Abstract

Wider stakeholder participation is an increasingly important feature of sustainable water resources planning and management. Despite regulatory and commercial recognition of the benefits of wider participation, there is considerable variation regarding interpretation and successful practical application of participative planning activities. Research in this field has concentrated on the identification of alternative methods and tools to improve both the quality of engagement and associated outcomes with Social Learning attracting significant attention. Rather less attention has been paid to the homogeneity and consequently the usefulness of the stakeholder group as a social and professional unit.

This thesis explores the constituency concerns of four prominent stakeholder groups relevant to water resource management, namely: lay public, regulators, managers and researchers via a social learning model of participative planning. Based on a collaborative learning framework a conceptual model is developed and used to illustrate and analyse the relationships between individual and group concerns, opinions and intervention preferences. A questionnaire based survey was used to identify how constituency concerns vary, allowing the four groups' expectations and opinions regarding the planning and management of water resource projects to be compared and contrasted.

Results show that there is significant variation of attitude and opinion within stakeholder group communities on a large number of issues. A greater than expected level of agreement between stakeholders from different constituencies on some topics was also observed. The results of the research inform contemporary debates about the design and management of stakeholder engagement processes and challenge existing assumptions about the robustness of a 'stakeholder group' in terms of having a distinct set of opinions. The conceptual model is then revised to suggest a more appropriate process and content for participatory planning, based on the social learning model used.

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Glossary of terms

Participative planning

Participative planning has a common objective of extending the boundaries of inclusion so that previously excluded groups can be incorporated.

Stakeholder

The classic definition of a stakeholder is given by Freeman (1984): "*Stakeholders can be defined as any group or individual who can affect or is affected by the achievement of the firm's objectives*". There are four sectors that loosely encompass the basic stakeholder types, as described by the UN which are: public (the word 'public' here is used to describe utilities, local authorities etc), private, academia and communities (UNU - INWEH, 2005). The number and types of stakeholder groups involved in water stewardship can vary widely from project to project. However, a common feature of all definitions regarding *"stakeholders or interested parties is that they identify and define groups relative to a specific issue...that issue may be as broad as 'the environment', or as narrow as 'the riverine ecosystem between A and B streets in Anytown*"(Glicken, 2000, p307).

Water Resource Management

The control, treatment or utilisation of water resources. For example, water quality enhancement and flood control are water management activities.

Wastewater or Water Reuse

There is much debate surrounding the typology and appropriate terminology relating to the reuse of wastewater. The Chartered Institution of Water and Environmental Management (CIWEM) definition for effluent reuse however states: "*There is no one universal definition as to what effluent reuse comprises but in general it is considered to cover the reuse of wastewater for whatever purpose which may or not may not involve treatment*" (www.ciwem.org/policy/policies/effluent.asp).

Glossary of Acronyms

ANOVA	analysis of variance
BPS	British Psychological Society
CAPI	Computer Assisted Personal Interviews
CATI	Computer Assisted Telephone Interviews
CEC	Commission of the European Communities
CGI	Common Gateway Interface
EC	European Commission
EU	European Union
HarmoniCOP	Harmonising collaborative planning (EU funded project)
HTML	Hyper Text Markup Language
IAP2	International Association for Public Participation
ICT	Information and Communication Technology
OECD	Organisation for Economic Co-operation and Development
PAPI	Paper And Pencil Interviews
QWRS	Queensland Water Recycling Strategy
SLIM	Social Learning for the Integrated Management and sustainable use of water at catchment scale
SPSS	Statistical Package for Social Scientists
UN	United Nations
UNECE	United Nations Economic Commission for Europe
URL	Uniform Resource Locator
WFD	Water Framework Directive
WERF	Water Environment Research Foundation

Publications arising from the research presented in this thesis

Anderson, J. Baggett, S. Jeffrey, P. McPherson, L. Marks, J. Rosenblum, E. (in press). Public acceptance of water reuse. In: *Water Reuse: An international survey. Contrasts, issues and needs around the world*, edited by Blanca Jimenez and Takashi Asano. IWA Publishing.

Baggett, S. Jefferson, B. Jeffrey, P. (in press). Just how different are stakeholder group opinions on water management issues? *Desalination.*

Baggett, S. Jeffrey, P. Jefferson B. (2006). Risk perception in participatory planning for water reuse. *Desalination* 187: 149-158.

Baggett, S. Jeffrey, P. Jefferson, B. (2004). Participatory water reuse planning: a conceptual model based on social learning and personal constructs. *In: Workshop on Participative planning for water reuse projects at IWA 4TH World Water Congress 2004*, Marrakech, Morocco September 19th-24th 2004. (Available at Water Intelligence online http://www.iwaponline.com).

Baggett, S. Jeffrey, P. Jefferson, B. (2004). Water resource management and participatory planning: a preliminary analysis of survey data on the perceptions, needs and requirements of different stakeholder groups. In: *International Commission on Irrigation and Drainage (ICID) Tools for public participation, conflict resolution and decision making in water resources management*,

Seminar held on 14th October, 2004, ICID British section, London p. 46-53 (Available online at www.icid.org.uk).

Baggett, S. Jeffrey, P. Russell, S. (2003). Stakeholder perceptions of water reuse and participatory planning models (a literature review), *AQUAREC milestone report*, EVK1 – 2001 – 00213.

Chapter 1 : Introduction

There is increasing awareness within institutional and constitutional organisations that if the environment is to be adequately and successfully protected and managed then wider participation needs to be an intrinsic part of natural resource management. To that end, expansion of participatory planning, so as to include previously excluded parties in the process, has been formally realised and actively encouraged in more recent legislative documents.

However, there are problems associated with the interpretation of what actually constitutes a desirable participatory process, which includes both official and lay public perspectives. In parallel therefore to the gradual adoption of broader stakeholder engagement and involvement in natural resource management, there has been an increasing awareness of the need for, and ongoing research of, methods and tools to improve and facilitate participation processes and their outcomes. Utilisation of social learning, as an alternative participatory approach to 'traditional' information and consultation techniques significantly occupies the present focus of research attention. The thesis attempts to further address and inform that debate, by exploring how wider participation can be better structured and facilitated in the context of water resource management.

This introductory chapter initially provides background information relevant to the research presented in this thesis. Subsequent sections within the chapter present:

- an explanation of the motivation behind the research carried out;
- a justification for the research;
- an outline of the contribution made to research within the subject area;
- a guide to thesis layout and content.

1.1 Background to the research

Interest in stakeholder participation has significantly increased in recent years in a multiplicity of sectors, spanning from health care to environmental planning (SED, 2004). It is now generally accepted that stakeholders should be involved in policy making procedures (Innes & Booher, 2004; Doelle and Sinclair, 2006). Motivated by considerations of social justice (of both procedural and distributive versions) and ethical practice (House, 1999; Tisdell, 2003), a number of formal approaches have emerged to support the engagement of stakeholders (including lay communities) in both planning and governance processes. This is reflected in a number of national and international declarations which now regard wider participation to include previously excluded parties, as essential in safeguarding the environment via adequate planning and management.

For example, Article 7 of the Aarhus Convention (UNECE, 1998) states that parties to the convention should "*endeavour to provide opportunities for public participation in the preparation of policies relating to the environment*". The article is enshrined in several EC directives, as, for instance, in Directive 2003/35/EC (CEC, 2003). Furthermore, UK researchers and policymakers progressively acknowledge that the boundary between science and policy is

complex and consequently requires the appropriate framing of problems and acknowledgement of different values (Stagl, 2006). Judgements based on the old technical-rational model utilising 'objective assessments', which were thought to lead to better decision making, have proven to be "*theoretically, politically, and practically inadequate*" (Stagl, 2006, p3). The following section provides an example of efforts in the UK to provide opportunities for the public to be more involved in founding environmental policies.

1.1.1 Water resource management in practice – an example

The European Water Framework Directive (WFD) provides an example of environmental legislation that has followed this trend. Both (i) the inclusion of stakeholder participation requirements, and (ii) the acknowledgement of the increased concern shown by individuals and organisations regarding the quality of water resources within its framework (SED, 2004), reflect that trend. Article 14 of the EU Water Framework Directive (CEC, 2000) specifically recognises the need for equitable allocation of water and the desire for wider stakeholder participation in water resource management.

In order to clarify the meaning of water resource management in practice, the river basin planning framework developed for England and Wales is used here as an example: The aim of the framework is to fulfil the overall objectives of the WFD. As the 'competent authority' for the WFD in England and Wales, the Environment Agency (EA) is responsible for submitting proposals to the

Secretary of State for the Environment, Food and Rural Affairs and/or the Welsh National Assembly regarding:

- objectives for each body of water
- the programme of measures (PoMs) that are to be applied to achieve those objectives
- a River Basin Management Plan (RBMP) for each of the eleven designated River Basin Districts (RBDs) within England and Wales

The development of the EA's framework for River Basin Planning (Environment Agency, 2006) was aided by:

- the input of "various interested parties" engaged in a series of events held within England and Wales during 2004
- formal consultation on a draft River Basin Planning Strategy, conducted during Spring 2005
- the Ribble Pilot River Basin Project, one of a set of 15 prototype RBMPs, tasked by the European Commission, designed to test and guide the public participation requirements set out in the WFD (to be published in 2007).

To be consistent with the cycle of planning and action as stipulated by the WFD, the EA divided the planning cycle into six main stages (see Figure 1-1 below). They view the planning cycle as "*a continuous and iterative process of analysis*

and decision making designed to shape the final RBMP" (Environment Agency, 2006, p4). They intend to work in partnership with all interested parties while "*ensuring and enabling the participation and influence of stakeholders will be an integral part of the river basin planning process…We are committed to working with a wide range of stakeholders*" (p8).

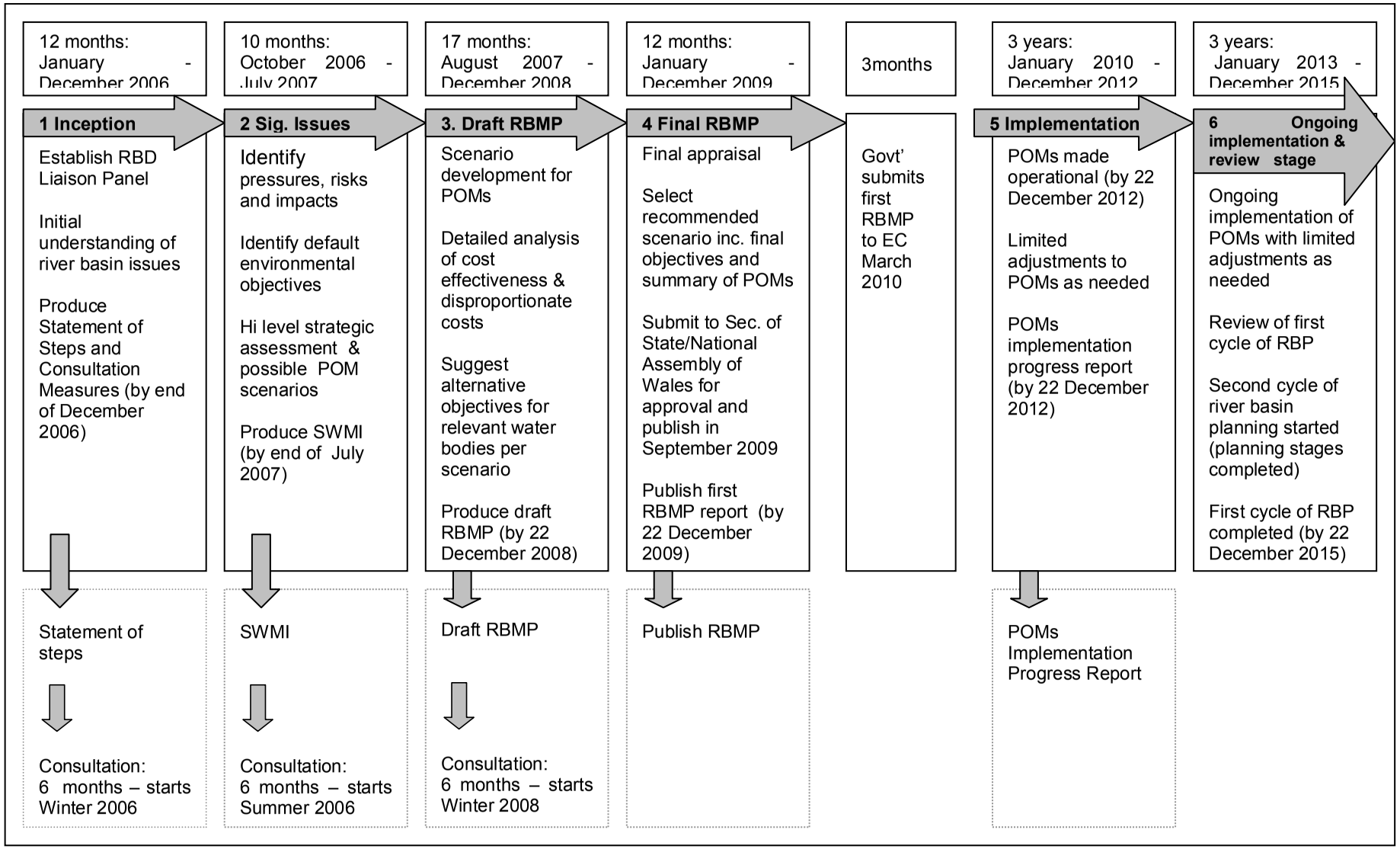


Figure 1-1: Environment Agency WFD planning cycle (adapted from Environment Agency, 2006, p4)

The EA analysis and decision making process illustrated in Figure 1-1 is co-ordinated and managed across four different scales of planning and engagement: National, RBD, Catchment and Local. The EA have opted for an approach that focuses on the RBD scale as they view this as providing "*a balance between national consistency and local flexibility while maintaining the focus of the WFD at the RBD level*" (p6). However, as some of the RBDs are large then it will be necessary, for planning purposes, to subdivide them into catchments. They envisage that this approach will also facilitate:

- Access to data required to assess costs and benefits of different measures and to analyse cost effectiveness;
- Development of opportunities for partnerships at the RBD level and stakeholder engagement in river basin planning;
- Opportunities to integrate water related planning activities over time.

In relation to the different designated scales of planning and engagement, the main activities scheduled to take place during the various stages of the (first) river basin planning cycle, provide the following opportunities for stakeholder engagement and input:

- Stages 1 & 2:

- - At the RBD scale, to produce “a work programme to inform interested parties of the RBMP process and how and when they will be involved” (p10).

  - At the National scale, national groups and bodies will be given the opportunity to contribute through the Stakeholder Group for England (and Wales if a Stakeholder Group is formed) plus sector based workshops.

- **Stages 3 & 4:**

  - At the RBD scale, interested parties will be provided with the opportunity to formally comment on the draft RBMP, during the planned six month consultation period. A revised RBMP, justifying any alternative objectives, is to be submitted for approval following the consultation.

- **Stages 5 & 6:**

  - Develop and agree a National Change Protocol (for making and managing changes to POMs) with national stakeholders.

Where necessary, the EA will contact other organisations “*to share information about the implications of the RBMP and to provide input to their planning processes”* (p12). The EA consider that their adoption (and their interpretation) of an ‘adaptive management’ approach will ensure that the planning stages outlined will effectively achieve WFD objectives.

1.1.2 Synopsis of the Ribble pilot project

An independent overview of the Ribble pilot project (SED, 2004), admits that "*it would be unrealistic and perhaps unproductive to assume that the pilot process would be perfect*". However, they reported the following weaknesses, identified by stakeholders involved during the Ribble pilot, directly associated with participation procedures used by the EA:

- Although a small group of stakeholders were involved from an early stage in the pilot, the majority did not have any contact with the EA until nearly one year after the project started - during the vision building workshops.
- Stakeholders were unsure how their inputs during the workshops would be used during the preparation of the vision statement.
- Information offered to stakeholders before the workshops did not constitute a sufficient platform for some of them to contribute meaningfully to the vision building process.
- The public, business and industry were considered to be poorly represented during the workshops, in contrast to environmental groups who were viewed as too prominent during the vision building process.
- The process was 'water centric' and did not integrate or exploit potential synergies with participation procedures carried out during the preparation of other actions that influence water quality. For example, land use plans or catchment abstraction management strategies.

Based on the findings of the Ribble pilot project, recommendations to improve practice included:

- better information provision
- using independent facilitators
- mapping and targeting a cross section of appropriate individuals and stakeholders
- inclusion of innovative techniques (rather than relying on 'traditional' information provision and consultation techniques which may exclude certain stakeholder groups)
- providing feedback to maintain support and encourage openness
- using integrated participation procedures which draw together a range of stakeholders involved during the preparation and implementation of related actions

Further comments on the EA's approach during the Ribble pilot are levied by the WWF, a supporter of their stakeholder participation efforts during the development of the vision statement. They deem that appropriate engagement with other stakeholders is central to the overall success or failure of the Environmental Agency in implementing the WFD. However, they comment that

"*The guidance prepared under the WFD Common Implementation Strategy defines active involvement as 'a higher level of participation than consultation' (EC, 2002)…there appears to be a confusion in the Environment Agency*

between consultation and stakeholder engagement…significant concerns have been raised by a range of interested parties and representative bodies over the draft strategy for River Basin Planning…published by the EA in 2005, in particular the weaknesses of the envisaged procedures for the involvement of interested parties" (Le Quesne & Green, 2005, p7).

1.1.3 Participation in water management: similarities and differences to other participatory processes

The above comments are specifically targeted at measures undertaken by the Environment Agency in relation to the Water Framework Directive. These comments echo general concerns regarding (i) the issues faced in the practical application of participatory planning procedures (e.g. Bruns, 2003; Innes and Booher, 2004; Doelle and Sinclair, 2006); and (ii) which methods are appropriate for meeting the requirements of multiple stakeholder groups (e.g. Abels, 2006; Collins and Ison, 2006).

On a different, but relevant, issue regarding UK institutions, Stagl (2006) also remarks that while the Green Book (a best practice guide for appraisal and evaluation of policies, programmes and projects, used by all central government departments and executive agencies) does not explicitly prescribe monetary valuation, it only provides in depth guidance on how this form of assessment should be conducted. Within the same publication, the sections covering alternative methods are particularly short and fail to provide guidance on the utilisation of the various methods available. He recommends that:

"*as no one appraisal and evaluation method is best suited to appraising all types of policies, programmes and projects, then a differentiated approach should be favoured. In order to develop cultures that support the search for the most suitable methods, departments need to be familiar with the different methods at hand and to provide if-then guidance to enable appraisers to choose the most appropriate method*" (p6).

Whilst attempts to assess or adopt participative planning are evident in a number of areas of natural resource management not all resource sectors seem to be actively promoting the widening of participation. For example, the nuclear power industry is viewed as taking a *"retrograde step away from participatory planning*" (www.dti.gov.uk/files/files35611.pdf). The nuclear industry is of the opinion that the public inquiry process needs to be streamlined '*as it presents an additional risk for private investors*' (Postnote, 2003, p4). Regarding public consultation on the policy framework for new nuclear build the UK Department of Trade and Industry (DTI, 2006) are of the view that "*it will be for the private sector to take decisions on proposing new power stations, based on commercial considerations*" (p3). The Campaign to Protect Rural England (CPRE, 2006) has voiced opposition to changes to the rules for public inquires, in that:

"*Any proposals to weaken the public's voice in planning decisions will only intensify concern over nuclear power…attempts to short circuit the planning*

system will lead to greater public opposition to unpopular proposals and possibly lead to legal challenges in the UK and European courts" (p3).

The Committee on Radioactive Waste Management (CoRWM, 2007) have also expressed concerns regarding a lack of open and transparent public consultation in relation to the long term policy implementation processes required for the disposal and storage of nuclear waste. In relation to generating electricity, the effective running of associated public inquiries and the procedures required the Science Policy and Research Unit (SPRU) also recommended that the UK Government should take further action "*to develop public engagement and build legitimacy for science-technology governance … in the spirit of the Aarhus Convention, environmental assessment Directives and Human Rights Act. The proposals seem to take these commitments as boundaries on the extent to which public participation can be curtailed, rather than opportunities to be enhanced"* (www.dti.gov.uk/files/file37228.pdf).

Greenpeace's (2007) recent successful legal challenge in the High Court regarding the UK Government's nuclear consultation process revealed that the process was indeed "*seriously flawed*" (p1), compelling the Government to hold a second consultation on its nuclear power plans. Results of the new consultation were due out in May 2007. The government have however stated that they wish to consult further and have extended the process until October 2007 before making any decisions (DTI, 2007). Opponents of the consultation

process however are of the view that the whole process is a pretence, with major decisions having already been made.

Appropriate engagement of stakeholders in the current energy policy and management debate is an important issue. However, nuclear energy is only one energy policy option amongst a range of available natural resource alternatives that can be used to deliver electricity, while taking into account the pressures of climate change and carbon targets. In direct contrast, there are some additional and important differences that need to be considered relating to the appropriate engagement of multiple stakeholders in water resource management, as follows:

- Water (and the natural water cycle), which is also increasingly affected by climate change, has no substitute.

- Water is a fundamental natural resource whose good stewardship is vital for the continuation and well being of the natural environment, biodiversity, human lives and livelihoods (e.g. drinking water quality; water quantity in relation to drought, or flooding of land).

- The implementation of national and European laws and regulations (such as the WFD) related to water resource management necessitates "*action and behavioural change from a wide range of individuals, companies and statutory bodies…a fundamental difference to many other sectors, where*

'interested parties' or 'stakeholders' are essentially consumers of government supplied services" (Le Quesne & Green, 2005, p11).

The emerging international consensus regarding best practice in the management of freshwater endeavour to fully address these issues, by focusing on the key aspects of integrated management of water bodies and the active involvement of interested parties (Global Water Partnership, 2004). While present management concerns in relation to water as a resource therefore are similar in some ways to other resource sectors there are some important differences (as outlined in this section) that need to be taken into account. Furthermore the examples used above help demonstrate the variation possible between different forms of resource management regarding their interpretation of and practical approaches towards achieving official participative planning requirements.

The effective design and implementation of water resource management plans under these circumstances are dependent on attaining general agreement and improved understanding between a multitude of concerned or affected parties. Nevertheless, whilst wider stakeholder participation has been formally identified as being both desirable and beneficial in the process of water management, there is limited recognition of what the parties involved view as just or fair (Syme *et al.* 1999). Bruns (2003) comments that:

"*Ambiguity, confusion and large gaps between policy and practice are prevalent. There are often major questions about the extent to which institutional reforms actually change the power of individuals, groups, and communities to influence decisions that affect their lives and livelihoods*" (Bruns, 2003, p1).

Viewed from this perspective, the successful strategic management of water resources is not dependent on cost or engineering performance attributes alone. It is also reliant on identifying, understanding and adequately addressing the social and cultural environments to which it is applied, rather than merely trying to anticipate the likely responses of different stakeholder groups. Frequent assumptions are made by the proponents of participatory planning of what the process should entail; Doelle and Sinclair (2006) particularly comment on this aspect in relation to inclusion of members of the public in participatory planning:

"*The assumption is that if a process is put in place it will be properly facilitated and the public will participate actively, resulting in better decisions. Such processes assume that if an opportunity is provided in appropriate circumstances at crucial decision-making points of the process, the public will be ready, willing and able to step up and make constructive and convincing contributions, and that those contributions will be incorporated into project design and decision-making…These unrealistic assumptions have led to public participation mechanisms that actually have the effect of discouraging*

participation, encouraging conflict, and fostering distrust among the participants" (p 186 -187).

It could also be argued that the expectations of different stakeholder groups, both in the domain of the general public and those who participate in a professional capacity are unclear. This appears to be particularly relevant in relation to participatory planning and wider involvement within water resource management. There is a need for processes that allow different actors to be informed by and learn from each other, as highlighted by Innes and Booher (2004):

"*One-way processes from the agency to the community, designed to say 'we are doing a great job' rather than actual participation…many agencies list such techniques as participation. While education of the public is essential it is not participation if it does not include education of the agency*" (p426).

Widening participation and actively pursuing the engagement of different actors brings with it the problems of how to address the variance in and variety of experiences, expertise and expectations within and between different stakeholder sectors. Extending stakeholder engagement is therefore not only about inclusion of previously excluded parties. Developing, planning and managing the process also needs to provide for and address the various parties' level of understanding and agreement with: (i) the nature of their own

engagement in the process, (ii) other stakeholders; (iii) the measures required to adequately address the environmental issue to hand.

1.2 Motivation for research work

Enabling different actors to be included and engaged in addressing environmental matters have been defined and guided over recent years by bringing the research areas of natural resource management and social psychology together (Routhe *et al.*, 2005). In parallel therefore to the increasing efforts to broaden stakeholder engagement and involvement in natural resource management, there has been an increasing awareness of the need for, and ongoing research of, methods and tools to improve and facilitate the objectives of wider inclusion.

Alternative participatory approaches to the 'traditional' information provision and consultation techniques, such as the utilisation of social learning, occupy research attention in this field. Schusler *et al.* (2003) defines social learning as "*learning that occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action*" (p311). This definition recognises the basic requirements that enable collective engagement and development to promote collaborative co-management in a social learning setting.

Several authors have attempted to develop social learning theories within the environmental field, as identified by Blackmore (2007). This is due to many

natural resource situations, including water catchments, inherently containing numerous and diverse characteristics which pose a challenge to the existing approaches to policy making. SLIM (2004) suggest that:

"*new ways to think about the nature of environmental issues require commensurate inquiries about the meaning, not just the means, of participation in policy-making processes…in natural resource management contexts…the issues under consideration are characterised by complexity, uncertainty and multiple stakeholding (SLIM, 2004).*

Collins and Ison (2006) put social learning forward as a new policy paradigm, to compliment, rather than replace, other policy options for managing water (SLIM, 2004) when preferred outcomes are not clearly defined and cannot be based on fixed forms of knowledge. They suggest that social learning requires a process that will accommodate and allow outcomes to 'evolve' out of joint participation. Furthermore, they propose that:

"*the roles, responsibilities and purposes of those involved have to be re-conceptualised, not along the lines of participation mediated in terms of power as suggested by Arnstein, but as a process of social learning about the nature of the issue itself and how it might be progressed*" (Collins & Ison, 2006, p2).

Another issue, highly relevant to stakeholder involvement, is highlighted by Abels (2006). He comments how despite the identification of "*four principal*

groups of participants: *lay people, interest groups, scientific experts and policy makers …most models include only two social groups: experts and lay-persons, experts and interest groups*" (p 2). This suggests that not all known and relevant stakeholder groups are adequately included in the models currently used – an issue that needs to be specifically addressed.

Relevant to the two issues above, Bosch *et al.* (2003) (reviewed in Section 2.6) describe the problems that can arise if different project partners function within separate cycles to try and attain the same objective. They emphasise how the integration and management of learning and knowledge transfer within a collaborative learning framework can aid further understanding between different groups engaged within the same project.

The adoption and legitimacy of broader stakeholder engagement using collaborative methods in water management, and the recognition of social learning in particular, as "*a purposeful policy option*" (SLIM, 2004, p6), will remain contested until there is further evidence to support adoption. There is need for more systematic research to show how, when and why collaborative methods may succeed or fail (Booher & Innes, 2004).

1.3 Problem Statement

As shown in the previous sections, choosing and implementing appropriate participative planning processes to ensure that stakeholders are appropriately and adequately engaged is not a straightforward procedure (see also Section

2.3). Indeed the implementation of participatory processes in water resource management in particular has been subject to varying levels of success. This is a cause for concern among its practitioners, researchers and potential adopters. How 'success' is measured in this context is also subject to debate (see Section 2.4.2).

In both general and specific terms relating to water resource management there is need for:

(i) further exploration and description of how and when stakeholders want to be engaged

(ii) further understanding of how factors related to the structure and content of a participatory process may affect different actors attitudes

(iii) further exploration of factors that may affect or influence joint decision making.

The exploratory research activity reported within this thesis is based on the following argument:

Improved processes of social learning could directly enhance the effectiveness of participative planning within water resource management.

1.4 Research contributions

The research explores how different the following four stakeholder group types are with regard to social learning and the participation process: regulatory bodies, water managers, water management researchers and the lay public. The research findings offer some further understanding of the mechanics of inferring optimal ways of designing and managing a participatory process, by means of obtaining and utilising information on different stakeholders' expectations of that same process.

Central to this thesis is a Conceptual Model, developed (in Chapter 4) to illustrate the relationship between the constituencies of the four key stakeholder groups studied within this thesis. The model addresses how the process of collaborative interaction between the four stakeholder groups may lead to the furthering of social learning and promote understanding and knowledge transfer between the groups. In turn this could increase the relevance of the process in relation to their individual constituencies and the water resource management decisions made.

This model is based on the work of Bosch *et al.*(2003) who suggest a collaborative learning framework incorporating the dual working cycles of researchers and managers into a single knowledge base (see Section 2.7). The framework has been expanded for the purposes of this thesis. It incorporates the individual 'cycles' of two further stakeholder group types which are relevant to water resource management; those of regulatory bodies and the lay public.

Collaborative learning is depicted as an essential factor which underpins and promotes the integration of different knowledge sets. By this means, it enhances understanding between stakeholder groups of substantive details that are, or need to be, addressed.

This thesis will demonstrate a contribution to existing research by identification and characterisation of the variation within and between the attitudes of four categories of stakeholder, as depicted in the conceptual model. Key components that may influence the stakeholders' effective engagement in inclusive participatory processes, in relation to water resource management, are identified in Chapter 2 and Chapter 3. They are used to pose a set of research questions (Section 4.3) focused on the extent of variation within and between the stakeholder group attitudes to:

- Preferred structures of participatory planning processes
- Preferences for different water policy mechanisms
- Anticipated risks and benefits of water management projects
- Information and knowledge sources

A questionnaire survey was used to elicit the information required to inform the research questions. So as to provide a context for respondents to express an opinion on, some of the questions in the survey elicited their viewpoints regarding specific water management options (for example, see Appendix 1, Questions 7 & 8).

Analysis of the answers elicited from four stakeholder respondent groups (as depicted in the conceptual model), were used to assess the extent of attitude variation within and between the four groups. Analysis of their responses further informed two additional research questions, posed in relation to the four stakeholder groups represented within the conceptual model:

- How robust is the concept of a 'stakeholder group' in terms of it having a distinct set of opinions and attitudes?

- Can an understanding of the variation in stakeholder group opinions be used to better structure the process and content of participative planning based on the social learning model?

Assessment of the data provided by the survey helps describe common ground and interests shared by these different actors, alongside areas where their differing expectations, concerns and definitions of process and outcome regarding water resource management could lead to conflict. This is not to say that conflict is unhealthy, as it is likely to bring to the surface issues that need to be raised and discussed. Rather, that having a tangible grasp of the dissenting issues that may arise can guide the structure and content of the participative planning process, to help facilitate participation of all actors, and promote social learning between the different stakeholder constituencies.

Different actors may have different outlooks and different drivers that motivate their reasons for inclusion into a stakeholder framework. However, the assumption that a preferred outcome might not be common (and mutually beneficial) to all may be incorrect. This is not to say that every project will have the same issues of concern that need to be addressed. Each water management project is likely to have its own set of issues to resolve. Nevertheless, the research does describe and illustrate an approach that could aid better communication, knowledge transfer and understanding between stakeholder groups engaged in water resource management projects based on participative planning.

The research was conducted in the context of water resource management. However, the research findings could also be of interest to agencies or researchers in other areas of natural resource management who: (i) are interested in widening participation, developing, or implementing partnership based planning processes; (ii) require co-ordination and co-operation among its stakeholders to collectively structure (Mendoza & Martins, 2006) and solve (Janssen *et al.*, 2005) a resource management problem.

1.5 Structure of the thesis

The structure of the thesis and the relationship between the chapters is depicted in Figure 1-2. The contents of successive chapters are abridged below:

Chapter 2 presents a comprehensive review of existing knowledge on the role and challenges of stakeholder engagement and participative planning. Current literature on participatory planning in relation to water resource management is looked at from several aspects including: the institutional and social drivers behind the desire to change from traditional exclusive processes to more inclusive processes; the various forms of public inclusion; the challenges and benefits of stakeholder engagement; the history and evolution of social learning, and the role of social learning models in participatory events; how relevant management issues can be influenced by the different participants' construing of the situation. Appropriate structuring is identified within this chapter as a key component of participative planning.

Chapter 3 addresses specific factors that are likely to be key components of deliberation between stakeholders engaged within a participative planning process in the water sector. Namely: water policy mechanisms; real and perceived risks and benefits of water resource management; and finally information and knowledge sharing, as information provision mediates the participatory process.

The key issues and knowledge gaps that emerge from Chapter 2 and Chapter 3 are assimilated in **Chapter 4.** This chapter introduces and explains the conceptual model developed to illustrate and explore the individual 'constituency processes' of four broad stakeholder groups (research, management, regulatory and lay public). This is followed by the generation and

introduction of research questions that support the study of variation of attitudes and opinions within and between the four stakeholder groups. The research questions relate to key components of deliberation, as identified in Chapter 2 and Chapter 3, and are intended to further inform the conceptual model. Finally, there is a review of elicitation methods. Justification is given for the choice of a questionnaire survey as the elicitation method to explore the research questions posed.

Chapter 5 covers two interrelated aspects of the fieldwork design. The first part of the chapter reports the process of designing, administering, collecting and coding the questionnaire survey. The second part is a review of the analytical methods available, and justification for the tests chosen to analyse the survey data.

In **Chapter 6** results of the questionnaire survey are presented. Analysis of the survey results demonstrate the variation within and between stakeholder group attitudes, in relation to the four research question themes investigated via the questionnaire survey.

The findings of the research activity described in the previous chapter are discussed in **Chapter 7**. This chapter includes an assessment of how the survey findings inform or support the current literature on stakeholder engagement and participatory planning in relation to water resource management. Evaluations of the variance within and between the respondent

groups' attitudes are used to further contribute to the conceptual model described in Chapter 4.

Finally, the conclusions of the study and ensuing reflections are presented in **Chapter 8.** The contribution of the thesis to further understanding of the factors that can influence stakeholder engagement in the planning and implementation of water resource management projects is examined. This is carried out by initially responding to the research findings and knowledge gained in direct relation to the research questions that guided the research activity. This is followed by a reflective appraisal of both the research activity itself and the conceptual model developed during the course of the thesis. Final conclusions comment on: (i) implications of the research, regarding planning and management of stakeholder engagement in participatory water resource management events; (ii) additional matters identified by the research activity that further our understanding of issues involved in participatory planning within water resource management (iii) other areas of participatory planning and management where this approach may be applied; (iv) areas of future research.

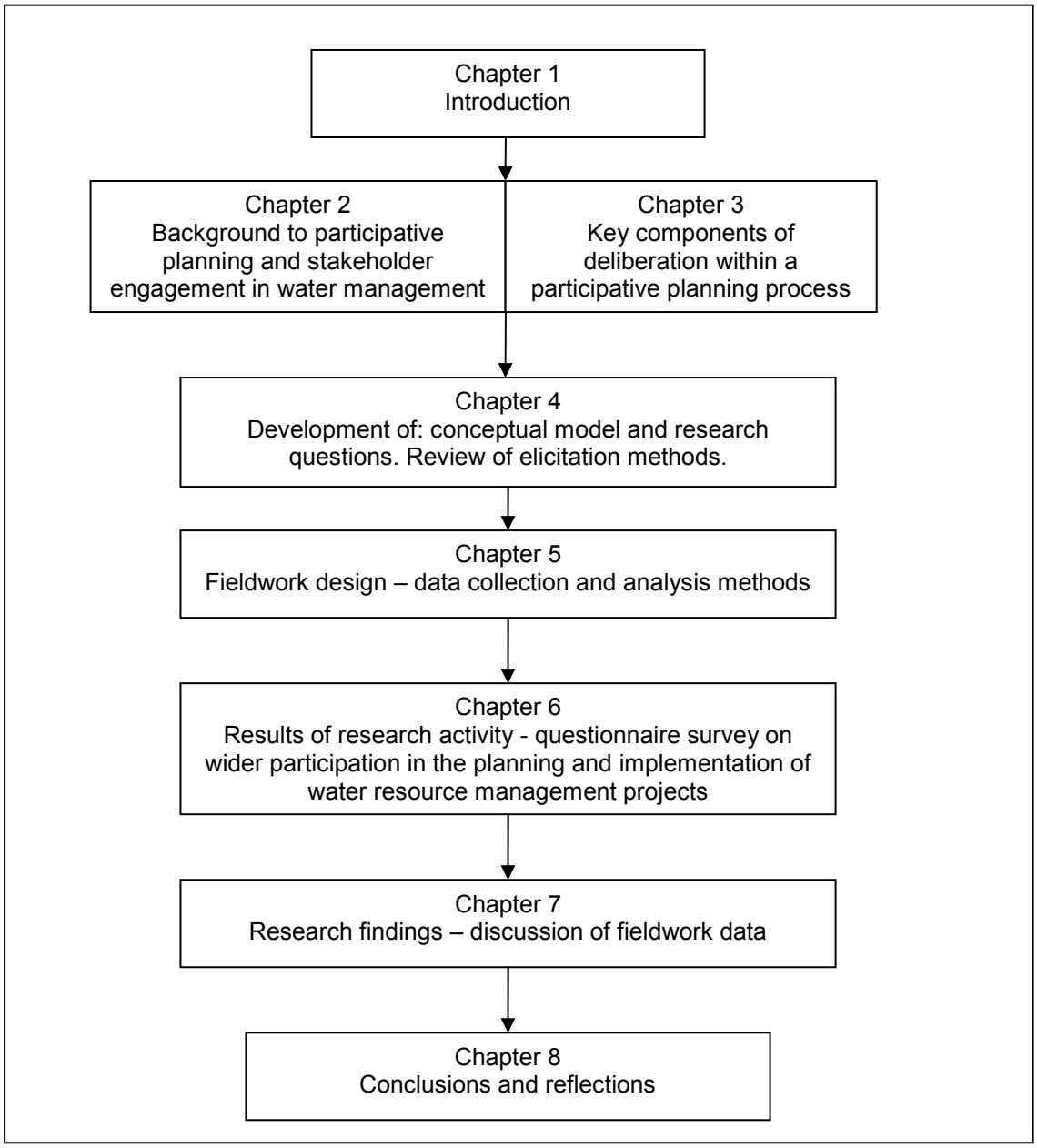


Figure 1-2. Thesis structure

The next chapter reviews the application and adoption of participatory planning and stakeholder engagement. The chapter comprises of several sections which review: why participatory planning processes are now viewed as desirable; how they may be conducted and managed; the challenges and benefits of stakeholder engagement; the history and evolution of social learning and its

application in water resource management. Finally Bosch *et al*.'s (2003) collaborative model is described and discussed. The model plays a significant role in the design and development of the conceptual model used within this thesis, introduced and explained in Chapter 4 (Section 4.2).

Chapter 2 : Background to participative planning and stakeholder engagement in water resource management

2.1 Introduction

This chapter presents a comprehensive review of existing knowledge on the role and challenges of stakeholder engagement and participative planning in general. It also provides information in relation to the application and adoption of social learning and stakeholder collaboration in water resource management. The chapter is divided into the following sections, with conclusions relevant to the thesis drawn at the end of each section. The chapter is structured as follows:

Section 2.2 provides a brief introduction on the history of participatory planning. The section then goes on to explore the ideal for contemporary governance (in the UK); different interpretations of widening participation; definitions of and distinctions between community, public and stakeholder; the concept of stakeholders in relation to water resource management; stakeholder viewpoints regarding widening participation.

Section 2.3 reviews the spectrum of inclusion in participatory planning and consists of three parts (i) how theory and practice in relation to participatory planning have evolved; (ii) reviews the range and application of participatory tools or techniques available to support participatory planning objectives; (iii) provides case studies to illustrate the effect of widening participation.

Section 2.4 assesses the challenges and benefits of stakeholder engagement. The first part of this section provides a general overview of ideas on the current management of participatory planning in relation to stakeholder engagement. This overview is then followed by an assessment of existing views on specific issues that can influence the quality of stakeholder engagement.

Section 2.5 pays particular attention to the history and evolution of social learning theories, with particular focus on the work of Albert Bandura within this field of research.

This is followed by Section 2.6 which reviews the role and utilisation of social learning models: (i) in participatory planning for water resource management; (ii) in relation to other more traditional policy mechanisms.

Section 2.7 reviews a model of collaboration (Bosch *et al.* 2003). This model illustrates how a collaborative framework that supports collaborative learning between different actors, via an integrated knowledge base, can improve information or knowledge management and production, and influence joint outcomes. (Relevant conclusions for Section 2.6 and Section 2.7 are drawn together at the end of this section).

Finally, Section 2.8 summarises the findings of the literature reviewed within the chapter and how they helped to inform and guide the research questions that underpin the thesis.

The body of work informing current theory and practice on participatory planning, both in general and on specific subjects, is extensive and encompasses a wide range of academic fields. These academic fields include: the natural sciences (e.g. Tippett *et al.*, 2005); social science (e.g. Cash *et al.*, 2002), computer science (e.g. Conte & Paolucci, 2001); philosophy (e.g. Bromley, 2004); social psychology (e.g. Routhe *et al.*, 2005); risk management (e.g. Beierle, 2002); planning (e.g. Innes & Booher, 2004); and policy studies (e.g. Mostert, 2003). Given the nature of the subject and the broad interest it has generated, it is inevitable that certain opinions transcend academic boundaries. The author also acknowledges and appreciates the extensive body of literature available on knowledge management and organisational learning. Some of the literature available in these two fields were utilised, however their use was justifiably limited to maintain the primary focus of the thesis.

2.2 The history of and rationale behind widening participative planning

The first part of this section initially provides a brief history regarding the general motivation and justification for widening participation followed by a review of the subsequent related topics:

- The ideal for contemporary governance

- Different interpretations of widening participation and how they relate to water resource management
- Definitions of and distinctions between community, public and stakeholder
- The concept of stakeholders in relation to water resource management
- Stakeholder views regarding widening participation in environmental decision making

2.2.1 General motivation and justification for widening participation

Since the end of World War II, societal dilemmas and human needs have typically been addressed by the formation of procedures to identify the issues involved, followed by a programme intended to deal with them by means of private and public support (Nicholls, 2002). Post war programme evaluators however observed that in many cases the programmes put in place were ineffectual (Martinson, 1974). The widespread failure of these early projects, often designed to aid developing countries, or address widespread public opposition to major technical projects, provided the motivation for further research and development of participatory methods.

Public interest and involvement in natural resource management and environmental issues dramatically increased from the 1970s onwards. These changes were fuelled by (i) popular environmental books; for example, Silent Spring (Carson, 1962) and (ii) growing concerns regarding adequate transfer of risk communication from official bodies to the public; for example, the nuclear power plant incident at Three Mile Island (Kaperson, 1986). This further

prompted researchers and practitioners to call for systematic methods to evaluate when and why different approaches to widening involvement were effective (Chase *et al.*, 2004).

Movement towards "*new participation models*" (Innes & Booher, 2004, p426) was in response to citizens anger (Susskind & Field, 1996), stalemates over issues (Susskind & Cruikshank, 1987) or due to negative reactions towards organisational or political leaders' proposals (Bryson & Crosby, 1992; Chrislip & Larson, 1994). The 'participatory revolution', observed by political sociologists since the 1960s, was furthered by the increasing demand for 'more', 'better' or 'enhanced' citizen participation, guiding new ways of political participation (Abels, 2006).

A more balanced mix of approaches was suggested as the way forward, where the interests of all relevant parties (public agencies, private organisations and citizens) were explored and treated equitably (Innes & Booher, 2004). Ensuring adequate involvement of all participants was seen to provide a basis for transparent, sensitive and sound decision making. Indeed, the major development funding bodies nowadays strongly prescribe stakeholder engagement as an integral part of the development process, providing guidance on appropriate methods (see, for example, World Bank, 2006; Matthews *et al.*, 2003).

These developments reflect another important shift in ideas; public participation has been increasingly viewed as an emerging governance paradigm in democratic societies, based on political equality, legitimacy, accountability of government and social responsibility among citizens (Hirschman, 1982; Renn *et al.*, 1995). In addition to these normative rationales it is also argued that public participation can provide the following substantive and instrumental functions (Fiorino, 1990):

- Provision of crucial community-based knowledge, information and insight which is often absent in expert-driven processes
- Enhanced efficiency of administrative decision-making
- Aiding conflict resolution
- Creation of support for and acceptability of organizational actions
- Facilitation of decision implementation
- May lead to more judicious and legitimate decisions regarding risk involved

Running parallel to the shift towards more inclusive governance has been the promotion and adoption of working partnerships between agencies (Connelly & Richardson, 2003). These 'dual' ideological shifts have increasingly converged, giving rise to a new mode of partnership – where stakeholders from different societal and organisational backgrounds are (ideally) expected to form a new, cohesive form of governance (Department of the Environment Transport and the Regions, 2001). The shift towards participative planning as an intrinsic and necessary part of the management of natural resources, has been formally

realised and actively encouraged in more recent legislative documents (see also Section 1.1). It is not by chance therefore that participation is one of the five principles of the European Union White Paper on European Governance (CEC, 2000).

2.2.2 The ideal of contemporary governance

The ideal form of contemporary governance is viewed as one where joint decisions are made together by state and citizen rather than the more traditional model of public exclusion from decision making (Connelly & Richardson, 2004; Le Quense & Green, 2005). Movement towards this style of governance in modern-day Britain is typified by the

"*drive for decentralisation and the meaningful partnership of communities and the private sector in decision-making and government service delivery are predominant themes across all sectors of contemporary government in the UK, most notably in some of the key focal areas for government delivery. It is increasingly recognised across government that such approaches offer significantly improved delivery over more traditional approaches*" (Le Quesne & Green, 2005, p9).

A broad based example of this new approach to UK governance is demonstrated by the *Together We Can*, a co-ordinated strategy, launched in June 2005 by 12 government departments, including DEFRA (HM Government, 2005). This suggests that a particular form of participation – stakeholder

involvement processes – should be used to provide a basis for and function as a type of 'social peer review' where legitimate and socially acceptable decisions can be made (Yosie & Herbst, 1998).

2.2.3 Different interpretations of widening participation and how they relate to water resource management

Despite official promotion of widening participation different interpretations exist regarding what actually constitutes participation. In many cases the theoretical ideals of widening participation do not translate well into practice. Many terms are used interchangeably in relation to and as reference towards public involvement, but these terms can have very different meanings (Robinson & Bond, 2003). Terms such as 'participation', 'involvement' and 'engagement' are often used synonymously to indicate processes where individuals and groups are given some form of opportunity to communicate, interact and share in decision making, to a greater or lesser degree (MIT.edu). To try and clarify the differences between the terms used Canter (1996) suggests that 'participation' is a degree of citizen power, whereas 'consultation' and 'information provision' are merely token gestures.

In the UK, participation has become an integral part of public policy development, yet the level of effectiveness is somewhat variable, with participatory processes typically falling into the "*middle ground of informing and consulting rather than real engagement in decision-making*" (Walker, 2003, p515). The difference between 'consultation', 'active involvement' and

'partnership' is often misunderstood, suggesting that appropriate and adequate engagement of 'interested parties' or 'stakeholders' are liable to a high degree of variability (Harris, 2002; Le Quesne & Green, 2005). Further distinction between 'consultation', 'active involvement' and 'partnership is attempted by Le Quesne & Green (2005):

"*Consultation consists of the familiar process whereby stakeholders are invited to comment on decisions proposed by statutory bodies. Active involvement, on the other hand, is a far more extended process of joint decision making, and comprises the inclusion of some or all interested parties in the design, decision making and delivery processes for implementation…The concept of partnership …emphasises that active involvement will…demand both joint decision making and co-ordinated delivery*" (p11).

Abel (2006) comments "*while different schools of democratic theorists agree that some citizen participation is required, there is strong disagreement about how much and what kind*" (p4). Certainly, what actually is meant by wider participation and how it should be approached has been further confused – by some government sponsored efforts viewing the process as a means of empowering people and improving democracy, while others have viewed the process as a means of marketing government policy when decisions have already been made (Mostert, 2003). Creighton (2005) suggests that when there is only one issue that needs to be resolved, such as costing or health risks for instance, then it may be perfectly valid for technical experts to decide on a

course of action. On the other hand, once a choice needs to be made between two or more values:

> *"the issue is no longer simply technical, it is a decision about what is more important, jobs or clean water, individual freedom or environmental protection, human health concerns or the needs of other species. These decisions by their very nature, are value choices…Even though expertise and scientific study are badly needed for good decision making, ultimately there is nothing about expertise that provides the basis for making fundamental value choices" (Creighton, 2005, p271).*

Certainly, collaborative participation is not required in every situation when decisions need to be made (Innes and Booher, 2004). However, in relation to widening participation in water resource management the following points are particularly relevant and should be considered:

- The possibility of multiple stakeholder groups is high (see also Section 1.1.3).
- There is the likelihood that multiple stakeholders may hold different sets of values and different expectations regarding decision making.
- There is a need to face questions surrounding the extent to which institutional reforms, in relation to water resource management, actually provide for appropriate distribution of power and influence in decision making within and between different actors (Bruns, 2003).

2.2.4 Definitions of and distinctions between community, public and stakeholder

Defining stakeholder groups can be problematic. Distinctions made between the terms public, community and stakeholder within the available literature on participatory processes, are inconsistent and tend to overlap, which can confuse rather than clarify understanding (MIT.edu). In general these terms can be defined as meaning:

The Public

There is general agreement that use of the term 'the public' does not refer to a single body of people. Rather it refers to a collection of different publics, both amateur and professional, who may or may not be organised, aware of, or attentive regarding specific issues (Peele, 1995).

Communities

Communities have been defined as groups of people associated by their common interest, situation or proximity in relation to issues that may affect their welfare (CDC/ATSDR, 1997). However, the character of a particular community is likely to be dependant on the issue or situation to hand, or the nature of their common interest.

Stakeholders

In practical terms a stakeholder group often (but not necessarily always) represent members of an organised and attentive public (MIT.edu). Regarding

the question of who is a stakeholder however, the general trend in the literature on stakeholder involvement in environmental issues "*seems to be inclusive in nature, trying to accept a large number of individuals and organisations as stakeholders*" (Elias *et al.*, 2004, p89). The classic definition of stakeholder, described by Freeman (1984) as "*any group or individual who can affect or is affected by the achievement of the firm's objectives*" is therefore supported by this trend. Mitchell (2001) however, extends this definition by also including those that have legal responsibility and authority relative to a decision. According to Jackson (2001) it is equally important to recognise that stakeholders are by their own definition those who believe themselves to have a stake or interest, rather than simply being defined by an agency. She found that the most successful public involvement processes carried out (in British Columbia, Canada) were those that identified and invited all potential stakeholders and allowed them to self select. In relation to a particular set of circumstances not all of the public are stakeholders, conversely nor are stakeholders limited to the public; stakeholder involvement therefore is more comprehensive and targeted than public participation (English *et al.*, 1993).

2.2.5 The concept of stakeholders in relation to water resource management

The requirements of water resource management practices so as to fulfil official directives, such as the Water Framework Directive (as discussed in Section 1.1) are however markedly different to many other sectors. They require co-ordinated action and behavioural change from a wide range of individuals,

companies and statutory bodies. In this context, the concept of ‘stakeholders’ and ‘interested parties’ in relation to water resource management can take on a variety of different meanings, sometimes distinct from their use in other sectors as in this instance:

“*Interested parties are not just members of the public who choose to be concerned about WFD delivery or who have preferences about EA actions. Interested parties and stakeholders also include a range of groups who will be required to take action to achieve WFD objectives. This difference can be the cause of considerable misunderstanding. ‘Stakeholder engagement’ and ‘public participation’ can be misconceived purely in terms of engagement with not only the general public but also a series of different groups with important roles to play*” (Le Quesne & Green, 2005, p11).

Quesne and Green (2005) have attempted to define the different categories of stakeholder or interested party (in relation to the WFD).as follows:

- Other statutory bodies, (in addition to the EA) who need to take action; e.g. local, regional and national planning authorities, OFWAT, English Nature
- Water companies
- Farmers, landowners and land managers
- Businesses who either utilise fresh water, or depend on freshwater environmental services
- Community and environmental groups

- Water bill payers
- Members of the different publics

Abels (2006) simplifies the process of identifying who should participate in science and technology policy making by naming the following as the four principle groups of participants: lay people, interest groups, scientific experts and policy makers.

It is evident from the literature available that stakeholder engagement in water resource management calls for:

- Identification and acknowledgement of all appropriate stakeholders and interested parties
- Adequate attention to the various roles of stakeholders and interested parties
- Appropriate engagement of stakeholders and interested parties in identifying, planning, implementing and delivering water resource management objectives.

2.2.6 Stakeholder views regarding widening participation in environmental decision making

Public demand for stakeholder inclusion in government decision-making has gradually increased, in tandem with the societal breakdown of trust and confidence in traditional hierarchies (Kasperson, 1994; Berman, 1997; Walker,

2003). Certainly, Walker (2004) has observed that Scottish stakeholders increasingly expect their active involvement in decision making. She suggests that this phenomenon is linked to a sense of increased contact with the development of policies since devolution.

On the other hand, when civil society is excluded from governance processes and kept at the peripheries of environmental decision-making it has become increasingly evident that the following problems are both foreseeable and likely (Green, 2005):

- Protests outside meeting venues (e.g. G-8 summit; World Trade Organization)
- Continued exclusion can result in undermining institutional credibility and legitimacy
- "*Unity of purpose may be an unintended consequence of exclusion"* (p71).

Civil society actors who want to be engaged in the process but denied access will therefore find other decentralised routes, such as coalitions or campaigns, to make certain their voices are heard and acted upon. Green stresses the increasing will of some members of civil society to be actively involved in issues regarding environmental polices and that civil society has already taken its own steps towards achieving that goal by formulating:

"*its own agenda for social change, independent of government sanctioned discussions, such as the World Social Forum…(and) in a number of forms of 'hybrid governance' such as the Type II partnerships which came out of the World Summit on Sustainable Development*" (p71-72).

However, it should also be recognised that not all members of civil society may want to be directly involved or engaged. Different mechanisms may therefore be required for:

- Concerned and/or affected members of civil society who want to participate.
- Members of civil society who are affected but appear unwilling, or are unable, to participate.

The question posed is not whether citizens should be engaged in environmental planning, but how? There seems to be an urgent need to adopt approaches where policy makers and civil society can decide on mutually agreeable and beneficial processes of decision making.

2.2.7 Conclusions

To summarise, the discussion within this section has centred on how the promotion of inclusive decision making processes has been generated both by public assertion and official recognition of the necessity for such a change. However, there are problems associated with the interpretation of what actually constitutes a desirable participatory process which includes both official and

public perspectives. There is a recognisable need to further understand what the different professional and public constituencies view as a just and fair process. Furthermore, water resource management requires co-ordinated action and behavioural change from a wide range of individuals, companies and statutory bodies, necessitating the appropriate choice of methods for stakeholder engagement.

2.3 The spectrum of inclusion in participatory planning

This section is in three parts. The first part examines the aetiology of participatory planning and how theory and practice have evolved. The second part then reviews the range and application of participatory tools or techniques that can be used to support wider participation. The third and final part illustrates the effect of widening participation using case studies. Conclusions at the end of the section comment on how issues that have been addressed within the three parts of the section may affect participation and levels of inclusion.

2.3.1 Objectives of participatory planning at different levels of inclusion

Arnstein's (1969) ladder of citizen participation is often cited as one of the early characterisations of varying forms of public engagement and admission to decision making. The ladder reflects the different power levels that may be achieved by citizens in relation to institutional or organisational power holders;

from lack of inclusion (levels one and two) to increasing degrees of empowerment (levels six, seven and eight) (see Table 2-1).

Level 1	Manipulation	Assumes a passive audience, which is given information that may be partial or constructed.
Level 2	Education	
Level 3	Information	Tells people what is going to happen, is happening, or has happened.
Level 4	Consultation	People are given a voice, but no power to ensure their views are heeded.
Level 5	Involvement	People's views have some influence, but institutional power holders still make the decisions.
Level 6	Partnership	People negotiate with institutional power holders over agreed roles, responsibilities and levels of control.
Level 7	Delegated power	Some power is delegated.
Level 8	Citizen control	Full delegation of all decision-making and actions.

Table 2-1: Arnstein's ladder of citizen participation (Source: Arnstein, 1969)

As testimony to the impact of Arnstein's paper, nearly forty years later it is referred to, and in some cases, still used as a participatory benchmark. However, since its publication, the numbers of instances where the public are included alongside other stakeholders in the management of natural resources have significantly increased. Processes which support public involvement are moving away from the traditional public meeting format to more inclusive, collaborative processes. Changes in terminology to 'stakeholder involvement', reflect a deeper, more personalised stake in decision making, rather than the connotation of more impersonal involvement evoked by the term 'public participation' (Beierle, 2002).

While still referred to both academically and in practical terms, the limitations of Arnstein's ladder as a tool for characterising participation is subject to increasing critical evaluation. These critical evaluations cover a range of ideas

regarding Arnstein's 'ladder', from structural modifications and extensions (for example Ross *et al.*, 2002; IAP2, 2000; Bruns, 2003) to rejection or abandonment of the ladder metaphor (Tritter & McCallum, 2006; Collins & Ison, 2006).

Ross *et al.* (2002) argue that Arnstein's ladder is inadequate, as it only reflects the distribution of power. In addition to the characteristics and extent of tasks required to plan, manage and initiate required activities, they suggest that participatory processes are also affected by participants' characteristics, namely: number, selection, organisation, history, and their tenure rights to the resource in question. The typology they propose ranges from governmental decisions with no external participation, right through to private decision making with no governmental involvement.

The International Association for Public Participation (2002), however recognise that the "spectrum of public impact", or level of public involvement, in the decision making process is also related to other stakeholder groups that are concerned about or engaged in the decision process (Table 2-2). A deliberate horizontal arrangement of the options within the formulation of the IAP2 table, suggests there are a range of options rather than a hierarchy. The spectrum not only deals with specific communities or local citizens, but also addresses (Bruns, 2003):

- The inclusion of two way interaction with stakeholders at the consultation, involvement and collaboration levels, having different levels of engagement and influence on the process
- Partnership, delegated authority and other forms of devolution as different forms of empowerment, where the government does not have unilateral authority to make final decisions.

	Inform	**Consult**	**Involve**	**Collaborate**	**Empower**
Objective:	Provide public with balanced objective information to assist them in understanding the problem, alternatives and/or solutions	To obtain public feedback on analysis , alternatives and/or decisions	Work directly with public throughout process to ensure public issues and concerns are consistently understood and considered	To partner with public in each aspect of decision including development of alternatives and identification of preferred solution	To place final decision making in hands of the public
Promise to the public:	We will keep you informed	We will keep you informed, listen to and acknowledge concerns, provide feedback on how public input influenced decision	We will work with you to ensure your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced decision	We will look to you for direct advice and innovation in formulating solutions, incorporating your advice and recommendations into decisions to maximum extent possible	We will implement what you decide
Example tools:	Fact sheets Websites Open houses	Public comment Focus groups Surveys Public meetings	Workshops Deliberative polling	Citizen Advisory committees Consensus building Participatory decision making	Citizen juries Ballots Delegated decisions

Table 2-2: The IAP2 public participation spectrum (Source: www.iap2.org).

An alternative and extended version of the ladder of participation by Bruns (2003) based on Arnstein (1969), Potapchuk (1991), Berkes (1994), Pomeroy *et al.* (2001) and IAP2 (2000) further differentiates levels of empowerment or devolution (Table 2-3). This adapted scale not only covers engagement of the public in governmental decisions, or arrangements where power is distributed, but also situations where the power is shifted more towards local organisations and citizens making the decisions. Bruns' scale therefore addresses two key questions – (I) who decides and (ii) who has input into the decision. He views the scale as both a descriptive and analytical tool where…"*different levels can be framed as descriptive categories, to help analyse different forms of participation that may be appropriate under various circumstances*" (p11).

Level of public participation	Function
Enable	Framework providing status and recourse for organisations and individuals. Accountability .
Advise	Provision of information, guidance or other technical assistance as input to decisions or guidance for voluntary compliance
Establish Autonomy	Autonomous decisions by communities, organisations or individuals, subject to compliance with specific laws and regulations
Delegate Authority	Decisions by a group or organisation with specific authorisation
Partner	Joint decisions by mutual agreement
Collaborate	Stakeholder representatives at the table, acting as team members
Involve	Interactive discussion and dialogue
Consult	Two way communications
Inform	One way information dissemination

Table 2-3 An extended ladder of participation (Source: Bruns, 2003, p14)

On the other hand, Tritter and McCullum (2006) criticise the 'ladder' for failing to

"*capture the dynamic and evolutionary nature of user involvement. Nor does it recognise the agency of users who may seek different methods of involvement in relation to different issues and at different times. Similarly, Arnstein's model does not acknowledge the fact that some users may not wish to be involved*" (p165).

They suggest that the metaphor of the ladder is flawed by missing rungs, and a diversity of snakes and ladders. Instead they suggest a mosaic metaphor where:

"*A completed mosaic creates a picture that is the product of the complex and dynamic relationship between individual and groups of tiles. Tiles of different colours and shapes are essential to creating a complete picture, which without systematic integration reveals only chaos…The mosaic illustrates the relationship between horizontal and vertical accountability and enables user involvement to be mapped and monitored*" (p165).

Collins and Ison (2006) also criticise Arnstein's ladder – not only for over-emphasising power as the sole motivator responsible for citizens changing their roles and responsibilities, but that it also:

"*Overlooks the more complex set of relationships which exist in many ongoing participatory situations where roles are less easy to define and responsibilities emerge during, and as a consequence of, the participatory process itself. In other words, individuals do not necessarily define their roles in relation to their sense of power*" (p4).

Their counter argument is that an individual's role and responsibilities are to be founded on the building of their interest in the situation. While Collins and Ison (2006) agree with much of the analysis carried out by Tritter and McCullum (2006) they also emphasise that "*ladders do not exist in free space. They are defined by their usefulness in relation to something else*" (p5). This is, possibly, an obvious assertion. Nonetheless this reveals two major obstacles to the ladder metaphor's usefulness as a conceptual framework for participation, which Collins and Ison (2006) define as:

1. Arnstein's view of participation, at a conceptual level lacks any form of context, and therefore has no means of making sense of the context in which the ladder is used.
2. Arnstein's ladder provides few insights into how participation might be developed as a collective process between all of the stakeholders involved, when the nature of the issue is highly contested, or lacks definition.

Furthermore, they suggest that the conceptualising of participation as a linear process does not call attention to the significance of either the process, or any feedback loops that it may contain. They suggest that these obstacles have wide reaching implications regarding the types of tools and techniques which are to be used to make participation possible, thus requiring an alternative policy paradigm - social learning (see Section 2.6) to enable concerted action between multiple stakeholders.

2.3.2 The range and application of participatory tools or techniques to support wider participation

Examples of the different types of participation tools available to support various levels of involvement are provided in Table 2-2 within the previous section. Table 2-4 below supplies further explanation of the typical structure of some prominent participatory procedures used to support wider participation.

Participatory tool	Structure
Public meeting/hearing	Long standing and popular form of public participation. Normally required by law, are open to everyone and provide an opportunity for citizens to learn about proposed plans. Typically, two to three minute time limits are placed on speakers, regardless of relevance. Citizens are positioned in front of a stage where the board or commission members sit. Tend to be dominated by announcement and defence of proposals by the organising agency to an audience of avid challengers or defenders of the issues presented.
Workshop	The middle ground between public meetings and citizen advisory committees. Citizens are involved in a task orientated process, enabling more time for discussion. The time allotted for discussion however is less than allowed for in a citizen advisory committee.
Citizen Advisory Committees	A group of individuals are appointed to examine an issue, or set of issues. They may be expected to provide ongoing advice or make recommendations to agencies or organisations in relation to the issues. They meet over a longer period of time than either public meetings or workshops, allowing for more critical appraisal of issues and accumulation of relative information. The general view is that this form of structure encourages more extensive interaction.
Citizen juries	Participants are selected at random from the community. These jurors or panellists hear evidence given from technical experts and other stakeholders and are provided with the opportunity to ask questions and to challenge the facts presented to them. This is followed by a period of joint discussion between all parties and evaluation of the facts presented. Final decisions or set of recommendations are selected via a voting system.

Table 2-4 Participatory tools and their structure (adapted from Chess & Purcell, 1999)

Creighton (2005) recommends the use of more interactive techniques such as workshops, interviews or informal group meetings in preference to large formal public hearings, as they give opportunity for genuine interaction and dialogue. Public hearings, in his opinion, only function as instruments to fulfil (US) legal obligations and are not the best instrument for building agreement on required actions. The formal structure of public hearings and the time limits placed on speakers, regardless of their relevance, suppress meaningful

interchange between the various proponents and opponents attending the hearing (Innes & Booher, 2004).

On the other hand, Hartley (2003) stresses that it is not merely a matter of choosing which participatory tool or technique to apply, but rather about employing as many as required and adapting them as necessary to the needs of the communities involved. When designing participation processes, Hartley therefore recommends reviewing and applying all feasible methods. Stagl (2007) has reviewed emerging methods which apply and combine established deliberative methods with quantitative methods (e.g. multi criteria analysis) for the assessment and evaluation of sustainable development planning. He comments that these new methods require further testing and development; "*however they have been shown to be effective tools…under a range of circumstances*" (p4) and "*allow for incommensurability of values*" (Stagl, 2006, p 3).

Doelle and Sinclair (2006) argue for engaging likely participants in the design of the process, to ensure suitable tools are applied for the level and type of forum they want to participate in. Chase *et al.* (2004) further extend this argument. They also recognise that selection of appropriate methods that meet participants' criteria for inclusion are important. However, they add that "*people may need to learn about the characteristics and trade offs associated with different methods to understand how these methods satisfy their concerns*". This suggests that further explanation and description of what

different processes entail are required for participants to be able to make informed decisions.

Based on a critical review of available literature, and in response to recent displays of support for more participatory science and technology policy making, Abels and Bora (2004) propose a typology, which links the formal and functional dimensions of participation. Their underlying assumption is "*that there are systematic links to be found between who participates, how and why*" (Abels, 2006). They have identified several different models with regard to form, and focused on the similarities and differences between the models. The models were assessed in relation to four principal groups, which they identified as relative in technology assessments: lay people, interest groups, scientific experts and policy makers. The participatory procedures assessed span from simple models where only one, or the same, social group deliberate, to models which involve all four groups. Table 2-5 is an abridged version of Abels and Bora's (2004) assessment of these models.

Number and heterogeneity of participants –							 +
	Type 1 dialogue procedure	**Type 2 PTA in a narrow sense**	**Type 3 public hearing**	**Type 4 consensus conference**	**Type 5 extended consensus conference**	**Type 6 voting conference**	**Type 7 scenario workshop**
Participants							
Lay people			x	x	x	x	x
Scientific experts		x	x	x	x	x	x
Interest groups	x	x			x	(x)	x
Policy maker						x	x
Participant selection criteria	Representative; partly affected groups	Representative	Everybody; those affected	Citizens: lottery & representative; Experts: deliberate selection by lay people	As type 4, plus Interest groups: cooptation	Citizens: lottery & representative; Experts & policy makers: representatives	Representative
Social role of participatory form	Participants have equal procedural rights	Experts hold key position	Citizens provide arguments, experts deliberate	Lay people hold key position; experts deliver knowledge	As type 4, plus additional expert knowledge delivery for interest group dialogue	Participating groups enjoy equal procedural rights	Participating groups enjoy equal procedural rights.
Primary tasks & objectives of participation	Dialogue initiation between opposing groups; interactive goal exploration; identification of consensus and lack of agreement	Resolve status of expert and counter expert scientific knowledge; clarify political options; legitimize political decisions	Deliberation in a strict sense i.e. Influence decisions by good arguments	Communication between lay people and experts; fostering and enlightening public debate	Fostering and enlightening public debate	As type 5, plus reveal perspectives of different groups	Planning process; dialogue between all involved groups of actors; foster understanding for divergent perspectives
Attributed or expected achievement	Disclose divergent perspectives; overcome inertia; provide alternative policy options	Risk assessment; identify accepted knowledge for basing decisions	Inform/foster citizen acceptance of legitimacy re: administrative decision	Typical opinion of informed lay person; agenda setting	Exploration of objectives; typical opinion of informed lay person	Filter for competing policy options	Disclose divergent perspectives; agenda setting; political legitimacy; resolve deadlock
Underlying model of democracy	Pluralist, but with deliberative elements	Not specified, rather deliberative	Formally participative, actually deliberative	Deliberative	Deliberative-pluralist	Deliberative with some pluralist elements	Participatory-deliberative with pluralist elements

Table 2-5 Assessment of participatory models (Source: Abels & Bora, 2004)

In two of the models (voting conference and scenario workshop) all four groups enjoy equal rights and are therefore considered as 'balanced models' (Abels & Bora, 2004). "*Balanced models seem more promising insofar as policy-makers are integrated on equal terms in the actual deliberative pTA process and the production of knowledge. This could improve recommendations and increase social learning*" (p5). While they appreciate that expansion of the 'participatory revolution' has "*reached the field of science and technology governance*" (p6) they also recognise the political and theoretical challenge as:

(i) knowledge and expertise issues can complicate the "*process of throughput*" in participatory assessments when multiple stakeholders are involved

(ii) there is no guarantee that even the best advice will have any impact on policies

(iii) despite several highly relevant and informative research projects during the last few years, the practical and theoretical consequences of the integration of deliberative and pluralist elements are still not clear.

Further discussion on the role and utilisation of social learning in relation to widening participation in resource management is provided in Sections 2.5.2 and 2.6.

2.3.3 Case study examples of widening participation

The following case study examples are used to illustrate the effect of widening participation. The first case study provides general evidence to support widening participation, whereas the second example is taken from a particular water resource management scheme.

Case 1. **Replacement plans for The World Trade Center in New York after 9/11** (Source: Innes & Booher, 2004).

The redevelopment plans for the World Trade Center site, following its destruction, and subsequent demolition, after the attacks of September 11th was initially fraught with problems. Planned investment in the site was severely and repeatedly delayed by seemingly inflexible opinions and conflicting ideas regarding the plans for the site, coupled with deep and emotionally charged divisions between citizens. At a cost of $400 per head, a 4000 person workshop was used successfully to resolve the situation. The main features of the workshop that were put forward as contributing to its success were (1) recruiting diverse participants; (2) providing balanced information for the participants; (3) providing technical equipment for recording discussions; (4) networking between the groups, and the staffing. While the overall cost of the workshop may seem dear, "*the costs of not using such methods can be even greater*" (p432)

Case 1 illustrates that the appropriate use of collaborative methods can encourage purposeful discussion and help to resolve seemingly intractable situations, which may otherwise cause delay, continued litigation or conflict.

