



WaND
water cycle management for new developments



Combining social science with engineering: Reflections from the WaND project

Liz Sharp

Pennine Water Group

e.sharp@bradford.ac.uk



About me

- 1. Geographer & planner in Pennine Water Group (Bradford branch)**
- 2. Working with engineers on WaND project bid & execution for about 4 years**
- 3. Previous work on waste management and local authority environmental policy making.**



Presentation Goal

Should social science and engineering work together on water management problems, and if so, how?

.... Through reflections on WaND content and process



Presentation Content

- 1. Theory - Aristotle's three types of science**
- 2. Introduction to WaND**
- 3. WaND work packages**
- 4. WaND bid process**
- 5. WaND management process**
- 6. Conclusion – lessons from WaND?**



 **WaND**

water cycle management for new developments



Theory



Aristotle – 3 types of knowledge

(After Bent Flyvbjerg, “*Making Social Science Matter: Why Social enquiry fails and how it can succeed again*”)

Episteme

Techne

Phronesis



Episteme

Universal

Cumulative

Predictive

Generalisable

'Theoretical know-how'

Traditional 'science'



Techné

‘Technical know-how’ – ‘a practical rationality governed by a conscious goal’

Cumulative

Predictive

Instrumental

Pragmatic – context dependent

Engineering



Phronesis

‘Prudence’ in governance of self and society

Investigating value choices:

- Where are we going?
- Is it desirable?
- Who gains and who loses?
- What should be done?

Non-cumulative

Data led

**Practical context dependent knowledge
through case studies.**

Social Science



Why I like this categorisation

- **‘Phronesis’ describes the sort of social science that I want to do – (basically, I like asking questions about values).**
- **‘Techne’ – the emphasis on solving a problem – seems to me to be a good description of the way engineers I know think about knowledge**
- **As an environmentalist, I am a bit of a ‘techne’ person too.....**



Flyvbjerg's arguments

'It is often the case that activities are rationalised as episteme although they are actually techne or phronesis' (p61)

Be proud of what you do!

'there is a marked need for discussion and reorientation of values and goals; for example, in relation to environmental risks,'(p168)

More phronesis now!



Three sciences & WaND

Questions to consider:

- 1. Does the three science model help ‘make sense’ of WaND?**
- 2. Are ‘techne’ and ‘phronesis’ presented as ‘episteme’?**
- 3. What – if anything – does analysis tell us about integrating different sciences?**



