Building trust along the water model pipeline

Communicating for awareness & engagement

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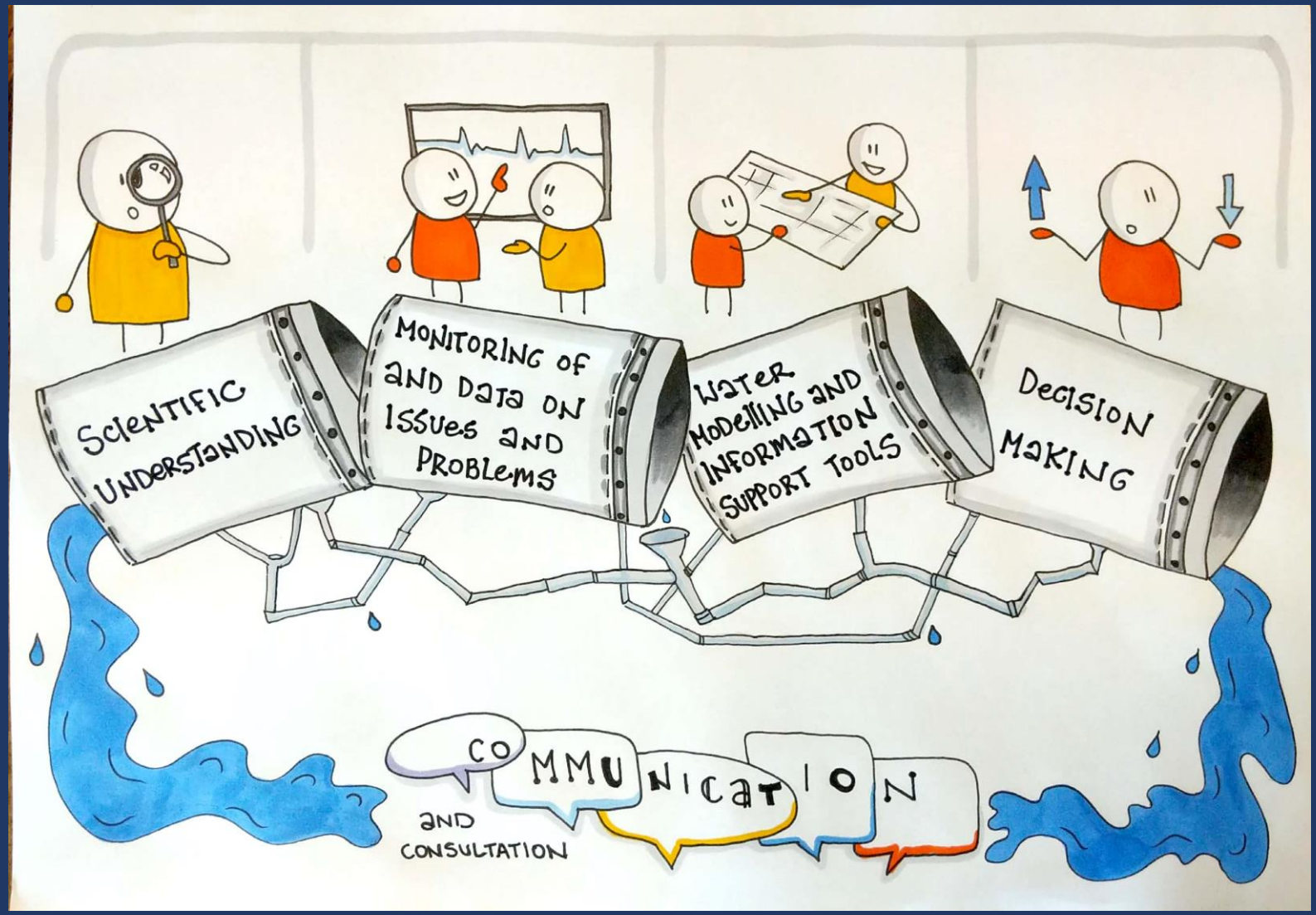
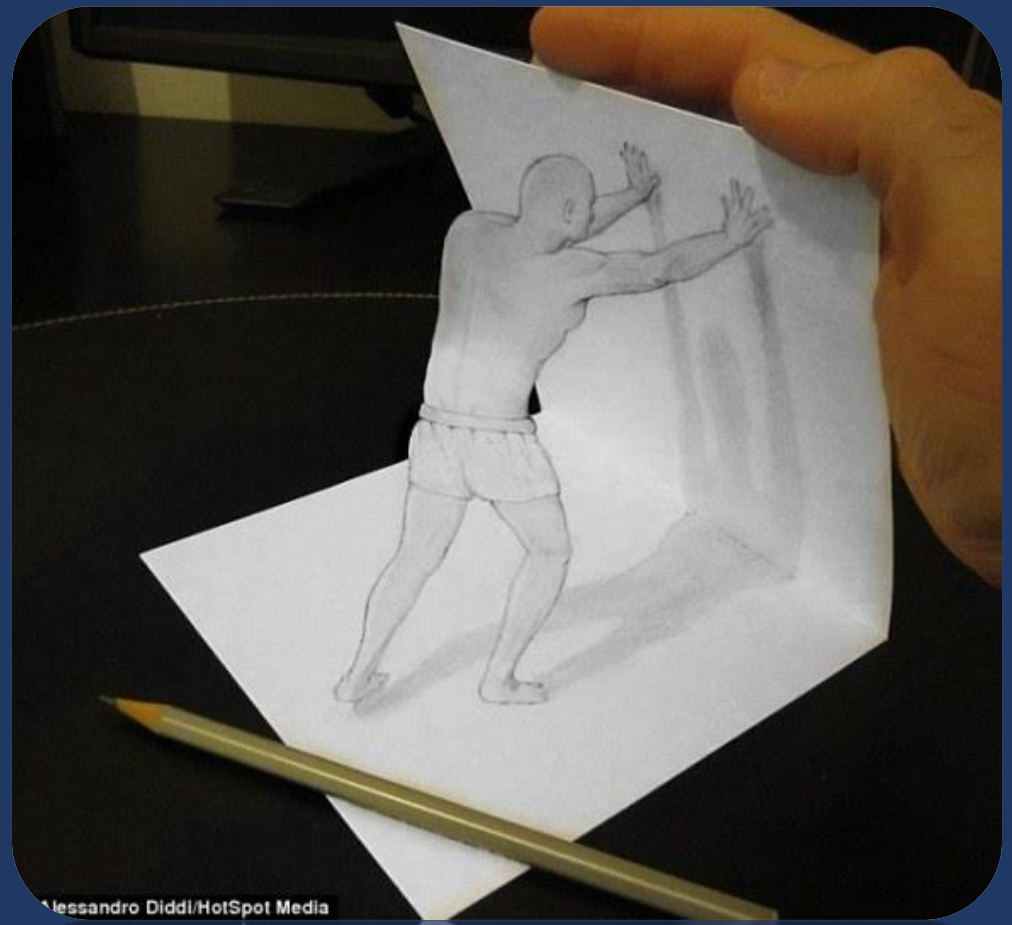
Decision science is a social activity



Decision science is a social activity

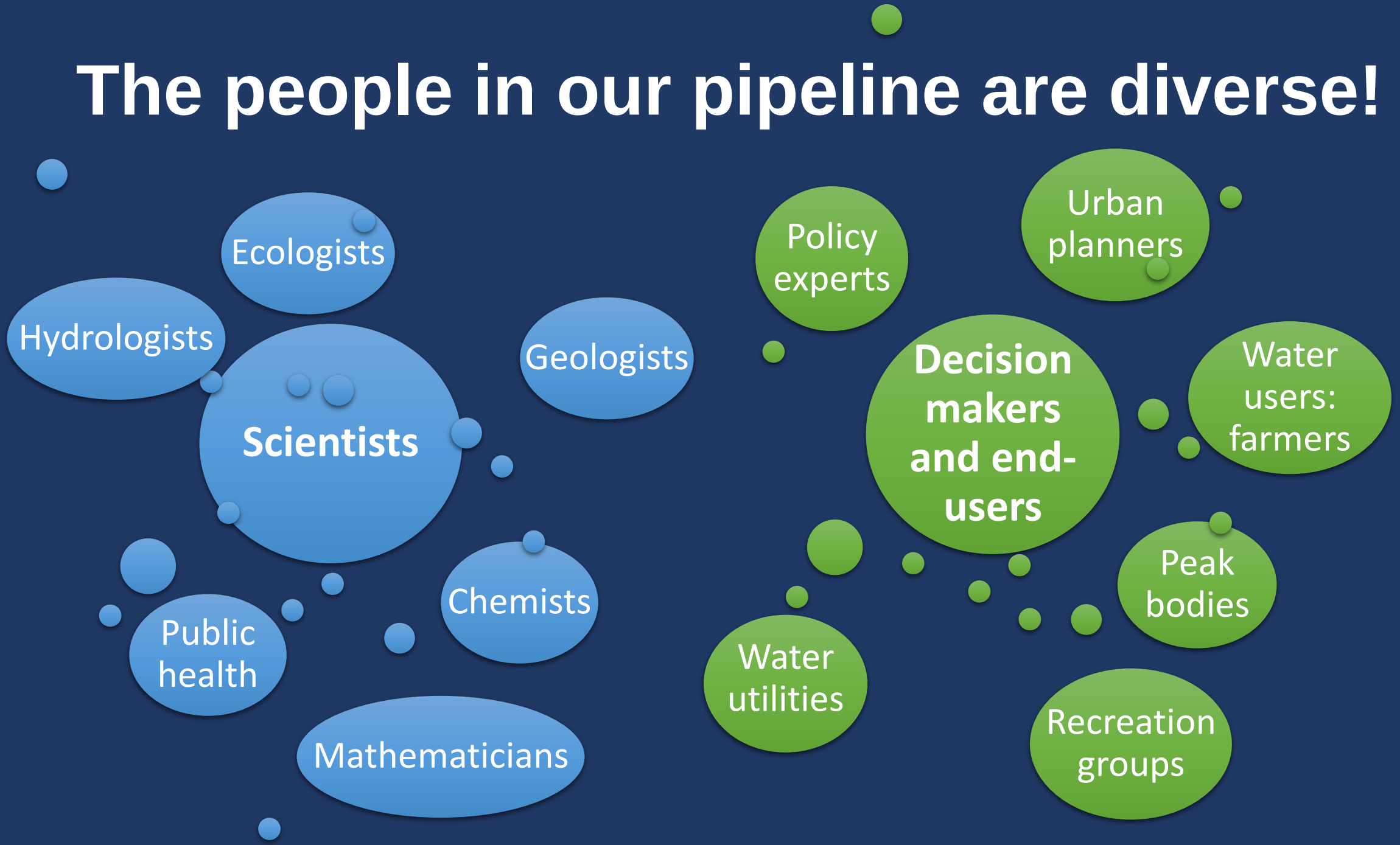
Our data doesn't do the work on its own

We need to communicate and collaborate effectively



Step 1. Understand our audience

The people in our pipeline are diverse!