Case 2. The Tweed Forum

(Sources: www.tweedforum.com, Collins, 2004; Quesney & Green, 2005;)he reasoning behind setting up the Tweed Forum in 1991 was to provide a way for those involved in the management of the River Tweed to share information, resolve issues and develop co-ordinated approaches to address factors affecting the river. The forum is made up of 29 statutory and non statutory organisation members. From 2001 onwards the Tweed Catchment Management Plan was co-ordinated and developed via the Tweed Forum. This provided the members of the forum with a strategic framework which helped them prioritise the work involved and supported their collaboration on such efforts.

The benefits of the Forum, by working in conjunction with primary stakeholders, are evident in many of the projects undertaken by its members. Two of these projects are given here as examples. For instance, (i) the system for issuing permits for river works and engineering on the Tweed were viewed as unnecessarily complex, time consuming and lacking transparency. The Forum produced a more streamlined process of assessment for the issuing of permits, which was well received and has proved to be both simple to use and accountable.

(ii) The Tweed Forum also developed, resourced and co-ordinated a cross catchment programme to eradicate the Giant Hogweed – a highly invasive plant species infesting most of the 2000 square miles within the catchment. The eradication campaign was partially funded by SEPA, Heritage Lottery Fund, English Nature, local councils and landfill tax credits. The campaign programme managed to gain support and agreement from the relevant landowners to co-ordinate the required activities of identifying and eradicating the plant species on their land. Landowners were provided with additional assistance from project contractors in difficult or large areas of infestation. An additional benefit of the co-ordinated campaign was financial. The likely costs of eradication measures using contractors only were significantly reduced.

The Tweed Forum illustrates both in example (i) and (ii) that partnerships between stakeholders can be beneficial and produce positive results by allowing for problem solving, negotiation, and resolution of differences within a decision making process. An ongoing process of stakeholder engagement can therefore be beneficial where the solution is not clear, or resolution of differences is required. On the other hand, not all issues or questions can

always be resolved; in those situations a more formal process may be required as part of the stakeholder engagement procedure (Le Quesney & Green, 2005). The second example from the Tweed Forum illustrates how concerted action between stakeholders can be applied to achieve regulatory requirements. Furthermore, "*successful compliance with any regulations depends at least in part on a recognition by those being regulated of the legitimacy and feasibility of any regulations that are introduced*" (Le Quesney & Green, 2005, p20).

2.3.4 Conclusions

To conclude, there are a wide range of participatory methods and associated tools that can be utilised in relation to different types and levels of participatory planning. However, the literature reviewed shows that it is not always clear:

- what level of inclusion is appropriate
- what type of procedure is appropriate
- which method, or combination of methods, is suitable to ensure the participants' desired level of participation in the process.

Furthermore, it seems that levels of inclusion and the type of procedure adopted have in the main only addressed concerns regarding levels of power or authority given to a particular group. The potential uses of more collaborative mechanisms to help integrate all participants on equal terms, and the uses of social learning as a possible method of joint knowledge production are introduced in this section.

2.4 The challenges and benefits of stakeholder engagement

The uptake of participatory measures, within Europe, range from public consultation and awareness raising to the direct engagement of various stakeholders in the process of decision making (Boak *et al.* 2004). Adoption of processes that facilitate stakeholder participation is part of the current agenda of water management, and a requirement of certain recent legislations that have been put in place, as, for example, within the EU Water Framework Directive (WFD) (see Section 1.1). Consequently, the subject of stakeholder engagement has provided an impetus for extensive research into the factors that may impinge, or enhance their engagement in participatory processes, and the effect that stakeholder inclusion or exclusion has on participatory process and/or outcomes.

The first part of this section provides a general overview of ideas on the current management of participatory planning in relation to stakeholder engagement. This overview is then followed by an assessment of existing views on specific issues that can influence the quality of stakeholder engagement namely:

- Participative planning – the definition and evaluation of success
- Trust between different parties
- Conscious or unconscious exclusion of stakeholders
- Conflict management between stakeholders
- Soliciting and acknowledgement of stakeholder viewpoints

2.4.1 An overview of current thinking regarding the management of stakeholder engagement

Methods employed in an attempt to engage stakeholders and promote participation often fall short of their goals. For instance, Innes and Booher (2004) stress that members of the public are often not convinced that their views are being heard. In their estimation the participatory methods employed frequently do not improve the decisions made by agencies or public officials, rather they only serve to antagonise the members of the public who attempt to work with them. This has a negative effect on the outlook of the official bodies involved; consequently, they become increasingly cautious in their pursuit of further dialogue with the public. Innes and Booher (2004) promote a "*new paradigm for participation*" (p428) whereby participation is viewed as a "*multi-way interaction in which citizens and other players work and talk in formal and informal ways to influence action in the public arena before it is virtually a foregone conclusion*" (p429).

They suggest that stakeholders who are given the opportunity to collaborate "*develop shared heuristics, joint objectives and shared knowledge and meanings*" (p429). This in turn provides a base for forming and maintaining newly created networks which generate their own forms of power and action, which include rather than exclude citizens (Booher & Innes, 2002).

Indeed, some advocate that inclusion of the public can improve decision making, by the sharing of knowledge, experiences and scientific evidence resulting in workable new arrangements which are acceptable to the public (CIS, 2004). Mostert (2003) identifies certain problems that may arise in relation to public participation (see Table 2-6) On the other hand, he also points out that public participation can promote social learning. However, social learning (see Section ?) is reliant on all the involved parties – "*different publics, government and experts*" (p181) – entering into a constructive dialogue where they can collectively learn how to manage a complex natural resource, such as a river basin, and handle conflicting views and interests. Social learning in this context could also facilitate an increase in water awareness, the overcoming of stalemates and promote real innovation.

Potential benefits	**Potential problems**
Better informed and more creative decision making	Reluctant government that gives no serious follow up, resulting in disappointment and less public acceptance of decisions
Greater acceptance of decisions, fewer implementation problems	Limited and unrepresentative response
Social learning of all involved	Low quality response
More open and 'integrated' government	Inconsistent decision making
Enhanced democracy	Costs and time
Environmentally and economically sustainable water management	

Table 2-6: Potential benefits and problems of public participation (Source: Mostert, 2003, p181).

Lack of planning and forethought associated with participatory methods, and the challenges associated with engaging technical and non-technical participants in

meaningful dialogue, can become effective barriers to communication (Glicken, 2000). Managers of the process should be aware that:

> "*Participation will always involve problems and that the problems will be specific to the particular participatory process… [and] must be as carefully managed as the technical side of the risk assessment if the process is to succeed in eliciting useful information from the correct people and in getting all necessary parties to agree to the outcomes" (p308).*

This suggests attention to the management of a specific process and ensuring effective and appropriate communication channels to accommodate all the relevant stakeholders are essential. In relation to water resource management, Hartley (2005) suggests there are five themes, critical to building and maintaining public confidence:

- Ensure that the decision making process and outcomes are fair and sound
- The building and maintenance of trust
- Maintenance of individual motivation and demonstration of organisational commitment
- Promotion of communication and public dialogue
- Information management for all stakeholders

2.4.2 Participative planning – the definition and evaluation of success

The increasing uptake of stakeholder involvement, by both public and private agencies, has generated a call for defining whether such efforts have been successful. Much effort has been exerted in trying to define participatory 'success' both in academic and practical terms. Based on empirical evidence, the research criteria used to define and evaluate 'success', in relation to stakeholder involvement and the goals of participation, can be divided into two broad categories (Chess & Purcell, 1999):

(1) Those that evaluate success of a participatory process. That is, successful stakeholder involvement is judged by the processes used in the programme. From this perspective it is the means of participation, rather than the ends that are used to define success, usually measured in terms of fairness, exchange of information, and group process and procedures.

(2) Those that evaluate success of the outcome of the process. That is, the end results determine whether participation was accomplished. The evaluation of how successful the 'results' are however can vary considerably. "*Many discussions concerning the outcome [Renn et al. 1995; Fiorino,1990; Rosenbaum,1978] note the distinction between public participation efforts that use citizens to garner support for agency efforts and those that involve citizens while developing policy*" (p2685). Independent of the goals selected, outcome evaluation of a participatory effort is problematic. It is not always easy to determine whether the end result is due to the participatory

effort alone or whether some other factors have simultaneously influenced the outcome (e.g. elections, a history of controversy, or nature of the environmental problem).

On the other hand, many analysts hold "*the middle ground of the process-outcome spectrum*" (p2686) believing that participatory success can only be achieved by using both 'good' process and 'good' outcome criteria together. By using both outcome and process criteria it is suggested that "*key decisions are improved by public participation [and] the decision-making process allows full and active stakeholder representation*" (Carnes *et al.*, 1996). From their analysis of available empirical research Chess and Purcell (1999) support the following views:

- Goals need to be clarified as it is evident that a variety of participatory targets are possible
- Participation needs to start early and requires advanced planning
- Traditional participatory forums need to be modified to meet process and outcome goals
- A public participation programme requires the implementation of various forms of participation so as to involve as many individuals as possible
- Feedback should be collected on participatory efforts

Yosie and Herbst (1998) found agreement among 30 experienced practitioners of stakeholder involvement for the need to evaluate factors associated with both process and outcome. Nevertheless, these practitioners could not agree on

what the evaluation should compose of and how factors should be weighted. From the available literature and case studies Peele *et al.* (1996) identified the following as common factors associated with the success or failure of participatory efforts:

- Process factors
- Organisational context
- Strategic considerations
- Contextual factors
- Unique factors

The factors fairness and competence are judged as central by Webler *et al.* (1995) to the success or failure of engaging stakeholders in participatory events. By this they mean fairness in relation to what people are allowed to do within the participatory process and competence in relation to the "*construction of the best possible understandings and agreements, given what is reasonably knowable to the participants at the time the discourse takes place*" (Webler & Tuler, 2002, p183). Based on their own empirical research and review of relevant literature they propose that theories regarding participation in environmental decision making should account for:

- How preconditions and other moderating variables affect the process
- How specific participatory techniques perform

- Which intermediary outcomes can stand in for long term outcomes that cannot be measured because of delayed effects
- Pluralistic notions of what is appropriate or successful

They remark that the future development of participatory planning theories and their practical usefulness in actively engaging stakeholders needs to:

"*Address a broad landscape of variables, from preconditions and moderating variables, to variables that depict the deliberative process itself, to variables that capture the significance of the outcomes of the process. It should be broad enough to capture the plurality of perspectives that people may have toward the process. Different people expect different things of a participatory process, and a good theory explains the logic of different perspectives*" (p186).

Webler and Tuler (2002) support the view that stakeholder involvement should provide all participants the same opportunities to influence the plans and tenets of participation. In relation to the exclusion of outcomes or actions however additional problem can occur "*where instead of pressing for substantive action-orientated outcomes, processes lead towards and create pressure for acceptance of general statements which can be agreed by all*" (Connelly & Richardson, 2004, p13). They refer to Selman (1998) to illustrate by example, who argues that in general, attempts to broaden participation to reach consensus in Local Agenda 21 processes, resulted in agreement being harder to achieve and the delivery of weak outputs.

On the other hand Sharp (2002) advocates that defining process and outcome goals in relation to participatory efforts should be an important consideration as: "*Substantive policy goals are goals about substantial policy outcomes – the goal of achieving more green space in urban areas, for example. Procedural policy goals are goals concerning the process through which policy is made – the goal of involving a wide range of stakeholders, for example*" (p20).

Sharp (2002) concludes that "*all ways of structuring participation affect its outcomes – there is no such thing as value-neutral participation. Moreover, the potential for participation to have substantive effects on policy means that it will be the subject of conflict between those forming differing agendas…and explicit awareness of such underlying conflicts enable practitioners to act strategically*" (p20). Initiating and facilitating wider participation to provide stakeholders the opportunity to express their opinions on process and outcomes can be beneficial. Nevertheless, we should be aware that it also has the potential to expose or initiate conflict, which therefore raises the equally important question of how conflict between stakeholders should be managed (see Section 2.4.5 where the role and management of conflict is debated further).

To conclude, it seems from available theoretical and empirical literature on the evaluation of participatory efforts there is general agreement that:

- Stakeholder involvement and engagement should include both procedural and outcome objectives

- Success should be defined and evaluated in terms of both process and outcome.

2.4.3 The importance of trust between different parties

Many research disciplines define the concept of trust (and there is widespread agreement on the importance of trust) yet there is no single agreed definition of the concept (Hosmer, 1995). From a sociological perspective Sztompka (1999) defines trust in general terms as *"a bet about the future contingent actions of others*" (p25). On the other hand, Luhmann (1988) sees trust as an attitudinal mechanism that allows individuals to subjectively assess whether or not to expose themselves to situations when the possible damage may outweigh the advantage. "*To trust someone there must be a situation of uncertainty in which there is an element of perceived risk on the trustees part*" (p103). On the trustees part however trust is conveyed independently of their ability to monitor, or control, the other party (Mayer *et al.*, 1995).

A feature of Kant's (1795) theory of trust within relationships is particularly pertinent when considering interactions between stakeholders engaged in decision making - trust between people is crucial as a means of acquiring other things of value. If trust was withheld from everyone, then our ability to learn from others would be impossible. "*After all they may not be telling the truth; nor could you co-operate with other people in joint ventures; after all, they may fail to honour their side of the deal*" (Hills, 2002, p2).

Trust is a multi-dimensional concept (see also Section 3.3.1) and may be considered as the interaction of values, attitudes, emotions or moods (Mayer *et al.*, 1995). Trust may be fragile or resilient in nature (Ring & Van de Ven, 1994);

and depending on the outcome of these interactions conditional trust may develop over time to unconditional trust (Jones & George, 1998). However little empirical research is available on the dynamic longitudinal development of trust. In some cases 'swift' trust may be required, as a pragmatic strategy for getting on quickly with a particular task to hand (Meyerson, 1996). In relation to all these instances Newell and Swan (2000) consider that there are three types of trust:

- Companion trust, is based on judgements of benevolence or personal friendships - that is, the trusted person will conduct themselves in a way that will not harm others.
- Competence trust is based on the standing or reputation of the person or institution involved. This type of trust can develop more swiftly than the other types, but may be more fragile.
- Commitment trust originates from contracts drawn up between different parties. Parties to the agreement expect mutual benefit to be gained from the transaction and therefore anticipate reciprocated levels of reliability and commitment to deliver according to the agreement.

In human relationships, trust between different parties, according to Newell and Swan (2000) "*is central to the operation of such networks*" (p1287). Based on their exploratory research of trust in relation to inter-organisational networks they:

(i) Underline the importance of developing different kinds of trust for collaborative knowledge sharing or creation in multidisciplinary networks.

(ii) Suggest that different types of trust (considered here as companion and competence trust) interrelate in specific ways, depending on particular motives (considered here as commitment trust).

(iii) Suggest that trust development may be hampered by an overemphasis on formal or hierarchical mechanisms in the absence of informal mechanisms that focus on interpersonal integration.

(iv) Illustrate the problems of developing trust (especially competence trust) in situations where participants come from a variety of epistemological and ontological backgrounds or positions.

The failure to develop trust fully is likely to be due to a mechanistic approach to the pooling of knowledge, rather than joint knowledge production (p1287). Such mechanistic pooling can lead to compromises and does not produce creativity or innovation, which in reality underpin the rationale for planning and implementing multidisciplinary teams. They concur however that developing trust within multidisciplinary teams may result in mutual benefits that could not be achieved independently. These points complement Bandura's views on the benefits of collective agency (see Section 2.5.2).

2.4.4 Conscious or unconscious exclusion of stakeholders

Connelly and Richardson (2004) remark on the effects of conscious or unconscious exclusion of stakeholders in participatory planning. They argue that while consensus building is often viewed as the hallmark of a fair, transparent and fully engaging participatory process, in reality, due to practical limitations and tensions between different objectives, it almost inevitably leads to the ideals of inclusion and non-coercion being compromised. They stress that an ideal inclusive process is, at the very least, difficult if not impossible to attain. It is important therefore for practitioners and researchers alike to improve their ability to recognise and respond to the:

> *"often obscured effects of practices which institutionalise exclusion in consensus building processes...key decisions in process design should be made consciously and transparently as they involve choices (made consciously or unconsciously) to exclude people, interests, issues, actions and possible substantive outcomes. These different dimensions of exclusion can result in different possible forms for consensus building processes. Through exclusion, consensus may be located between very limited numbers of stakeholders…or confined to relations between representatives of government agencies, or be genuinely broad-based but isolated in a 'bubble' of consensuality from the arenas in which real decision making is done" (p14).*

Furthermore, they suggest that if researchers avoid asking questions surrounding the subject of exclusion then they cannot fully "*understand how and whether the core principles of consensus building are being achieved in practice, which in turn hinders the ability of practitioners to be fully reflexive in the way they approach consensus building*" (p15).

On the other hand, Boak *et al*. (2004) recognise that different stakeholder groups involved in water resource management schemes may require different levels of involvement and suggest that stakeholders fall into one of three categories:

- Core stakeholders, who are the ones most likely to be directly affected by the outcome, and should be actively involved throughout the process, for example water abstractors or end users;
- Interested stakeholders who may have some influence on the process, for example representatives of statutory consultees;
- Other stakeholders and the general public within the catchment.

They stress the importance of allowing stakeholders the opportunity of choosing which category they fall into, as this aids the targeting of the required level of communication and documentation. The onus should be on the stakeholder to determine the level of involvement they can commit to and any changes in their level of involvement, if required, during the process. However, the authors do not broach the question of how such a fluid structure could affect levels of stakeholder accountability or process continuity.

2.4.5 Conflict management in relation to stakeholders' interests

The problem of managing a common resource, where different stakeholders may have possibly conflicting interests, values or expectations are well recognised (Mitchell, 2001; SLIM, 2004; Elias *et al.*, 2004).Instances, for example, where the utilisation of the resource by one actor may impinge on, or restrain, another's use of that resource, may require further understanding of how the issue is socially constructed (SLIM, 2004).

According to Pendzich (1994) there are four broad based categories of conflict:

- Conflict of interests
- Conflict of process
- Structural conflicts
- Interpersonal conflicts

Connelly and Richardson (2004) recognise that the exclusion of people (see Section 2.4.4) runs in tandem with the exclusion of issues. There is the potential therefore to ignore or fail to recognise other, conflicting interests, favouring instead to concentrate on "*areas where agreement is more likely*" (p12). If handled properly conflict can even be beneficial and may help to (Priscolli, 2003):

- Identify the problems that need to be solved

- Initiate change and allow adjustments to be made without threatening the strength of relationships
- Initiate changes in thinking; guide participants away from 'groupthink' (see Griffin, 1997)
- Clarify rationale and what factors are important to each group

According to Priscolli (2003) conflict is reliant on good management, so that it does not become dysfunctional. Connelly and Richardson (2004) however are of the opinion that there is a lack of significant differentiation in the available literature between choosing 'conflictual' or 'non-conflictual' approaches to gain agreement. While the goal of both approaches may be to gain agreement between stakeholders, based on the "*assumption of a possibility of movement of positions*" (p13) or "*signalled in the changes in interests or interpretations*" (Ross, 1993, p190) they are based on fundamentally different understandings. Drawing from Skollerhorn (1998) and Forrester, (1999) they correspond conflictual approaches almost exclusively to the "*Habermasian ideal of communicative rationality*" (p13). This ideal is based on explicitly seeking opening positions and then reaching agreement by an argumentative process, where the best argument, ideally, is adopted by the "*development of opposing positions into shared viewpoints*" (ibid).

Conversely, 'non-conflictual' approaches are based on discussions around initial disparities being explicitly excluded, seeking instead areas of common ground to attain agreement. An approach, as Connelly and Richardson (2004)

point out, that is rapidly being adopted within broad based participative efforts in Britain. Drawing from Driver and Kravatsky (2000) however they point out that "*critics suggest that there are inherent risks in avoiding conflict, arguing that the mutual learning and 'transformation' which is fundamental to changing initial positions may require conflict rather than an illusion of common ground*" (p13).

The question is therefore whether it is better to initially expose, or hide, conflict. Certainly, Ross (1993) has observed that "*what is completely absent from conflict management failures…is the recognition of any set of common interests or any notion of linked fate which could provide the basis for a settlement of differences*" (p165). While he recognises that low conflict societies are not without their problems he argues that they are "*the most likely places to find constructive conflict management because there the psychocultural dispositions are more conducive to creative problem solving and open communication*" (p40). In contrast, he maintains that high conflict situations are "*rarely constructive because the effective communication needed for creative problem solving is difficult to start or maintain*" (p40). Based on Coleman (1957) and Pruitt and Rubin (1986) he elaborates further "*instead, high conflict settings are often characterised by escalation of hostile actions, a polarized community, radicalised leaders, and little middle ground*" (p40). In relation to constructive conflict management, he argues that "*parties may best deal with the substantive issues when they develop interpretations of the conflict which incorporate (or even create) concerns about the larger social context and potential future*

relationships. These interpretations then broaden the concerns of the parties and increase the chances of finding a basis for agreement" (p42).

In relation to addressing interest based disputes or demands and gauging changes in interests and interpretations, Ross (1993) considers the following as indicators of successful conflict management:

- Movement from general grievances to specific demands
- Emergence of clear ranking of each party's interests
- Identification of inclusive interests benefiting all and making inter-group agreements attractive
- The degree to which each side perceives flexibility in the other groups involved with respect to important demands
- The extent to which each side develops empathy for the other groups
- The degree of acceptance of one group from another
- The ability of group members to perceive how they would be better off due to cooperative efforts
- The extent to which each group believe or accept another group's core needs.

2.4.6 Soliciting and acknowledgement of stakeholder viewpoints

Friedman and Miles (2002) comment that stakeholder theory has been hindered by:

"Almost exclusive analysis of stakeholders from the perspective of the organization (and) has been approached from the point of view of

business ethics, corporate governance and/or corporate social performance. This puts the organization at the centre of the analysis and discourages consideration of stakeholders in their own right as well as discouraging balanced viewing of the organization/stakeholder relation" (p3).

This has been further compounded by the majority of commercial organisations paying attention primarily to particular sets of salient economic stakeholders (Driscoll and Starik, 2004) as they have been:

"Trained and encouraged to prioritize economic indicators and shareholder issues… Even today, some managers may still not be aware of the impact of their decision making on both local and global ecological systems"(p67).

This lack of understanding regarding stakeholder viewpoints is partially echoed by comments made by the Environment Agency (2005). They acknowledge that while the majority of their water management plans set out requirements for when and how to engage stakeholders, few have established formal reporting and evaluation methods to check, for example, how satisfied stakeholders are with their level of involvement. The Environment Agency concedes that they have instead "*tended to rely on more informal feedback from individuals and groups*" (p23).

2.4.7 Conclusions

To conclude, there seems to be strong support for inclusive structuring of participative planning processes. However, choosing and implementing appropriate participative procedures and ensuring that stakeholders are adequately engaged is not a straightforward process. There is a need for further exploration of not only how stakeholders want to be engaged but also when they would want to be engaged. Whether it is more beneficial to broach or hide possibly conflicting viewpoints is also emotive and highly relevant in respect of widening participation. The issue regarding a lack of understanding of stakeholder viewpoints was also raised, underlying that there is a tendency to analyse stakeholder requirements from the perspective of the proponents of the process. There is therefore a gap in the research regarding the soliciting and evaluation of stakeholder viewpoints to help improve the structure and content of participatory planning.

Furthermore, reformations in the institutional governance of rights to water have wide reaching implications for all those involved in, or affected by, decisions related to that issue. Any change that may open or close the opportunities for a stakeholder to participate is therefore an important consideration that needs to be adequately provided for and actively addressed (Bruns, 2003).

2.5 History and evolution of social learning theory

Social Learning Theory evolved under the umbrella of behaviourism - a group of psychological theories that aim to provide explanations for human (and animal)

behaviour. Behaviourism is a reductionist school of thought which embraces the view that:

> *"The observation and description of overt behaviour is all that is needed to comprehend the human being, and that manipulation of stimulus-response contingencies is all that is needed to change human behaviour. In other words, behaviourism consists of denying the relevance or importance of cognitive, personal or other dimensions of human experience" (Hayes, 1996, p998).*

In contrast to behaviourism, social learning permits an individual to gain complex units of behaviour quickly and efficiently, without the possible risks inherent in trial and error learning. Conte and Paolucci (2001) define social or observational learning as

> *"one of the cognitive processes responsible for social propagation…by means of which agents' acquisition of new information is caused or favoured by their being exposed to one another in a common environment. Social learning results from one or other of a number of social phenomena, the most important of which are social facilitation and imitation" (p1).*

Social facilitation and imitation are defined (Conte & Paolucci, 2001) as:

- Social facilitation - a mechanism by which an individual updates their knowledge base (including social and pragmatic knowledge) by observing the features and behaviours of others and possibly (but not always) by assuming their mental state.

- Imitation – a behaviour governed by the goal that a given individual (A) model themselves on another individual (B) as long as B is (perceived as) a suitable model under certain circumstances.

Drawing from a number of publications within the public deliberation and social learning literature (and offered here as an extension to the definition of social learning given above), Schusler *et al.* (2003) defines social learning as "*learning that occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action*" (p311). This definition therefore recognises the basic requirements that enable collective engagement and development to promote collaborative co-management in a social learning setting.

2.5.1 Behaviourism and social learning theorists

The primary instigators of behaviourism, Watson (1908) and Thorndike (1898) dismissed the notion of learning by observation, preferring a more mechanistic approach to understanding human behaviour. In their opinion, learning could only occur by acting out responses, and could only be explained in terms of observable acts that could be described in terms of stimulus-response

sequences (Crosbie-Brunett & Lewis, 1993). These views were strongly adhered to during the behaviourist era that followed on from their work, with research and analysis of learning almost entirely focused on "*learning through the effects of one's actions"* (Bandura, 2005, p10). And,

> *"Despite the centrality and pervasiveness of social modeling in everyday life, there was no research to speak of on modeling processes until the publication of Social Learning and Imitation by Miller and Dollard in 1941. They recognised modeling phenomena, but construed them as a special case of discrimination learning. A model provides a social cue, the observer performs a matching response, and its reinforcement strengthens the tendency to behave imitatively'" (Bandura, 2005, p11).*

Miller and Dollard's publication generated interest and underpinned further research into social learning by several social learning theorists, each with their individual notions on the subject (e.g. J. Rotter, A. Bandura, and R. Sears). (Please refer to Hayes (1996) for further information on the social learning theorists other than A. Bandura).

Albert Bandura however questioned the model of observational learning put forward by Miller and Dollard. He found it severely lacking demonstration of the determinants and mechanisms of social learning. Bandura therefore led the efforts on cognitive development, within the field of social learning.

A programme of research, conducted by Bandura to test the determinants and mechanisms of learning by observation demonstrated that:

- Observational learning does not require either response enactment or reinforcement (Bandura, 1965)

- Social modelling and the mechanisms required to transform knowledge into appropriate action are governed via four cognitive sub-functions that are – Attention: an individual must pay attention to the features of the new behaviour for them to be able to adopt it. Variable factors affecting the observer and the observed can influence the uptake of a new behaviour. Representation: if the individual is to be influenced by the observed/modelled behaviour then the ability to recall and recollect in detail needs to be optimised. People tend to retain information better the more senses that are stimulated simultaneously. Enactive translation: once the observed behaviour is stored in one's memory then it needs to be converted to appropriate action for modelling to occur. Motivation: there must be some internal or external incentive for the individual to pursue or carry on imitating the behaviour. These incentives can act as positive reinforcers, which stimulates encouragement, or negative reinforcers, where the individual feels discouraged. (Bandura, 1971 & 1986).

- General imitation is determined by a person's social beliefs and their outcome expectations rather than by conditioning reinforcements (Bandura & Barab, 1971).

Furthermore, from our own "*prior experiences and the experiences of others we are able to anticipate consequences of behaviour in similar situations*" (Maarleveld & Dangbegnon, 1999, p270). The anticipation of consequences can therefore act as motivators that influence our behaviour (Bandura, 1971). Bandura, unlike Watson, or his contemporary behaviourist counterpart B. F. Skinner (1953), recognised the importance of social factors in social learning (Hayes, 1996). These factors included individual learning through the processes of imitation and identification. As Bandura (2005) points out, the mechanisms that govern translation of *complex* thought or styles of behaviour into capable or skilled performance require more than factual or procedural knowledge:

> *"It requires enlistment of multifaceted self-regulative operations and corrective feedback systems through which knowledge structures are converted to proficient performances. For example, a novice given factual information on how to ski, a full set of procedural rules, and then launched from a mountain top would most likely end up in an orthopedic ward or in an intensive care unit of a local infirmary" (p12).*

In 1986, Bandura renamed his Social Learning Theory to Social Cognitive Theory. This title change provided: (i) a better description of his endeavour to

demonstrate that much of what we learn is via the power of social modelling; (ii) further distinction between himself and the behavioural theorists.

2.5.2 Social learning – extending the idea of human agency to collective agency

Bandura also rejects the argument that individual agency and social structures are independent entities, rather viewing people as contributors to their life circumstances rather than mere products of them. Social Cognitive Theory (SCT) does not view personal agency and social structure as operating independently. As a theory it therefore:

> *"Adopts an agentic perspective in which individuals are producers of experiences and shapers of events. Among the mechanisms of human agency, none is more focal or pervading than the belief of personal efficacy. This core belief is the foundation of human agency. Unless people believe that they can produce desired effects and forestall undesired ones by their actions, they have little incentive to act. The growing interdependence of human functioning is placing a premium on the exercise of collective agency through shared beliefs in the power to produce effects by collective action…Perceived collective efficacy fosters groups' motivational commitment to their missions, resilience to adversity, and performance accomplishments" (Bandura, 2000, p75).*

As Bandura (2000) points out, many of the desirable outcomes that people seek are only achievable through joint efforts. By working collectively people can accomplish and secure outcomes that could not be achieved single handed. However, merely bringing people together to attempt to work collectively is not enough as:

> *"People's shared beliefs in their collective power to produce desired results are a key ingredient of collective agency A group's attainments are the product not only of shared knowledge and skills of its different members, but also of the interactive, coordinative, and synergistic dynamics of their transactions. For example, it is not uncommon for groups with members who are talented individually to perform poorly collectively because the members cannot work well together as a unit. Therefore, perceived collective efficacy is not simply the sum of the efficacy of beliefs of individual members. Rather it is an emergent group level property" (p76).*

Therefore social cognitive theory extends the idea of human agency to collective agency, and recognises how the shift from individual to collective agency may affect individual and group efficacy. Furthermore, Bandura (2000) recognises that a growing body of research confirms the higher a groups' perceived collective efficacy, then the higher the groups' motivational outlay in their tasks, their ability to overcome setbacks, and their performance

achievements. High perceived self or group efficacy is therefore vital for successful functioning and attainment.

2.5.3 Misconceptions and limitations of social learning

Social learning lends itself to understanding and predicting individual and group behaviour. However, there are a few misconceptions and limitations regarding the utilisation and application of social learning. Bandura (2005) voices his concerns regarding some 'entrenched misconceptions' specifically regarding the nature and scope of social modelling (pp13-14):

- That social modelling interpreted as 'imitation' can only produce a mimicked response. Bandura argues that individuals can generate new versions of a particular behaviour to suit new circumstances, based on the guiding principles which they have learnt.

- That social modelling negates creativity. Bandura's work has demonstrated that innovation can emerge by modelling behaviour. When exposed to different styles of behaviour or thinking an individual rarely adopts the behaviour of only one source, or indeed all of the sources they are exposed to. Rather, they selectively blend different features of various models to create a personalised variant model.

- That social modelling cannot build cognitive skills, as thought processes are hidden and are not adequately revealed in modelled actions. Social

modelling therefore has no value regarding gaining and using information for problem solving. The counter argument is provided by Meichenbaum (1984), who demonstrated that an individual's cognitive skills could be improved, by encouraging them to verbalize aloud their reasoning strategies when engaged in problem solving activities. In comparison to the popular tutorial methods, cognitive modelling has also proved to be more powerful in promoting self efficacy, innovation and other complex cognitive skills (Gist, Bavetta & Stevens 1990; Debowski, Wood & Bandura, 2001).

Furthermore, regarding the application of social theories Bandura (2005) also points out

> *"There is much talk about the validity of theories, but surprisingly little attention is devoted to their social utility…Theories are predictive and operative tools. In the final analysis, the evaluation of a scientific enterprise in the social sciences will rest heavily on its social utility" (p31).*

The practical utilisation of social learning theory is becoming more widespread, yet the conceptual understanding of social learning is lacking and the interpretation of what constitutes social learning is diverse (Schusler *et al.*, 2003; Conte & Paolucci, 2001, Parson & Clark, 1995). Conte and Paolucci (2001) describe social learning as a "*ragbag of heterogenous phenomena with a variety of functions*" (p3) and call for a systematic treatment of the notions of social learning.

According to Schusler *et al.* (2003), social learning on its own is not enough (when utilised in the context of collaborative management). They suggest that *"social learning may be a process by which other requisites for co-management, including capacity, appropriate processes, appropriate structures, and supportive policies, can be developed or negotiated"* (p324). Finally, not all learning is positive (Schusler *et al.*, 2003) – participants sometimes share inaccurate technical information, or adopt negative perceptions of others, which may hinder collaborative associations.

2.6 The role of social learning in participatory planning for water resource management

Research into the utilisation of social learning in participative water resource management activities, within projects such as SLIM (Ison *et al*., 2004) and HarmoniCOP (2005) for example, have increased our recent understanding of how social learning may help address the complexities of multiple stakeholders' interaction with dynamic ecological systems (Tippet *et al*., 2005). The importance of social learning, as an alternative model of interaction for discourse in natural resource management has steadily gained momentum, albeit the concept is still "*imperfect and evolving*" (Pahl-Wostl, 2002, p399).

Social learning addresses the relationship between individual and situational factors in modifying human behaviour. This sharply defines its role in relation to other perspectives in natural resource management, which tend to concentrate

on either individual action, or structural incentives as determinants of human behaviour, (Maarleveld & Dangbegnon, 1999).

There are two main components that constitute social learning according to Webler *et al*. (1995):

(i) cognitive enhancement, which in this context not only embraces the concept of learning via the acquisition of knowledge, but also learning about shared values, preferences and the personal notions of others;

(ii) moral development, which is how individuals gain the ability to make judgements about right and wrong.

The process of social learning requires the ability to bring together both comprehensions and factual knowledge. Social learning therefore is an attempt to go beyond the mere bringing together of individuals to learn within a social situation; rather it is a product of "*individuals learning how to solve shared problems in a manner that is responsible to both factual correctness and normative consent (meaning legal and social responsibilities)*" (Webler *et al*., 1995, p445).

The acquirement, assimilation and application of new information by individuals participating in a process based on social learning are essential. Schusler (2001) highlights eight characteristics of deliberative processes that may support (social) learning:

- open communication
- diverse participation
- unrestrained thinking
- constructive conflict
- democratic structure
- multiple sources of knowledge
- extended engagement
- facilitation

These characteristics underpin a process that helps build and transform relationships engaged within the decision framework, steering it away from the more traditional 'decide-announce-defend', as commented on by Forester (1999). Social learning therefore allows stakeholders to:

> *"Co-construct the identity of the…problem in ways that help them move towards a shared understanding and to learn their way towards solutions. It involves changes in norms, practices and behaviour as well as changes in perception and understanding among stakeholders" (Röling et al., 2004, p10).*

Ison *et al.* (2004) stress that understanding how an issue is socially constructed around the use of a particular resource is particularly important and put forward that such an issue may be composed of the following primary features:

- Interdependencies: between human activities and their effect on the quality and quantity of water; links between different geographical areas and ecosystems.

