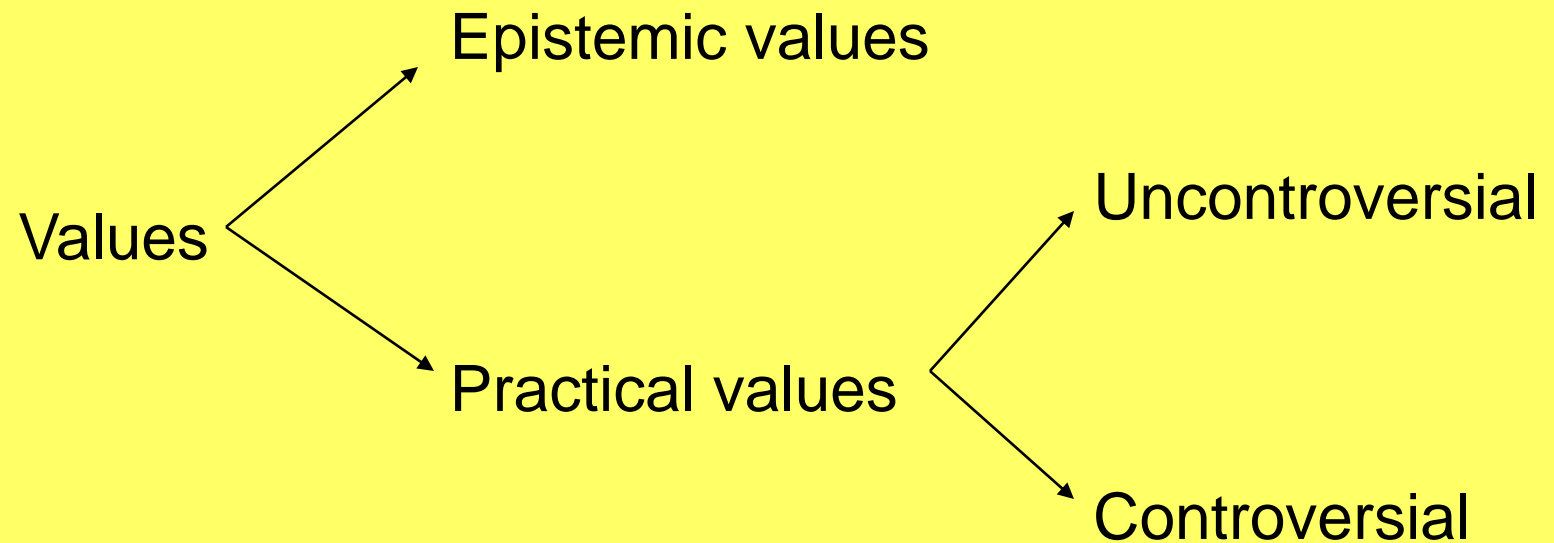


# Value issues, the precautionary principle, and equity in relation to radiological protection

**Sven Ove Hansson, KTH**

## Separating values and facts - is it possible ?



## **Trying to separate facts and values**

Cannot be done perfectly

Is still worth doing as far as possible

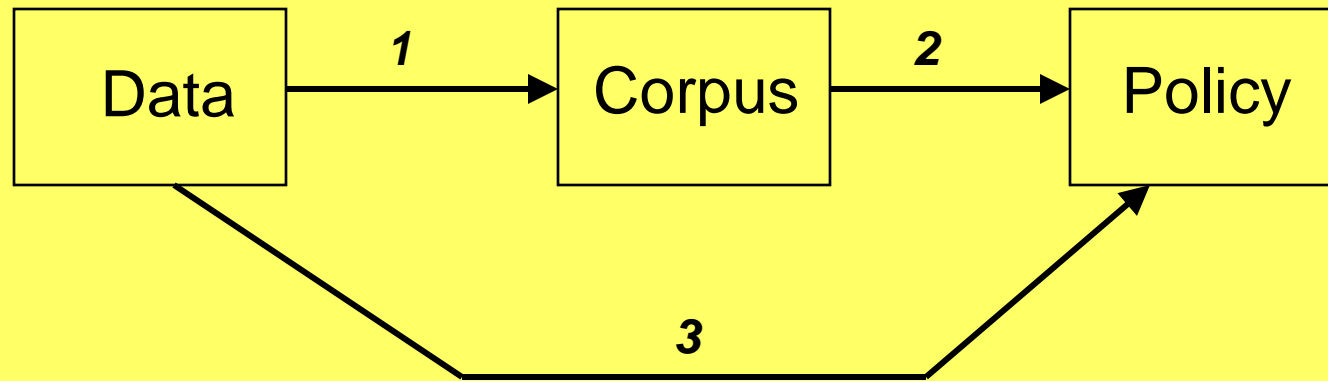
Requires awareness of scientific uncertainty

# **Rationality**

Theoretical rationality (what to believe)

Practical rationality (what to do)

# The scientific knowledge production process



## **Using the “bypass route” from evidence to policy**

1. The same type of evidence
2. The same assessment of actual strength of evidence
3. Differences in the required level of evidence

# **The precautionary principle**

The vulcano example

The Iraq example

Not special to radiation protection or to the discourse on human health and the environment

# Three basic thought patterns in ethics

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

Utilitarianism

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

Deontology

QuickTime™ and a  
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Virtue ethics



# Three basic thought patterns in ethics

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Utilitarianism

Optimization

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Deontology

Dose limits

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Virtue ethics

Justification

# Can a disadvantage for one person be outweighed by a (larger) advantage for another person?

Moral philosophy	 Yes! (utilitarianism) No! (deontology) <i>Sometimes</i> (“everyday” ethics)
Economics	 Yes! (old welfare economics) No! (new welfare economics)
Risk analysis	————— Yes!
Medical ethics	————— No!
Radiological protection	— <i>Partly</i> (?)

## **Combining equity with optimization**

Egalitarianism (against “relative poverty”)

Prioritarianism (against “absolute poverty”)

## A simple mathematical model

$$\langle x_1, x_2, x_3, x_4, x_5 \rangle$$

Collective dose:  $x_1 + x_2 + x_3 + x_4 + x_5$

Dose limit:  $\max(x_1, x_2, x_3, x_4, x_5)$

Egalitarianism:  $x_1 + x_2 + x_3 + x_4 + x_5 + m(\langle x_1, x_2, x_3, x_4, x_5 \rangle)$

Prioritarianism:  $f(x_1) + f(x_2) + f(x_3) + f(x_4) + f(x_5)$

# Ethics and the future

Discounting spelt out:

