

ECOLOGICAL EFFECTS OF RADIATION ON POPULATIONS AND ECOSYSTEMS

IUR International Consensus Symposium

Francois Bréchignac - IRSN & IUR

Holiday Inn Miami Beach Ocean Front, 17-19 November 2015, USA

Setting up the scene

- A worldwide concern about climate change driven by carbon based industries for energy production (emiting CO₂)
- Being CO₂-free, nuclear energy appears to be a useful alternative solution...
- ... but it promotes local or widespread (accidents) increases of environmental radiation levels, which are/could be promoting radiation harm
- For the human species, radiation effects are welknown and handled via the ICRP International radiation protection system
- For ecosystems and their wilddlife, ecological impacts from radiatiton are still controversial within the scientific community

Why no consensus, and what can be done ?

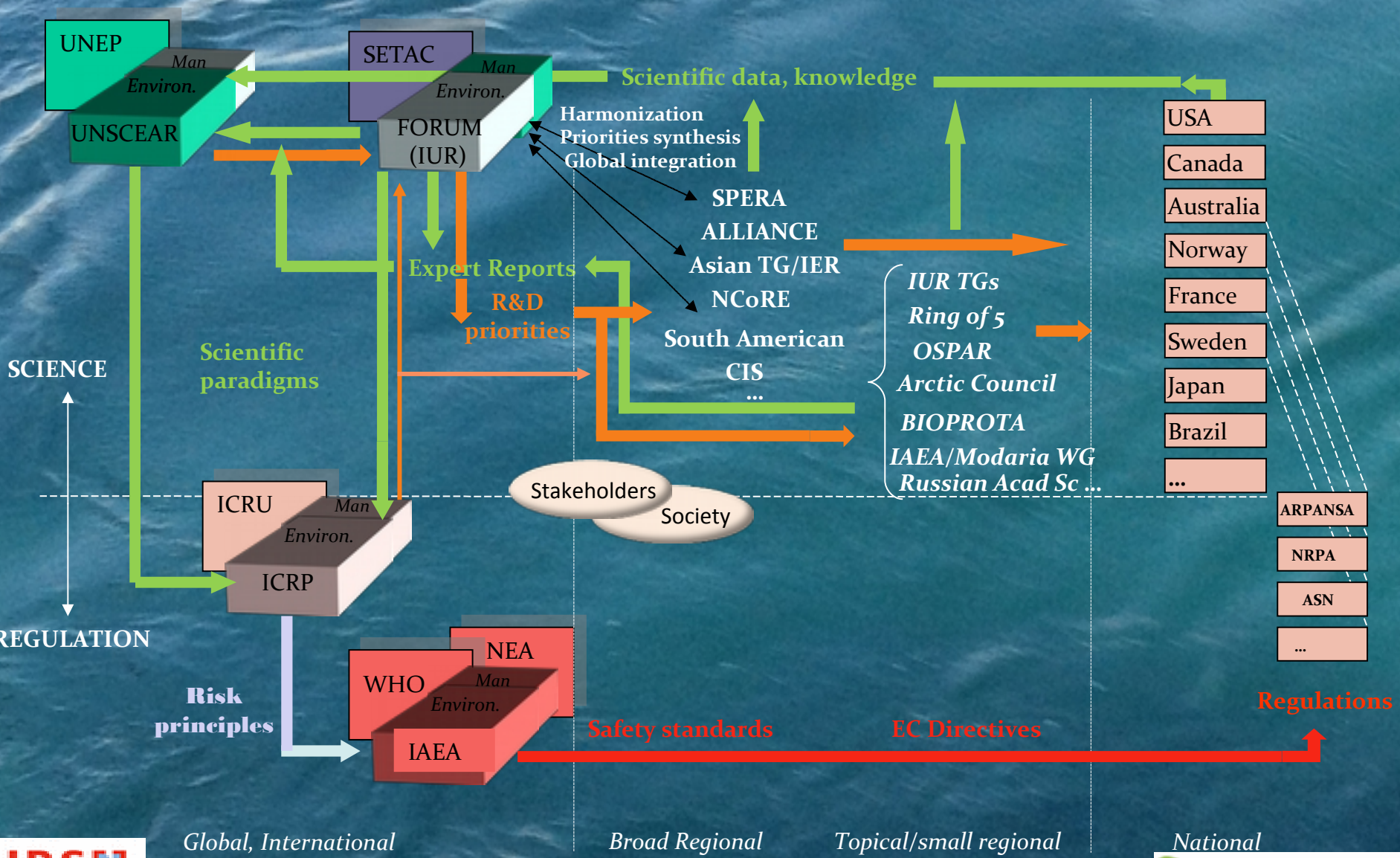
IUR International Consensus Symposium

- To review the various studies yielding contrasting/different interpretations of the results
- To identify to which extent we have consensus, and what are the issues of concern (methodological, conceptual, experimental...)
- To collectively elaborate possible directions for improving consensus
- Draft a collective consensus paper to take stock of the situation and take responsibility for initiating improvement

Why IUR has taken this initiative to set up an International Consensus Symposium ?