- Complexity: the diverse and interrelated combination of natural, technical and social practices, which include the modification of public policies, organisations and the diversity of perceptions held by different stakeholders.

- Uncertainty: the more complex the issue the more difficult it may be to accurately forecast the impact of recommended solutions. The nature of the uncertainty may be diverse and bounded by technical, ecological, socio-economic and/or political circumstances.

- Multiple Perspectives: The likelihood of one person knowing everything that needs to be known about a certain situation is low. In addition, peoples' perception of a situation may be framed by their 'system of interest' and may influence how they view a proposed action.

- Controversy: the interaction of uncertainty and interdependencies can result in varying perceptions and long term disagreements regarding the issue. These controversies may question the existence, origin and understanding of the linkages between cause and effect and management issues pertinent to the problem.

Furthermore, a decision making process that goes beyond the solitary needs of just one individual "*requires the stimulation of trust, identity and solidarity within the respective society. These are social phenomena which are products of communication and mutual understanding*" (Stagl, 2006, p54). The ability of a socio-ecological system to respond to change is further enhanced by the iterative nature of social learning; it comprises a feedback cycle of learning and change ensuing from a process embedded in social networks and outcomes (Tippett *et al.*, 2005). This means that expected technical and social changes are not only anticipated or "*defined 'a priori' but are also emergent properties of social processes*" (Ison *et al.*, 2004, p36). An effective co-operative inquiry therefore intentionally utilises the *"interplay between making sense and action, and the realisation that both the meaning and the action need progressively to emerge as the inquiry proceeds*" (Heron, 1996, p47.)

2.6.1 The role and positioning of social learning in relation to traditional policy approaches to water resource management

Röling *et al.* (2004) point out that natural resource management problems, including water resource management have traditionally been met by utilising regulatory or fiscal determinants such as charging, grants or tax breaks, for example. They affirm that there is increasing evidence that these determinants can be enhanced and complemented by social learning – an approach where utilising participatory tools play an important role. Similarly, Ison *et al.* (2004) are of the opinion that the process of multi-stakeholder learning can aid both

individual and institutional behaviour by helping people involved in natural resource management gain further understanding of their role, and the role of others, in the process.

This viewpoint is not meant to indicate that when social learning is applied other more traditional approaches should become obsolete. Merely, that these different approaches can be incorporated within a broader understanding of how knowledge and issues are constructed and employed in policy processes (Collins & Ison, 2006). As such, social learning processes should be viewed rather as a "complimentary governance mechanism" (see Figure 2-1 below), whose epistemological assumptions are significantly different from traditional mechanisms.

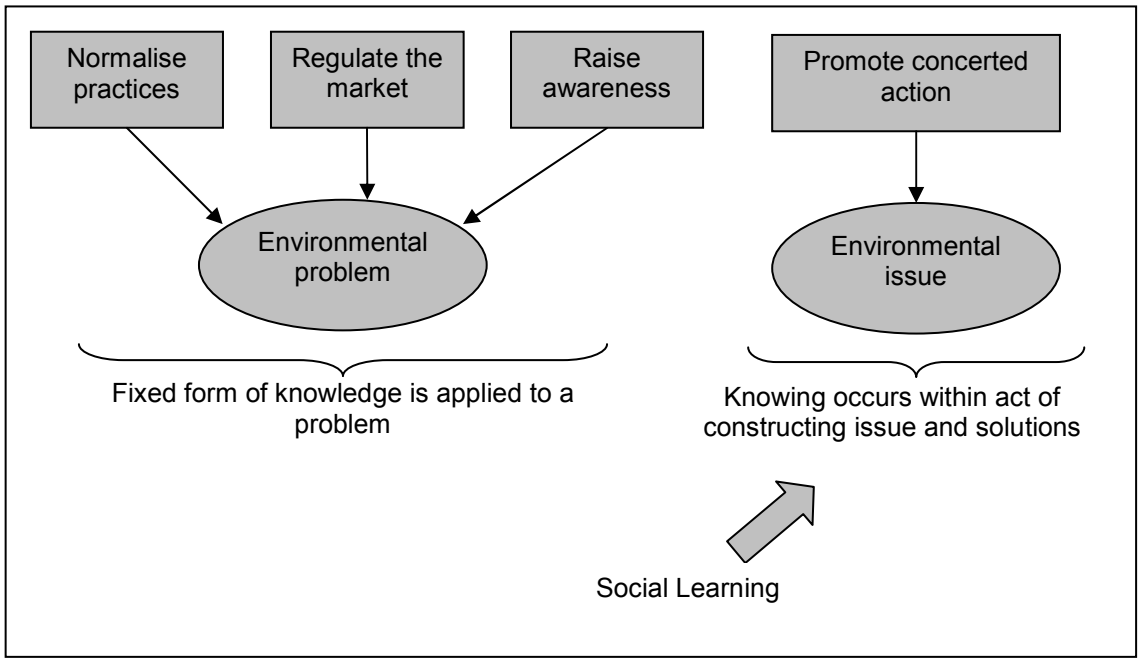


Figure 2-1: Traditional policy responses to objectified environmental problems (left) versus an alternative epistemological based policy response where social learning can be utilised as a decisive policy choice (Source: Ison *et al.*, 2004, p7).

The conceptual framing of social learning in relation to other procedural mechanisms is depicted in Figure 2-2 below.

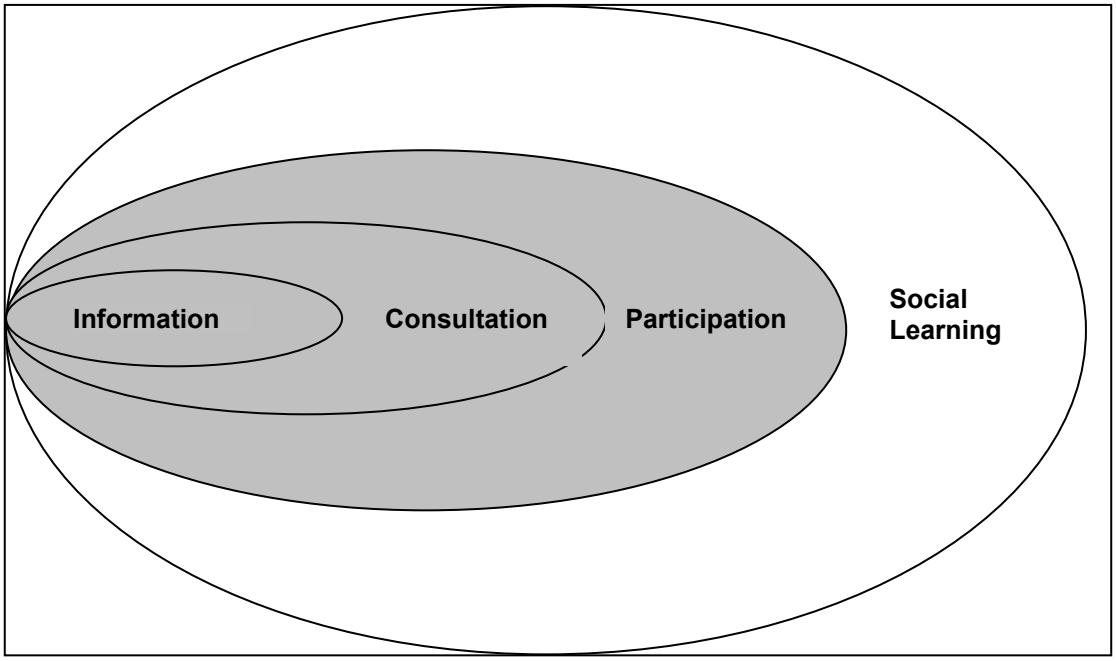


Figure 2-2 Conceptual framing of social learning in which information, consultation and participation may be necessary but not sufficient to improve complex situations (Source: Collins & Ison, 2006, p11).

Figure 2-2 demonstrates that just as there is a significant border between information and consultation, so a similar definitive (epistemic) boundary is present between participation and social learning. *"The epistemologies differ within each ovoid and these differences are also reflected in the practices needed for each*" (Collins & Ison, 2006, p11). From their perspective, the shaded area relates to 'tame' problems where reasonable levels of understanding and proposals for their resolution exist. In these situations they concur that traditional policy approaches, such as regulation, may be valid. Whereas situations where considerable complexity and uncertainty are likely and multiple stakeholders are involved are represented by the unshaded area.

In these instances information, consultation or participation may not be sufficient to improve such situations.

Nevertheless, Collins and Ison (2006) importantly note that all the ovoids, (in Figure 2-2) share a common origin – conveying the message that, unlike Arnstein's linear model, there is not necessarily a fixed sequence of progressive steps from information provision to social learning, "*although each ovoid may encompass some aspects of the other i.e. they can be systematically related. Social learning approaches are chosen on the basis of the characteristics of the situation and may occur at the outset of policy-making, rather than as a 'last resort' or 'end point' of policy making*" (p11).

They state that the epistemological grounding of social learning is based on knowing occurring within a process of 'constructing' an issue and searching for improvements. Traditional policy mechanisms however are built on a foundation of fixed knowledge sets. Agencies therefore who may want to use one (or more) of these substantially and conceptually different participatory procedures, need the ability to distinguish (i) the differences between them, and (ii) which one is most appropriate for a particular situation (Collins & Ison, 2006).

The basic principles underlying the utilisation of a social learning model as a tool are to further understanding of a process. Yet, the function of social learning models and how they can be applied are diverse. Tippett *et al.* (2005) propose a conceptual framework for social learning, where the context of the

resource management problem to be resolved is directly connected to the processes of social networks and outcomes, generating a responsive loop of learning and change (Figure 2-3). They expand on the relevance of the conceptual framework by describing how the process of social learning in this case is:

> *"embedded in a context of governance structure and the natural environment. In the process of resource management, social involvement (e.g. the generation of social capital, the development of new social practices) is as important as content management (e.g. the development and communication of knowledge about the state of a water resource, use of models to predict the effects of measures to achieve a good ecological state of a river…The outcomes of the management process are not only technical qualities such as an improved state of the environment but also relational qualities such as an improved capability of the actors in a basin to solve conflicts and come to co-operative agreements. The outcomes feed back into change and mutual tuning of governance structure and the state of the natural environment" (p289).*

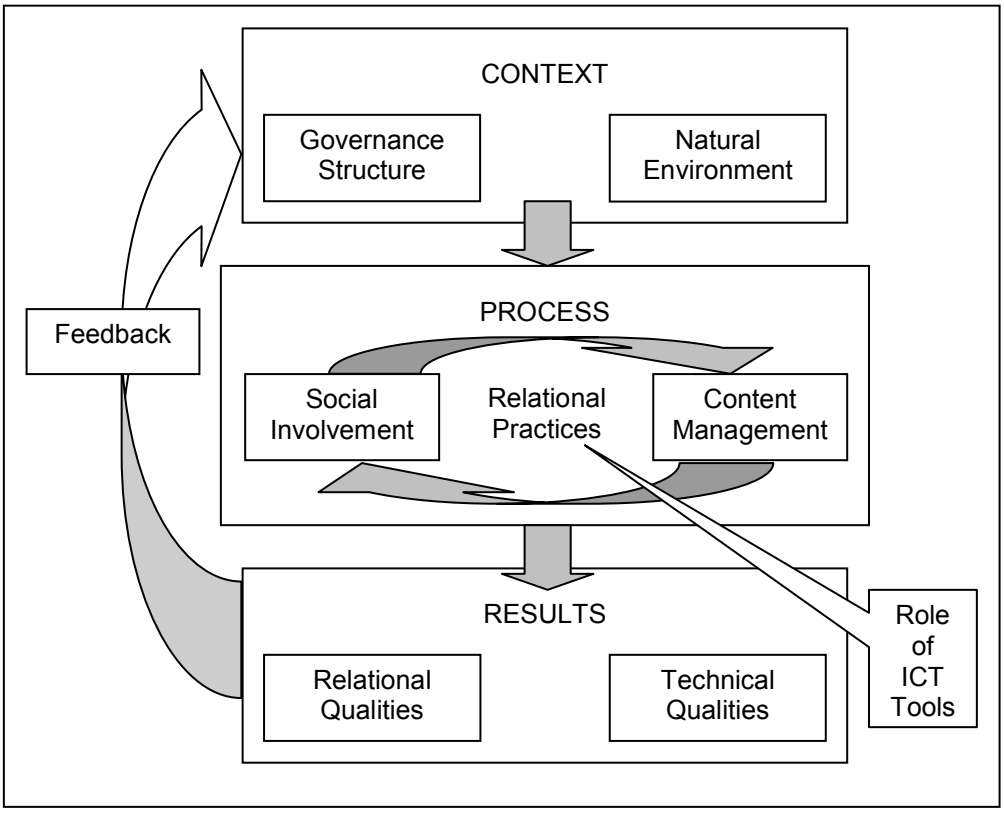


Figure 2-3: Conceptual framework for social learning (Source: Tippett *et al.* 2005, p289)

This conceptual framework underlines the necessary requirements of a social learning process, and suggests that such a process may indeed improve the participants' ability to resolve conflicts, if necessary, and facilitate agreement. Ongoing concerted action can indeed modify and transform situations. However, increasing the capacity of an actor to participate in, contribute to, or understand such a problem does not automatically guarantee a successful outcome (Creighton, 2005).

2.7 A collaborative framework for resource management

In relation to the points made in the previous section, Bosch *et al.* (2003) also fully recognise how an issue is socially constructed around the use of a

particular resource. Bosch *et al.* (2003) however comment on the limitations of a particular approach to managing and sustaining natural resources, commonly adopted by managers (or policy makers) and scientists who are involved within the same project. Typically, they work within independent cycles; researchers acquire knowledge and managers, or policy makers, try to apply knowledge, without any feedback mechanism having been set up between the two groups. The outcome of this approach can lead to (i) knowledge, that could be of value to all parties, accumulating in separate areas; (ii) a lack of ownership of scientific knowledge; (iii) a lack of mutual understanding regarding each others' viewpoints and beliefs.

To give research and management the opportunity to share and evaluate the various outcomes from their independent activities Bosch *et al.* (2003) propose a framework that induces collaborative learning and knowledge sharing. This is achieved via an integrated knowledge base (Figure 2-4) as:

> *"Transforming data and information into useable knowledge in such an environment also reveals knowledge gaps, involving the end users of research in identifying new research questions. The outcomes are then captured in a knowledge base, making it available to all who can potentially benefit from it" (p109).*

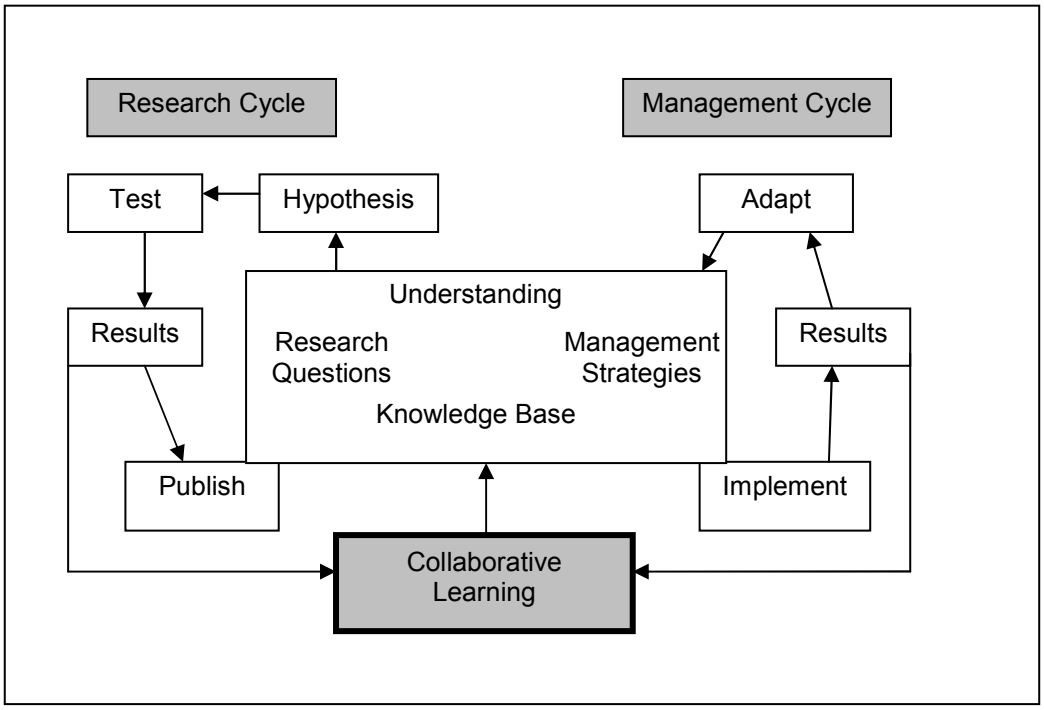


Figure 2-4: Research and management linked together through the integration of learning and knowledge (Source: Bosch *et al.*, 2003, p109).

The central issues highlighted within this model are therefore collaborative learning, improved information management and joint knowledge production. Furthermore, Bosch *et al.* (2003) point out that the framework does not just rely on typical 'hard' systems thinking but applies a more holistic 'soft' systems approach which enables the different participants to:

- Contribute their awareness of connections to the recognition of an enriched system
- Learn more about the system by their exposure to one another's *personal* systems framework (personal constructs) – thereby including each relevant actor's ways of viewing the management issue within the relevant context and their formal and informal knowledge levels in relation to the issue.

It may be argued that such a collaborative framework extends the idea of social learning, by the recognition of not only individuals learning *from* each other but also *with* each other, thereby influencing individual world views and possible joint outcomes simultaneously. The Bosch *et al.* model described and discussed here therefore provides us with a framework for adaptive management, based on ongoing knowledge building through collaborative learning and improved information management. This model plays a significant role in the design and development of the conceptual model used within this thesis, introduced and explained in Chapter 4 (Section 4.2).

2.7.1 Conclusions

Both Section 2.6 and Section 2.7 addressed how practical attempts to include stakeholders within more integrated systems of decision making have evolved and are still evolving, based on conceptual models which incorporate social learning and utilise collaborative frameworks. In Section 2.6.1 the role and positioning of social learning, in relation to traditional policy approaches to water resource management, was specifically examined. Drawing on the literature covered within this chapter, Figure 2-5 endeavours to summarise the appropriateness of the following factors identified as relevant in relation to different participatory mechanisms:

- Number of stakeholder groups
- Level of uncertainty, complexity and/or controversy in relation to resource

- Level of stakeholder involvement required

Low → → → → **High**
Number of stakeholder groups Level of interdependency, uncertainty, complexity and/or controversy Level of stakeholder involvement required
Type of participative mechanism
Information Consultation Participation Social Learning

Figure 2-5 Appropriate participative mechanism necessary in relation to stakeholder and resource characteristics (drawing from literature reviewed)

It can be argued that an increase or decrease in any or all the factors depicted in Figure 2-5 may determine which participative mechanism might be appropriate. Bosch *et al.*'s (2003) model is in all likelihood appropriate and relevant towards the right hand side of Figure 2-5. Furthermore, within their model (see Figure 2-4) collaborative learning is depicted as an essential factor which underpins and promotes the integration of different knowledge sets, thereby enhancing understanding between the groups of the substantive details that are, or need to be, addressed. A further question one might ask therefore is what might be the topics or substantive content of collaborative learning, in the context of water resource management?

One key area of concern that could be raised by water management participants is in relation to appropriate structuring of the process to facilitate their required level of engagement in the process, as already discussed in the previous sections of this chapter. Another likely key component of deliberation within a participative process would be the participants' preferences for different

water policy mechanisms (Section 3.1). The anticipation of risks (and benefits) in relation to water management (Section 3.2) is also one of the key topics for stakeholders involved in water management (Johnson & Handmer, 2002). The model is based on collaborative learning. Increasing the overall knowledge base of collective members by provision of information and transfer of knowledge is a central factor, as it mediates the process. Consequently, conveying information within such a framework is also an important consideration (see Section 3.3).

2.8 Summary

The survey of literature presented in this chapter has provided us with an extensive range of information and knowledge on the various aspects that are relevant to participatory planning in water resource management and illustrated the complex issues involved. It describes the shift towards the adoption of more participatory techniques in the planning of water resource management. Such a shift by the institutions involved has been driven by their identification of such a need and the increasing public interest in issues of sustainability and resource management. We have also seen that there are many different techniques and tools that can be applied in relation to participatory planning, with varying success. Yet, the overlying message seems to be that knowing what type of process and level of stakeholder engagement is appropriate is not always clear.

Sections 2.6 and 2.7 addressed how practical attempts to include stakeholders within more integrated systems of decision making have evolved and are still evolving, based on conceptual models which incorporate social learning and

utilise collaborative frameworks. Social learning and collaborative frameworks are viewed, in some instances, as the way forward for increasing and supporting participation. However, there are a number of problems and questions that still need to be addressed in relation to furthering stakeholder inclusion, and understanding what is expected from the process.

One issue, raised within Section 2.3, was the lack of stakeholder engagement in the design of the process (Doelle & Sinclair, 2006). The question is therefore: are too many assumptions made by the proponents of the process regarding the level of participation that the public desire? We have seen how Bosch *et al.* (2003) illustrate the problems that can arise if different project partners function within separate individual cycles to try and attain the same objective, and how a collaborative framework can potentially aid further understanding of each others construing of the situation. In addition to further understanding required of the expectations of stakeholders who are taking part in a professional capacity, such as regulatory bodies, water managers and water management researchers, what also of the lay persons' expectations regarding, extension of the participatory process to include collaborative decision making? The next chapter will address, in detail, the comments made in Section 2.7.1 regarding the likely key considerations for discussion between different stakeholders within a participative planning process focused on water management.

Chapter 3 : Key components of deliberation within a participative planning process, in the context of water resource management

The question posed in Section 2.7.1, in relation to the context of water resource management, was: 'What might be the topics or substantive content of collaborative learning?' One key area of deliberation for water resource management participants could be the appropriate structuring of the process to facilitate their required level of participation and engagement in the process. This factor has already been identified and discussed within the preceding chapter and will therefore not be reviewed within this chapter

A fundamental question (regarding the usefulness of edicts in water resources management) is "*how 'options' will be compared and in what detail, uncertain, future 'adverse impacts' can be determined*" (Kallis & Butler, 2001, p135). Another likely key component of deliberation within a participative process would therefore be the participants' preferences for different water policy mechanisms. Section 3.1 therefore addresses water policy mechanisms. The section initially provides an overview of current opinions regarding the adoption of principles intended to promote the management of water as a resource. The second part of the section concentrates on the main water policy mechanisms that could be adopted to fulfil the principles set out by a water resource management policy.

The anticipation of and attitude towards risks (and benefits) in relation to water management is also one of the key topics for stakeholders involved in water

management (Johnson & Handmer, 2002). To adequately address and discuss the topic, Section 3.2 is comprised of the following three parts:

- Factors that can influence attitudes towards personal (real or perceived) risks
- Primary (real or perceived) risks associated with water resource management
- Case study examples of success and failure in the implementation of water resource management projects.

The Bosch *et al.* model (which forms the basis for the conceptual model used within the thesis, see Section 0) is based on collaborative learning, which aims to increase the overall knowledge base of the collective members. Provision of information and transfer of knowledge is also therefore an important factor, as it mediates the process. Information provision and knowledge sharing play an important part in participatory planning and stakeholder dialogue. Section 3.3 therefore reviews not only how information or knowledge is conveyed but also how certain factors can influence the information recipient's attitude towards the information source.

Finally, a summary of the conclusions drawn within the chapter is provided and reflects on how the knowledge gained from this chapter may help form the conceptual model and ensuing research questions.

3.1 Water policy mechanisms

"*Institutions can be policies and objectives, laws, rules, regulations, organisations, policy mechanisms, norms, traditions, practices and customs. They influence how we think and what we do*" (Ison et al., 2004, p11).

In general terms a water policy can be defined as "*a statement of general principles governing water allocation, development and management*" (Howsam, 1996, p35). Water policy mechanisms could therefore be defined as the methods used to fulfil the general principles set out within a water policy. Howsam, points out that for many years policy statements were based on very simple statements like 'water is essential for life'. Now however, the agenda is much broader and water policy is influenced by, for example, political, financial and environmental principles. Furthermore, he stresses that the formulation of polices may not always "*include full consideration of the practical implications of effective implementation, or perhaps of the long term social impact*" (p35).

The first part of this section provides an overview of current opinions regarding the adoption of principles intended to promote the management of water as a resource. The second part of this section concentrates on the following water policy mechanisms that could be adopted to fulfil the principles set out by a water resource management policy. These policy mechanisms have been selected for further comment as they address both traditional fiscal measures, and recently adopted methods that concentrate on multiple stakeholder interaction with dynamic ecological systems (see also Section 2.6).

- Pricing
- Imposing restrictions
- Increasing public awareness
- Adopting alternative or sustainable technologies

Pricing and imposing restrictions as policy mechanisms are commented on together as much of the available literature deals with both issues simultaneously. Similarly, increasing public awareness and the adoption of alternative water management methods are discussed under the same heading as they also tend to be addressed together within the existing literature.

3.1.1 Current opinions regarding water resource management policies

Directives, such as the EU Water Framework Directive (WFD), signify an important movement towards an ecosystem based approach for water policy and water resource management (Kallis & Butler, 2001). Kallis and Butler suggest that the fundamental question regarding the usefulness of such directives in water resources management is:

"How 'options' will be compared and in what detail, uncertain, future 'adverse impacts' (i.e. on the status) can be determined. A crucial issue is therefore whether the WFD will be able to open up the decision-making and evaluation process to water conservation and demand orientated alternatives, which in

many cases could provide better socio-economic and environmental options" (p135).

While the intentions of such legislative movements are to primarily facilitate and promote environmentally based management of water resources they also need and are required to address their social and economic impact. Cohen *et al*. (2006) comment that "*The scenarios of changing water supply and demand provide a picture of impending challenge for regional water managers and user groups, as well as various levels of government …which may result in increased conflict*" (p348). They identified three common problematic areas when reviewing the challenges facing the required adaptation in water management due to climate change:

- Values and perceptions
- Financial and human resource issues
- Politics and decision making processes

However, the capacity for adaptation to occur within these areas is dependent on conditions that either help or hinder adaptation to take place. They argue that "*legislation and regulation can be effective barriers as some are institutionally entrenched…however changes in regulating regimes can also be key motivators for change*". Schaefer and Brelak (2006) are also of the view that new legislation can stimulate change at a broad societal level. They recognise that during the last twenty years there has been a movement away from

developing new water resources, towards management of existing water resources. However, they are of the opinion that "*shifting the underlying attitudes of individuals may take a generation or more*" (p1).

On the subject of water policies that promote wider participation Mostert (2003) points out "*there is no shortage of international declarations referring to public participation as a key water management principle*" (p179). Nevertheless, he supposes that the real challenge in the public promotion of sustainable water policies is that "*it requires an open, transparent and outward looking government that recognises that it cannot solve current water management problems on its own and has sufficient confidence to enter into direct discussion with its citizens*" (p194).

It seems therefore that furthering the adoption of current water management ideals requires acceptance of and adaptation towards a more pluralistic attitude by those governing the changes required in water resource management. Tisdell (2003) suggests that if the "*water doctrine of a state or country conforms to a set of social justice principles then the water policies derived from it should produce just outcomes*"(p401). Colebatch (2005) however argues that the governing of water use should be viewed more as the institutionalisation of social practice rather than the execution of governmental decisions and calls for attention to the interaction between:

- How people make sense of the world (the cognitive dimension)

- Value-judgements on which people base their sense making (normative dimension)
- Organisational framework via which the practice is ordered (regulative dimension)

Stenekes *et al.* (2004) extend this argument. They suggest that although knowledge about and the values attributed to water cycles have changed and norms have shifted towards considering shared social responsibility, the goals of new policies are being pursued via old organisational structures. This causes frustration among those holding a 'reformer' viewpoint and competing institutionalisations as shown in Table 3-1 below:

Dimensions of Institutions	'Conservative' (Traditional Model)	'Reformer' (Towards Sustainable Model)	'Community/Green Activist'
Cognitive (knowledge)	Supply & disposal Feed demand Mono-disciplinarity	Water cycle management Multiple users & goals Trans- disciplinarity	Environmental & public health dangers
Normative (values)	Exploit & discard Sewage as a waste Government responsibility	Water efficiency & conservation Sewage as a resource Shared social responsibility	Social construction of risk Community empowerment – 'us' & 'them'
Regulative (rules & sanctions)	Professionally controlled state monopoly Functional activity	Professionally controlled State monopoly Catchment based management	Loosely defined organisational structures e.g. public forums

SHIFT

Partial Shift

Table 3-1: Competing institutionalisations of water management evident in water recycling initiatives (indicative) & cognitive & normative shift in thinking (but not regulative) (Source: Stenekes *et al.* 2004 adapted from Brown, 2003, p31-35 (drawing on Scott 1995), Colebatch & Lamour, 1993, p108-116)

Furthermore, Means (2002) comments on the lack of connectivity " *between what the public says it wants and what water utilities often think the public wants*" and is of the view that "*it is the role of the utility to support informed decision-making not impose values*" (p32). This view is also echoed by Starkl *et al.* (2003), who comment on mismatches between solutions to local water resources utilisation and the expectations of the government who implemented the solution in the first place. Regarding water supply options and choosing which water policy to apply, Haider and Rashid (2002) recommend assessing

the trade off behaviour of residents in relation to the water management options available. They suggest that this type of assessment can lead to insightful responses, as there is "*potential for discrepancy between preference of the public at large and the expert driven consultation process*" (p337).

3.1.2 Water Pricing and Restrictions

A variety of perspectives are evident regarding the value of water. As Jeffrey Philips of Welsh Water commented (cited in AMA, 1993), "*On the one hand some people say that water is so important it should be free. On the other hand others say that it is so important that it is worth paying for*". Within the water sector there are many ways of promoting equity, efficiency and sustainability. And, "*water pricing is probably the simplest conceptually, but maybe the most difficult to implement politically*" (Rogers *et al.*, 2002, p1). Rogers *et al.* point out that consumers and water suppliers have very different expectations of water tariffs. Consumers expect delivery of affordable high quality water and stable pricing, whereas suppliers expect to cover their expenditure and maintain a stable profit margin. Therefore, the expectations of what water generated fees should provide are numerous. However, "*no one tariff can meet all objectives…the key is for the utility or community to identify the objectives most relevant to its situation*" (p5). Boland (1997) recommends that the 'best' tariff design is one which addresses the circumstances of a particular community and provides a desirable balance between important objectives within that community.

However a major difficulty encountered by water regulators and water service providers, when proposing changes in expenditure, in relation to water supply security, is gauging the extent to which customers' are willing to pay more to effect improvements in service quality, and what aspects of that service they would like to see improved (Hensher *et al.*, 2006). For example, Hensher *et al.* concluded that a customer's willingness to pay to avoid drought restrictions was related to the severity of the drought order. They found that "*customers were willing to adjust their watering schedules compared to paying higher water bills*" (p65). However "*water restrictions beyond low levels were not generally accepted as a long term solution to Canberra's future water needs…These findings are consistent with other results from other surveys in the region*" (p63). There seems to be therefore a link between willingness to pay and the level of restrictions to be imposed. Several studies, summarised within their paper, demonstrated there was wide variation in customers' willingness to pay. While the reasons for variation were unclear they were "*likely to be linked in part to the methods used and in part to the specific trade offs being targeted in particular countries*" (p58).

3.1.3 Raising awareness and receptivity to change

With water management projects specifically in mind, investigating receptivity to change and understanding the drivers for including new technologies into an individual's or communities' daily routine are important factors worthy of consideration. Receptivity in this context is defined by Jeffrey and Seaton. (2004) as:

"The extent to which there exists not only a willingness (or disposition) but also an ability to (or capability) in different constituencies (individuals, communities, organisations, agencies etc.) to absorb, accept and utilise a given technology".

Within the UK, water conservation adoption in the home is increasingly promoted, both by water companies and the government (Gilg & Barr, 2006). Activities, such as, turning the tap off when cleaning teeth, only using the washing machine when fully loaded, water meter installation, or using water saving devices (e.g. water butts or Hippos), are common encouragements for the consumer to adopt water conservation methods. However, Gilg and Barr's findings, based on the frequencies of water and energy conservation behaviour measured within their study, suggest that the adoption of water and energy saving activities by consumers are diverse. Four different behavioural patterns in relation to environmental commitment emerged from their study:

- Committed environmentalists and mainstream environmentalists – both groups most likely to engage in water and energy saving activities
- Occasional environmentalists - less committed to all behaviours in question
- Non-environmentalists – never undertook the majority of water saving behaviours

Their study did not investigate levels of environmental awareness. However, their findings suggest that the non-environmentalist group were also significantly less likely to report knowing someone who helped the environment, and therefore were less inclined to view environmental concern as socially acceptable or desirable. A survey published in the Melbourne Resources Review (WRSC, 2001), Australia also demonstrated that domestic water consumers could be categorised, into the following four groups:

- Conservers: 34% believed in and practised routine water conservation.
- Water consumers: 25% assumed that water was abundant and took water for granted.
- Gardeners: 23% voiced an interest in supporting water conservation provided their gardens did not suffer.
- Pretenders: 18% said they were concerned about conserving water. However, their attitudes and habits indicated that they made no effort to adopt it in practical terms.

They concluded that "*This study suggests different programs are required to influence the behaviour of different segments of consumers*" (p24).

The promotion of water reuse is generally viewed as a viable resource conservation option. Promotion and adoption of this water conservation option is more evident in certain water shortage prone countries such as Australia, where they have piloted and invested in a variety of water reuse schemes For

example, Hurlimann and McKay (2006) have carried out research of recycled water for domestic non-potable reuse in Mawson Lakes, South Australia. They voice some concerns that:

> *"The effectiveness of policies designed to promote recycle water systems depends on the acceptance by the community of the price, odour, colour and salt content of recycled water especially in urban settings…Community acceptance of recycled water and the economic feasibility of such projects have not been widely evaluated, even though the long term feasibility of many projects is dependent on such information" (p1).*

Their comments suggest that without the proper evaluation of reuse schemes, in the context of community acceptance and economic viability, it may be difficult to effect policies to promote their uptake.

Pirie *et al.* (2004) however argue that it is not always the water consumer who is at fault regarding awareness of, or commitment to, conserving water as: "*County level education programs have focused on water quality…However there has been a tendency to ignore water quantity aspects, such as water conservation in the educational component of local plans*" (p36). The barrier to further adoption of water reuse technology is therefore not always because of its rejection by the end user. (Fittschen & Niemczynowicz, 1997) comments on the difficulties experienced by the ecovillage of Toarp in Sweden who

implemented dry sanitation (composting toilets) for recycling human excrement. The technology was introduced due to the people's own enthusiastic request for such an environmentally friendly system. They experienced major technical and operational difficulties due to insufficient information transfer and lack of usage instructions, resulting in most of the composting toilets being replaced by water toilets. Therefore poor uptake of water conservation measures can also be due to (i) a lack of governing institutions promoting the right message to directly address why there is a need for water conservation measures or, (ii) inadequate information transfer to the consumer when adopting new technologies.