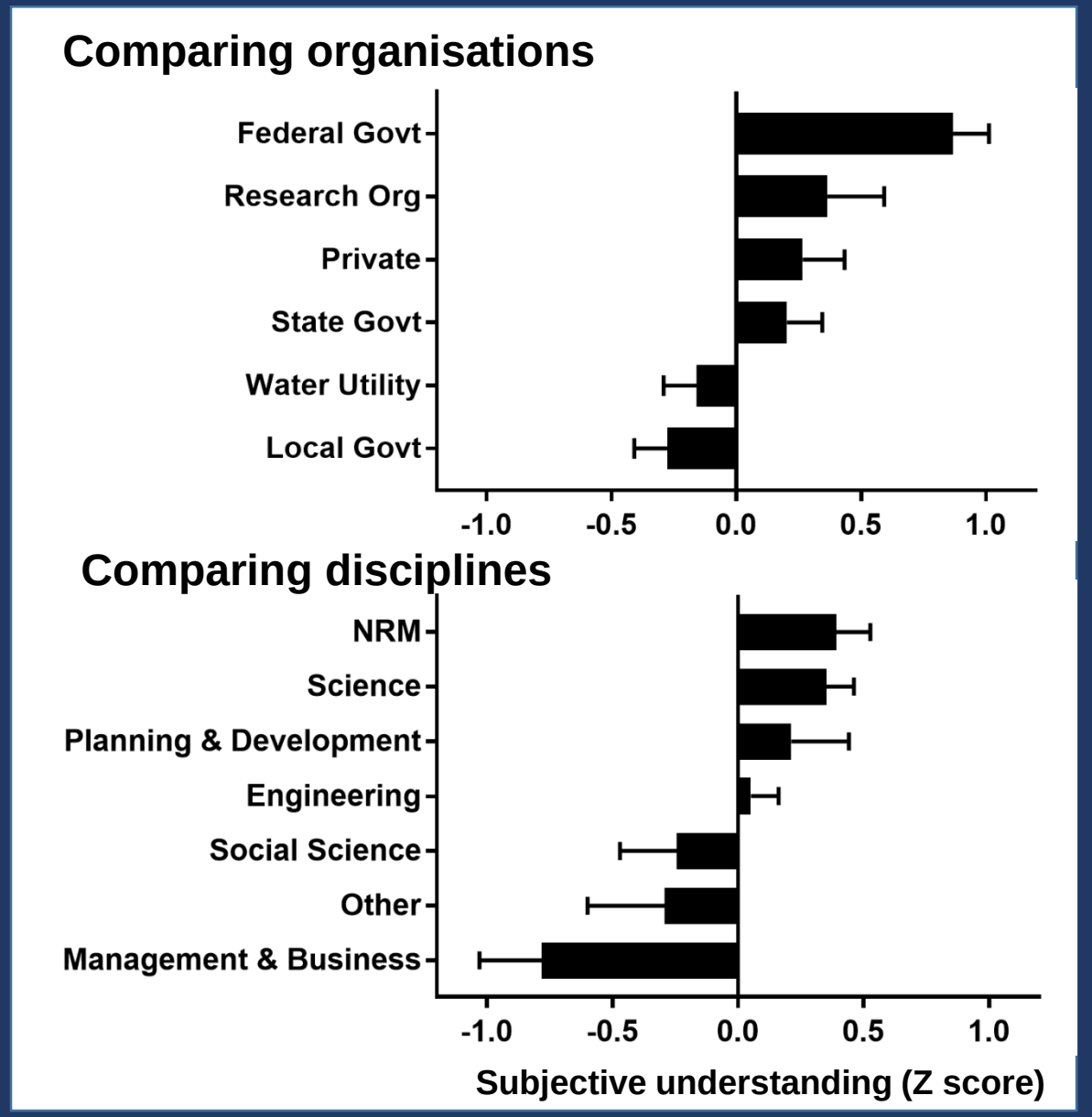
Our language is different

Variations in perceptions about technical terms - even in ‘similar groups’ of professionals

Some professionals more likely overestimate understanding

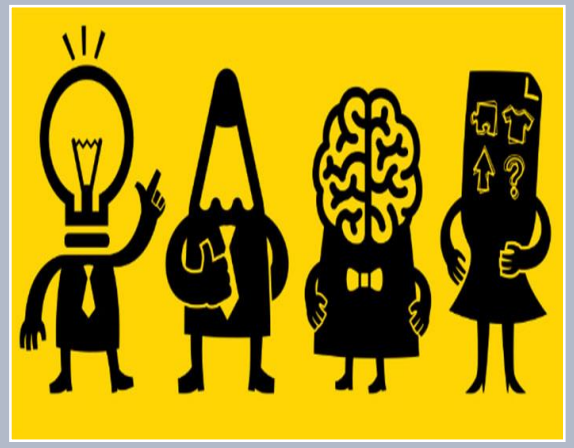
- Younger males
- STEM training

Survey Of Water Professionals

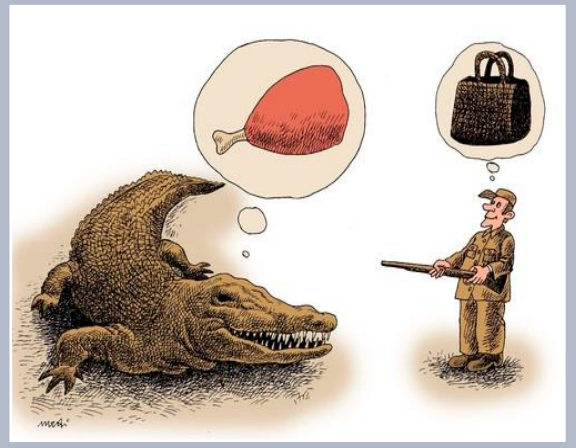


Dean et al, 2018 Urban Water Journal

People are different



Different ways of thinking



Different interests

Different life experiences

Different values

Our differences are not just disciplinary

…its how we understand the issue

Experience, beliefs, values

How we conceptualise a problem & define success:

- Environmental vs health impacts
- Urban vs rural
- Acceptability of risk

Aligning with experience…

A key challenge for communication ~ when our data challenges people's experience

"If they're a threatened species, there is a hell of a lot of them"

Aligning with experience…

A key challenge for communication ~ when our data challenges people's experience

If this is your experience, are you receptive to messages about poor water quality

So what does ‘communication’ involve?

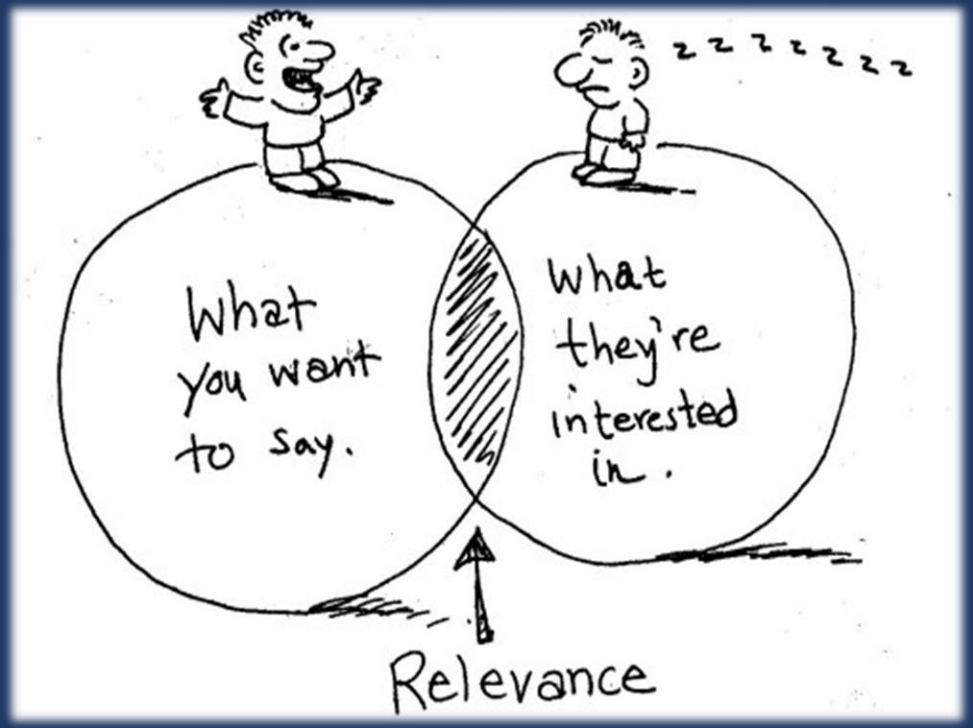
“A responsive approach to science communication means considering the needs, abilities, perspectives and constraints of the audience”