 **WaND**

water cycle management for new developments



WaND

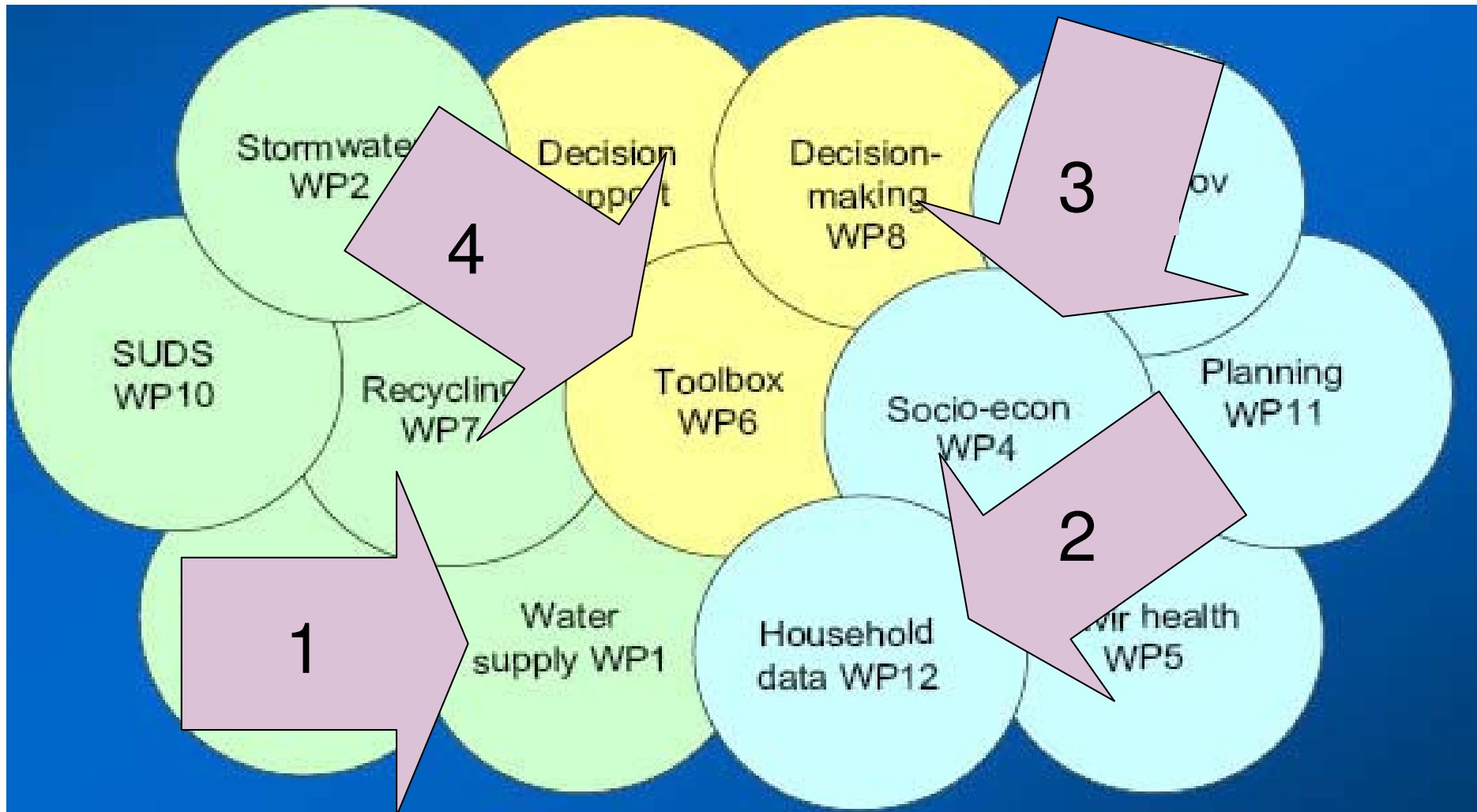


WaND – Water Cycle Management for new developments

- **£2.7 million project, 4yrs, 13 work packages.**
- **Goal: How can a sustainable approach to water management be applied in new developments?**
- **Funded by Engineering and Physical Science Research council ‘Sustainable Urban Environments’ (SUE) programme**
- **SUE is explicitly ‘multi-disciplinarily’**



WaND Work Packages





 **WaND**

water cycle management for new developments



WaND work packages



Water Supply

- 1. To produce suite of demand forecasting tools on common interface**
 - 2. To identify, quantify and evaluate conservation options**
-Fairly clearly 'techne' aimed at instrumental goal of evaluating demand management options**



Household data for water management

1. To forecast future household and population size for different area.

2. To use forecasts to predict water demand.

....Fairly clearly 'techne' aimed at instrumental goal of measuring future demand



Social and economic aspects

- 1. To identify critical points in the decision process for new developments when more information would help achieve SWM**
- 2. For different SWM innovations, to determine the extent & distribution of costs and benefits between stakeholders**
- 3. To generate recommendations for implementing SWM, including advice about awareness raising strategies**

....Presentation as 'techne' – instrumental goals of implementing SWM.

In reality.. looked at developments with **an** aspect of SWM and investigated who gained what & who (if anyone) lost..Phronesis?



Toolbox (selected goals)

- Development of a toolbox with input from all other Work Packages to support development-specific planning and preliminary design of composite sustainable urban water management practices.
- Development of a methodology for using this toolbox to maximise relative sustainability using agreed social, economic, political and environmental criteria.



Toolbox - analysis

- Goals are presented as ‘techne’ – definition of relative sustainability of different innovations.
- Implication that relative sustainability of different options can be defined at a site or development scale.
- Implication that integrating ‘social, economic, political and environmental’ data enables relative sustainability to be calculated.



Toolbox – my opinion

Defining ‘relative sustainability’ is about defining the development path for society – inherently ‘phronesis’.

It needs to be done at a regional or national scale through debates over values.

Instrumental ‘techne’ approaches to sustainability are misguided because we (currently?) have no consensus about the overall goals.



 **WaND**

water cycle management for new developments



WaND

Process: Bid



WaND Bid

July 2001: Expressions of interest in Sustainable Urban Environments (SUE) projects called for by EPSRC.

Autumn 2001: Successful representatives drawn in for discussion of 'themes' – David Butler & Adrian McDonald voted 'project champions' for water theme.