3.1.4 Conclusions

To conclude, it seems that there is general recognition of the need for movement towards the uptake of more sustainable water management practices. However, there are some obvious tensions between different stakeholder constituencies, and differences between the cognitive, normative and regulative institutional dimensions, regarding water management practices. Knowing how different stakeholders view the uptake of the various approaches available to help sustain water resources could further our understanding of the tensions that can occur between different actors regarding the choice of water policy mechanisms.

3.2 Anticipated risks and benefits in water management projects

Within the preceding section, Haider and Rashid (2002), and Hensher *et al.* (2006), commented on the possible importance of assessing the trade off behaviours of residents, in relation to different water policy options. One of the key areas of concern for stakeholders involved in water resource management are the real or perceived risks involved (Johnson & Handmer, 2002). Furthermore, "*a shift from crisis-response to proactive risk management has become evident in recent years*" (Pirie *et al.*, 2004, p26) and water management is increasingly viewed from a risk management perspective. This section therefore considers the anticipated risks and benefits that people associate with water resource management.

A high proportion of the references used within this section report on public perceptions in relation to water reuse. Current literature on that particular theme is used here as water reuse is a particularly sensitive issue. Various forms of water reuse are increasingly viewed as an important option in the water resource management armoury. Furthermore, a high proportion of recent research specifically explores the issues and concerns voiced by residents directly affected by proposed or adopted water reuse schemes. The section comprises of three parts that address the following topics:

- Factors that can influence attitudes towards personal (real or perceived) risks

- Primary (real or perceived) risks associated with water resource management
- Case study examples of success and failure in the implementation of water resource management projects.

The section ends with the conclusions drawn from reviewing the content of these three parts.

3.2.1 Factors that can influence attitudes towards personal (real or perceived) risks

3.2.1.1 Defining the risks involved

It is very likely that a water company spokesperson will have a different arrangement of concerns influencing their behaviour within a participatory process than a farmer, due to their different mental models and goals in relation to the process, resulting in different perceptions of what the problem is and how it might affect their interests (Tippett *et al.*, 2005). The relationship between perception and participation is commented on by Hartley (2003):

"Perception is usually considered to be an individual level factor, while participation is a process context, social and structural level phenomenon. In other words, perception relates to what is going on in an individual's head – how they think and feel about things. Participation on the other hand, refers to all features of a decision making process in which individuals are participating.

Perception and participation are closely related, as individual factors influence the outcomes, success and characteristics of the process and context of decisions. At the same time, the nature of the process contributes to shaping an individual's perceptions" (A-4).

In addition, experts tend to define risk in terms of the high value placed by the public on health issues, while the public viewpoint on what risk is and the value they attribute to their definition of risk is more complex (Beierle & Cayford, 2002).

3.2.1.2 The quality of information provided, and use of terminology.

The extent to which an end user will expose themselves to contact with reused water can be dependent on the quality of information provided (Marks *et al.*, 2003). It is therefore beneficial to introduce educational measures to increase awareness about urban water issues among residents to enhance their overall motivation to participate, especially when it involves the introduction of a change from traditional to more innovative systems (Starkl *et al.*, 2003).

It is also evident that the general public think differently about, and apply different terminology to, products and services than professional entities (technologists, policy makers, planners, suppliers) directly involved in their production (Jeffrey & Seaton, 2004). Choice of terminology may therefore be important when discussing water reuse, especially when describing water for personal consumption or use (Hamilton, 1990; Owen *et al.*, 1999). For example, in 1993 the technical staff of City of San Diego's reclaimed potable water project were adopting technical terminology, such as reverse osmosis and ozonation,

into their personal vocabulary. The staff handling public education however had to contend with citizens' revulsion regarding the idea of drinking treated wastewater (Katz, 1997). Descriptive terminology preference (i.e. reclaimed, recycled or repurified) was addressed and included in their public outreach and education programme. The term repurified was adopted for the project, thus reflecting the sensitivity of both the general public and the public outreach staff to the issue.

The terminology used by the bottled water industry such as 'pure' or 'purest' complements the public perception that source waters can be contaminated (Means, 2002). The consumer is therefore encouraged to question what exactly is being delivered via their domestic tap. One study of odour and taste in drinking water suggests that such associations can even influence people's rating of water purity in the absence of objective differences (Comrie *et al.* 2003). Clearly, defining the language or terminology used between the different groups involved in water reuse and reclamation could aid overall understanding and ensure clear, unambiguous communication (Asano, 2002; Harris, 2002).
Several studies have shown that there is a relationship between the attitude of an individual and his/her level of formal education or knowledge of water reuse. It seems that the higher the level of education someone receives the greater the probability that they will accept water reuse (Baumann, 1983; Olson & Pratte,1978) People with a university education were twice as likely to accept potable reuse, and potable reuse was twice as likely to be accepted if the respondent had previously heard of reuse (Hamilton, 1990). However,

Creighton (2005) points out that a "*better informed public is not necessarily a more supportive public*" (p272) and that any attempt to manipulate them to accept a predetermined outcome may result in them being more aggrieved than if they had been omitted.

3.2.1.3 Public trust levels regarding institutions involved in decision making

A positive public attitude towards information conveyed to them about risk from any institution is also closely related to the level of credibility and trust they attribute to those institutions (see Section 3.3). This multidimensional social trust, or confidence, can be seriously diminished if national agencies or institutions are judged to be incompetent, biased or compromised, or seem to arrive at decisions without regard for public concerns. The cause of poor communication between professional groups engaged in water quality was attributed to their different frames of reference by Bruvold in 1975 and this is still recognised as a determining influence today. The resulting effect of these differences between experts on the lay public, especially when addressing risk, has led to customer dissatisfaction and lack of trust regarding drinking water services and its quality (Owen *et al*., 1999).

Erosion of the social dimensions of trust can seriously impair the ability of institutions to communicate with risk bearers (Kasperson, 1986). As Robinson and Bond (2003) point out, the greater the public involvement in the participative process the greater the level of trust that may be received. It is also crucially important that the decision making process with regard to water

allocation within a community is, above all else, a fair process (Syme *et al.*, 1999).

Furthermore, Slovic *et al.* (2004) point out that people may base judgements regarding actions taken or technologies used not only on how they think about it but also on how they feel towards it. If they favour an activity then they tend to judge the risks as low and the benefits as high; conversely, if they feel unfavourable towards it then they will judge it as high risk and of low benefit (Slovic *et al.*, 2004). People's risk perception and the potential severity of that risk are not based solely on numerical data. If the said risk is seen to be more under the direct control of an individual then it seems to be more acceptable than if the risk is controlled by others. Water resource management is typically perceived as the latter type of activity (Aertgeerts & Angelakis, 2003).

3.2.2 Primary (real or perceived) risks associated with water resource management

3.2.2.1 Health risks

A major survey, by questionnaire, of a representative sample of households in England and Wales demonstrated that there is a broad willingness to accept in-house water recycling, as long as public health is not compromised (Jeffrey, 2002). Nearly 90% of respondents agreed with the statement 'I have no objections to water recycling as long as safety is guaranteed', but this of course

leaves unaddressed, the question of what they would consider a guarantee of safety.

The lack of water quality standards for greywater reuse systems can also lead to a perceived threat to public health. The guidance available with regard to faecal coliform counts that would be acceptable is not consistent and therefore only serves to confuse (Howarth, 2002). Public trust in (UK) water quality standards may have been further eroded by reports showing that 99.5% of tests have passed governmental standards. Media and government reporting on performance versus these standards may have led to heuristic judgments being carried out by the public allowing them to only surmise what may have been the health risks surrounding the 0.5% of tests that failed the set criteria (Owen *et al.,* 1999). In some circumstances, the public's perception of water quality may be entirely based on the aesthetic properties (appearance and odour) regardless of whether they affect the overall physico-chemical or biological water quality (House, 1996; Means, 2002).

However, Hurlimann and McKay (2006) argue that the "*risk averse approach is warranted as cross connections between potable and recycled water mains have occurred in various parts of the world with detrimental impacts to the projects*" (p10). For example, dual water supply systems were banned in the Netherlands in 2003 after an incident involving the cross connection of a dual water supply system at a 'greenfield' housing development site in Lichi Rijin (Netherlands Ministry of Spatial Planning Housing & the Environment, 2003).

This cross connection was purported to have caused 200 people to be infected with gastroenteritis (Cooperative Research Centre for Water Quality & Treatment, 2003).

3.2.2.2 Monetary risks

Whilst many residents using reclaimed water systems within their homes recognise water conservation as an issue, they demonstrate more enthusiasm about the possible monetary benefits that using a cheaper alternative to potable water may bring (Marks *et al.*, 2003). There is however an unproven cost benefit with regard to greywater recycling systems, making it difficult for end users to see whether they can recoup their initial investment (Howarth, 2002; Marks, 2003). Nevertheless, Syme *et al.* (1999) argue that economic arguments hold less importance in the overall process when considering or deciding on the allocation or reallocation of water.

Some individuals may not object in principle to a specific type of development, but are averse to adopting it themselves, or having it installed in their immediate area of residence, even when the economic case for water reuse can be made. For example, purchasers of new homes on a housing development in Hampton Court, England, UK, marketed during the drought of 1995, had an option of buying a greywater recycling unit for £1000 (house purchase price £250,000). There was no uptake and the general attitude was ‘good idea but not for me, not now’. This attitude seemed to encompass not just the potential house owners but also house builders, water companies and regulators (Howarth, 2002). Syme *et al.* (2000) suggest that this type of response reflects contextual

self interest – that is, how fair an individual judges a situation to be on them or their immediate family only.

3.2.2.3 Social acceptance risks

Strategic decisions on the introduction of a water management scheme needs to take into account public attitudes and behaviour towards the relevant technologies and processes. In this context, successful strategic management is not only dependent on practical performance but is also reliant on understanding and identifying the nature of the social environment to which it is applied rather than merely anticipating the likely outcome of the public response. The issues here are both complex and complicated, having to do with beliefs, attitudes and trust. The importance of 'reality testing' therefore still holds true; as Bruvold pointed out in his (1975) review of the studies on public perception and attitudes to renovated waste water – there is a need for research on actual usage to be able to interrelate attitudes, beliefs and behaviour in a realistic manner.

Hamilton (1990) conducted a questionnaire survey to investigate public perception on potable reuse in parts of Queensland and New South Wales. The most frequent reason given for non-acceptance was lack of faith in institutions, politicians and authorities. However, it seems that NGOs are more trusted overall than business, government or the media on issues concerning health, social policy or the environment and are viewed as "*selfless crusaders, whereas businesses might be perceived as supporting corporate greed*" (Wootliff & Deri, 2001, p159).

Giving people the opportunity to make an informed choice when adopting new sanitation or water reuse systems can be more sustainable long term as sustainability has been noted as being:

> *"Markedly higher in communities where household members made informed choices about whether to build a system and what type of service they preferred. This relationship proved statistically significant, even after controlling for the effects of independent factors such as poverty level and distance from a major city, and project related factors such as training, technology type, and the per-capita cost of the system" (Sara and Katz, 2002).*

The overall outcome of numerous international studies carried out on public attitudes to water recycling conclude that the level of personal contact expected with the reused water and the source of the reused water are two important factors that influence its social acceptance (Jeffrey, 2002; WRSC 2001; QWRS; Flack & Greenberg, 1987; Olson & Pratte, 1978). So, while there may be considerable public support gained for the utilisation of reused water for remote purposes such as industry, agriculture or park irrigation the level of support diminishes in respect of the level of personal contact expected, with potable reuse having the lowest level of acceptance. The source of the water may also have some bearing on acceptance. Whilst the reuse of water within a single household may be acceptable for many people, plans for recycling water that

comes from next door or the next street may be met with less enthusiasm (Jeffrey, 2002).

The operation of and maintenance required for certain water reuse systems may also have some bearing on uptake as it is not "*fit and forget*" technology (Howarth, 2002). However, many engineering professionals within the water sector also resist getting embroiled in conflict situations with the public over new technological issues. This attitude manifests itself via their reluctance to "*go against the status quo of Western style water and sanitation infrastructure as well as a lack of interest in guaranteeing the sustainability of this infrastructure*"(Morrison, 2003, p46).

However professional institutions are typically embedded in wider legal and/or financial systems. Organisations may also be restricted by the level of information they can divulge to outside institutions regarding internally confidential or competitively sensitive material.

3.2.2.4 Environmental risks

The 'perception spectrum' with regard to water management and conservation is wide; from countries such as the UK, who are frequently flooded by heavy winter rainfall and have difficulty in perceiving a need for it, to the active involvement of consumers in Australia, where the shortage of rainfall is more obvious (McCann, 2003).General support for water recycling is stronger in countries and regions where environmental and resource concerns are greater;

where there is not so much pressure to conserve water supplies, health concerns tend to dominate (Bristow & Prieto-Curiel, 2002).

Not surprisingly, a similar correlation is observed among individuals: that people with strong concern about environmental problems tend to support initiatives like water recycling seen as having environmental benefits, even though these same individuals may be more informed about health hazards and more inclined to question official reassurances. Syme *et al.* (1999) however identified the following as being respondents' most important principles regarding fairness within a water allocation process:

- Management for future generations (intergenerational equity)
- The rights of the environment
- Efficiency of water use
- Water is owned by everyone and its management overall is for the public good

3.2.3 Case study examples of success and failure in the implementation of water resource management projects

Some of the issues that may either beneficially or detrimentally affect the implementation of a water resource management project are illustrated in the following examples. The main factors that seem to have contributed to the outcome of the projects are highlighted after each example.

Examples from Queensland, Australia (Source: QWRS, 1999)

In 1996, Caboolture Shire Council conducted a six month public information and consultation exercise to gain feedback on its proposal for reuse of effluent to produce water of potable quality. Their confidence in gaining public acceptance for this type of water reuse, rather than try and gain acceptance first for other less personal uses may have been partially driven by the perceived success of their neighbouring councils Caloundra and Maroochy in a similar but much more intensive and lengthy survey. The feedback that Caboolture council received was so negative that they abandoned the project. "*The consultation process also appears to have naively been conducted 'on the cheap', in an area noted for strident councillor opinion*".

In contrast to this, in 1996 Caloundra-Maroochy Shire Councils conducted a lengthy and intensive three phase strategic wastewater management study. They initially identified broad water reuse options. These options were then short listed and finally they obtained feedback on the shortlist. Public attitude was measured via discussion groups, a telephone survey and a final workshop. Indirect potable reuse was given the most support out of the options. However, the validity of the support shown for potable reuse is questionable as some of the questions asked during the telephone survey could be described as leading (choice of options was limited to reuse or a dam for instance). The input from environmental groups may have also impacted on this study.

Factors that could have contributed to the different outcomes of these projects therefore were:

- Caloundra-Maroochy S.C. provided their constituents with the opportunity to voice their opinion, initially on a broad based selection of proposed water reuse options. Feedback from their shire constituents allowed them to draw up a short list of acceptable options
- Caboolture relied heavily on the relative success gained by the neighbouring Caloundra-Maroochy S. C. to be an indication of what they could achieve within their own constituency, within a shorter time frame and less capital outlay.

Example from USA: City of San Diego, California: Water repurification project (Source: Hartley, 2003)

Back in 1990, ninety percent of San Diego's water supply was imported from surplus water in the Colorado River Aqueduct, a little known fact amongst the city's public according to polls conducted in the area. Recognising that future constraints on this supply was likely in the future, due to San Diego's progressive expansion and of the continuing growth of other cities upstream in Arizona and Nevada, San Diego decided to initiate a pilot project to test the viability of a potable water reuse system in the early 1980's. This pilot project was not used to distribute water for potable use but provided data on system reliability and the safety of reclaimed water from 1984 to 1993. Views expressed by government and elected officials and technical experts regarding the success of the pilot project varied, including its use in the education of the public and efforts towards public outreach. A legal decision in 1994 required the city to build a water reclamation system capable of handling 45 million gallons

per day. The ensuing demand for the reclaimed water from the plant however was limited and resulted in millions of gallons of the water being dumped into the ocean. Due to official concerns regarding the dumping of the resource and the reliance on water importation, a project to infuse reclaimed water into the potable water supply was jointly proposed by the city and the county water authority.

For several years, the proposal moved forward, endorsed by panels of technical experts and California's Department of Health Services. However, in 1999 the proposed project was halted due to political and public opposition, the main concerns voiced being racial and economic bias regarding the project design, public health and project costs. Even today there is still substantial disagreement between the parties concerned over how and why the project failed. The city of San Diego continued to work towards its goal of utilising twenty five percent of its reclaimed water by 2003, but its quest for potable reuse was no longer pursued.

Factors that may have contributed to the outcome of this project therefore were:

- Lack of information provided to the public on San Diego's reliance on water importation
- Concerns regarding possible water stress within the area in the future were only addressed 'internally' by governmental and technical officials, without public input, and then addressed by further legislation.

- Concerns voiced by the public and political opponents were only listened to after nine years of planning the proposed project. This resulted in the halting of the proposed full scale reclamation project and its substantial downsizing.

3.2.4 Conclusions

To conclude, the relationship between water management methods and the real or perceived risks involved in relation to water management issues are illustrated within this section. However, much of the research in this sector has centred on public perception of risks and benefits, while little is known directly about the perceptions of other stakeholder groups. Furthermore, little is known of the variation between different stakeholders' expectations of the risks and benefits in relation to their adoption of inclusive water management schemes.

3.3 Transmission, acceptance, and comprehension of information and knowledge

Cash *et al.* (2002) argue that managing the boundaries between different forms of knowledge is critical to transferring information. By boundaries they mean the:

> *"socially constructed and negotiated borders between science and policy, between disciplines, across nations and across multiple levels. They serve important functions (e.g. protecting science from the biasing influence of*

politics, or helping organize and allocate authority), but they can also act as barriers to communication, collaboration and integrated assessment and action" (p1).

In addition to their argument that managing such boundaries is essential for the effective linking of knowledge to action, they suggest that credibility, salience and legitimacy are the "*three pillars of knowledge production*" (p4). Dynamic interactions between these three subjective attributes seem to be critical determinants of how different actors perceive and judge information. The interaction between these three attributes can therefore either enhance (compliment) or decrease (create tension) each other. Furthermore, Cash *et al.* put forward the case that science and technology systems which actively and consciously pursue multiple boundary management within a system *and* focus on reaching the thresholds of salience, credibility, legitimacy and balance the tradeoffs between them are more successful than those that do not.

Information provision, knowledge sharing and production play an important part in participatory planning, stakeholder understanding of process and resource management options, and the promotion of stakeholder dialogue. In this context, identifying and understanding the information requirements and viewpoints of stakeholders in relation to water resource management projects is therefore an important consideration.

The features selected for detailed study within this section, regarding the transmission, acceptance and comprehension of information or knowledge are; trust, credibility, reliability, impartiality, respect, orientation, knowledge and ease of understanding. This list is by no means exhaustive and no claim is made for its primacy. However, as will be seen below, these are features which have been identified in the literature as modifiers of audience attitudes towards information sources. The intention in reviewing these features is to identify how various intellectual traditions have addressed and signified their influence on communication and information sharing.

3.3.1 Trust

Trust (see also Section 2.4.3) is a recurring theme in much of the literature on human perceptions and attitudes, particularly with regard to risk and the management of risk (Frewer *et al*., 2003; Kasperson, 1986; Renn, 2004; Slovic *et al*., 2004). While many research disciplines define the concept of trust (and there is widespread agreement on the importance of trust) there is no single agreed definition of the concept (Hosmer, 1995). From a sociological perspective Sztompka (1999, p25) defines trust in general terms as "*a bet about the future contingent actions of others*".

Slovic (1996, p175) points out that *"if trust is lacking no form or process of communication will be satisfactory*". While perceptions of 'vested interest' and 'degree of knowledge' are significant factors in the amount of trust invested by an individual when considering a particular information source, neither are

sufficient by themselves to warrant trust per se (Hunt & Frewer, 2001). How knowledgeable a particular source is thought to be is not the only factor that leads to trust but rather "*that trusted sources are seen to be characterised by multiple positive attributes*" (Frewer *et al.* 1996, p473).Synthesising a review by Renn and Levine (1991) and definitions (Kasperson *et al*., 1992; Peters *et al*., 1997) of the cognitive components of trust which are relevant to both people and situations, Petts, (1998) concludes that trust constitutes "*perceived competence; objectivity; procedural fairness; consistency; goodwill and caring*", p308). Rosati and Saba (2004) hypothesise, after synthesising research data from Kasperson (1986) and Covello (1992a) that trust attributed to any source of information is based on three factors (i) perceived reliability of the knowledge held by a given source; (ii) perceived completeness or honesty of the information provided by the source; (iii) perceived level of concern shown regarding protection of citizens from harm. Poortinga & Pidgeon (2004) also discuss how influential and important people's prior attitudes, termed 'confirmatory bias' can be when assessing an issue. Their findings suggest that people with strong preconceived ideas do not easily change their attitudes or their allegiance of trust as they tend to interpret situations so that they fit in with their previous attitudinal stance.

The relationship between trust in the source of information and the impact that information has on the perception of the risk involved is clearly not straightforward - it is therefore important to understand what the person receiving that information feels is important (Frewer *et al.*, 2003).

3.3.2 Credibility

Source credibility, alongside the concept of trust, has also become a prominent area of research in recent years. Credibility is now recognised as a valuable asset when communicating possibilities. Risk communicators within industry and government are typically viewed as being less trustworthy sources and "*source credibility can function as an information cue affecting systematic and heuristic processing*" (Trumbo & McComas, 2003, p346). The definition of credibility in general (Collins English Dictionary, 1994, p373) is that someone possesses the quality of being believable. In the context of information provision regarding the management of risk "*if the communicator is viewed as having a compromised mandate or a lack of competence, credence in information provided tends to be weakened accordingly*" (Kasperson, 1986, p277)

The assignment of high credibility to an information source has also been found to be inversely correlated to risk perception (Jungermann *et al*., 1996). Credibility is therefore enhanced when the message issued by the information source is perceived as believable or valid by the receiver of the message (Ohanian, 1990).

3.3.3 Reliable sources

The reliability of information has been citied in many academic papers as a crucial factor when considering the space between scientific risk assessment

and the lay person's perception of that risk (Slovic, 1997). There is always the added risk that a person who is trusted may be unreliable. One way to reduce that risk is to rely on "*those individuals who we sense will follow what we consider to be appropriate guidelines and general principles for setting goals and procedures – those with similar salient values*" (Siegrist *et al*., 2000, p360). The acceptance or rejection of an information source is highly reliant on how the recipient views the reliability of the source (Cantwell, 1998). Cantwell suggests that:

(i) If the information is presented by a fairly reliable source and there is no reason to suspect the new information to be false then we may tentatively accept it. Conversely, if the source is notoriously unreliable or we suspect the new information to be false we may reject it;

(ii) If several unreliable sources are involved and they all provide the same information independently of each other that contradicts the information from a trustworthy source, or, highly trustworthy sources supply information that seems to be contradictory, then whether to accept the information or not may be a difficult decision for the recipient.

Confidence in a source can also be diminished if it is not regarded as sufficiently informed to have a reliable view on the subject (Hunt *et al.,* 1999).

3.3.4 Importance of impartiality

Recipient expectations can be diminished if an information source is viewed as having a high level of reporting bias (Hunt *et al.*, 1999; Eagley *et al*., 1978). For example, if scientists are seen to endorse the safety of a local facility whilst also being paid by the "*polluting party*" then the audience may be more sceptical regarding the content of the information received (McComas, 2003, p1259). In this situation it may not be the intrinsic credibility of the said scientist that is altered but rather that there would seem to be a conflict of interest. According to Earle (2004) being universally fair is not as important to people as being fair to those who possess similar traits to themselves.

3.3.5 Respected sources

Being respected is the state of being honoured, admired, well thought of, or being held in high regard. De Cremer & Tyler (2005) state that being respected within a group reflects a positive standing within that group and social reputation directly refers to how members of a group evaluate an individual. Furthermore, the moral trustworthiness or reputation of a company according to Kaptein (1998) is in direct reference to how stakeholders perceive the company's conscience and that "*the moral conscience of a company is anchored in its culture and structure*" (p11).

Saiia & Cyphert (2003) use the Mobil company as an example of the relationship between respect and corporate communication, noting that "*patronizing and self-righteous effort to position itself as the corporate solution*

to America's oil problems was deemed a self-serving attempt to influence, denying Mobil a respectful rhetorical relationship with an audience of equals" (p49).

3.3.6 Orientation of concern

Covello (1992b) suggests that while the factors of caring, empathy, competence and expertise, honesty, openness, dedication and commitment are important in communication, empathy and caring are more essential than competence. The meaning of orientation is defined as "*the adjustment and alignment of oneself or one's ideas relative to surroundings or circumstances*" (Collins English Dictionary, 1994, p1101). Levels of perceived concern shown in relation to a given situation could be viewed as the intrinsic orientation of an individual, a group or a company either because of pure self interest/preservation or as a more altruistic act. The expectation of concern is therefore an important determinant when sources of information are being considered by individuals (Rosati & Saba, 2004).

Those receiving information are less likely to trust the honesty and expertise of the sources of information if they "*promote a view that does not align with the respondents' own attitudes*" (Frewer *et al*., 2003, p1131). However, knowing what different stakeholders value helps to clarify concerns about potential risk and management goals and aids the identification of the information required to address the questions articulated by stakeholders (Charnley, 2000).

3.3.7 Degree of knowledge

Knowledge is defined as "*awareness, consciousness or familiarity gained by experience or learning*" (Collins English Dictionary, 1994, p860). Knowledge is not an entity that can be directly observed, however its existence can be detected indirectly by the information generated via the actions of a human agent; therefore "*information serves as a necessary intermediate stage between raw data and knowledge creation*" (Alexopoulos & Theodoulidis, 2003, p324).

The degree of knowledge that an information source is assumed to have about a particular issue is an important expectation (Hunt & Frewer, 2001). Eagley *et al*. (1978) use the term 'knowledge bias' with reference to the level of knowledge or expertise attributed to a source on a particular subject. For instance, it seems that experts and engineers involved in infrastructure planning are reluctant to include the public for fear of loss of quality in problem solving and decision making, which is in sharp contrast to the flexibility needed to assure successful participation (Enserink & Monnikhof, 2003).

3.3.8 Ease of understanding information or knowledge sources

Dialogue between technical and non-technical communities can be fraught with problems as scientists often use language or terminology that are unfamiliar to non-scientists and can make them feel excluded by their use. On the other hand, scientists feel that replacing certain scientific terminology so that it becomes generally understandable to lay people means that accurate or precise scientific meaning is lost in translation (Glicken, 2000).

Another position, known as the least effort principle (Zipf, 1949), argues against any supposition that the quality of information is the main factor considered during source selection. Based on a body of relevant literature Pinelli *et al*. (1993) also suggest that accessibility is the most important variable that determines the use of information.

Judgements regarding trustworthiness may also "*vary as a function of stakeholder groups*" and if indeed stakeholders do hold different levels of confidence in different sources of information then this in itself could lead to poor communication between stakeholders (Ferguson *et al*., 2004, p206). How information or knowledge is conveyed from one party to another and the preferred style of the information accepted by the receiving party is therefore a matter that deserves attention.

3.3.9 Conclusions

To conclude, as illustrated within this section the transmission, comprehension and acceptance of information and knowledge can be highly reliant on the attitudes of the receiver towards the source of that information. In addition, managing the boundaries between different forms of knowledge is critical to transferring information. There is a need therefore to better understand how different stakeholders view information and knowledge provision from sources that may be directly involved in or can influence water resource management.

3.4 Summary

Within this chapter certain features have been identified from the available literature as:

- Influential regarding the choice and implementation of policy mechanisms
- Influential regarding anticipated risks associated with water resource management
- Modifiers of audience attitudes towards information sources and how these features may influence the transmission, acceptance and comprehension of information

The adoption of certain water management options can be highly dependent on public perceptions regarding water management issues and have been used to illustrate and comment on the problems that can arise if mismanaged.

The next chapter describes how the research agenda was targeted and structured based on the knowledge gaps and relevant research questions that emerged from this chapter. The targeting and structure of the research questions relate to the aspects of participatory planning in water resource management as commented on at the end of each sub-section within this chapter and the preceding chapter. This forthcoming chapter also reviews the elicitation methods available and their suitability for the study, and finally outlines the elicitation technique and the vehicles chosen to administer the questionnaire survey.

Chapter 4 : Development of conceptual model, research questions and review of elicitation methods

"Science does not begin with facts; it begins with the perception of a problem and the belief in the possibility of an answer" (Goldstein & Goldstein, 1978, p19).

4.1 Synthesis of themes and issues emergent from Chapters 2 and 3

It is evident from Chapter 2 and Chapter 3 that the effectiveness of participatory processes in water resource management have had mixed results and is a cause for concern among its practitioners and potential adopters. It seems that arbitrarily increasing the capacity of an actor, whether public or professional, to participate in, contribute to, or understand water resource management does not automatically guarantee a successful outcome. On the other hand, if interested or affected parties are denied adequate opportunity to participate in, contribute to, or understand water management issues, then the increased incidence of being to unable to implement proposed water resource management measures is well documented.

While there have been efforts to elicit and document public attitudes towards the management of water as a resource, less is known directly about their expectations regarding the structure of participatory planning processes and their engagement in such a process. The views of institutional or corporate stakeholders directly engaged in participative planning for water resource management is also rather obscure and under researched.

Chapter 2 and Chapter 3 illustrated and addressed the complex issues surrounding the implementation of participatory planning processes in water resource management. The two chapters demonstrated that there is need for further investigation of how different actors involved in the participatory process may view the following features that represent the primary deliberative content of participatory planning in water resource management:

- The structure of participative planning and widening stakeholder participation
- Choice of mechanisms to achieve principles set out within water policies
- Risks and benefits associated with water resource management
- Information provision from different stakeholders

A better understanding of the viewpoints and expectations, not only of the public but of all the actors (therefore including professional actors), regarding these particular features of participatory planning in water resource management, may further our understanding of what stakeholders expect or require from the process. The question therefore is could eliciting and analysing the variation between different stakeholder groups' viewpoints and expectations provide useful information that offers guidance for the structuring and content of stakeholder participatory events?

The remainder of this chapter comprises of three sections. The first two sections draw on the knowledge gained from Chapter 2 and Chapter 3. In

relation to the research questions posed, the final section reviews the different data collection techniques and options available. Therefore, to summarise:

Section 4.2 formulates a descriptive conceptual model, adapted from the Bosch *et al.* (2003) collaborative framework model (see Figure 2-4) specifically for the purposes of collaborative participatory planning in water resource management. The model reflects: the linkages between different stakeholder groups; the interaction that may occur between the stakeholder groups; and the concerns pertinent to each stakeholder groups' constituency, which may be influenced by their interaction with the other stakeholder groups.

Section 4.3 specifies a set of research questions for investigation. The research questions reflect the content issues of a participative planning process that may be of general concern to all the stakeholder groups as identified in Chapter 2 and Chapter 3. However, viewpoints of different stakeholder groups regarding those issues may differ and influence how their stakeholder constituency views a particular issue.

Section 4.4 reviews the type of information required to help answer the research questions posed, and the data collection techniques and options available to elicit the required information. This is followed by an in depth evaluation of the advantages and disadvantages of questionnaire survey techniques and the methods that may be used to administer questionnaire surveys. The section

concludes with a justification for administering a questionnaire survey and the elicitation strategy used.

Finally, Section 4.5 provides a summary of the subject matter covered within the chapter.

4.2 Development of a conceptual model of the participatory process based on social learning

Evaluation of the potential areas of dispute, encased within stakeholders' varying expectations of process and overall outcome, could be a useful starting point for guiding the required *content management* of a participatory planning process. Creating common ground, so that all parties involved can actively and confidently participate due to adequate facilitation and dissemination of knowledge, ideas and goals, could ultimately form long term sustainable strategies that better serve and satisfy all involved. Social learning – whereby the social origins of individual thought and action are influenced and transformed - promotes self direction towards future goals and outcomes (Bandura, 1986). Such a model of reflexive interaction provides a useful framework for analysing participatory processes. The following section describes how a modified version of a well established collaborative learning model has been applied in the context of water management.

As Bosch *et al.* (2003) point out (see Section 2.7) and as illustrated in Figure 2-4, managers (or policy makers) and scientists who are involved with the same

project typically work within independent cycles. Researchers acquire knowledge and managers or policy makers try to apply knowledge, without any interaction or mutual learning taking place between the two groups. Bosch *et al.* propose a framework that induces collaborative learning, via an integrated knowledge base. This provides research and management the opportunity to share and evaluate the various outcomes from their individual activities. It could also be argued that such a collaborative framework extends the idea of social learning - by the recognition of not only individuals learning *from* each other, but also *with* each other, thereby influencing individual world views and possible joint outcomes simultaneously.

This collaborative learning framework provides a useful model for participatory processes relating to water management. However, to be of practical use, it needs to be tailored to reflect a participatory planning framework in the context of water management. This is achieved by considering the particular stakeholder groups that may be engaged in water management projects. There are four broad stakeholder groups that may be involved in a water resource management scheme: Research, Management, Regulatory and Lay Community. The integration of knowledge from these four groups, to form a common knowledge base within the decision making framework, could be used as a way of recognising and addressing the requirements of each stakeholder constituency, during the life of a water management project.

In addition therefore to the managerial and research cycles, which comprise the original Bosch *et al.* model, two further constituencies (lay public and the regulatory bodies) are introduced and incorporated into the framework for the following reasons. The lay public are incorporated into the model as there is growing societal recognition of natural resource management issues. In some instances, there is a palpable public desire to be directly involved in addressing issues of environmental sustainability. If the public are not given adequate opportunity to be directly incorporated into the process, they may adopt alternative measures to ensure their views are heard or recognised (see Section 2.2.6). Furthermore, there is also a governmental shift towards policies that aim to widen participation and include previously excluded parties (See Section 2.3). The factors, therefore, that affect the public's attitudes and consequently influence the action they take towards a project are:

- their level of access to the project
- the extent to which they are allowed to participate
- the quality and type of information made available to them

The lay public cycle comprises the components 'information', 'attitude' and 'action'. The information or knowledge that the public impart may also influence the other stakeholder constituencies.

Regulatory bodies transmit current policy guidelines (or changes thereto) and may need to provide guidance from a policy or governmental perspective.

Based on OECD (1993) recommendations, the predominant constituency concerns of a regulatory body are likely to be concentrated on:

- the pressures on the environment
- the state or condition of the environment due to this pressure
- societal responses to these conditions to prevent further negative impact resulting from this pressure

Pressure, State and Response are the components incorporated into the regulatory cycle to reflect these concerns. Appropriate indicators are important (see Pinter *et al.*, 2005) to help quantify whether and why changes within a Pressure – State – Response (PSR) system are taking place over time. The choice of appropriate indicators is dependent on a specific system. However, the model used here is time-independent (i.e. not longitudinal). It is meant to assess the differences within and between the four stakeholder groups' constituencies, and is not linked to any specific water management project.