National Academy of Sciences

Communication is a two-way process

Listen

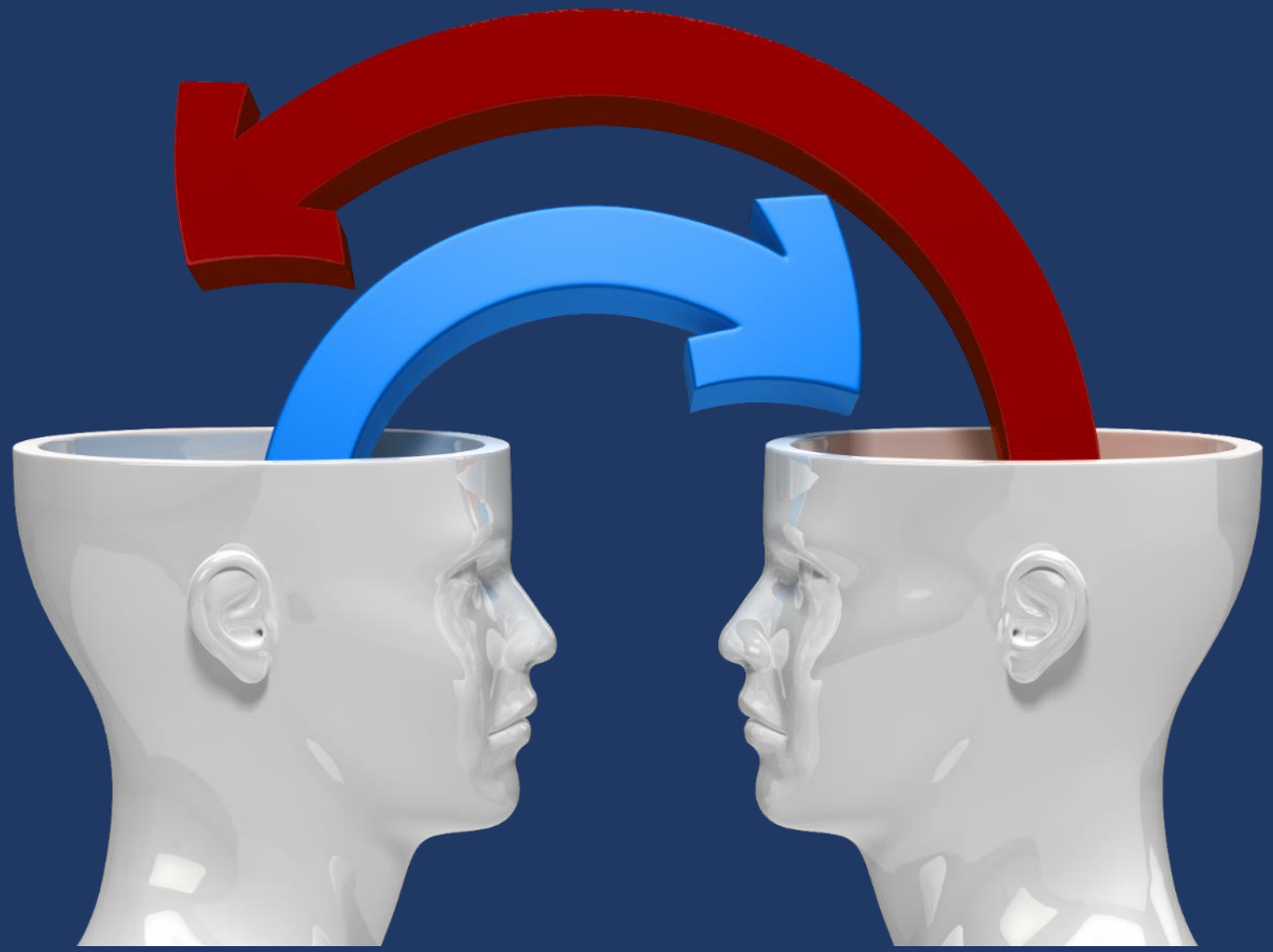
Build relationships



So we need to build relationships across professional boundaries

Learn about each others perspectives

Two-way dialogues are vital



Listening is a core component

Understanding the decision context

What do end users need?

Are we asking the right questions?

What are the time frames?

How do end users plan to use the data?

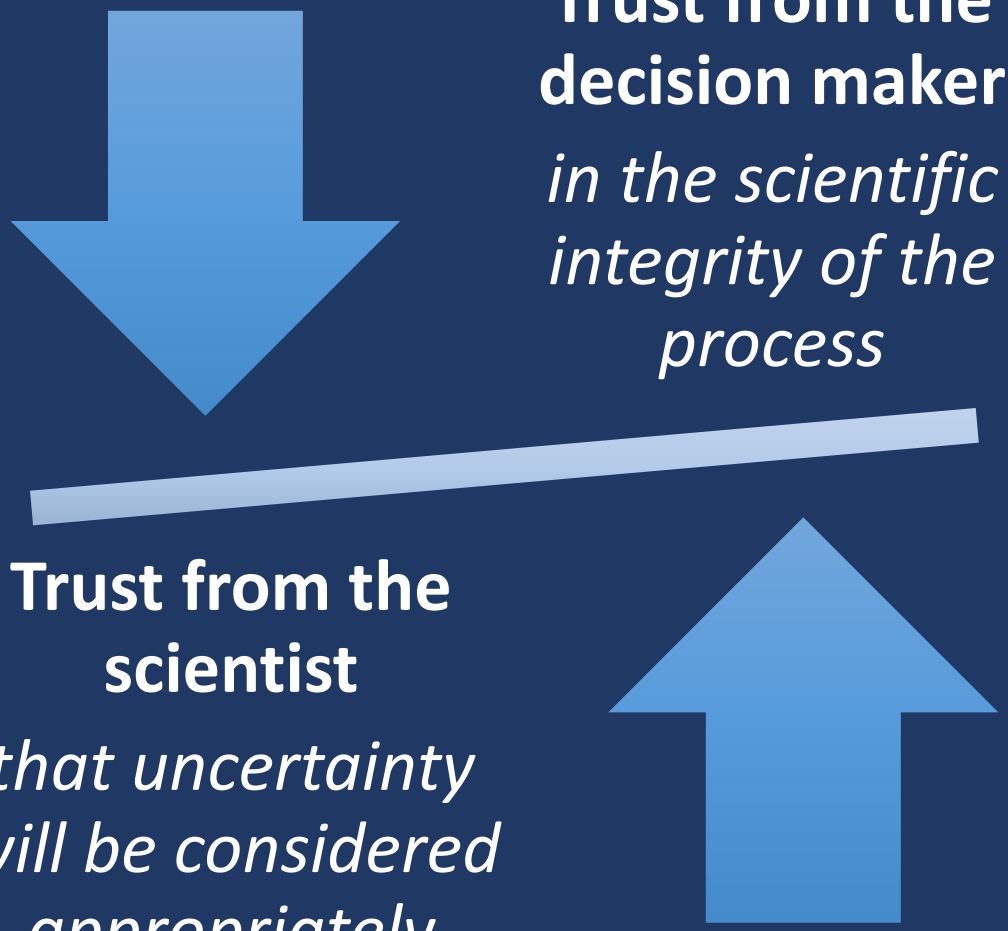
What type of uncertainty or risk is acceptable?

Enables tailoring outputs

Dialogue builds relationships

Creates
- shared language
- shared understanding of issues, needs & values

Dialogue can build trust



Trust from the decision maker

in the scientific integrity of the process

Trust from the scientist

that uncertainty will be considered appropriately

Learning from observation & interaction

How someone acts & responds

Indicators of values, respect and professionalism

“Confidence intervals” for a relationship

Can we have too much trust?