- IUR already successfully initiated consideration of environment protection in radiation protection by means of a founding Consensus Conference held in Oslo (2001)
- In 2014, IUR launched the FORUM dedicated to worldwide harmonization and coordination of radioecology and associated networks
- The FORUM is meant to facilitate and improve the flow of consolidated scientific knowledge towards international organisations such as UNSCEAR (and their further use by IAEA, NEA, ICRP, ...)

Science and expertise synergy in radioecology





ARCTIC COUNCIL



Protecting and conserving the North-East Atlantic and its resources

BIOPROTA



The agreed IUR « FORUM » objectives

General agreement on the role of IUR to operate the FORUM

FORUM assigned overall objectives:

- Global integration and construction of consensus
- Communication
- Maintenance of expertise

Symposium Programme

Day I - Tuesday, 17 November 2015 (morning)

Plenum - Symposium introductory talks

- IUR's introduction to the Consensus Symposium - *Francois Bréchnignac (IRSN & IUR)*
- 'UNSCEAR's assessment of doses and effects for non-human biota following the Fukushima nuclear accident
 - **Short address (on video)** by *Malcolm Crick Secretary, United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR, Vienna, Austria)*
 - **Review presentation** by *Per Strand (NRPA, Norway)*
- IAEA's environmental impact assessment after Fukushima - *Justin Brown (NRPA, Norway)*
- Introduction to the process aims and objectives of the Symposium – *xxxx??*

Day I - Tuesday, 17 November 2015 (afternoon)

General introduction and what is meant by environmental protection

- **The 2001 previous consensus statement on environment protection** - *Deborah Oughton (CERAD, NMBU, Oslo, Norway)*

What is/what means “environment protection” in the radiation context?

- **Targets of protection and related endpoints (organisms, populations, ecosystems’ structure and functions)** - *Larry Kapustka (LK Consultancy, Alberta, Canada)*

Current status of environmental protection systems

- **Quantifying exposures to non-radioactive substances** - *Larry Barnthouse (LWB Environment Services, Inc., Hamilton, Ohio, USA)*
- **ICRP Reference Animals and Plants (RAPs) approach** - *Kathy Higley (Oregon University Oregon, Corvallis, USA)*
- **Quantifying exposure from radionuclides for environmental receptors** - *Justin Brown (NRPA, Oslo, Norway)*

Discussion breakout

Day II - Wednesday, 18 November 2015 (morning)

Field and laboratory studies

- **Background Mutation Rates Across the Tree of Life** - *Michael Lynch (Indiana University, USA)*

Summary of field studies – effects on populations

- **Recent Findings from Fukushima** - *Timothy Mousseau (University South Carolina, USA)*
- **Some thoughts on statistical difficulties in detecting radiation effects in the natural environment** - *Jim Smith (University of Portsmouth, UK)*

Linking field investigations and laboratory experiments

- **Fukushima and the pale grass blue butterfly** - *Joji Otaki (University Okinawa, Japan)*
- **Effects of radiation on populations and ecosystems, the Chernobyl and Kyshtym cases** - *Stanislav Geras'kin (RIARAE, Obninsk, Russia)*
- **Synthesis of the 2013 Workshop in Lancaster (UK)** - *Steve Mihok, (Canada)*

Discussion breakout

Day II - Wednesday, 18 November 2015 (afternoon) Ecosystem approach, systems ecology, indirect effects

Summary of field studies – effects on ecosystems

- Ecosystem effects of ionizing radiation - *Anders Moller (CNRS, Orsay, France)*
- Reaction of water biocenoses to chronic radiation exposure aquatic flora and fauna - *Evgeny Pryakhin (Tchelyabinsk, Russia)*

Reference organism/biological effects versus ecosystem approach ecological effects

- Alternative conceptual approaches for assessing ecological impact of radiation - *François Bréchignac (IUR/IRSN, Cadarache, France)*
- Biological effects versus ecological effects : an ecologist's systems view - *Clare Bradshaw (University of Stockholm, Sweden)*

Chronic low dose range implications

- Non-Targeted Effects of Ionising Radiation : possible implications for Environmental Radiation Protection - *Carmel Mothersill (University McMaster, Hamilton, Canada)*

Discussion breakout

Day III - Thursday, 19 November 2015 (morning & afternoon)
Discussion towards consensus development
Drafting statement/conclusions

Thank you