next water
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Water Research AUSTRALIA

Prioritisation of contaminants

Stuart Khan

University of New South Wales

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Prepared by:

Stuart J. Khan
Carla Frankel
Jessica Vorreiter
Guido Carvajal Ortega
UNSW Water Research Centre, School of Civil & Environmental Engineering,
University of New South Wales, NSW, Australia

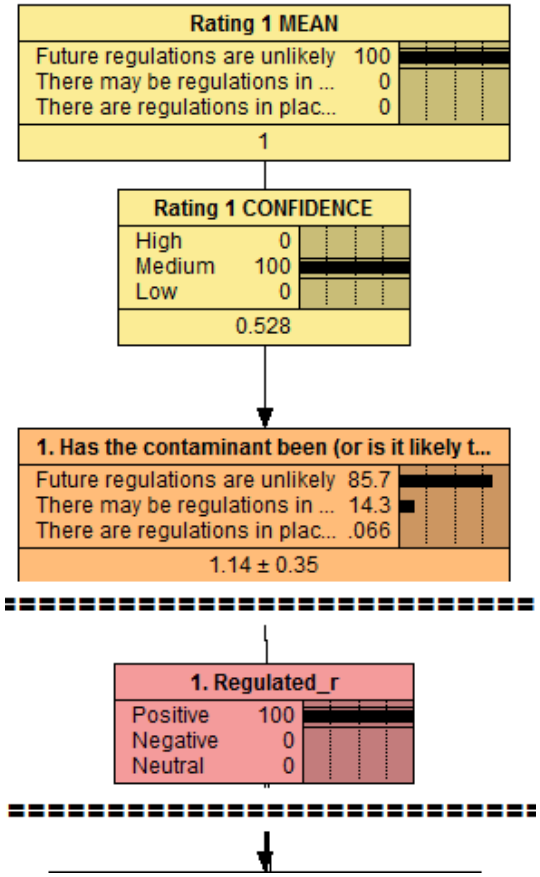
Background

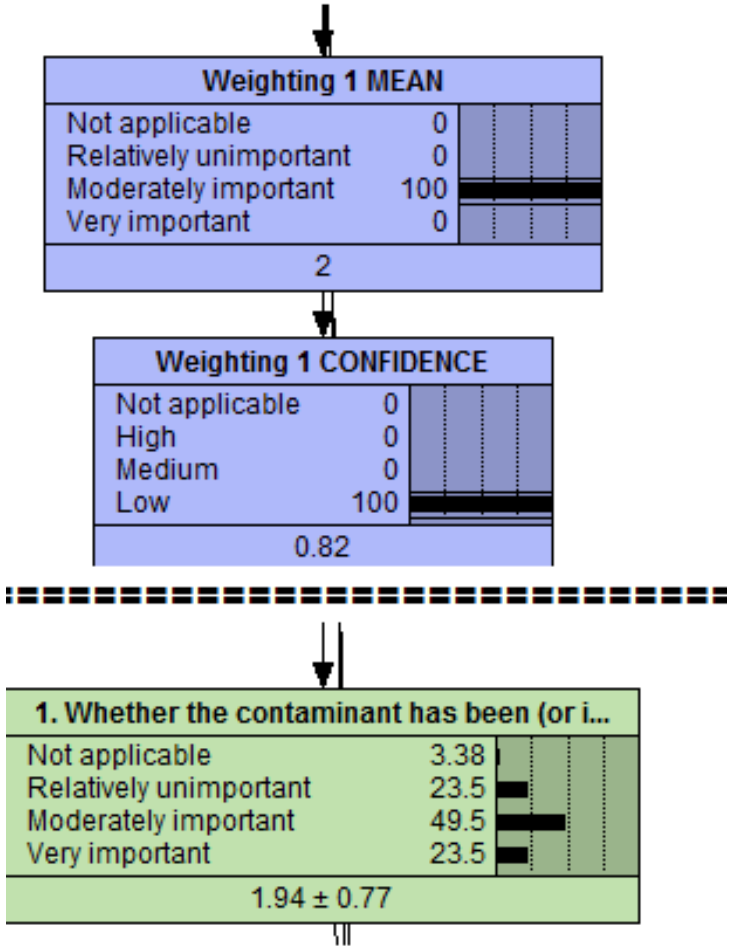
- GWRC workshop “Emerging Contaminants and Pathogens (Karlsruhe, 2015)
- Which contaminants should be prioritised for future research?
  - Most toxic?
  - Hardest to treat?
  - Most unknown?
- The “answer” depends on organisation’s responsibilities, as well as ‘values’.
- A “prioritisation framework” was proposed
  - An improved basis for research priority decision making.
  - Improved decision making justification to stakeholders (including the community).
  - Informed policy making.