"Blind faith" can lead to

- unreasonable expectations & burden
- 'locking-in' policy responses to detriment of other data

Trust is active → scrutiny is vital

- Be explicit about expectations assumptions
- Share concerns
- Ask for more information
- Model the transparency you want to see

Lacey et al. *Nature Climate Change* 2017

Dialogue allows us gauge the utility of our data

How is our data received and interpreted?

- What is most useful?
- What is least useful?
- New interpretations?
- How does data shape future needs?

Dialogue can improve data uptake

Modelling effects climate variations on rainfall & expected grain yields

- Subsistence farmers in Zimbabwe
- Shared forecasts via:
  1. Workshops vs
  2. Non-participatory process
- Farmers who had attended workshop - more likely to use the forecasts

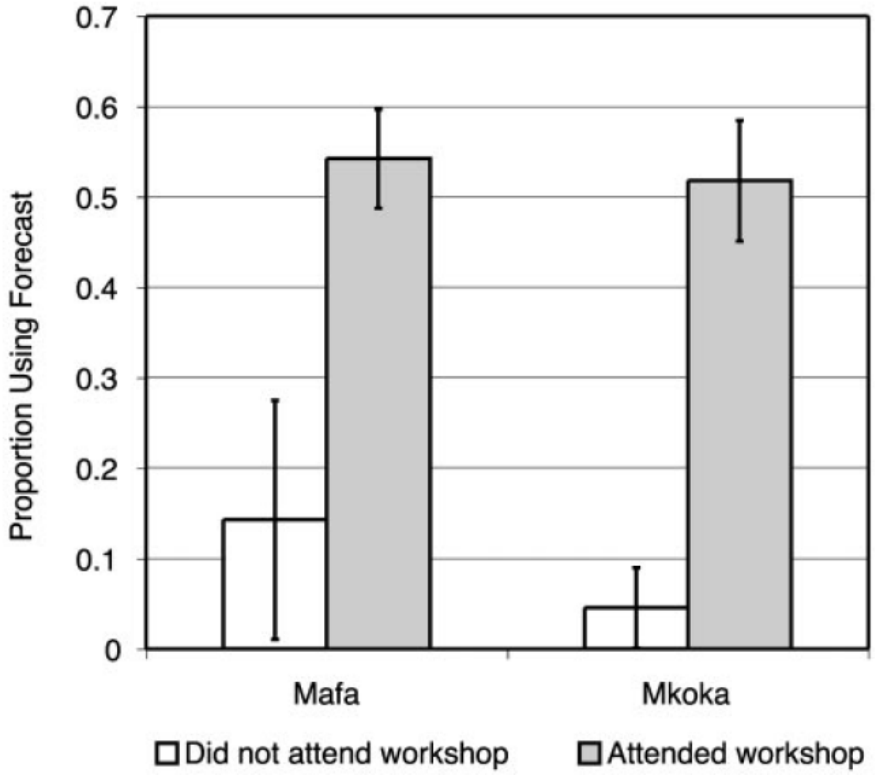


Fig. 3. Proportions reporting using forecast information within groups divided by location and workshop attendance. The white bars are limited to the subsample that reported hearing the forecast in that year through a medium other than the workshop.

Patt, 2005 *Proceedings of the National Academy of Science*

What do these processes look like?

California Public Utiities Commission

Responding to risk of health impacts (leukemia) from electromagnetic radiation

How to identify policy options that consider uncertainty and different stakeholder values

Options: No action, Moderate mitigation, Full mitigation (underground powerlines)

von Winterfeldt, 2013
PNAS

Suitable issue for more in depth process

Complex decision context

Important consequences

Uncertainty

Multiple stakeholders

Conflicting objectives

Need for accountability

von Winterfeldt, 2013 *PNAS*

Interviews with stakeholders to identity key concerns

Health effects
Costs
Property values
Power outages

Detailed models with experts
Health impact & dose response ~35 yrs

Quantified risk of:
Health impacts
Overall costs
Property values
Costs of outages

Convert all estimates into $ costs for each action

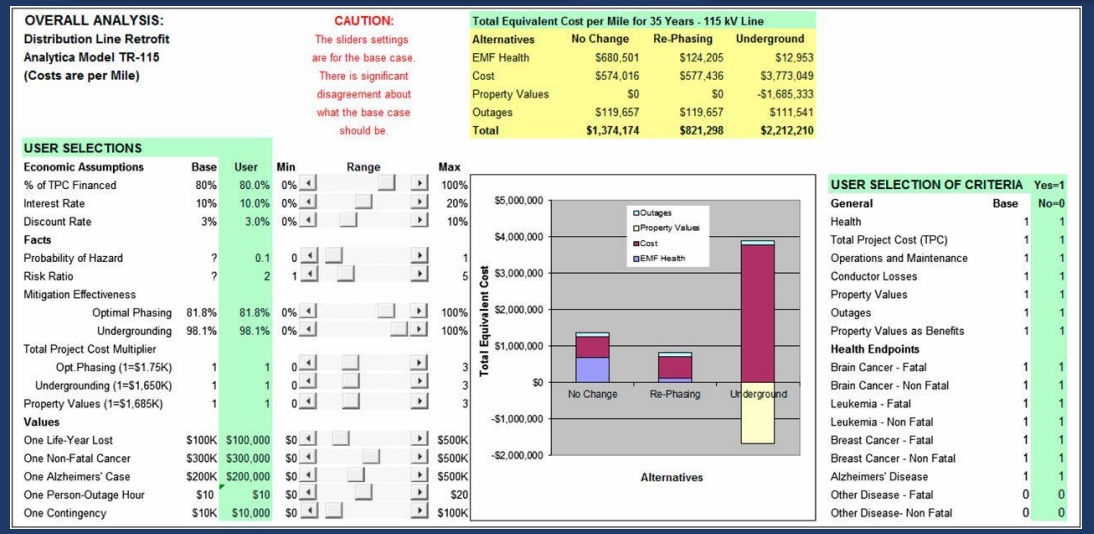
Discussed with stakeholders
~ 'Issues' with all estimates

Ranges: sliding scale for all critical variables
Allowed users to set values ~ beliefs

Moderate mitigation most optimal decision – even with ranges

Stakeholders still differed
But analysis focused future conversations

NB Caution in some decision contexts



OVERALL ANALYSIS:
Distribution Line Retrofit
Analytica Model TR-115
(Costs are per Mile)

CAUTION:
The sliders settings are for the base case. There is significant disagreement about what the base case should be.