The conceptual model reflects:

- the interactions that may occur between the stakeholder groups due to the inter-group linkages
- the concerns pertinent to each stakeholder groups' constituency, which may be influenced by their interaction with the other stakeholder groups

The four individual cycles (constituency processes) feeding into the process of relationships and social learning helps identify and build the necessary content needed for knowledge transfer and understanding (constituency concerns). This in turn helps clarify the individual issues (livelihoods, management strategies, research questions and governance) pertinent to the four stakeholder groups, both in their individual constituencies, and for the other stakeholder groups involved. The model developed is shown in Figure 4-1 below (Figure 7-2 shows the modifications made to the developed model based on the research findings):

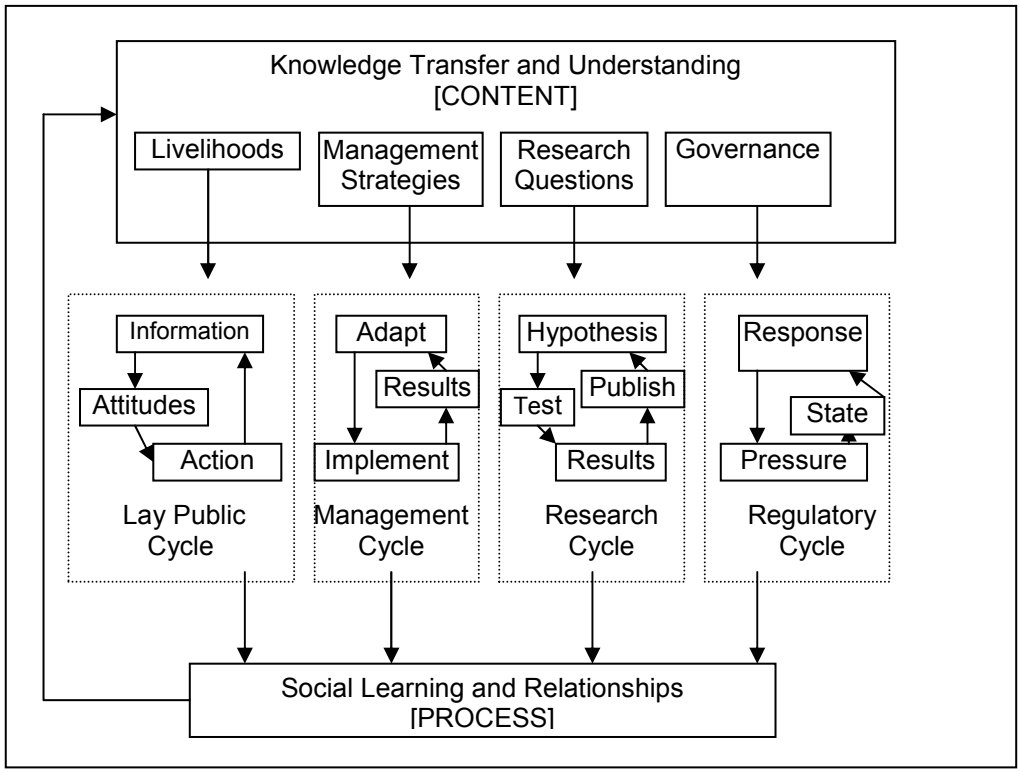


Figure 4-1 Framework linking the research, management, regulatory and lay public stakeholder cycles

So, what actually needs to happen to promote understanding between the stakeholder groups and facilitate a shared knowledge base? What are the essential issues that need to be addressed and taken into account to maintain an equitable and just process? The processes for making decisions collectively when faced with different alternative priorities and viewpoints are clearly complex.

In relation to this model it is also worth noting Shaw and Gaines' (1988) comments. They acknowledge how much of the richness of a collaborative learning environment comes from the differing constructions that different learners bring to the learning domain. However, they suggest that characterising the distance or dissonance between the different stakeholder groups' understandings, perceptions and knowledge sets, and taking appropriate action to resolve that dissonance, could help sustain social learning, improve relationships, increase understanding and facilitate knowledge transfer within the stakeholder framework. To facilitate the process of social learning, knowledge acquisition in particular, and aid understanding of the requirements of the process by the stakeholders we need to:

- Identify the issues that are regarded by the stakeholder groups as salient and need to be addressed.
- Characterise the differences and similarities within and between stakeholder groups' attitude in relation to each issue identified as important by the stakeholder groups.

Within the model depicted in Figure 4-1, effective collaboration is therefore dependent on the ability of the various constituencies to develop a common language and share understandings. Facilitating and improving communication and providing opportunities for dialogue between the stakeholder groups may help to build up and encourage the required understanding, improve trust levels, develop relationships and contribute to the emergence of workable and sustainable management solutions. Furthermore, characterising the dissonance between constituencies, in terms of key issues that require further understanding, may help target resources to support such interactions. One should also be aware that the stakeholder interactions that can take place within the framework shown in Figure 4-1 may vary from project to project.

4.3 Research Questions

These research questions reflect the content issues of a participative planning process that may be of general concern to all the stakeholder groups as identified in Chapter 2 and Chapter 3. The following questions provide a robust underpinning for the thesis and as act a clear guideline for the analysis stage of the fieldwork. In relation to wider participation in the planning and implementation of water resource management projects, what is the extent of variation of within and between the stakeholder groups' attitudes to:

- Preferred structures of participatory planning process
- Preferences for different water policy mechanisms

- Anticipated risks and benefits of projects
- Information and knowledge sources

Answers to the above questions may then also further inform the following research questions:

- How robust is the concept of a ‘stakeholder group’ in terms of it having a distinct set of opinions and attitudes?
- Can an understanding of the variation in stakeholder group opinions be used to better structure the process and content of participatory planning based on the social learning model?

The next section will address how these research questions may be answered, by eliciting appropriate information, from the different stakeholder groups identified and defined in Section 4.2.

4.4 How to address the research questions? Choosing appropriate data collection and administration methods

First, a brief recap on the purpose of this research. As stated in the introductory chapter (Section 1.4), the aim of the research is to directly elicit information from four broad stakeholder groups who are likely to be involved in water resource management. More specifically, empirical information on their attitudes to salient issues (identified in Chapter 2 and Chapter 3), that may affect appropriate levels of participation and acceptable outcomes in a water resource management project. The reason for eliciting this information is to assess and

describe where common ground and interests shared by the different groups lie, and the areas where their differing expectations, concerns and definitions of process and outcome regarding water resource management may differ and could lead to conflict.

Selection of stakeholder group types to be investigated and the research questions posed have been determined in the previous two sections. But this leaves unaddressed the question, how can the research questions posed be explored? How can we elicit information from the identified stakeholder groups in relation to the research questions? There is a need for empirical analysis of the research questions to allow some descriptive dimensionality. The next part of this section therefore reviews available data collection techniques, followed by: (i) an in depth assessment of survey options (ii) a review of questionnaire survey techniques and (iii) justification for the option adopted for the research.

4.4.1 Data collection techniques

Research may be classified in a number of ways (Figure 4-1). However, it is quite common for some fluidity and partial overlap between the different research dimensions. In relation to answering the research questions posed there are therefore a number of research options available.

Purpose of study	Use of study	Time in study	Data collection technique
Exploratory	Basic	Cross-sectional	Quantitative data: Experiment
Descriptive	Applied: Action	Longitudinal: Panel	Survey Content analysis
Explanatory	Impact Evaluation	Time series Cohort analysis	Existing statistics
		Case study	Qualitative data: Field research Comparative historical

Table 4-1 Dimensions of social research (Source: Neuman, 2000, p37)

In addition, there are a number of techniques that can be used to gather information (as shown in the last column of Table 4-1) These different techniques are distinguished from each other by the form of the data they are designed to collect and the method of analysis used (De Vaus, 2002), as expanded on in Table 4-2. These techniques are commonly grouped into two categories (Neuman, 2000):

- Quantitative, where the data collected is numerical
- Qualitative, where the data collected is in the form of words or pictures

Techniques for quantitative data collection	Description
Experiment	Conducted in laboratories or real life. Usually involve a small number of participants. Often limited to topics or treatments where the researcher can manipulate the situation in which the participants find themselves.
Survey	Often used in descriptive or explanatory research. Survey researchers ask participants to answer questions set out in a written questionnaire either distributed to and filled out by the participant, or during an interview where participant responses are recorded by the researcher.
Content analysis	A technique for examining information or content in written or symbolic material. A systematic way of recording specific aspects of the material identified is formed (for example, how often certain words or topics occur) and often presented as tables or graphs.
Existing statistics	The reorganisation or recombination of previously collected survey information which may result in re-examination of the data using statistical procedures.
Techniques for qualitative data collection	
Field research	The researcher observes and interacts with a small group of people over a length of time. Detailed daily notes and informal interviews may be conducted. At the end of the field research the notes and interviews are transcribed and reported.
Comparative historical	Examines aspects of a past historical era or across different cultures. Research may concentrate on one historical period or culture or compare several. Researchers frequently use a combination of facts to support their research.

Table 4-2 Different techniques for data collection (adapted from Neuman, 2000; Babbie, 1990)

For the purposes of this research, it was decided that collecting quantitative data, directly from likely stakeholders, would provide the best available data to explore the research questions raised for the following reasons:

- The respondents' answers would be based on their current opinions and attitudes

- The data from the different respondents would be collected within the same time frame
- The questions the respondents were asked to answer could be the same, therefore allowing direct comparison of the answers given

Furthermore, “quantitative researchers collect facts and study the relationship of one set of facts to another…Researchers adopting a qualitative perspective are more concerned to understand individuals’ perceptions of the world” (Bell, 2005, p7). Given therefore that the information required would preferably be elicited directly from respondents, and that the responses provided by four different stakeholder group types should be compared, then adopting a survey method seemed the best choice for data collection. Survey research does have some disadvantages and is not appropriate for studying certain topics. However Babbie (1990) justifies surveys as a method as it “provides one method of empirical verification…Since survey research involves the collection and quantification of data, the data gathered become a permanent source of information” (p44).

Water management projects typically run for a number of years. The ideal scenario therefore could be to elicit information in relation to the research questions posed from stakeholders directly involved in (a number of) projects over time i.e. a longitudinal study. However, finding enough water management projects and project members to be representative, and who were involved in projects that started and finished within the time allotted for the research was

not a feasible option. Therefore a cross sectional study (one point in time) was chosen to contrast and compare the perspectives of four stakeholder groups.

4.4.2 Survey options

Providing an all encompassing definition of what constitutes a 'social survey' is difficult (Bell, 2005; Aldridge & Levine, 2001; Moser & Kalton, 1971). Moser and Kalton specifically comment that:

> *"Such a definition would have to be so general as to defeat its purpose, since the term and the methods associated with it are applied to an extraordinarily wide variety of investigations…When it comes to subject matter, all one can say is that surveys are concerned with the demographic characteristics, the social environment, the activities, or opinions and attitudes of some group of people" (p1). One can surmise from this statement therefore that it is up to the researcher to define the purpose and the boundaries of their survey. However, one factor common to all surveys is that "all the respondents will be asked the same questions, in as far as possible, the same circumstances" (Bell, 2005, p14).*

The cost of surveys is an important consideration. As May (1993) points out, *"to interview everyone in the population would be prohibitively expensive. For this reason, the 'Census' takes place only once every ten years and is not a sample, but a total* '*enumeration' of the population*" (p68). To take a representative

sample of a population is therefore the most common compromise on the grounds of "*technical efficiency and time and resources*" (p69). Sprent (1988) defines sampling as a "*mechanism whereby we can make an estimate of a population characteristic and get, based on probability theory, a numerical measure of how good that estimate is*" (p188).

Furthermore, Mays (1993) notes that the word population does not necessarily refer to people *per se.* For example, the 'units of analysis' might include a particular organisation or business, and the population sampled would therefore be the company itself, or its employees. Furthermore, he recommends that survey methods should fulfil two criteria:

- The researcher or interviewers should have no choice in who they interview
- That there is a systematic procedure involved in the random selection of the units of analysis

As highlighted in Table 4.2 there are two basic methods of conducting a questionnaire survey. The first method involves distribution of a written questionnaire to likely participants. The questionnaire is then filled out and returned to the researcher by the participant. The second method involves an interview, where participant responses are directly recorded by the researcher. The techniques that can be used for administering questionnaires are given below (de Vaus, 2002):

Face to face interviews

In face to face interviews the questionnaire is personally administered to the respondent by trained interviewers. Responses to the questions are recorded and coded by the interviewer via either Paper and Pencil Interviews (PAPI), or Computer Assisted Personal Interviews (CAPI) where responses are recorded using an electronic version of the questionnaire held on a laptop computer.

Telephone interviews

This method involves interviewers making contact with selected sample members and asking the questions over the telephone. This type of interview may be conducted from a central interviewing centre, using Computer Assisted Telephone Interviewing (CATI) equipment and software.

Postal self administered questionnaires

This type of survey mainly uses PAPI style surveys where the respondent fills out the questionnaire themselves and then returns the questionnaire to the researcher, usually in a pre-paid questionnaire.

Internet surveys can be administered in one of the following three ways:

- **E-mail**. The questionnaire is distributed via e-mail, either as part of the main text of the e-mail or as an attachment. The form of the questionnaire may be

basic, plain text which the respondent then edits, or, a formatted or interactive questionnaire. Respondents can return their responses via e-mail.

- **Web page**. Questionnaires made available via a dedicated web page on the internet have dynamic, interactive features constructed by using specialised software. The questionnaire can be generated by using interactive internet software packages that create the questionnaire for you online. Researchers proficient in authoring Hypertext Marking Language (HTML) may build their questionnaire using HTML and Common Gateway Interface (CGI) script to publish on a website (Burgess, 2001). Completed responses are submitted to and stored on the web server, which may automatically code the responses. When the survey closes the responses are then usually put in a database for statistical analysis by the researcher.

- **Combined web page and e-mail**. This method also involves the use of a dedicated web page to make an electronic version of the questionnaire available on the internet. In this instance however submitted responses via the web server are returned directly and instantly to the researcher via e-mail.

There are advantages and disadvantages associated with both the interview and self administered survey methods as shown in Table 4-3 (see also Bell, 2005). The main advantages of interviewing respondents are that it allows for some adaptability during the interview to explore and investigate responses directly. However interview techniques are time consuming and consequently

the number of people that can be interviewed within an allotted time frame may be too few. While all surveys are required to conduct themselves within the boundaries of ethical practice this type of survey also requires ‘informed consent’ from the participant before they can take part.

A survey using self administered questionnaires is usually more cost effective than interviewing respondents. However, they typically result in lower response rates than personal interviews. The opportunity for further elaboration may also be lost. On the other hand there is no likelihood of the interviewer influencing the answer given by the respondent.

*Mode of delivery:	Face to Face	Telephone	Mail	Web
Response rates				
General samples	3	3	3	1
Specialised samples	3	3	3	3
Representative samples				
Avoidance of refusal bias	3	3	1	2
Control over who completes questionnaire	3	2	2	2
Gaining access to selected person	2	3	3	3
Locating selected person	2	3	3	3
Effects of questionnaire design				
Ability to handle:	3	2	2	2
Long questionnaires	2	3	1	3
Complex questionnaires	3	2	1	2
Boring questions	3	3	1	3
Item non-response	3	3	2	3
Filter questions	3	3	1	3
Question sequence control	3	3	1	2
Open-ended questions				
Quality of answers				
Minimise social desirability	1	2	3	3
Make question order random	1	3	1	3
Minimise distortion due to:				
Interviewer characteristics	1	2	3	3
Interviewer opinions	1	2	3	3
Influence of other people	2	3	1	2
Allows opportunities to	2	1	3	3
consult	1	3	3	3
Avoids interviewer subversion				
Survey implementation				
Ease of obtaining suitable	1	2	3	3
staff	1	3	1	3
Speed	1	2	3	3
Cost				

*** 1 = poor; 2 = satisfactory; 3 = good**

Table 4-3 Advantages & disadvantages of different media for administering questionnaire surveys (Source: De Vaus, 2002, p132, adapted in part from Dillman, 1978)

In comparison to other data collection methods, online surveys do have some advantages such as, low implementation costs, short response times and

researcher control of the sample (Ilieva *et al*., 2002). Web based surveys have also been reported as having fewer missing values than the more traditional pen and paper data collection methods (Stanton, 1998; Ilieva *et al*., 2002). Stanton (1998) points out that while the internet can be a useful tool for conducting a survey, one should be aware that it can result in the obvious exclusion of those who do not have access to a computer or the internet. On the other hand, while Stanton's point is worth noting, the use, ownership and availability of computers and the internet have dramatically expanded since 1998.

Multi-mode strategies can also be used for collecting questionnaire based survey data, and help recruit suitable samples. While this strategy may help recruit a more representative sample, the researcher should also be aware that the mode of questionnaire administration may affect the way participants respond (de Vaus, 2002).

4.4.3 Choosing question response formats

One other major decision that needs to be made when constructing a questionnaire is the format of the responses. Two basic formats can be used when constructing questions for inclusion in a survey (de Vaus, 2002; Oppenheim, 1992):

- closed or forced choice questions, where a number of alternative answers are presented to the respondent who is asked to select one or more of the answers
- open ended or free response questions are not followed by any kind of choice. This option allows the respondent to form their own written responses to answer the question.

There is much debate and disagreement on whether open or closed questions are preferable when constructing and conducting questionnaire surveys (de Vaus, 2002; Neuman, 2000). Each of these forms has advantages and disadvantages as illustrated in Table 4-4.

Advantages – Closed questions	Disadvantages – Closed questions
Easier and quicker for respondents to answer	May suggest ideas that respondent would not otherwise have
Answers of different respondents or groups easier to compare	Allows respondents who have no opinion or knowledge to answer anyway
Easier to code and statistically analyse answers	May irritate respondents if their desired choice is not an option
Response choices can clarify question meaning for respondents	Can be confusing if too many response choices are given
More likely that respondent will answer question on sensitive topics	Misinterpretation of the question can go unnoticed
Fewer irrelevant or confused answers to questions	Distinctions between respondent answers may be blurred
Less articulate or less literate respondents not at a disadvantage	Marking or recording the wrong response is possible
Ease of replication	Force respondents to give simplistic responses to complex issues
Low costs	Force people to make choices they would not make in real world
Advantages – Open questions	**Disadvantages – Open questions**
Permit an unlimited number of possible answers	Different respondents give varying degrees of detail in answers
Respondents can answer in detail and can qualify and clarify responses	Responses may be irrelevant or engulfed by useless detail
Unanticipated findings can be discovered	May be difficult to compare responses and analyse statistically
Allow adequate answers to complex issues	Difficult to code responses
Allow creativity, self expression and richness of detail	Favours highly literate and articulate respondents
Uncover a respondent's logic, thinking process and frame of reference	Respondents may lose direction if question too general
	Responses written verbatim difficult to interpret
	Requires more effort from respondent
	Questions may intimidate respondents
	Answers take up space on questionnaire

Table 4-4 Advantages and disadvantages of utilising open or closed questions (adapted from Neuman, 2000; Oppenheim, 1992, p115)

The main consideration when choosing a response format however should be dependent on: (i) the reason for the research and (ii) the practical limitations of the research project. The choice of response format in this instance needs to consider that the reason for this particular research is to elicit different

respondents' attitudes towards certain issues, as specified within the research questions, so that they may be compared.

Regarding the practical limitations, open ended questions may require more time and effort spent by the respondent. Coding (see also Section 5.1.5) and understanding the open responses received also require more time of and a skilled eye by the researcher for precise interpretation, making them impractical for certain studies. On the other hand, close ended questions are quicker and easier for both respondent and researcher. However, they may lose the real essence of the respondent's beliefs and feelings, as they are forced to choose from fixed categories created by the researcher (Neuman, 2000; Oppenheim, 1992). Neuman suggests that "*the disadvantages of a question form can be reduced by mixing open-ended and close-ended questions in a questionnaire. Mixing them also offers a change of pace*" (p260). Therefore it is recommended to try and incorporate both types of format within the layout of a questionnaire. The different types of closed questions and response formats that can be used within a questionnaire are illustrated in Table 4-5).

Type	Format of response
Numerical rating scale	Scale where alternative answers are ordered from low to high. Respondents are asked where their attitude lies between the given low and high extremes. Example: Likert scales.
Ranking	Requires respondents to rate importance or strength of agreement *in relation* to the way other items in the set have been rated rather than the *absolute* importance of an item.
Scores	Respondents are asked to indicate their rating of a particular feature by awarding it a score (for example, out of ten).
Checklists	Respondents are supplied with a list of items and asked to select those that apply.
Binary choice	Format requires respondent to choose between two fixed alternatives, for example yes or no.
Multiple choice	Respondents are asked to select one alternative from a given list of responses that cannot be ranked from high to low.

Table 4-5 Different types of closed format questions (adapted from de Vaus, 2002)

Another form of closed questioning that may be used to elicit respondent attitudes is the repertory grid technique. The grid used is in the form of a matrix consisting of 'element' labels at the top of each column and 'construct' labels on either side of every row, creating a set of cells for the respondent to provide their rating for each element, in relation to each construct (Fransella, 2003).

The potential usefulness of this technique was proposed by George Kelly (1955) for characterising perceptual distance. How we construe what happens around us helps construct our personal theories and has a direct bearing on how we view our personal environment, the people within it and how we behave towards it. And "*behind each single act of judgement that a person makes*

(consciously or unconsciously) lies his or her implicit theory about the realm of events within which he or she is making those judgements" (Fransella *et al.*, 2004, p3).

Constructs therefore provide a means of comparing things around us in terms of similarities or differences. Therefore just as a yardstick may be used to measure length, constructs can be used to measure the meaning of an object, action or context in terms of the bipolar scales of good or bad (Plank & Minton, 1995). According to Kelly, people seek to develop and organise their personal constructs into a coherent system, which allows them to accurately anticipate future events by choosing the available alternatives that lead to a greater extension and definition of their construct, thereby reducing uncertainty (Hjelle & Ziegler, 1987).

Personal construct theory was originally used in clinical psychology. However, the elicitation and utilisation of personal constructs have extended to further understanding of how individuals and groups view the world in relation to a number of issues. This includes for example, teaching, social relationships, language and market research, yet their use in relation to the environment is lacking (Fransella, 2004). Personal construct theory can therefore be used to predict future outcomes based on an individual's expectations.

There are arguments for and against eliciting or supplying constructs. However, there is no reason why, or strong evidence to indicate that constructs for a grid

should not be supplied as long as they are "*carefully selected because the grid designer must ensure that they are as meaningful as possible to the user"* (Fransella *et al.*, 2004, p48).

Regardless of the question format chosen, careful consideration should be given to the wording of questions. When designing attitude statements Oppenheim (1992) points out that a good deal of careful thought and exploration is required to select the right statement as:

> *"An attitude statement is a single sentence that expresses a point of view, a belief, a preference, a judgement, an emotional feeling, a position for or against something…(Therefore) attitude statements are the raw material of attitude scales" (p175).*

Oppenheim therefore underlines the importance of accurate wording within a questionnaire if it is to elicit accurate information from the respondent. The following considerations should also be taken into account when writing a questionnaire (Berg, 1989; Bell, 2005):

- Be concise and unambiguous; make questions as brief as possible, clear and jargon free.
- Avoid double questions i.e. dealing with two issues within a single question.

- Avoid using negatives within a question – this may confuse the respondent
- Ask for precise answers if you think that constraints are unlikely and the information is readily available, for example, age of respondent. This has many advantages; it provides the researcher some degree of flexibility as the data can always be collapsed later into broader categories if required (de Vaus, 2002).
- Avoid leading questions, that is, where an apt level of agreement or attitude is suggested within the question.

Furthermore, respondents are more likely to respond to a questionnaire if they view it as interesting, of value, clear, well presented and not too long. The sequencing and flow of the questions are also important. For example, beginning the questionnaire with interesting or easier questions may assist and encourage the respondent to complete the questionnaire (Berg, 1989).

Piloting the questionnaire (see Section 5.1.2) can supply valuable feedback for the researcher regarding these considerations and provide an opportunity to remove, reword or redesign questions that may be inappropriate or unclear in their existing state, prior to the survey launch (Oppenheim, 1992). The researcher should also be aware of and comply with their ethical responsibilities (see Section 5.1.4) with regard to the research of survey participants, as data protection and human rights legislation have implications for privacy and confidentiality in relation to survey data.

From the review of the available literature on addressing questionnaire surveys the following issues were therefore given careful consideration when forming and circulating the research questionnaire:

- Intentions of research and its relevance to the respondent should be made clear
- Balance between open and closed questions
- Construction, content and sequencing of questions
- Time and effort levels that may be acceptable to respondents and retention of respondents' interest in completing questionnaire
- Researcher's ethical responsibilities and compliance with levels of stated respondent confidentiality (see Chapter 5)
- Type of medium used to administer questionnaire
- Analysis of data generated by responses (see Chapter 5)

4.4.4 Choice of data collection technique and elicitation vehicles

The review of the data collection techniques and elicitation vehicles available provided the opportunity to make an informed choice about how the study should be conducted. However, the following points also needed to be considered before a final decision could be made on choosing an appropriate form of elicitation method and mode of delivery:

- Adequate delivery and presentation of the research questions while enabling the respondent to provide answers accurately and efficiently

- Type of respondents targeted and ease of access to them.
- Number of responses required per sub sample of respondents. Most authors suggest between 20 to 30 responses as a minimum sample size for reasonable statistical analysis. In this study there were four stakeholder group types, therefore a minimum of 80 to 120 responses were required.
- Ability of elicitation technique and mode of delivery to target a particular sub sample if more responses required. That is, if the number of responses from a particular sub group is low, then particular methods of administering the questionnaire may enable quick and easy targeting of respondents from the desired sub sample group.

For the reasons stated in Section 4.4.3 the question formats used were a mixture of open questions, and closed questions using Likert rating scales, multiple choice formats and a modernised form of repertory grid. Given the number of stakeholder groups that would be targeted for inclusion in the study, and the number of desirable responses from each group, it was decided that a self administered questionnaire survey would be the best option. A multi-mode strategy, to maximise the chances of responses and aid the targeting of a particular stakeholder group if response levels were low, was employed for administering the survey. However it was decided that the main elicitation vehicle would be a dedicated web page, where the responses were e-mailed directly to the researcher. Further explanation of the questionnaire survey design and data collection methods used in the study is provided in Chapter 5.

4.5 Summary

In this chapter a conceptual model was introduced to describe four prominent stakeholder groups likely to be involved in a collaborative water management project. The model reflects: the linkages between the stakeholders groups; the interactions that may occur between the stakeholder groups; and the concerns pertinent to each stakeholder groups' constituency, which may be influenced by their interaction with the other stakeholder groups. The model also enables us to view such a collaborative stakeholder framework as an iterative and dynamic process which, depending on appropriate structure and content may improve communication and knowledge transfer between the stakeholders over time. The model may therefore be used as tool or a framework to explore or describe appropriate process structure and content of participatory planning events and further our understanding of the subject area.

The research questions underpinning the study were also introduced in this chapter, based on the key issues that emerged from the literature reviewed Chapter 2 and Chapter 3 , which may have significant bearing on the required structure and content of a participatory planning process, from the stakeholders' perspective.

The second part of the chapter reviewed the elicitation techniques and vehicles available and their suitability for the study. The choice of elicitation technique and the vehicles used to administer the questionnaire and obtain the necessary data were outlined and justified. The next chapter (Chapter 5) describes the (i)

design of the questionnaire survey and data collection methods used in the study, (ii) choice of analytical methods and statistical software packages used to analyse the data.

Chapter 5 : Fieldwork design

This chapter covers two interrelated aspects of the fieldwork design. The first part reports the process of designing, administering, collecting and coding the questionnaire survey. The second part is a review of the analytical methods available and justification for the tests chosen to analyse the survey data.

5.1 Questionnaire design

The purpose of the questionnaire was to discover and identify the attitudes and requirements of four different key stakeholder groups, in relation to the research questions presented and explained in Section 4.3. In relation to the research questions posed, four themes were investigated within the questionnaire, consisting of questions relating to:

- Structure of participative planning
- Different policy mechanisms
- Benefits and risks of water management projects
- Information or knowledge sources

In addition, questions were used to collect demographic data on the respondents and elicit information on their levels of familiarity with or experience in the subject area. A copy of the final questionnaire used for the survey, is provided (see Appendix 1). Key questionnaire survey design and administration

issues, covered in Sections 4.4 provided guidance during construction of the questionnaire.

5.1.1 Types of variable and the structure, content and aim of questions used

Elicited responses can be classified into one of the following types of variable (Table 5-1):

Type of variable	Function of variable
Nominal	The values of the scales used by the respondents in their answers have no numerical meaning in the usual sense of the word and therefore have no inherent ranking or order sequence. Examples include personal data questions on gender and country of primary residence.
Ordinal	A given sample member is rated or ranked on a given characteristic. For example, a Likert five point rating scale on levels of trust from 'strong trust' to 'no trust' was used for one of the questions.
Discrete	A variable that can only assume one value in a given range; a value which describes the age of respondents is an example of this type of variable.
Dichotomous	A discrete categorical variable with two possible values, where the respondent is asked whether or not they have a particular listed attribute or viewpoint.
Free response (open) questions	Questions where the respondent is not provided with a set of variables to choose from but asked to provide their own opinion on the subject of interest in written form. Individual responses to the question are then assessed. Any commonality between respondents with regard to their responses results in a list of response variables that can be attributed with a code number for statistical analysis.

Table 5-1 Classification of response variables (drawing from De Vaus, 2002)

The final questionnaire consisted of:

- five open or 'free response' questions

- fifteen closed questions, where the respondent was expected to choose from a set of given variables

The following part of this section provides further information on the content, structure and aim of each question used within the survey (see Appendix 1 for full copy of questionnaire).

Question 1: "*In the context of the management of water or water use do you (please choose one from the following)*".

Nominal closed. This question asked the respondent to define which perspective they were answering the questions from, thereby defining which the stakeholder group they belonged to. Respondents were asked to categorise themselves into one of eight given 'role' or 'perspective' categories. These comprised five category variables relating to the management of water in a professional capacity. The customer respondent categories within the question were expanded into three sub categories. This type of question structure (as discussed in Section 4.4.3) allowed the sub categories to be either independently analysed, or justifiably collapsed into a single joint category grouping, as required. The respondents were then asked to base all further responses on the perspective they selected from this given list of category variables. For reasons explained in Section 6.1 responses received were then either eliminated or collapsed down, as appropriate, into the four response groups featured in this thesis.

Question 2: "*Have you ever been involved in, or are you currently involved in the planning or management of a water management project or scheme?*"

Dichotomous closed. This question provided background information on whether or not the respondent had any experience of water resource management.

Question 3: "*The water management project(s) or scheme(s) that you have been or are involved with have been concerning (please tick all relevant categories).*"

Nominal, check list. This question was an extension of Q2 and only required those who had prior experience of a water management project to give an answer. It provided further information on the breadth of respondent experience in water resource management.

Question 4: "*Please indicate which of the following options you consider to be the most efficient way to conserve water (please choose only one of the following).*"

Closed multiple choice. This question assesses the possible variation within and between the different stakeholder groups regarding water resource management options. The specific investigates whether they view more restrictive options such as pricing or imposing restrictions as the best options, or the more wide-ranging options of increasing general awareness or adopting sustainable or alternative technologies.

Question 5: "*Please indicate which of the following names and terms are familiar to you in the context of water management.*"

Closed, checklist. It was suggested within the literature review, that variation in stakeholders' familiarity with the terminology used in water resource management could affect levels of communication and understanding between different actors. This question explores this issue further by eliciting different stakeholders' level of familiarity with names or terms used in water resource management.

Question 6: "*To what extent do you agree or disagree with the following statement?* "*The appropriate reuse of wastewater is a desirable option as a means of conserving water resources*"."

Ordinal, five point Likert scale. This question is used to investigate to what extent respondents agree or disagree with appropriate wastewater reuse as an optional approach for conserving water resources. As a question it therefore provides further information on the variation in attitudes towards an alternative water conservation measure and extends the information already provided in question 4.

Question 7: "*What do you consider to be the primary potential benefit of wastewater reuse?*"

Open question. This question is part of the theme investigating risks and benefits of water reuse. Used to elicit information on the respondent's

perception of the primary benefit they would expect from the uptake of wastewater reuse.

Question 8: "*What would you consider to be the two most important risks of a wastewater of a wastewater reuse project or scheme?*"

Open question. As identified within Chapter 3, risk, whether real or perceived, is a common cause of disagreement between different actors involved in water management projects. Knowing what the respondents' views on risks that may be associated or perceived with wastewater reuse is therefore explored in this question. A qualitative question is used to give the respondent the opportunity to provide their own answers.

Question 9: "*To what extent do you think the following stakeholder groups would agree or disagree with what you consider to be the two most important risks identified in Q8?*"

Ordinal, five point Likert scale. Further extends Question 8 by asking the respondent to assess whether they would expect the other stakeholder groups to agree or disagree with what they consider to be the primary risks. This illustrates which stakeholder groups the respondent may feel more affinity with and which one/s they perceive as less likely to agree with their view on a particular risk.

Question 10: "*At what stage(s) of a water management project or scheme do you think the public or local community should become involved?*"

Closed, multiple choice. It was identified in Chapter 2 that soliciting and evaluating different stakeholders' viewpoints regarding the structure of participatory processes was under researched. This question investigates at *what* stages of the project the respondent would like to have the public or community involved in managing the project.

Question 11: "*Why do you think the public or local community should be involved in a water management project at the stage(s) you indicated in question 10?*"

An open question, which explores respondents' views on public inclusion in management projects by providing them with the opportunity to freely express their views on the subject.

Question 12: "*How do you think the public or local community affected by a project or scheme should be included in the project planning?*"

Closed, multiple choice. This question used a condensed version of Arnstein's ladder, based on four instead of eight levels of public participation (i.e. be informed; be consulted; make some of the decisions; make all of the decisions). Respondents were asked to choose one out of the four options presented.

Question 13: "*What would you consider to be the main factor(s) that could contribute to a water management project succeeding?*"

An open question which asks for the respondents' identification of the main factors that they think could lead to the success of a water management project.

Question 13 is coupled with Question 14*:* "*What would you consider to be the main factors that could contribute to a water management project failing*". Asking these two questions provided the respondents with the opportunity to freely express what factors they viewed as influential in relation to the success or failure of a water management project.

Question 15: "*If you were involved in the planning or management of a water management project, to what level would you trust each of the following groups to protect your interests?*"

Ordinal, five point Likert scale. Within Chapter 2 and Chapter 3 varying levels of trust was identified as a factor that may affect relationships between different groups of people. This question investigates the levels of trust that the respondents attach to certain classes of stakeholder. This may help to identify the level of affinity that the respondent may feel with certain groups and the level of mistrust of, or scepticism towards, other groups.

Question 16: "*How do you rate the following as sources of knowledge or information on water management?*"

Ordinal, seven point scale. This question utilises a modified form of the repertory grid technique (see Section 4.4.3), to explore respondents' attitudes towards different sources of information or knowledge in relation to water resource management. The grid is in the form of a matrix consisting of 'element' labels at the top of each column and 'construct' labels on either side of every

row, creating a set of cells for the respondent to provide their rating for each element, in relation to each construct (Fransella, 2003).

There are arguments for and against eliciting or supplying constructs. However, there is no reason why, or strong evidence to indicate that constructs for a grid should not be supplied as long as they are "*carefully selected because the grid designer must ensure that they are as meaningful as possible to the user"* (Fransella *et al.*, 2004, p48). In this instance, the elements and the constructs were provided after careful selection, informed by: (i) a limited exercise of eliciting constructs (from the researcher and a volunteer) using triads of the six elements chosen (further information on this technique is explained in: Fransella *et al.*, 2004, pp27-30); (ii) an extensive review of appropriate literature (see Section 3.3); (iii) feedback provided during the piloting the questionnaire.

The respondents were asked to rate six information or knowledge sources provided (given as column headings) *independently* of each other by giving them a score on a scale of one through to seven. The resulting eight by six grid provides 48 pieces of data in total and gives some insight into the assumptions that have been made by the respondent with regard to the different sources listed. The version of the grid provided on the internet was enabled with a drop down menu of the available rating scale for each cell, whereas respondents returning paper versions were instructed to write the rating down in each cell.