Spring 2002: Development of proposal – colleagues with related interests asked to become involved to lead different parts of the bid (including me).

July 2002: Submission of bid

Feb 2003: Unofficial confirmation bid successful

April 2003: Start date (official confirmation received – May 2003!)



WaND Bid – reflections 1

- EPSRC – engineering perspective, but expect ‘multi-disciplinary’ involvement
- Other water engineering researchers invited to join. Richard Ashley invited to lead social and economic side... invited me along.
- Bidding process – odd un-acknowledged tension between co-operation (so we all win) and competition (for each person’s share of the pie)..... Not conducive to creative approaches to problem.



WaND Bid – reflections 2

Social Science/Engineering – lack of mutual understanding

- Engineers frightened – need social science data but don't know how to get it.
- Social Scientists frightened – engineers will want data which we may be unable to produce (expecting me to be psychologist/ sociologist/ statistician/)
- Bidding process – does nothing to reduce the mutual misunderstanding & suspicion.
- Acronyms, language and culture



WaND Bid – reflections (Social & Economic Work Package)

- Why was social and economic aspects led by engineer?
- Why wasn't it possible to get a social scientist with water related research experience?
- When writing bid (social and economic aspects) – key importance of involving different players – bid amalgam of research goals of different staff.
- One page for each 'work package bid' – very little space for lots of money!



Social and economic aspects

- 1. To identify critical points in the decision process for new developments when more information would help achieve SWM**
- 2. For different SWM innovations, to determine the extent & distribution of costs and benefits between stakeholders**
- 3. To generate recommendations for implementing SWM, including advice about awareness raising strategies**

Critique:

- Which SWM innovations?**
- Does SWM innovation = sustainable?**
- Is it realistic to determine *extent* of costs and benefits?**



 **WaND**

water cycle management for new developments



WaND

Process:

during project



WaND Process during project

Management Group Meetings: Every 3 months – 1 page report on progress to targets.

Steering Group Meetings: Every 6 months – present progress to private sector funders.

Occasional workshops organised by specific WPs to communicate results and collect views/opinions.

Two ‘workshop away-days’ when we spent two days together with a packed programme.



WaND process & interdisciplinarity

Workshops – key occasions for exchange of information about research (though not development).

Integrative work packages – deliverable oriented ... limited space to promote & develop shared understandings

Shared deliverables – allocated to specific work packages to 'lead' (NB not yet produced... may yet prove key?!)

Meetings and away-days – crucial for getting to know each other

Steering Group = funders = water companies & Environment regulator. Other potential 'research users' (government/planners) under-represented.



WaND process & interdisciplinarity

Overall assessment: While lots of great work in individual work packages – WaND has only promoted limited mutual understanding between disciplines.

....Why?

The very effective WaND management process has focused on achievement of pre-defined goals.

Process suited to *Techne* (pre-defined goals) but not perhaps to *Phronesis*?



 **WaND**

water cycle management for new developments



Conclusions



Does the three science model help make sense of WaND?

Yes

Work packages are presented at techne – but include some phronesis & some work which (??) should be phronesis.

Bidding process forced towards techne presentation through timing and restricted length

Project process did not allow much time for exchange of findings, or generation of new ideas or new deliverables



Are techne and phronesis presented as episteme?

No

Work packages are presented at techne – but include some phronesis & some work which (??) should be phronesis.



What does analysis tell us about research for SWM?

Bidding

Need to fund some 'thinking space' for interdisciplinary discussion of projects and priorities.

Flexibility to allow 'research questions' not 'deliverables'.

Social scientists need to be involved in assessing (and mentoring) social science aspects of engineering problems.



What does analysis tell us about integrating sciences for SWM?

Management

Research is a 'social' process – build in time and activities for researchers to get to know each other.

Allow deliverables to develop through project

Construct broader steering group & give power to steer (to approve/not shifts in deliverables?)

Make space and priority for presenting interim findings between researchers

Hold funding back for 'projects which arise' during the course of the work



What does analysis tell us about integrating sciences for SWM?

Sustainable Water Management

In 19th & early 20th centuries, consensus about water management goals meant Techne was appropriate.

Now, given highly contestable nature of 'Sustainable Water Management', joint development of phronesis with techne is required.

..... Just beginning to learn how!



WaND

water cycle management for new developments



**Thank you
for
listening !**