Total Equivalent Cost per Mile for 35 Years - 115 kV Line

Alternatives	No Change	Re-Phasing	Underground
EMF Health	$680,501	$124,205	$12,953
Cost	$574,016	$577,436	$3,773,049
Property Values	$0	$0	-$1,685,333
Outages	$119,657	$119,657	$111,541
Total	**$1,374,174**	**$821,298**	**$2,212,210**

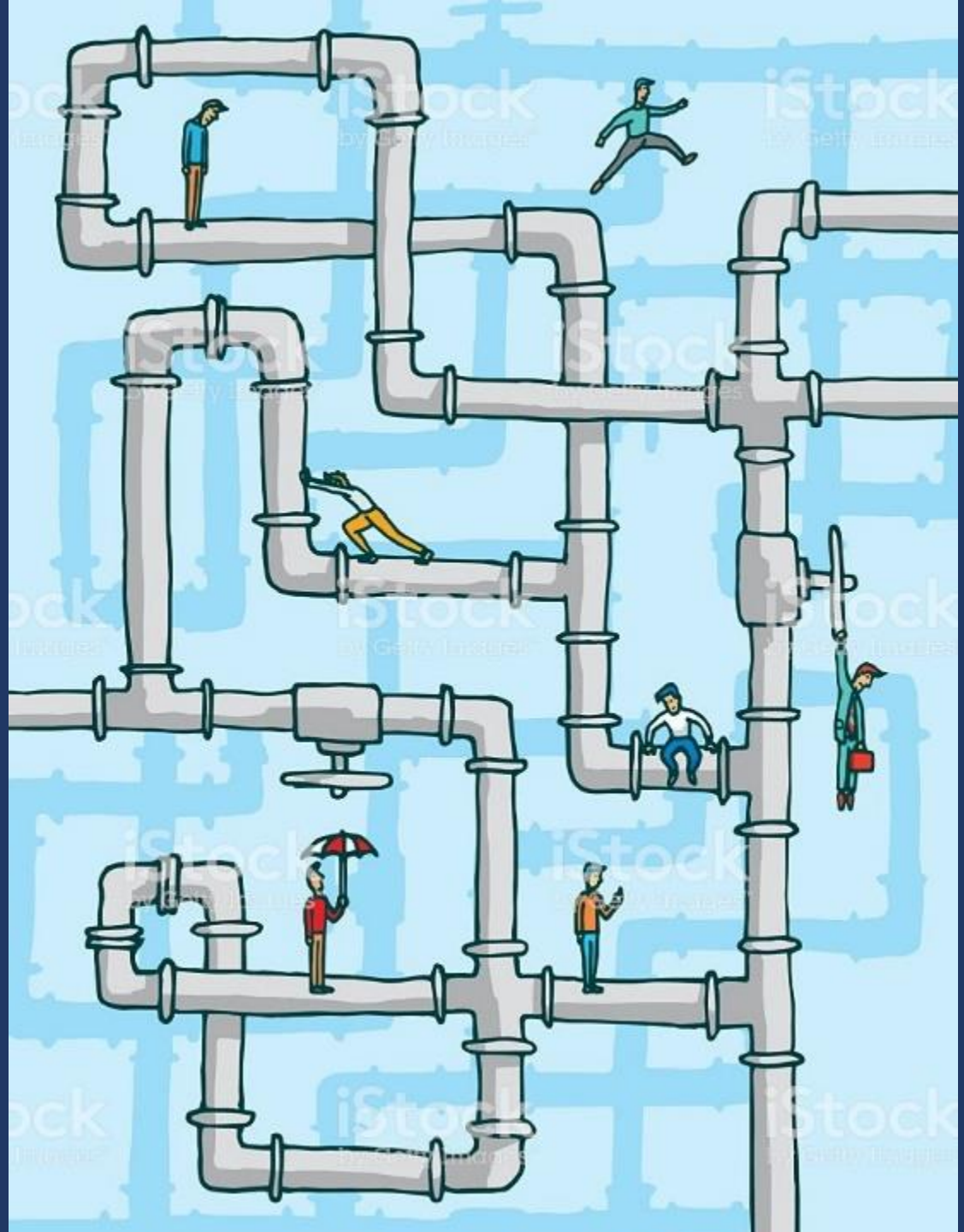
USER SELECTIONS

Economic Assumptions	Base	User	Min	Range	Max
% of TPC Financed	80%	80.0%	0%		100%
Interest Rate	10%	10.0%	0%		20%
Discount Rate	3%	3.0%	0%		10%
Facts					
Probability of Hazard	?	0.1	0		1
Risk Ratio	?	2	1		5
Mitigation Effectiveness					
Optimal Phasing	81.8%	81.8%	0%		100%
Undergrounding	98.1%	98.1%	0%		100%
Total Project Cost Multiplier					
Opt.Phasing (1=$1.75K)	1	1	0		3
Undergrounding (1=$1,650K)	1	1	0		3
Property Values (1=$1,685K)	1	1	0		3
Values					
One Life-Year Lost	$100K	$100,000	$0		$500K
One Non-Fatal Cancer	$300K	$300,000	$0		$500K
One Alzheimers' Case	$200K	$200,000	$0		$500K
One Person-Outage Hour	$10	$10	$0		$20
One Contingency	$10K	$10,000	$0		$100K

