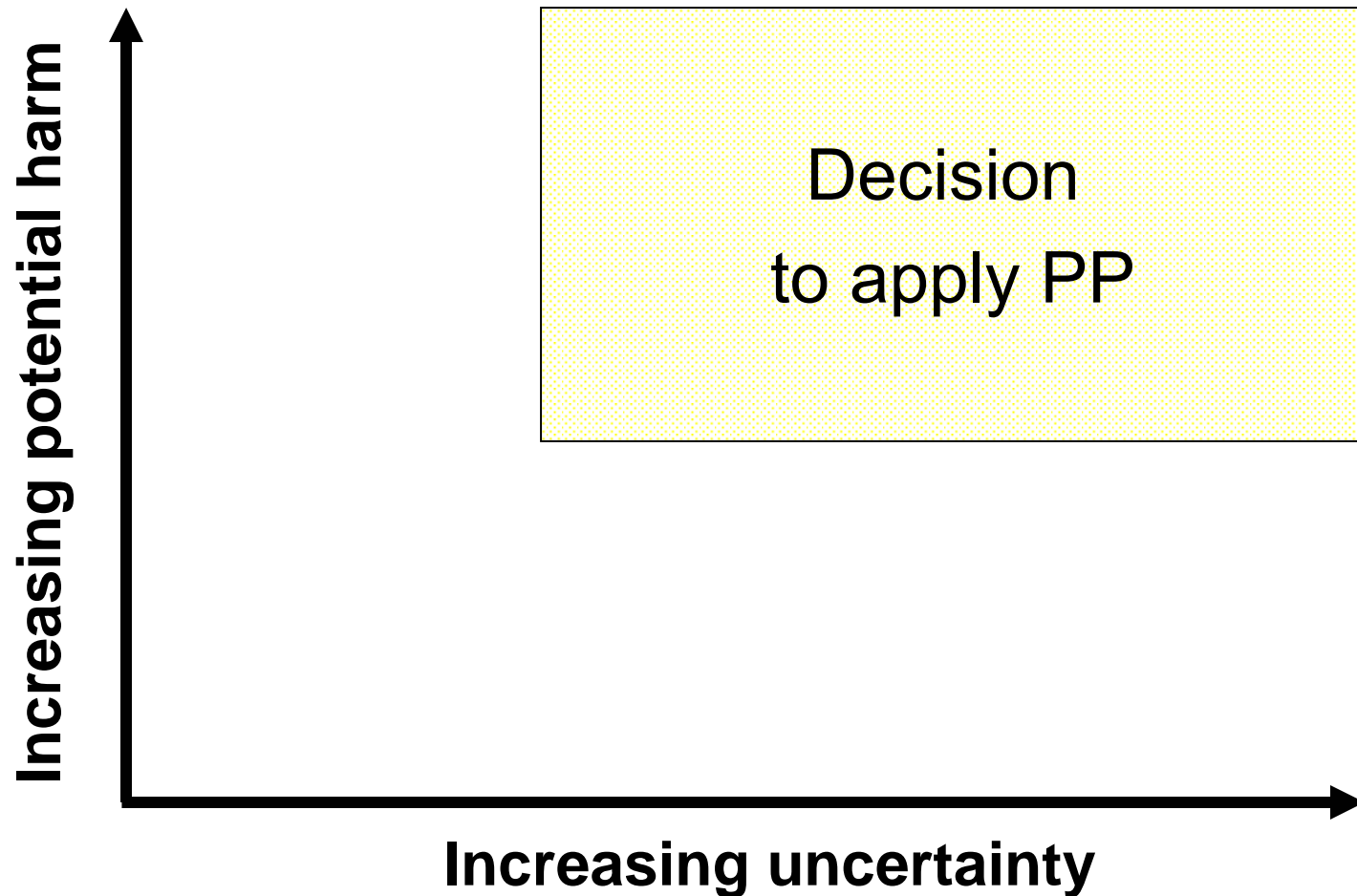


Conclusion

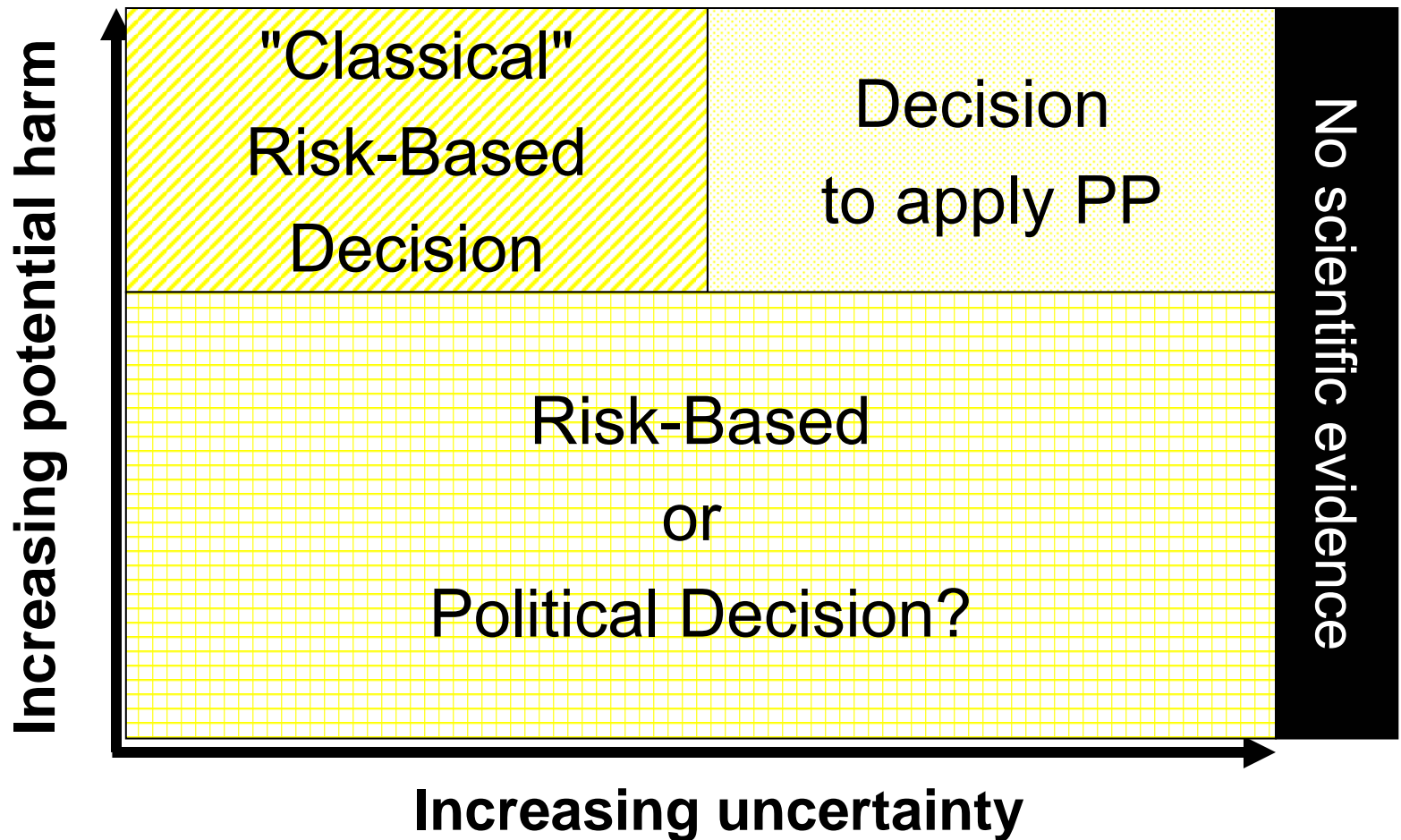
- ✓ **Should we apply the precautionary principle?**
- ✓ **What should be the role of the stakeholders?**