Question 17 – Question 19: Nominal questions, providing demographic data on the respondent's age, gender and country of primary residence.

Question 20: Dichotomous closed. This question allowed the respondent to accept or reject the offer of a copy of an executive summary to be e-mailed to them when available. The respondents who accepted the offer then had to provide their e-mail address.

A text box was also included at the end of the questionnaire template to allow respondents to make additional comments.

5.1.2 Piloting of the questionnaire template

Prior to the official launch of the survey, a pilot study of the computer enabled version of the questionnaire was conducted between the 14th and 20th of May 2004. Ten volunteers, with varying knowledge of the water sector, were randomly selected from different departments and roles within the Cranfield University campus. The volunteers were asked to go through the process of filling out the questionnaire and were then interviewed individually to provide feedback on the content and structure of the questionnaire template. The time taken by the volunteers to finish the task was also measured. The participation of and feedback provided by these volunteers gave further useful information on the style, content and length of the questionnaire prior to launch. No major problems were encountered by the volunteers and no significant changes were made to the questionnaire.

5.1.3 Elicitation of questionnaire survey

A multimode strategy was used for collecting the survey data for the reasons previously discussed in Section 4.4.4. The primary elicitation vehicle chosen for the survey was an online questionnaire form. This required the creation of the questionnaire web page in HTML (Hyper Text Markup Language) format (see McBride, 1999). The online form was then uploaded onto a web server, and linked to a form processing CGI script, allowing the questionnaires submitted via the web site to be e-mailed directly and automatically to the researcher, in a form that facilitated further processing as described below. Rigorous testing of the web site such as, for example, checking that radio buttons and check boxes functioned properly and were correctly linked to the correct response output, was carried out prior to launch and any faults discovered rectified.

Background information was provided at the beginning of all questionnaire templates used (see Appendix 1). This information explained to the respondent why the survey was being conducted, who was conducting and sponsoring the survey, and the reason why the respondent's participation was being sought. Instructions on how to fill out and submit the questionnaire were provided, together with the contact details of the researcher in case any questions arose or problems were encountered.

Launch of the website and requests to 3rd parties for linking to the survey website were promoted to a wide base of water sector organisations likely to be in contact with the target response groups (see Appendix 5). These

organisations and the contact details of relevant people within these organisations were researched and identified prior to the launch of the survey. An e-mail message containing a letter explaining the purpose of the survey, along with a URL to the questionnaire website was sent to these contacts. The questionnaire was also made available on request as an MS Word document for organisations that preferred to promote it to their members directly as a company or society e-mail attachment. These respondents could either fill out the questionnaire on line and send it back by e-mail, or print out the questionnaire and send to the postal address provided. Further, paper copies, created using MS Word, were distributed at relevant conferences and meetings (see Appendix 4) along with pre-paid return envelopes.

The survey was officially launched on 12th July 2004 and ended on 31st of December 2004. E-mail reminders, about the web based survey, were sent out to the identified contacts within the relevant organisations, during the first week of September 2004. A short article in the CIWEM-IWA publication Water 21 (October, 2004, p61) was also used to promote the website and encourage participation. Initially, the number of responses from water managers and regulators were lower than the other respondent groups. Further additional and specific targeting of water managers and regulators were conducted during October and November 2004 via IWA membership. The response format profile is shown in Table 5-2. Response format profile per respondent group as used for analysis in Chapter 6, is shown in Table 5-3.

Response Format	Number of responses
Web based	128
Paper copies	67
Total response	195

Table 5-2 Number of survey responses per response format

Self classification response group – Frequency (%)				
Questionnaire format	**Regulator**	**Manager**	**Researcher**	**Customer**
Web	12 (70.6)	27 (73.0)	29 (50.9)	37 (88.1)
E-mail	4 (23.5)	0	2 (3.5)	0
Paper	1 (5.9)	10 (27.0)	26 (45.6)	5 (11.9)
Total	17 (100)	37 (100)	57 (100)	42 (100)

Table 5-3 Response format profile per respondent group used for analysis

5.1.4 Data protection and respondent confidentiality

As discussed in Section 4.4.3 when conducting this type of study researchers should be aware of and comply with their ethical responsibilities regarding research involving human subjects. Data protection and human rights legislation have implications for privacy and confidentiality in relation to survey data.

Further assurance regarding the confidentiality of the respondents were therefore provided by the provision of additional details of the survey's approach to data protection and ethical research practice protocols based on British Psychology Society (2000) guidelines. A copy of the document outlining the measures taken to protect the data and provide respondent confidentiality was attached to all paper copies or word documents. Internet respondents were given the opportunity to view the document via a link provided at the beginning

of the web based questionnaire survey. (See Appendix 2 for a copy of the document).

5.1.5 Data collection and storage

Hard copies of all e-mail responses were made for backup and securely stored, along with all paper copies returned, until the end of the project. The date and time, automatically provided on each e-mail response, was used to number electronic responses. Individual paper responses were also given identification numbers, based on the date of return and the number of returns received on that date. A high percentage of the respondents took up the offer of a copy of an executive summary when available, providing their e-mail address. Respondent e-mail addresses where useful adjuncts to the time and date stamp in ensuring that no duplicate replies were incorporated into the database, as the respondents were not asked to submit their names. All closed question responses were manually transferred, when received, into an Excel database.

A prepared coding sheet for the closed questions within the questionnaire survey was used when transferring the data received onto the Excel database. These coded responses were checked for accuracy and then transferred to an SPSS (Statistical Package for Social Scientists) for analysis. Coding the qualitative data (questions 7, 8, 11, 13, &14) required a different approach to the one used for coding closed questions (see Section 5.2.2). Closed questions are easy to pre-code, as the researcher has already decided on the possible answers. The possible answers can therefore be ascribed a numerical code to

identify them prior to questionnaire distribution. However, open or unstructured questions typically ask for the respondents' views or opinions and are therefore more difficult to pre-code (Bell & Opie, 2002). (A copy of the code book used for both open and closed questions used within the survey is provided in Appendix 3). The following section reviews the analytical methods used to explore the data and test aspects of the research questions described in Section 4.3.

5.2 Review of statistical techniques and tests available for data analysis

The overall objective of the data analysis is to compare responses from the different stakeholder groups so as to identify areas and levels of variation within and between the groups. This is directly related to the descriptive model (see Section 4.2) depicting the type of interactions that can occur between the stakeholder groups and their own individual cycles. Techniques available for statistical analysis can be primarily split into two forms (Pallant, 2001):

- Techniques that explore the relationship among variables
- Techniques that explore differences between groups

While this split is to some extent artificial, as these two forms of statistical techniques do share some comparable features, Pallant (2001) suggests that it is a convenient way to review the various options for:

- The *type* of data available, that is: the kind of items and scales used within the questionnaire; the nature of the data available for each

variable; the assumptions that must be satisfied for each statistical technique.

- What the researcher wants to *find out* from that data
- The validity of the data set

Regarding the assumptions that must be satisfied for each statistical test brings us to another factor that must be considered when going through the process of choosing an appropriate statistical technique or test – whether the data available is parametric or non-parametric. Each of the techniques, whether parametric or non-parametric, still comes with its own set of assumptions which need to be satisfied. However, the set of assumptions that have to be met for non-parametric techniques is (usually) not as strict.

Parametric tests, as a group of statistical techniques, make certain assumptions about the data being analysed. Parametric data is usually defined by the following assumptions or requirements:

- That the data come from a normally distributed population.
- Homogeneity of variance. For example, when testing several groups of subjects then the groups should have the same variance.
- The data should be measured at least at the interval level, that is, the distance between all points on the scale should be defined as equal.
- That the data collected from different subjects are independent of each other, which means that the behaviour of one subject should not have influenced the behaviour of another.

Another assumption frequently used is that the sample taken is large enough to be representative of the population. However, some parametric techniques (such as ANOVA for example which is discussed later in the next section) are very robust and can withstand the violation of some of their intrinsic assumptions to a greater or lesser degree.

Non-parametric tests are also known as ‘distribution free’ tests as they are not based on the assumption that the data come from a normal distribution. Additionally, if categorical or ordinal data are used then the most appropriate statistics to base your findings on should be the median or mode as the measure of central tendency (rather than the mean which is used in parametric tests).

Candidate analysis techniques were reviewed, so that appropriate tests could be identified for analysing the data collected in the course of this research. A detailed discussion on each one of them would be beyond the scope of this thesis. Instead, the sections that follow are focused on a presentation of the methods eventually chosen for data analysis, and justification of the choices, in the context of the structure of the data involved. For further details of the analytical techniques mentioned throughout the rest of this chapter, readers may refer to: Field (2004), Pallant (2001), Coolidge (2000), Rodeghier (1996).

5.2.1 Justification for choice of statistical tests

Given that the objective of the analysis was to test four groups against each other the t-test, in this instance, was not a valid choice as it could increase the type 1 error rate. The following reasons therefore lead to the conclusion that a one way ANOVA between groups would be appropriate for the questions chosen for analysis that employ some form of rating or ranking scale:

- ANOVA is a robust test that can withstand certain violations of its underlying assumptions.
- The respondents were only asked to fill out a questionnaire once, that is, it was a cross sectional study not a time series.
- Analysing more than two groups.
- If ANOVA detects a significant difference then Tukey's test could be used to show between which specific groups the significant differences lay.
- Examining the differences between groups on one or more variables.

Tukey's test may be violated as the number of respondents per group was not even, however an alternative formula using the harmonic mean could be utilised instead to account for this. The harmonic mean uses a weighted version of the mean and therefore eliminates any bias that might be introduced by having unequal sample sizes (Coolidge, 2000; Field, 2004). The output given when using SPSS indicates the use of this alternative formula automatically if required. Tukey's test is also more desirable in this instance than carrying out

planned comparisons as there are more than two groups and gaining information about each group is of equal importance.

- Type 1 and Type 2 error in relation to power

In social research it is a quite common occurrence that the data do not meet the assumptions for a statistical technique, with some distributions being strongly skewed for instance. Some statisticians argue that most approaches are robust and can tolerate small violations, especially if the sample data is large. According to Stevens (1996, p6) '*power is not an issue*' when the sample size is 100 or more subjects; however if the size of the group within a study is small (e.g. n=20) then a test *may* not show any significant difference due to insufficient power. The suggestion put forward by Stevens when group numbers are small is to consider adjusting the alpha level to 0.10 or 0.15 rather than the more traditional 0.05 level (Pallant, 2001). There are also tables available that assess how large your sample size needs to be to detect the effect you want to measure. Some SPSS programs provide an output that take into account the effect size and sample size indicating the power of the test conducted. If the output indicates that the test is not significant *and* there is less than an 80% chance of detecting a difference then interpretation of the test should be more careful as this may signify insufficient power rather than there being no genuine difference between the groups. Power analysis therefore gives you some indication of how sure you can be that the failure to reject the null hypothesis is

indeed accurate; the higher the power the more confidence there is no discernable difference between the groups (Pallant, 2001, p173).

Some researchers will report a 'trend' in their data, which usually means that while they did not reject the null hypothesis they came close to rejecting it. However, "*The American Psychological Association publication manual officially discourages reports of trends*" (Coolidge, 2000, p103) and claim that results that do not meet the 0.05 level of significance should be viewed as chance findings. Another option for data that is not normally distributed is to manipulate or 'transform' the data so that the assumptions of the statistical test are met. This approach however is also controversial (Pallant, 2001). An alpha level ≤0.05 is used within this thesis to report a statistically significant difference.

The Chi-square test for independence would be more appropriate for the questions where there are no rating scales involved. The most useful output (resulting from cross-tabulation) as there are more than two categorical variables would be the Pearson Chi-square to assess whether the test results were significant or not. Cramer's V could be a useful adjunct as a test and is preferable to Phi in this instance as the contingency tables are more than two by two.

Kendall's coefficient of concordance (*W*) is considered here as the test of choice for measuring within sample agreement but only for continuous data, that is, it cannot be used to test categorical data. This statistical test is used

either to measure within group or repeated measures agreement. It is unclear whether any underlying assumptions would be violated if used for measuring between group agreement. All available data must be based on ranking rather than rating scales. This means that the ratings have to be converted into a ranking so that the test can be carried out. The use of this test is limited to the questions using a rating scale as it is impossible to convert questions and utilise a ranking scale when there are only two possible outcomes, or only one choice can be made from a subjective list of choices.

5.2.2 Statistical tests chosen

There are several sets of responses which can be used to test within and between group variations regarding the following common themes in relation to the research questions (Table 5-4):

Theme	Question Number
Questions relating to different water policy mechanisms	4 & 6
Questions relating to benefits and risks of projects	7, 8 & 9
Questions relating to participative planning	10 to 15 inclusive
Question relating to information or knowledge sources	16

Table 5-4 Themes relevant to research questions

Responses to Q9 (which uses a Likert scale to elicit levels of expected agreement regarding their answers to question 8) can also be used to compare

against Q8 responses. Responses to Q16 (using data from each cell as an ordinal data set) can be used to test within and between group agreement in two ways:

- Compare the scores by cell across respondent groups
- Use the scores to rank preferences for different sources of data and then compare rankings by row across respondent groups

The typical approach used for coding qualitative answers involves organisation of the raw data provided by the responses into conceptual categories or themes. These themes can then be used to code data and in fact form part of the analysis of the data (Bell & Opie, 2002; Berg, 1989; Miles & Huberman, 1994). This approach was adopted for the qualitative answers provided by respondents. Coding of the data was carried out by initially copying individual responses and creating tables for each open question in an MS Word document. These tabulated responses were read through and reflected on several times, culminating in the formation of a list of coded categories for each question. The individual responses were then coded according to the categories listed for each question, checked and then transferred onto an SPSS database. Open response questions 11, 13 and 14 after coding were analysed using frequency and/or percentage figures and used to illustrate respondent viewpoints by quoting respondent comments in the thesis text. The statistical tests that have been chosen for each question are shown in Table 5-5.

Theme relating to:	Question Number	ANOVA	Pearson Chi-square	Kendall's *W*
Water policy mechanisms	4	X	✔	x
	6	✔	x	x
Benefits & Risks	7	x	✔	x
	8	x	✔	x
	9	✔	x	✔
Participative planning	10	x	✔	x
	12	✔	x	x
	15	✔	x	✔
Knowledge sources	16	✔	x	✔

Table 5-5 Statistical tests chosen per question

Appropriate post-hoc tests, were used if a significant difference was detected at $p = \leq 0.05$ using ANOVA or Pearson Chi-sq (Table 5-6). Tukey's test is used to show between which specific groups the differences lie, while Cramer's V shows strength of association between the groups and variable tested.

Theme relating to:	Question Number	Significant ANOVA	Significant Pearson Chi-square
Water policy mechanisms	4	x	Cramers V
	6	Tukey's test	x
Benefits & Risks	7	x	Cramers V
	8	x	Cramers V
	9	Tukey's test	x
Participative planning	10	x	Cramers V
	12	Tukey's test	x
	15	Tukey's test	x
Knowledge sources	16	Tukey's test	x

Table 5-6 Appropriate post-hoc tests or outputs

5.3 Summary

This chapter has described the process of designing the questionnaire survey so that the questions used adequately elicited and provided data to further inform the research questions raised and discussed in Section 4.3. A balanced mix of open and closed questions were incorporated into the questionnaire survey, as suggested in Section 4.4.3 to give the respondent some opportunity to freely provide their own opinions on specific subjects. The first part of this chapter also provided information on the administration of the questionnaire survey, the collection and coding procedures, and construction of a database from the survey responses. The second part of this chapter reviewed the statistical tests that could be used to analyse the data and justified the reasons for the tests chosen.

The next chapter (Chapter 6) presents the results of the survey data analysis. An initial description of the data collected is given followed by analysis of the four themes.

Chapter 6 : Results

The results presented in this chapter initially describe the sample data collected. This is followed by and organised around four thematic sets of questions posed in the questionnaire survey relating to respondents':

- Preferences for different structures of participatory planning processes
- Preferences for different water policy mechanisms
- Expectations regarding risk and benefit of projects
- Attitudes towards different information or knowledge sources

Results for each theme are presented as follows:

- Initial description and reasoning behind each theme and question posed
- Analysis using frequencies and percentages
- Pearson Chi-square or one way ANOVA measures for appropriate questions (see Table 5-4)
- Tukey's HSD test (if significant differences found using ANOVA)
- Cramer's V (with Pearson Chi-square)
- Kendall's W for appropriate questions (see Table 5-5)
- Conclusion for each theme

Results for the qualitative questions exploring (i) why public involvement; (ii) factors affecting the success or failure of projects (contained within the theme

on preferences for different structures of participatory planning processes), are presented within Sections 6.2.4 and 6.2.5 respectively.

Justification for the type of analysis chosen for each question is discussed in the previous chapter (see Section 5.2.1). Variation in respondent numbers between the four groups meant the harmonic mean was used for multiple comparisons using Tukey's HSD test. In a few cases, Levene's test, (a test for the homogeneity of variance) was significant for ANOVA and therefore violated. In these instances, the Welch statistic was also used as it is more powerful than the standard F when sample size *and* variances are unequal (SPSS, 2004).

6.1 Description of data sample: self classification, sample demographics and basic characteristics

Respondents were asked at the beginning of the questionnaire to categorise themselves into one of eight given 'role' or 'perspective' categories. These comprised five category variables relating to the management of water in a professional capacity and three category variables for respondents who utilised water purely as a customer. The respondents were then asked to base all further responses on the perspective they selected from this given list of category variables. There were 195 responses in total, initially classified as shown in Table 6-1 below. The figures given in parenthesis in Table 6-1 (and Table 6-2) represent the percentage of responses within a self classification group in relation to the sample as a whole.

Self classification	Frequency (%)
Regulator	17 (8.72)
Manager	37 (18.97)
Researcher	57 (29.23)
Community Representation or Lobbying	9 (4.62)
Other	36 (18.46)
Domestic Customer	29 (14.87)
Industrial Customer	3 (1.54)
Agricultural Customer	1 (0.51)
Unclassified	6 (3.08)

Table 6-1 Response to self classification question

These responses were then condensed down to the four response groups, by either the elimination or merger of self-classification groups. As discussed in Sections 4.4.4 and 5.1.1 respondent categories were expanded to allow some flexibility, so that they could be either analysed as a single category, or collapsed, if justified, into one joint category. The merger of the 'community representation or lobbying' group with the three 'customer' groups was justified as members of this category may represent customer groups regarding their views on water resource management. Furthermore, they may seek to influence legislators regarding those views. The 'community representation or lobbying' group and the three 'customer' groups were amalgamated, and then referred to as the 'Customer' group. The 'Regulator', 'Manager' and 'Researcher' groups remained unchanged.

There was a possible argument for incorporating and absorbing the individual respondents from the 'Other' group into one or more of the remaining response groups. However, it was determined from the outset that as these respondents had already classified themselves as 'other' it would be difficult to reclassify and

disperse them with any degree of accuracy into the remaining categories. The 'Other' self classification group, and the responses that could not be classified (due to non-response, or multi-response, to the self classification question) were eliminated and not incorporated into any of the other groups.

This resulted in 153 responses as shown in Table 6-2, which were used for analysis. The number of self classification responses within the regulator group is low when compared to the other three groups. However, the proportion of regulators within the water sector is likely to be lower than that of other respondent groups.

Response groups used for further analysis – Frequency (%)			
Regulator	Manager	Researcher	Customer
17 (11.11)	37 (24.18)	57 (37.25)	42 (27.45)

Table 6-2 Classification of responses after elimination or merger of groups

Sample demographics, after the elimination or merger of response groups are shown in Table 6-3 below. The majority of respondents were male (71.2%) with the mean age for all respondents being 42.5 years. Nearly a third of responses came from the UK and a quarter from other European countries, with the two together accounting for 54.2% of responses. Australia/New Zealand and the USA accounted for 15% and 9.8% respectively.

Sample demographics	N	Data
Gender (% male)	153	71.2%
Age in years: Mean (S.D.)	150	42.5 (12.1) years
Country or region of residence		**Percentage**
UK	49	32.0
Other European countries	34	22.2
Australia/NZ	23	15.0
USA	15	9.8
Middle East	8	5.2
Africa	7	4.6
Asia	6	3.9
Canada	5	3.3
South America	4	2.6
None specified	2	1.3

Table 6-3 Demographics of sample

Respondents were asked whether they had any experience in the planning or management of a water management project and if so, to indicate what type of project(s) they had been involved in by selecting them from a given list (respondents could select more than one option). Table 6-4 shows the level and type of experience for each response group. Frequency and percentage figures given are *within* group responses for each type of project experience.

Type of project experience	Response Groups - Frequency (%)			
	Regulator	Manager	Researcher	Customer
Water quality	11 (64.7)	25 (67.6)	24 (42.1)	10 (23.8)
River protection or restoration	7 (41.2)	15 (40.5)	14 (24.6)	6 (14.3)
Reuse, recycling, sustainable methods	8 (47.1)	19 (51.4)	20 (35.1)	6 (14.3)
Irrigation	6 (35.3)	13 (35.1)	15 (26.3)	2 (4.8)
Industrial wastewater	4 (23.5)	5 (13.5)	12 (21.1)	2 (4.8)
Urban wastewater	8 (47.1)	15 (40.5)	24 (42.1)	3 (7.1)
Recreational waterways	3 (17.6)	6 (16.2)	8 (14.0)	3 (7.1)
Flood defence	3 (17.6)	6 (16.2)	7 (12.3)	3 (7.1)
River basin management	7 (41.2)	15 (40.5)	23 (40.4)	4 (9.5)
Other	2 (11.8)	9 (24.3)	9 (15.8)	1 (2.4)
None	3 (17.6)	1 (2.7)	15 (26.3)	31 (73.8)

Table 6-4 Respondent group experience by project type

The level of project experience within the customer group was generally low, with 'Water Quality' being the project type generating the most responses from the group (23.8%). Nearly three-quarters (73.8%) of the customer group had never been involved in any type of water management project. The three remaining groups had some respondents who had not been involved in such projects, most notably, the regulator (17.6%) and the researcher (26.3%) groups.

As discussed in Section 3.3.8 the terminology used when discussing water management is important as the public think differently about and apply different terminology to products than professional entities. The dialogue between professional entities and the general public can therefore be fraught with problems due to lack of familiarity of non-scientists with scientific terminology. Respondents' familiarity with names and terms used in the context of water management were therefore investigated. Figures given in Table 6-5 are within group responses in relation to names and terms used in the context of water management.

Terminology	**Response Groups - Frequency (%)**			
	Regulator	Manager	Researcher	Customer
Water Factory 21	5 (29.4)	13 (35.1)	16 (28.1)	4 (9.5)
Professor Takashi Asano	4 (23.5)	9 (24.3)	20 (35.1)	4 (9.5)
Greywater	17 (100)	35 (94.6)	50 (87.7)	16 (38.1)
EU Water Framework Directive	13 (76.5)	19 (51.4)	44 (77.2)	13 (31.0)
Faecal Coliforms	17 (100)	35 (94.6)	49 (86.0)	18 (42.9)
Membrane Bioreactors	8 (47.1)	24 (64.9)	39 (68.4)	11 (26.2)
Eutrophication	17 (100)	35 (94.6)	49 (86.0)	17 (40.5)
None of the above	0	0	3 (5.3)	17 (40.5)

Table 6-5 Familiarity with names and terms used in a water management context

	European Response Groups - Frequency (%)			
	Regulator	Manager	Researcher	Customer
EU Water Framework Directive	9 (100)	15 (100)	26 (100)	10 (30.3)

Table 6-6 Respondent recognition level regarding the term EU Water Framework Directive (European respondents only)

Within the customer group 40.5% of respondents did not recognise any of the names and terms listed. 'Greywater', 'faecal coliforms' and 'eutrophication' were the three most familiar terms across all the groups, however, the customer group's level of familiarity with these terms were significantly lower than the other three groups. When looking at the response to the term 'EU Water Framework Directive' it may seem surprising that the 'regulator' 'manager' and 'researcher' groups did not gain a higher percentage regarding recognition of the term. When responses from the European respondents only (including UK) were assessed for this term, the outcome was different, with all three of the professional groups showing 100% recognition. However, recognition of the term by European customer group respondents remained almost unchanged when compared to responses from the whole customer group (30.3% as opposed to 31%) as shown in Table 6-6.

Experience of water management projects and familiarity with names and terms used in relation to water resource management were found to be significantly lower in the customer group in comparison to the three professional respondent groups. However, the level of familiarity with certain names and terms (Water Factory 21 and Professor Takashi Asano) within the three professional groups

was also low. Familiarity with technical terminology, prominent personalities or projects within water resource management cannot therefore be assumed even within the professional sector.

6.2 Preferred structure of participative planning

This theme explored respondents' views regarding aspects related to the structure of participative planning, as identified in Chapter 2. The areas investigated were:

- When the public should be included
- How the public should be included
- Trust and protection of group interests
- Why the public should be involved
- Factors that influence success or failure of projects

Results for each of these areas are reported independently in the following text.

6.2.1 Stages of public involvement

Views on whether the public should be involved during the six likely stages (scoping, planning, construction or implementation, operation, monitoring and shut down) were investigated (Table 6-7). The majority of each of the four groups thought that the public should be involved at the scoping stage and

there was no statistically significant difference found between the groups (Table 6-8).

The majority of the members of each group supposed that the public should be involved during the planning phase. However, the percentage majority within each group that thought the public should be involved decreased when compared to the group percentages for the scoping stage. The customer group is nearly equally split between the preference for involvement or omission of the public at the planning stage. However, the Pearson Chi-square test shows there is no statistically significant difference between the groups regarding public involvement at the planning stage (Table 6-8).

In the case of public involvement at the construction or implementation stage the majority of the members of each group thought that the public should *not* be included. The Pearson Chi-square test shows there is no statistical difference between the groups' responses. Likewise, respondent views regarding public inclusion during the operational phase of a project show that the majority of the respondents in all four groups judged that the public should *not* be included during this stage of a project. Again, there was no statistical difference found between the groups.

The four groups differed in their outlook when it came to public involvement during the monitoring stage (p=0.026) of a project (Table 6-8). The majority of the respondents within the regulator, manager and customer groups thought

that the public should *not* be included during this phase. However, 62.5% of the researcher group members thought that the public should be included during the monitoring of the project. It should also be noted that customer group majority (in favour of the omission of the public during the monitoring stage) is borderline (54.8%).

The majority of the members of each group considered that the public should *not* be involved during the shut down phase of a project. However, members of the researcher group are almost split in two (Table 6-7) with only 55.4% preferring public exclusion during shut down. The difference between the groups' opinions on public inclusion during shut down is highly significant (Table 6-8).

	Response Groups - Frequency (%)			
At what stages should public be involved?	Regulator	Manager	Researcher	Customer
Pre-planning (scoping)	11 (64.7)	28 (75.7)	44 (77.2)	26 (61.9)
Planning	10 (58.8)	21 (56.8)	40 (70.2)	22 (52.4)
Construction	6 (35.3)	7 (18.9)	23 (40.4)	12 (28.6)
Operation	6 (35.3)	9 (24.3)	24 (42.1)	12 (28.6)
Monitoring	5 (29.4)	13 (35.1)	35 (61.4)	19 (45.2)
Shut down	3 (17.6)	4 (10.8)	25 (43.9)	9 (21.4)
How should the public be included?				
Make all decisions	0	1 (2.7)	5 (8.8)	5 (11.9)
Make some decisions	10 (58.8)	25 (67.6)	40 (70.2)	23 (54.8)
Be consulted	7 (41.2)	9 (24.3)	7 (12.3)	13 (31.0)
Be informed	0	1 (2.7)	1 (1.8)	1 (2.4)

Table 6-7 Participative planning and public involvement: frequency and percentage

Project stage	Value	p
Scoping		
Pearson Chi-square	4.383	0.223
Planning		
Pearson Chi-square	4.013	0.260
Construction		
Pearson Chi-square	5.356	0.147
Operation		
Pearson Chi-square	3.830	0.280
Monitoring		
Pearson Chi-square	9.236	0.026
Phi	0.247	0.026
Cramer's V	0.247	0.026
Shut down		
Pearson Chi-square	14.817	0.002
Phi	0.313	0.002
Cramer's V	0.313	0.002

Table 6-8 Inclusion of public during project stages: Pearson chi square (with symmetrical measures where appropriate)

Cramer's V was significant for both monitoring and shut down stages, therefore confirming the Pearson Chi-square test. However, the level of association of the respondent groups is low (signified by the value for Cramer's V) in relation to those particular stages (Table 6-8).

6.2.2 How the public should be included

A version of Arnstein's ladder of citizen participation (Arnstein, 1969) was used to ask the respondents how they felt the public or local community affected by a project or scheme should be included in the project planning. Arnstein's original ladder comprises eight rungs, however the ladder used here consisted of four condensed levels as follows:

- Make all of the decisions. (Full delegation of all decision making and actions to the people).

- Make some of the decisions. (Some power is delegated to the people).
- Be consulted. (People given a voice, but no power to ensure their views are accountable).
- Be informed. (People are only told what will happen, is happening or has happened).

The highest level of support across all the response groups in relation to this question was for the public making some decisions (Table 6-7). Researchers and customers chose 'make all of the decisions' in 8.8% and 11.9% of cases respectively.

The minimum and maximum scores for the regulator are different from the other three respondent groups (Table 6-9). However, the means of all four respondent groups lie between the two options 'make some of the decisions' (option two) and 'be consulted' (option three). ANOVA analysis (F ratio = 1.753; p = 0.159) showed no significant differences between the respondent groups' views on how the public should be included in project planning. Levene's test was significant (p = 0.024), however the Welch statistic (p = 0.109) also showed there were no significant statistical differences between the groups.

Response Group	Mean	SD	Minimum	Maximum
Regulator	2.41	0.507	2	3
Manager	2.28	0.566	1	4
Researcher	2.08	0.549	1	4
Customer	2.24	0.692	1	4
Total	2.21		1	4

Table 6-9 Descriptive statistics regarding question: How should public be included?

6.2.3 Trust and protection of group interests

Issues of trust were raised by the question "If you were involved in the planning or management of a water management project, to what level would you trust *each* of the following groups to protect your interests"? Responses to this question were recorded on a five point Likert scale ranging from (1) 'strong trust' to (5) 'no trust'. Respondents were asked to rate the following stakeholder groups:

- Water suppliers or distributors
- Academic researchers
- Regulators
- Public or their representatives

	Response groups – Mean (SD)			
Stakeholder groups:	Regulator	Manager	Researcher	Customer
Water suppliers or distributors	2.53 (0.87)	2.27 (0.90)	2.59 (1.04)	2.79 (1.00)
Academic researchers	2.29 (0.92)	2.38 (0.83)	1.85 (0.66)	1.85 (0.80)
Regulators	2.00 (0.79)	2.19 (0.78)	2.30 (0.79)	2.44 (1.02)
Public or their representatives	2.88 (1.05)	2.32 (0.75)	2.39 (0.90)	2.10 (0.96)
Range:	0.88	0.19	0.74	0.94

Table 6-10 Levels of trust in different stakeholder groups regarding protection of interest

The mean of the regulator response group suggest that they trust the regulator stakeholder group the most and the public or their representatives' stakeholder group the least (Table 6-10). The response group mean range for the managers was low (0.19) so the difference between the lowest mean (regulators = 2.19) and the highest mean (academic researchers = 2.38) is minimal. The means of the researcher and customer groups suggest that they both trust the academic researcher group the most (1.85) and the water suppliers or distributors group

the least (2.59 and 2.79 respectively). However it is worth noting that the mean for *each* of the groups are below three for every stakeholder group.

ANOVA (Table 6-11) revealed significant differences between the four respondent groups regarding the level of trust ascribed to academic researchers (p=0.003) and the public or their representatives (p=0.030). Levene's test for homogeneity of variances was not significant for any of the groups and was therefore not violated. Multiple comparisons, using Tukey's HSD test, revealed significant differences between some of the respondent groups (Table 6-12).

Stakeholder group	F ratio	p
Water Supplier	1.855	0.140
Academic Researcher	4.839	0.003
Regulator	1.182	0.319
Public or their representatives	3.064	0.030

Table 6-11 ANOVA analysis: Levels of trust attributed to different stakeholder groups with regard to protecting the respondent's interests

Stakeholder Group	Respondent Groups	p
Academic Researchers	Managers vs. Researchers	0.009
Academic Researchers	Managers vs. Customers	0.017
Public or their representatives	Regulators vs. Customers	0.016

Table 6-12 Significant differences found between respondent groups regarding levels of trust after multiple comparisons

Kendall's coefficient of concordance (Table 6-13) was low for all respondent groups. Kendall's *W* for each respondent group was slightly higher than for all groups together (W=0.063) except for the manager group. However the results of this test suggest that respondent groups' levels of trust in relation to all different stakeholder groups are diverse. However, the significance level for the

manager group is not significant and therefore could have occurred by chance, whereas all other groups are significant.

	All	Regulator	Manager	Researcher	Customer
Kendall's *W*	0.063	0.247	0.027	0.147	0.143
Chi-square	27.570	12.605	3.013	23.876	16.746
Asymp. Sig.	0.000	0.006	0.390	0.000	0.001
No. of cases	147	17	37	54	39

Table 6-13 Levels of trust in different stakeholder groups: Kendall's *W* test statistics

6.2.4 Respondent attitudes regarding why public involvement should be considered

Open response questions were used to ask respondents why they thought the public should be involved. Answers given by the respondents were read through several times and similar comments were identified and grouped together (see Section 5.1.5), thereby identifying similar issues brought up by one or more of the respondent groups. This process resulted in categorisation of the content of respondent answers into the following general themes:

1. Minimise conflict
2. Increase awareness or public buy in
3. Public ownership/right to be involved
4. Process and/or outcome improved
5. Only to inform of choices already made

Table 6-14 below is based on the number of times a particular factor was mentioned by members of each respondent group:

	Response Groups - Frequency (%)			
Why public involvement?	**Regulator**	**Manager**	**Researcher**	**Customer**
Minimise conflict	3 (17.6)	15 (40.5)	5 (8.8)	7 (16.7)
Increase awareness or public buy in	12 (70.6)	17 (45.9)	28 (49.1)	12 (28.6)
Public ownership/right to be involved	8 (47.0)	15 (40.5)	29 (50.9)	27 (64.3)
Process and/or outcome improved	2 (11.8)	8 (21.6)	20 (35.1)	12 (28.6)
Only to inform of choices already made	2 (11.8)	2 (5.4)	0	1 (2.4)

Table 6-14 Why the public should be involved

The majority of respondents highlighted more than one factor which they considered important in relation to public involvement. Respondents' comments (see Appendix 6) are used in the following part of this section to illustrate the general outlook of each group in relation to involvement of the public in a water management project. The reference system used in relation to respondents' comments denotes which respondent number and group the comment originates from: R = regulator; M = manager; A = researcher; C = customer.

Regulators' views

The most frequently cited reason for public involvement within this respondent group concerned increasing public awareness or buy-in (70.6%). According to one regulator "*public involvement is one of the most effective ways of raising awareness of water. The general public still do not believe that there is a need to use water resources sustainably due to flooding incidents over the past few years. Flooding leaves a much stronger memory of plenty than a drought does of depleted resources*" (R8).

One regulator commented on the relationship between level of public knowledge concerning water management and the likelihood of conflict - "*public perception (outrage potential) is usually inversely proportional to their knowledge, hence by understanding the public will have greater likelihood of being supportive*" (R3). Another also suggested there was a link between increasing awareness and ownership which in turn diminishes the likelihood of conflict, expressed as: "*familiarity breeds acceptance. That is the more folks know about and are involved in a project, the more they own it and the less problematic it is*" (R13).