USER SELECTION OF CRITERIA	Yes=1
General	**Base** / **No=0**
Health	1 / 1
Total Project Cost (TPC)	1 / 1
Operations and Maintenance	1 / 1
Conductor Losses	1 / 1
Property Values	1 / 1
Outages	1 / 1
Property Values as Benefits	1 / 1
Health Endpoints	
Brain Cancer - Fatal	1 / 1
Brain Cancer - Non Fatal	1 / 1
Leukemia - Fatal	1 / 1
Leukemia - Non Fatal	1 / 1
Breast Cancer - Fatal	1 / 1
Breast Cancer - Non Fatal	1 / 1
Alzheimers' Disease	1 / 1
Other Disease - Fatal	0 / 0
Other Disease- Non Fatal	0 / 0

von Winterfeldt, 2013 *PNAS*

All this can be difficult and time consuming!



All this can be difficult and time consuming!

- **Simple messages vs complexity**
- **Rapid response vs in depth quality**

- **End-user & scientist needs**
- **Level of trust**
- **Stage of policy cycle**

Reminder for senior people

Provide opportunities

Model the ‘right’ behaviour

Say when you don’t understand

Raise limitations

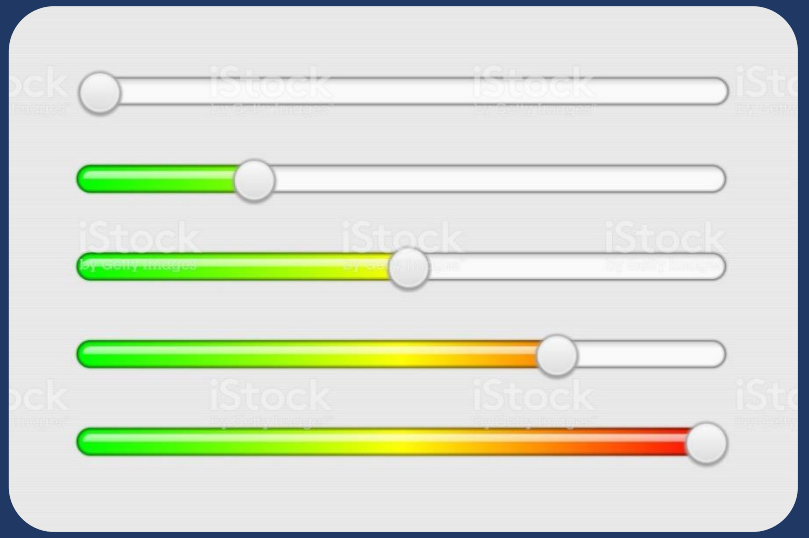
Challenge ~ respectfully

Think about career pathways

How working ‘in new ways’ can be rewarded

Is it worthwhile?

Supply-driven research
‘Curiousity-driven’
“Basic research’



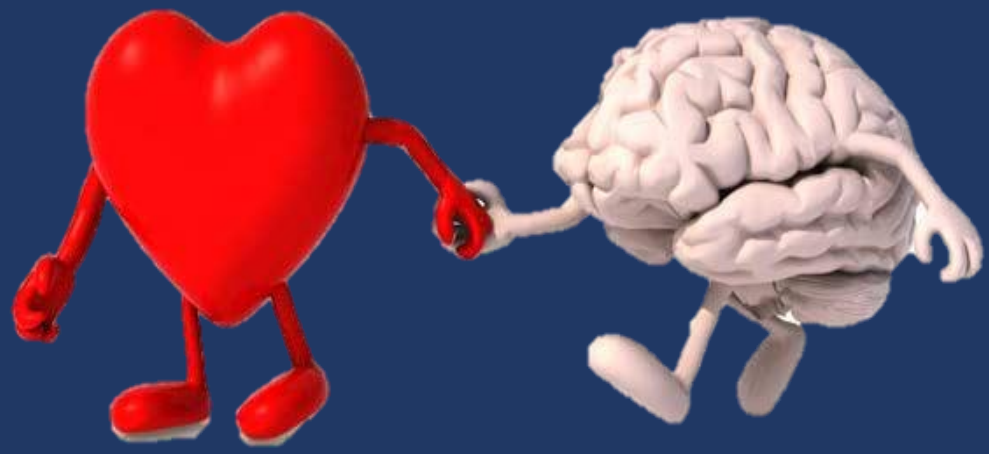
Demand-driven research
Designed to address a specific policy need

Not all scientists need to engage in identical ways

Understand what drives you

What is our purpose?

How do we make our practice fit for purpose?



Options for bringing it into a team

Intermediaries ~
Knowledge brokers

- Identify science and end-users needs and values
- Share information
- Facilitate communication & collaboration across networks

Thankyou

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QUT ife Institute for Future Environments

Hornsey & Fielding 2017

Rejecting climate science

Social identity
Group members adopt beliefs and actions to align with group

Hierarchical values
Belief in a just world
Unlikely to respond to fairness & equity arguments

Individualistic values
Likely to reject science that constrains individual freedoms

Personal identity
Non-conformist - *Not persuaded by consensus arguments*