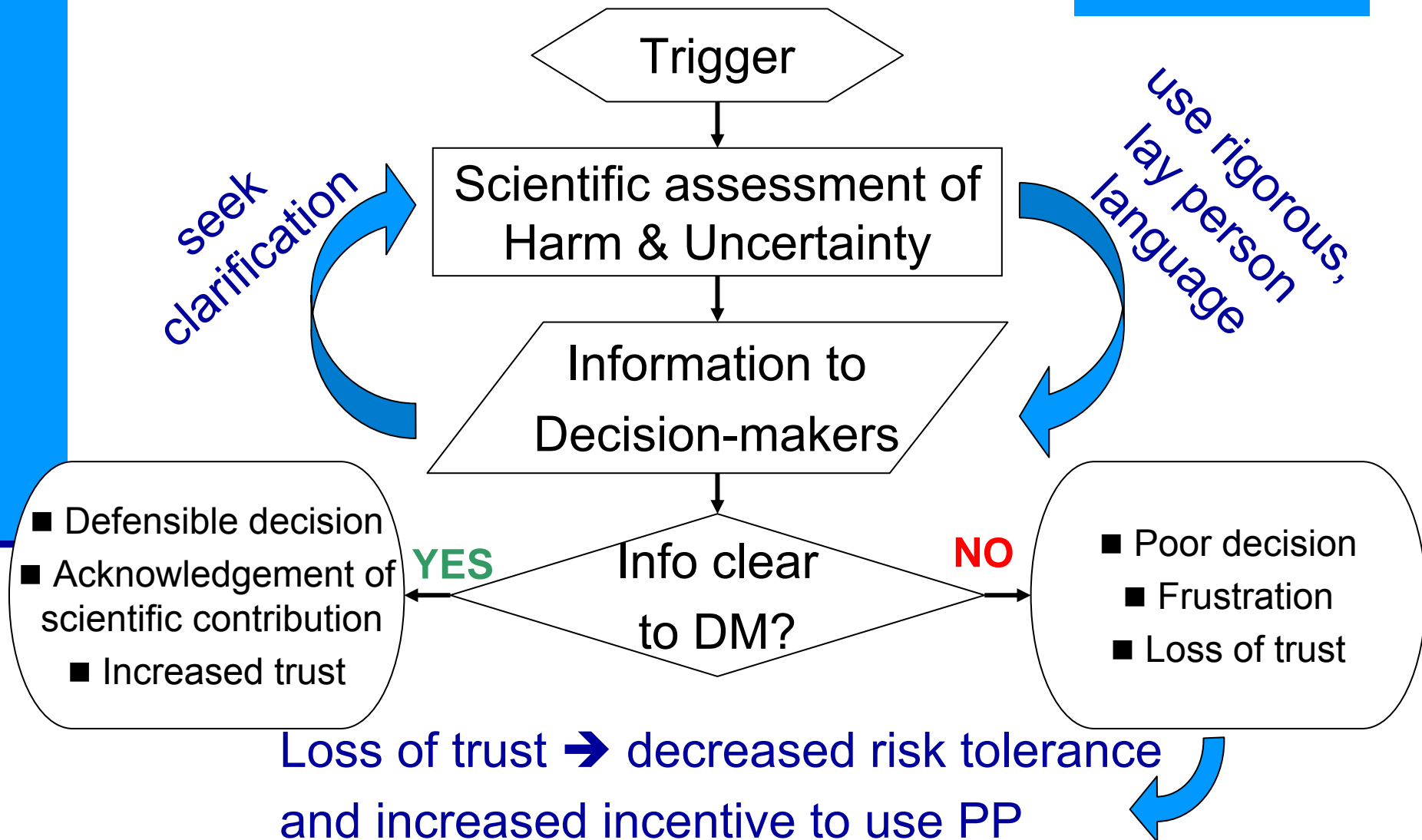
May I use this opportunity...?



May I use this opportunity...?



May I use this opportunity...?



May I use this opportunity...?

When speaking of the Precautionary Principle and of its application

- Uniformity = Utopia
- Consistency = Achievable Goal

May I use this opportunity...?

... to thank you for your attention!