11 key criteria identified from stakeholder survey

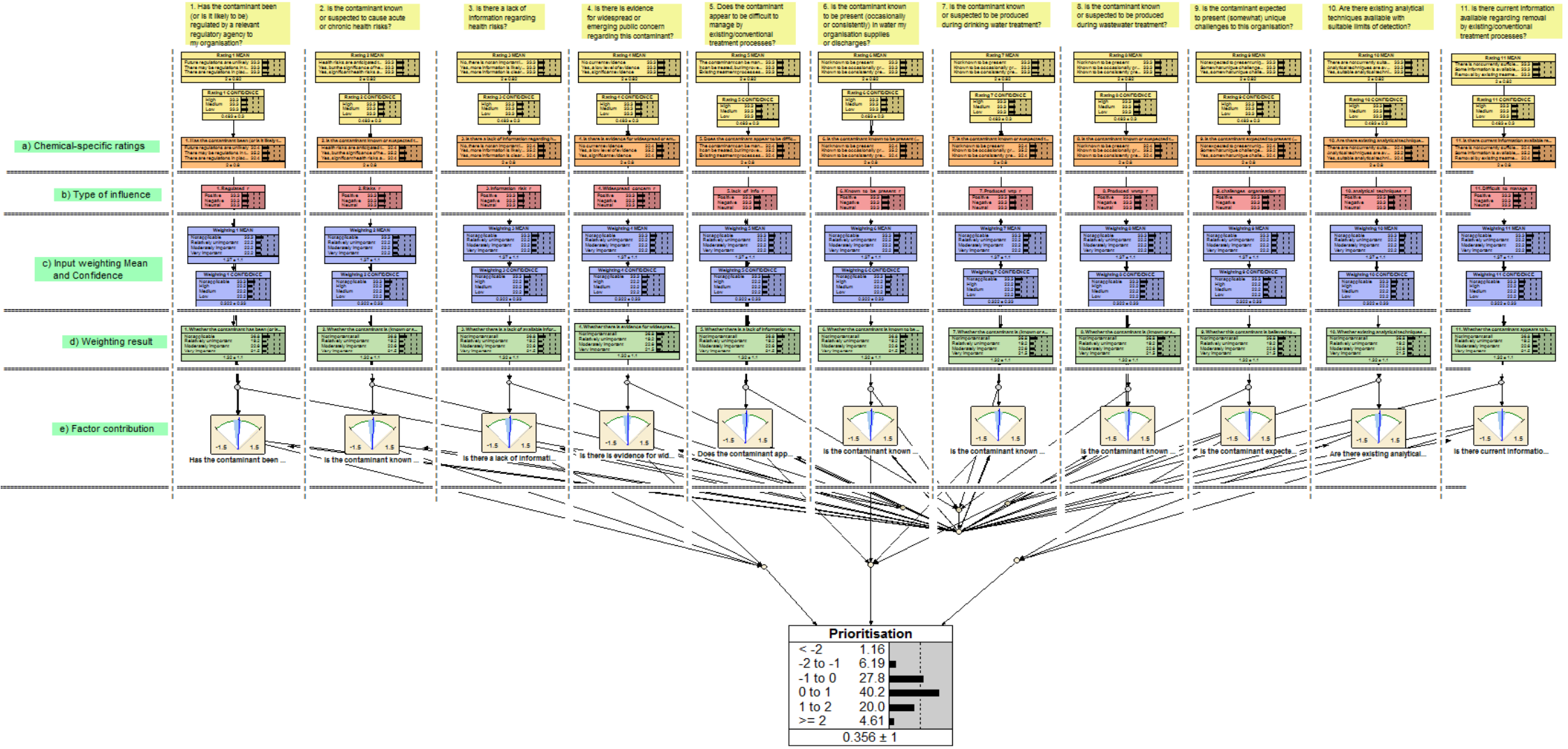
- Whether the contaminant has been (or is it likely to be) regulated by a relevant regulatory agency to the organisation;
- Whether the contaminant is known or suspected to cause acute or chronic health risks;
- Whether there is a lack of information regarding health risks;
- Whether there is evidence for widespread or emerging public concern regarding this contaminant;
- Whether the contaminant is known to be present (occasionally or consistently) in water the organisation supplies or discharges;
- Whether the contaminant is known or suspected to be produced during drinking water treatment;
- Whether the contaminant is known or suspected to be produced during wastewater treatment;
- Whether the contaminant is expected to present (somewhat) unique challenges to the organisation;
- Whether there are existing analytical techniques available with suitable limits of detection;
- Whether the contaminant appears to be difficult to manage by existing/conventional treatment processes;
- Whether there is information available regarding removal by existing/conventional treatment processes.

1. Has the contaminant been (or is it likely to be) regulated by a relevant regulatory agency to my organisation?





Bayesian network model for prioritisation of Contaminants of Emerging Concern (CECs)



Case study example

Chemical	CPI mean	CPI standard deviation	Most important criterion	Second most important criterion
Perfluorooctanoic acid (PFOA)	1.88	0.74	10. Management by conventional treatment	1. Regulations
Microcystin-LR	1.74	0.79	1. Regulations	2. Health risks
Chlorothalonil	1.73	0.80	1. Regulations	2. Health risks
alpha-Hexachlorocyclohexane	1.73	0.80	1. Regulations	2. Health risks
Saxitoxin	1.72	0.79	1. Regulations	2. Health risks
Bisphenol A (BPA)	1.70	0.80	1. Regulations	9. Analytical techniques
Phosmet	1.69	0.80	1. Regulations	9. Analytical techniques
Dicofol	1.69	0.80	1. Regulations	9. Analytical techniques
Endosulfan	1.69	0.81	1. Regulations	9. Analytical techniques
Linuron	1.68	0.81	1. Regulations	9. Analytical techniques
Azinphos-methy	1.68	0.81	1. Regulations	9. Analytical techniques
Butyl benzyl phthalate	1.68	0.80	1. Regulations	9. Analytical techniques
Carbaryl	1.68	0.80	1. Regulations	9. Analytical techniques
Nonylphenol	1.67	0.81	1. Regulations	9. Analytical techniques

The role of collaboration in this research

Extremely important:

- Many industry partners (Australia, Europe, South Africa, Singapore, USA)
- Project required diverse experiences and points of view to be successful
- Required a diverse skill set (Bayes modelling, etc)
- Needed to be ‘road tested’ for usefulness and applicability for industry users

Impact this research is expected to have

Improved prioritisation of research needs:

- Generation of future research where it is most needed and effective
- Improved value for limited research funds
- Transparent decision making provides improved communication opportunities

How findings will be implemented to ensure impact

Implementation steps:

- Dissemination through international conferences (IWA World Congress)
- International webinar
- Australian workshop
- Will work with water utilities to implement locally

What opportunities does this research generate for the water sector?

Facilitate improved decision making:

- Better targeting of research expenditure
- Exposure to advantages of MCDA generally
- Improved understanding of the most relevant issues relating to chemical contaminants
- Improved stakeholder communication