Public ownership and their right to involvement were conveyed as important factors by 47% of the regulator group, expressed by one respondent as "*it will be THEIR project. They deserve to have input, plus it will pay dividends in increased acceptance later on*" (R14). Whereas another respondent emphasised the impact of uncertainty, coupled with lack of information and involvement as "*the majority of people are negative in the face of unknowns, but are neutral to positive when given sufficient information and opportunities of involvement*" (R13).

Managers' views

Of all the groups, minimising conflict (40.5%) was most frequently cited as a motive for public involvement within this group, expressed by one manager as required "to *avoid the worst risk – conflicts with citizens*" (M30). Whereas another manager suggested how conflict could be deterred by reaching "*a*

common understanding early, and for all stakeholders to be informed of all the drivers of the project. More conflict if radical changes proposed late in project planning" (M3). A different manager recognised that *"the public/local community are the customer and have a stake in the local environment as well as the environment as a whole. The ramifications of not having public support depend upon the nature of the market and operators, but an unhappy public/local community is never a good situation for any business*" (M34).

The recognition of public involvement, not only to reduce conflict and improve relationships between different stakeholder groups but also so that they could positively contribute to the project was also expressed, as follows:

"*Public participation reduces unnecessary conflict and hostility between them and other stakeholders particularly water suppliers and the regulators. The public are the direct water users and they should have a say in the design and implementation of the activities affecting their water supply. Besides that, they should be able to contribute ideas to improve water management projects*" (M20).

Furthermore another manager was of the view that "*support of the community is vital in securing water options into the future*" (M34). Only one manager conveyed that "*the public should not be involved as it is not when a hospital for example is planned, built and operated. This has to be done by professionals and public only introduces perturbation, delay in the implementation, confusion*

and background noise" (M27). However another manager was of the view that there was real value to be gained from engaging the public and other stakeholders as: "*despite the view that public/local community involvement is 'non-expert involvement' I think that the earlier the stakeholders, any stakeholders, are involved then the better will be the process and the outcomes*" (M1).

Researchers' views

The rights of the public to be involved were considered an important reason for public involvement by 50.9% of the research respondent group. One respondent considered that their inclusion was justified as *"water is a national asset. Planning which affects the national or local assets (e.g. dam, use of lake water, transfer of water to another part of country etc) should take into consideration the public attitudes*" (A42). Another respondent expressed not only that they "*are entitled to have the right to express their opinion*" but also that "*their observations about the project will include some good points and thus would make it easier for the company or the authorities to carry out the project*" (A41).

Another researcher extended the idea of public involvement by considering that their increased participation with and understanding of other key stakeholders and the main issues involved could be of benefit as:

"Environmental management and specifically water charges are going to require an increasing level of participation, understanding and co-operation from the public at large. Hence full public involvement is essential to ensure increased awareness of the issues involved, the practical difficulties faced by government and industry in managing water and the cost/benefit analysis that informs decision on the use of water resources" (A52).

Promoting project ownership should not only be targeted towards the public according to another respondent as "*the community including water suppliers, users and general public should be engaged early in the decision making process so that they all can take ownership. Ownership means that all sections of the community will ensure appropriate risk management. Furthermore, this process should be an engagement process rather than a consultation process*" (A40). A change in approach to resolving counter opinions regarding resource use was seen as essential by a different respondent as "*competing claims on the same resource cannot be resolved without some from of process involving civil society. Technical, behavioural and institutional transformations need to be brought into concerted action*" (A23).

Frequent comments were also made by researchers related to increasing public awareness (49.1%). One researcher felt that public involvement would allow them to "*learn and develop own capacity to act in an independent and informed way in water resource management*" (A8), but that they may also need to *"perhaps change their behaviour*" (A8).

Improvements in process or outcome due to public inclusion were also frequently mentioned (35.1%). One respondent felt that their inclusion "*builds awareness, trust, problem more inclusively defined, shared meaning becomes possible*" (A36). However, the same respondent also suggested that "*public involvement can yield undesirable consequences for all parties too*" (A36).

Customers' views

Public ownership and the right to be involved featured frequently in the comments received from the customer group (64.3%). One respondent commented "*why not? If they are relevant further down the line then they might as well be in from the start of the consultation process so they can be integrated into decision making processes by constructive means*" (C38). Another respondent suggested that lack of early public ownership could result in a negative public response later in the project life as "*if no initial sense of ownership is created rejection is more likely*" (C1). The reason given for increasing public awareness through their involvement by another respondent was "*because they would like to be aware of the project's effectiveness and safety aspects*" (C37). While one customer recognised that "*they don't know enough to plan the project*" he went on to say however that they should "*be consulted for the implementation as they will be the first users*" (C27). Another respondent emphasised that "*every local problem requires local attention*" (C34). However, a different customer believed, "*in public and/or community ownership and control of all shared infrastructure*" (C11).

Project process and outcome would benefit in some way from public involvement according to 28.6% of respondents within this group. One respondent suggested that public inclusion would provide them with the opportunity to influence other key stakeholders to modify their practices, particularly "*to ensure water resources are managed sustainably and put pressure on the water industry to overcome its reluctance to change*" (C19). A different respondent suggested that "*the active participation of local community allows gradual incorporation of the program's learnings into government policies and decisions*" (C40) Another respondent felt that better solutions and policies could be influenced by public inclusion alongside other key parties because "*if the common sense issues about adoption are not taken on board by the stakeholders then it will not happen except by mandate (e.g. building regs, planning permission)*" (C41).

6.2.5 Factors influencing the success or failure of water management projects

Open response questions were used to ask respondents what they considered to be the main factors that could contribute to the (1) success and (2) failure of a water management project. Answers given by the respondents were read through several times and similar comments were identified and grouped together, thereby identifying similar issues brought up by one or more of the respondent groups. This process resulted in categorisation of the content of respondent answers into the following general themes:

1. Planning, management, evaluation.
2. Public involvement
3. Stakeholder involvement
4. Financial
5. Research and technology
6. Construction, operation, maintenance.
7. Environmental and sustainability issues
8. Risks and benefits

Table 6-15 and Table 6-16 are based on the number of times a particular factor was mentioned by members of each respondent group:

Success	**Response groups – Frequency (%)**			
	Regulator	**Manager**	**Researcher**	**Customer**
Planning/management	7 (41.2)	15 (40.5)	22 (38.6)	13 (31.0)
Public involvement	10 (58.8)	17 (45.9)	28 (49.1)	19 (45.2)
Stakeholder involvement	2 (11.8)	15 (40.5)	18 (31.6)	9 (21.4)
Financial	5 (29.4)	6 (16.2)	13 (22.8)	5 (11.9)
Research /Technology	2 (11.8)	10 (27.0)	5 (8.8)	7 (16.7)
COM	2 (11.8)	3 (8.1)	2 (3.5)	5 (11.9)
Environment/sustainability	1 (5.9)	10 (27.0)	4 (7.0)	4 (9.5)
Benefits/risks	4 (23.5)	4 (10.8)	7 (12.3)	9 (21.4)

Table 6-15 Main factors that could contribute to the success of a water management project

Failure	**Response groups – Frequency (%)**			
	Regulator	**Manager**	**Researcher**	**Customer**
Planning/management	9 (52.9)	13 (35.1)	27 (47.4)	18 (42.9)
Public involvement	6 (35.3)	19 (51.4)	23 (40.4)	10 (23.8)
Stakeholder involvement	2 (11.8)	11 (29.7)	6 (10.5)	9 (21.4)
Financial	4 (23.5)	8 (21.6)	13 (22.8)	12 (28.6)
Research /Technology	1 (5.9)	5 (13.5)	4 (7.0)	6 (14.3)
COM	2 (11.8)	4 (10.8)	0	3 (7.1)
Environment/sustainability	0	5 (13.5)	3 (5.3)	4 (9.5)
Benefits/risks	5 (29.4)	3 (8.1)	6 (10.5)	3 (7.1)

Table 6-16 Main factors that could contribute to the failure of a water management project

6.2.5.1 Contribution of factors to project success

The majority of respondents' statements highlighted more than one factor contributing to the likely success of a project. Respondents' comments (see Appendix 7) are used in the following part of this section to reflect the general outlook of each group in relation to factors that could constitute or influence levels of success in a water management project. The reference system used in relation to respondents' comments denotes which respondent number and group the comment originates from: R = regulator; M = manager; A = researcher; C = customer. The most frequently cited topics across all the groups were related to the themes of wider (public or stakeholder) involvement.

Regulators comments on success

Comments received by the regulator group on project planning, management and evaluation (41.2%) encompassed the need for sufficient preliminary research and proper planning, well organised processes and clear, transparent objectives, for example.

"*Sufficient preliminary research to assure cost/effective selection and application of appropriate technologies and management schemes*" (R6).

"*Proper planning utilising a cost/benefit appraisal of the different options from a quantitative and qualitative perspective*" (R8).

"*Clear concise and transparently agreed benefit goals*" (R17).

The level of project experience and adequate recording, transmission and evaluation of project experiences were also put forward as important factors. One respondent relayed this idea in direct relation to a project to hand, regarding "*project experience – other project success stories*" (R14) as aiding project success. Another regulator proposed that it was important to carry out "*proper post-implementation evaluation, otherwise a lot of knowledge and experience will be lost*" (R8).

Comments made by the regulators on wider involvement concentrated on the role of public involvement (58.8%), with most comments reflecting a need for public support, acceptance and raising public awareness.

"*Public acceptance a local driver (e.g. economic or environmental factor) which means the public also see value in the project as a reliable monitoring programme which is open for public view* "(R2).

The majority of the comments made by the regulators regarded successful public involvement constituting of information provision, public consultation and advice, via adequate communication channels, as illustrated by the following respondents' comments. The information provided or the consultation process used should, according this respondent group address project progress, risk, benefits and costs.

"*Keeping people informed of the progress and allowing input and advice at all stages of the project*" (R8).

"*Willing participation (through consultation and provision of information) by those who should be benefiting from it*" (R16).

"*A public outreach programme with full disclosure about where the water will be used and how the public will be protected from potentially harmful effects*" (R7).

Financial issues (29.4%) and benefits and risks (29.4%) associated with a project were also of major concern to the regulators. One expressed concern regarding these issues as there should be "*obvious public benefit. Limited public costs or risks*" (R13).

According to some of the regulators ensuring public ownership of the issues or problems relating to a project were also important, one regulator expressed it as "*ownership of the issues/problems and management by the local communities is also a key issue*" (R15). Stakeholder involvement (11.8%) and gaining agreement across different groups were also put forward as elements of a successful project. One regulator described it as the need for "*inclusion of all the correct people including the local wildlife trusts and parish councils*" (R8); another expressed the need for wider involvement to gain "*agreement across proposer, regulator and public as to the aims and purposes of the project*" (R5).

Managers' comments on success

Respondents within the manager group also raised issues concerning the relationship between a successful water management project and adequate planning and management (40.5%) illustrated by the following two excerpts taken from respondents' statements:

"*Allow sufficient time for planning and delivery of project*" (M17).

"*Flexibility/adaptive management*" (M21).

Both public (45.9%) and stakeholder (40.5%) involvement were frequently mentioned as important elements that could influence levels of project success. Many called for a more integrated approach taking into account a number of factors, as demonstrated within the following excerpts

"*In order of decreasing importance: public involvement (during pre-planning and planning) otherwise could result in a 'white elephant'. Public involvement in the operation and monitoring is required for users to gain (further appreciation) of the ongoing issues (avoiding complacency with respect to the risks and mutual obligations) and robust and appropriate technology in the scheme itself*" (M11).

"*Support of the community, a clearly thought out and well researched business case, a proven sustainability path, the use of the most appropriate technologies*

for the applications, an integrated approach to all the water issues – not focusing on a single issue" (M34).

One manager called for "*proactive community participation throughout project life and beyond*" (M33), therefore promoting the continuation and extension of community participation in future water management plans or improvements.

Managers' comments also brought up the role of adequate research and technology (27%) as contributing factors more often than the other three groups, conveyed by one respondent as needing to be both "*technically and economically sound*" (M8). According to another respondent project factors should be sequenced as "*scientific basis firstly and secondly, the involvement of interest groups and the public from as early as possible*" (M1). A different respondent held the view that it was important to ensure both "*economic and environmental sustainability*" (M30).

Some managers stressed the importance of highlighting the benefits to be gained from the project and how these benefits should be understood and agreed upon by all the stakeholders involved, expressed by one manager as "*real benefits well understood by all the stakeholders*" (M7). One respondent conveyed the need to gain agreement between different parties to achieve project success by gaining "*broad consensus among the people affected and the decision makers (politicians) of the need and the benefits of the project*" (M12). Another respondent suggested some of the key stakeholders to be

included: "*consultation with all key stakeholders (regulators, pressure groups, public/local community etc.)*" (M10).

Researchers' comments on success

Public (47.4%) and stakeholder (47.4%) involvement were thought to be the most important factors influencing the success of a project by the researcher group. Furthermore, some suggested what form the process should take and highlighted the importance of sufficient funding and facilitation of the process. This could be achieved according to one researcher by providing "*strong clear framework conditions; social learning adapted as a process/procedural principle; sufficient people with the new skills required (e.g. facilitation and joint learning process costs funded)*" (A23).

One respondent suggested that "*the authorities involved and the process used to engage the community have to be honest and transparent*" (A37), while another emphasised the need for "*working with the public to identify the most appropriate solution to solving the problem*" (A44). Appropriate communication channels and the dissemination of accurate, transparent, and up to date information between the different interested parties involved was therefore seen to be key issues brought up by the majority of the respondents within this group. There was more emphasis within this group regarding problem solving through information disclosure, engagement of key stakeholders and improved understanding of relevant issues and concerns via discussion and development of trust, as illustrated for example by the following two respondent quotes:

"*Accurate and complete information on water issues should be updated and available to the public, media and educators on a continual basis*" (A37).

"*Need to understand and engage people over the long term to develop trust and support*" (A48).

One respondent put forward *that water management* should be viewed "*as a structured societal problem and not as a problem of individuals*" (A3) an opinion which suggests that water management problems should be viewed as shared problems within the social order as a whole and that finding solutions should not be confined to just one sector. The impact of the project both, locally and beyond the immediate confines of the project would be more successful according to one researcher when "*it benefits the maximum number of people locally first and the regions around them and negatively impacts on the least number of people – again locally first and then regions around the resource*" (A5). Another researcher suggested that "*protection of water resources through water conservation may be another motivation*" but this could only be achieved "*with an educated public*" (A57). One researcher also suggested that it was important that the project was founded on "*appropriate drivers – not just for the sake of it*" (A40).

One respondent viewed it as essential to gain "*full commitment from all stakeholders involved until the project reaches its completion*" (A45). The

importance of flexible and adaptable management during short, medium and long term phases of planning and the importance of interaction between different stakeholders during those periods were highlighted by another respondent who suggested that:

> *"Stakeholders mean concerns, they look each other and evaluate, suggest or even implement tasks to make. Then, public represented may exert their rights and give regulators a bit of pressure. I think more objectives would get accomplished. Local regulations should be flexible enough to be changed with conditions over time. Long term decisions may be set to 20 years; mid-term 10-12 years, short term 3-5 years. This organisation may be coupled I think with land and other resources managers" (A55).*

Economic implications of the project in relation to cost both for running the project and appropriate pricing, if applicable, to the end user were suggested as notable factors as well as on-going planning, commitment and support of stakeholders. In common with the manager group were the multiple suggestions made regarding interrelated factors influencing project success.

Customers' comments on success

Comments received from the customer group predominantly contained features concerning public involvement (45.2%) and planning or management issues (31%). Public consultation, inclusion and securing public acceptance and support were important considerations within this group. As one respondent

stated people need to know how it works otherwise it will not be accepted easily and "*they will not trust the people in charge of the project or the reasons to use it*" (C29).

Provision of information so that those directly affected could make an informed choice and providing easily understood explanations of the benefits and risks involved in a manner accessible to the public were also put forward as elements of a successful project, expressed by one respondent as "*public acceptance – by involving people and informing them about the benefits in an easily conceivable way*" (C37). Public involvement was also put forward as a way of making people aware of the benefits they may gain from the project: "*Involvement of people, they have to feel concerned about the subject, to believe that they will get something positive out of it*" (C6). Comments regarding personal benefits or risks (21.4%) also featured in this group. One respondent focused on the need to keep localised risks to a minimum while also "*advertising of the long term and general benefits*" (C25).

A number of comments were comprehensive, taking into account the links between different factors, as for example the respondent who cited "*proper planning and development includes public consultation and response to expressed concerns by a sensitive, competent professional authority from duly constituted, competent, professional bodies*" (C16). Another respondent included "*money, resources, leadership, expertise, active involvement of stakeholders, a viable project, clear indications of the benefits, environmental*

improvement" (C17). For another respondent necessity for the project and the timescales involved would feature in the project's success: "highlight *the need, highlight the timescales required*" (C21). On the other hand, some expressed certain aspects needed to be present in relation to other stakeholders for a project to succeed, such as the public's "*trust in water providers, regulators*" (C19). Another cited "*strict and ruthlessly enforced regulation of water supply companies*" (C8) was required for a successful project.

A few expressed environmental concerns, suggesting for example, how it was important that the "*public feel like they're 'doing their bit' to save the planet's resources*" (C26), while another respondent not only commented on the necessity for "*good knowledge about the particular community needs*" but also how "*good knowledge of the local environment issues*" (C36) were also required. The use of reliable and appropriate technologies was also a factor considered, and described by one respondent as requiring an "*efficient system which works well from the offset*" (C26).

6.2.5.2 Factors contributing to failure of projects

Factors put forward by the respondents that, in their opinion, could contribute to project failure were, in the majority, negative 'mirror images' of the factors they highlighted as contributing to project success .For example, one manager noted the following factors "*lack of community support, wrong technology for the application, the business case was not sound, poor project management, unsustainable application, doesn't include all aspects of the water cycle –*

moves a problem or enhances a problem" (M34). Only some of the more notable comments, or any predominant shifts in emphasis, are provided therefore in the following text on project failure, rather than simply providing commentary on reversed statements.

Regulators – failure

The predominant factor put forward by members of this respondent group were concerning the lack of planning and/or inept management (52.9%) Further comments included financial factors (23.5%) and stakeholder involvement (11.8%), for reasons such as: "*not including all the right stakeholders or groups. Vital information could be missed and as a consequence the project plan might not be suitable for its purpose and therefore likely to be less successful*" (R8). 35.3% of this group made comments relating issues concerning public involvement to project failure. One respondent reflected on the impact of his own group by affirming that "*arrogance on the side of the regulator or project manager*" (R2) could be a major cause of project failure.

Managers – failure

Over half of the respondents (51.4%) in the manager group mentioned factors concerning public involvement contributing to project failure (whereas stakeholder involvement in relation to failure was only mentioned by 29.7% of managers). The majority of comments mirrored the statements regarding success in relation to wider involvement. However one respondent felt that "*the*

range of responses that one may get will greatly delay - and possibly block – many projects which are objectively beneficial for the community and/or the environment" (M27). Another manager foresaw problems arising if a project was "*driven through in the face of local opposition which becomes organised and resists in consequence, through lack of information*" (M16), while "*conflict with citizens*" (M30) was highlighted by another.

One manager suggested that project failure stemmed from "*not recognising local realities i.e. implementing a project that worked in a major European city to a city within Southeast Asia without taking into consideration whether it is technologically, socially, culturally, or economically appropriate)*" (M21).

Researchers – failure

The majority of researchers' comments centred on failure in relation to public involvement (38.6%). One comment suggested that the combination of "*imposition by central government together with too authoritarian and blinkered management*" (A25) could be a major contributor to project collapse. On the other hand another researcher viewed the "*lack of power of competent authorities*" (A19) as a key factor. The significance of not ensuring open and honest management of the planning process and public input was conveyed by one respondent as "*closed doors and manipulation of public opinion by the divide and conquer philosophy*" (A54).

One researcher, in a similar vein to a comment made by one of the managers, suggested that project failure could be induced by "*incorrect awareness of local conditions, including land use, practices, managers and land use tenure regimes, further development of towns cities and so*" (A55).

Customers – failure

The most frequent factor suggested by the customer group as contributing to project failure related to planning and management factors (42.9%) such as a "*a dictatorial attitude by the management*" (C5), or financial issues (33.3%) especially in relation to extra personal costs due to the project, expressed by one customer as "*capitalization of the water without control*" (C29). Some of the comments suggested a high level of suspicion regarding the intentions of water suppliers, who in one respondent's opinion "*may want to attempt to establish/maintain a monopoly in water supply; manipulate the supply/demand rates and ultimately make water an expensive and highly profitable commodity*" (C8).

Comments regarding public involvement were fewer than those made in relation to project success. However some statements addressed the need to provide wider opportunity for involvement instead of, as one respondent remarked, "*only having people who are 'environmentalists' and do not see the other side and the reasons for possible resistance to water management projects*" (C7). Another respondent stated that "*the lack of partnership between the community and government is not the best way to approach the management of water*

resources" (C40), conveying a possible aspiration for such projects to be looked upon more as a joint venture.

6.3 Attitudes to water policy mechanisms

This theme explored which policy mechanisms are preferred by respondents in relation to water conservation; their outlook towards the adoption of wastewater reuse as a conservation option. Table 6-17 shows the frequency of respondents' preferences when asked:

(i) To choose what they considered to be the most efficient way to conserve water out of five given options.

(ii) Level of agreement with the statement: "The appropriate reuse of wastewater is a desirable option as a means of conserving water resources", using a five point Likert scale ranging from strongly agree (1) to strongly disagree (5).

	Response Groups - Frequency (%)			
Most efficient way to conserve water	Regulator	Manager	Researcher	Customer
Pricing	5 (29.4)	17 (47.2)	19 (34.5)	5 (11.9)
Imposing restrictions	3 (17.6)	3 (8.3)	6 (10.9)	1 (2.4)
Increasing general awareness	4 (23.5)	8 (22.0)	11 (20.0)	14 (33.3)
Adopting sustainable or alternative technologies	5 (29.4)	8 (22.0)	15 (27.3)	22 (52.4)
Other	0	0	4 (7.3)	0
Wastewater reuse as conservation option				
Strongly agree	10 (58.8)	25 (67.6)	40 (70.2)	20 (47.6)
Agree	6 (35.3)	9 (24.3)	16 (28.1)	16 (38.1)
Neutral	1 (5.9)	2 (5.4)	0	5 (11.9)
Disagree	0	0	0	0
Strongly disagree	0	1 (2.7)	0	0

Table 6-17 Respondents preferences regarding: (1) water conservation (2) wastewater reuse as a conservation option

There was a significant difference (Pearson Chi-Square = 0.007) between the four groups preferred option for water conservation (Table 6-18).Of the choices given (Table 6-17), 47.2% water managers chose ‘pricing’, whereas only 11.9% of customers chose that option. Conversely, 52.4% of customers chose ‘adopting sustainable or alternative technologies’ option in comparison to only 22.2% of water managers. Of the researcher group 33.3% chose ‘pricing’ as their preferred water conservation option. The conservation preference of the regulator respondent group is spread fairly evenly across the options (excluding the ‘other’ option), whilst 7% of the researcher group chose ‘other’ forms of conserving water as their preference.

The least chosen option across all groups was ‘imposing restrictions’. The value of Cramer’s V is low (Table 6-18), indicating a weak association between the

conservation option chosen and the respondent group. This value is highly significant (p = 0.007).

	Value	p
Pearson Chi-square	27.496	0.007
Phi	0.428	0.007
Cramer's V	0.247	0.007
No. of valid cases	150	

Table 6-18 Most efficient way to conserve water: Pearson Chi-square and symmetric measures

Response groups – Mean (SD)				
All	Regulator	Manager	Researcher	Customer
1.44 (0.66)	1.47 (0.62)	1.46 (0.84)	1.29 (0.46)	1.63 (0.70)

Table 6-19 Wastewater reuse as a conservation option: groups' mean and standard deviation

When asked to what extent they agreed or disagreed with the appropriate reuse of wastewater as a desirable option for conserving water resources then the responses across the four groups were similar. That is, the majority of respondents either 'strongly agreed' or 'agreed' (Table 6-17) across all groups (mode for each group = 1). ANOVA results showed there was no statistical difference between the groups (F ratio = 2.283; p = 0.081) regarding this assertion. However, Levene's test was significant (p= 0.009). The Welch statistic was borderline (p = 0.051).

6.4 Attitudes towards benefits and risks of projects

Much of the research regarding risks (and to a lesser degree benefits) in relation to water resource management has focused on public perception, while little is known directly about the perceptions of other stakeholder groups

(Section 3.2). So as to provide some form of context, based on water resource management, respondents were specifically asked to give their views in relation to wastewater reuse. This theme investigates:

(a) The benefits that the four response groups would expect from wastewater reuse

(b) The risks that the four response groups would expect with wastewater reuse

(c) Levels of agreement expected by the respondent groups from different stakeholder groups regarding the risks they identified in (b).

6.4.1 Benefits of wastewater reuse

An open response question asking what respondents considered as the primary potential benefit of wastewater reuse resulted in the frequency and percentage responses shown in Table 6-20.

	Response Groups - Frequency (%)			
Primary potential benefit of wastewater reuse	**Regulator**	**Manager**	**Researcher**	**Customer**
Reduce primary source demand	8 (47.1)	23 (62.2)	11 (20.8)	7 (17.5)
Sustainability or environmental protection	4 (23.5)	5 (13.5)	23 (43.4)	17 (42.5)
Augmentation of supplies	4 (23.5)	5 (13.5)	3 (5.7)	9 (22.5)
Non potable reuse	1 (5.9)	3 (8.1)	5 (9.4)	2 (5.0)
Economic or infrastructure benefits	0	1 (2.7)	6 (11.3)	5 (12.5)
Increase awareness	0	0	5 (9.4)	0

Table 6-20 Benefits of wastewater reuse according to respondents: frequency and percentage

There was a highly significant difference (Pearson Chi-square = 0.000) between the four respondent groups expected benefits of wastewater reuse (Table 6-21). 'Reducing primary source demand' was the primary benefit of wastewater reuse for 47.1% of regulators and 62.2% of managers. For researchers and customers the primary benefit in 43.4% and 42.5% of cases respectively was 'sustainability and environmental protection' (Table 6-20). While Cramer's V is highly significant its value is low, suggesting a weak association between expected benefit and respondent group (Table 6-21).

	Value	**p**
Pearson Chi-square	48.149	0.000
Phi	0.572	0.000
Cramer's V	0.330	0.000
No. of valid cases	147	

Table 6-21 Expected benefits of wastewater reuse: Pearson Chi-square and symmetric measures

6.4.2 Risks of wastewater reuse

A free response question was used to explore what respondents' viewed as the two most important risks of a wastewater reuse project or scheme. The two risks identified by the respondents (after interpretation and coding) are shown in Table 6-22, which presents the number and percentage of times a particular risk was identified per respondent group. Health risks were a major issue for all the respondent groups. Acceptance as an issue of risk was predominantly identified by all four groups. Cost was also a dominant risk for the customer group, however their percentage expectations regarding five risks (health, cost,

misuse, acceptance and environmental) are similar. Environmental risk was a leading consideration within the researcher group.

	Response Groups - Frequency (%)			
Risks	Regulator	Manager	Researcher	Customer
Health	7 (20.6)	20 (28.2)	30 (29.1)	13 (17.6)
Cost	4 (11.8)	6 (8.5)	9 (8.7)	13 (17.6)
Misuse	3 (8.8)	10 (14.1)	5 (4.9)	11 (14.9)
Acceptance	5 (14.7)	12 (16.9)	16 (15.3)	11 (14.9)
Environmental	4 (11.8)	7 (9.9)	27 (26.2)	11 (14.9)
Technology	3 (8.8)	4 (5.6)	5 (4.9)	4 (5.4)
Monitoring	2 (5.9)	4 (5.6)	7 (6.8)	5 (6.8)
Reliance	2 (5.9)	4 (5.6)	0	2 (2.7)
Lack of information	3 (8.8)	3 (4.2)	3 (2.9)	3 (4.1)
Other	1 (2.9)	1 (1.4)	1 (1.0)	1 (1.4)

Table 6-22 Risks of wastewater reuse according to respondents: frequency and percentage

	Value	**p**
First Risk		
Pearson Chi-square	37.993	0.078
Phi	0.507	0.078
Cramer's V	0.293	0.078
No. of valid cases	148	
Second Risk		
Pearson Chi-square	34.700	0.147
Phi	0.509	0.147
Cramer's V	0.294	0.147
No. of valid cases	134	
Risks Combined		
Pearson Chi-square	29.705	0.328
Phi	0.325	0.328
Cramer's V	0.187	0.328
No. of valid cases	282	

Table 6-23 Risks of wastewater reuse according to respondents: Pearson Chi-square and symmetric measures

The Pearson Chi-square tests showed no significant differences (Table 6-23) between the respondent groups in relation to the first, second or both risks put forward by the respondents. This suggests that the type and frequency of the expected risks involved are similar for all four groups. The value of Cramer's V

was also low and not significant in all cases. This indicates a weak association between type of risk and respondent group that could have occurred by chance.

6.4.3 Expectation of agreement regarding risks

Table 6-24 presents to what extent each respondent group would expect (1) water suppliers, (2) academic researchers, (3) regulators, and (4) the public or their representatives to agree with their opinion on the risks involved, (as previously identified in Section 6.4.2). A five point Likert scale, ranging from strongly agree (1) to strongly disagree (5) was used for this purpose. A low mean score signifies a higher expectation of agreement. A high mean range signifies more variation in the response groups' expected levels of agreement, when comparing the assessed stakeholder groups on that issue.

Expected agreement from all four groups, regarding *all* identified risks is relatively high, compared with the agreement expectations for some *particular* risks. The most frequently identified risk across all the response groups was 'health issues', with the manager response group having the lowest mean range (0.35) and the researcher response group having the highest (0.96).The regulator response group has a mean range of 1.5 regarding 'cost' and 'environmental' issues. The manager response group has a mean range of 0.89 regarding 'acceptance issues'. The researcher and customer response groups have a mean range of 1 and 1.31 respectively regarding 'environmental pollution'.

Risk (%) and Range of anticipated agreement	Response Group: Regulators – Mean (SD) Water Suppliers	Academic Researchers	Regulators	Public or reps
All risks (100) Range = 0.47	2.06 (1.07)	2.41 (1.10)	1.94 (0.89)	2.21 (1.04)
Health (20.6) Range = 0.72	1.71 (0.49)	2.29 (1.11)	1.57 (0.53)	1.71 (0.76)
Costs (11.8) Range = 1.50	1.50 (0.57)	3.00 (1.15)	2.75 (0.96)	2.75 (0.96)
Misuse (8.8) Range = 1.00	2.67 (1.16)	2.00 (1.00)	1.67 (0.58)	1.67 (1.16)
Acceptance (14.7) Range = 0.80	1.60 (0.55)	2.20 (1.30)	2.20 (1.30)	2.40 (1.14)
Environmental (11.8) Range = 1.50	3.50 (1.29)	2.25 (1.26)	2.00 (0.82)	2.25 (1.26)
	Response Group: Managers – Mean (SD)			
	Water Suppliers	Academic Researchers	Regulators	Public or reps
All risks (100) Range = 0.48	1.80 (0.95)	2.21 (0.84)	1.99 (1.02)	1.73 (0.89)
Health (28.2) Range = 0.35	1.6 (0.75)	1.85 (0.59)	1.50 (0.69)	1.40 (0.82)
Costs (8.5) Range = 1.50	1.33 (0.52)	2.83 (0.98)	2.67 (0.82)	2.83 (0.75)
Misuse (14.1) Range = 0.60	1.6 (0.97)	2.10 (0.74)	1.50 (0.71)	1.90 (0.88)
Acceptance (16.9) Range = 1.00	1.75 (1.22)	2.58 (1.17)	2.75 (1.36)	1.33 (0.49)
Environmental (9.9) Range =0.43	2.14 (1.07)	2.00 (0.58)	1.71 (0.76)	2.00 (0.82)
	Response Group: Researchers – Mean (SD)			
	Water Suppliers	Academic Researchers	Regulators	Public or reps
All risks (100) Range = 0.55	2.34 (1.22)	2.04 (0.89)	2.13 (1.01)	1.79 (0.88)
Health (29.1) Range = 0.96	2.33 (1.37)	2.03 (0.98)	1.80 (0.98)	1.37 (0.56)
Costs (8.7) Range = 0.45	2.56 (1.42)	2.38 (1.06)	2.56 (1.01)	2.11 (1.05)
Misuse (4.9) Range = 0.60	2.00 (0.00)	2.00 (0.71)	2.2 (1.30)	2.60 (1.14)
Acceptance (15.5) Range = 0.43	2.06 (1.12)	2.06 (0.85)	1.88 (0.89)	1.63 (0.72)
Environmental (26.2) Range = 0.74	2.74 (1.20)	2.00 (0.96)	2.52 (1.01)	2.11 (0.97)
	Response Group: Customers – Mean (SD)			
	Water Suppliers	Academic Researchers	Regulators	Public or reps
All risks (100) Range = 0.50	2.36 (1.22)	2.37 (1.01)	2.37 (0.91)	1.87 (0.95)
Health (17.6) Range = 0.54	2.00 (1.28)	2.08 (1.03)	2.08 (0.79)	1.54 (0.97)
Costs (17.6) Range = 0.77	2.15 (1.06)	2.92 (0.86)	2.69 (0.63)	2.85 (0.80)
Misuse (14.9) Range = 0.36	2.09 (1.04)	2.09 (0.94)	2.09 (0.94)	1.73 (1.01)
Acceptance (14.9) Range = 0.64	2.27 (1.19)	2.64 (1.03)	2.55 (0.69)	2.00 (0.89)
Environmental (14.9) Range = 1.18	3.00 (1.25)	2.36 (1.21)	2.50 (0.71)	1.82 (0.87)

Table 6-24 Expected levels of agreement regarding risks identified by respondent groups

ANOVA analysis (Table 6-25) revealed significant differences between the four respondent groups regarding their levels of expected agreement from the water supplier stakeholder group (p=0.009). No significant difference was found between the respondent groups regarding the other stakeholder groups.

Levene's test for homogeneity of variances was significant between the respondent groups for the stakeholder groups 'water supplier' (p=0.003) and 'academic researcher' (p=0.002) and was therefore violated. In this instance the

Welch statistic for ANOVA was also highly significant for the 'water supplier' stakeholder group (p=0.004) and likewise no significant difference was found between the respondent groups regarding 'academic researchers' (p=0.087).

Multiple comparisons, using Tukey's HSD test, revealed significant differences between the respondent groups: (i) managers and researchers; (ii) managers and customers (Table 6-26).

Stakeholder group	F ratio	p
Water Supplier	3.953	0.009
Academic Researcher	2.397	0.068
Regulator	2.434	0.065
Public or their representatives	2.239	0.084

Table 6-25 Levels of expected agreement on risk: ANOVA

Stakeholder group	Respondent groups	p
Water Supplier	Manager vs. Researcher	0.014
Water Supplier	Manager vs. Customer	0.020

Table 6-26 Levels of expected agreement on risk: Significant differences using Tukey's HSD test

	All	Regulator	Manager	Researcher	Customer
Kendall's *W*	0.029	0.076	0.070	0.037	0.053
Chi-square	24.400	7.741	14.899	11.465	11.666
Asymp. Sig.	0.000	0.052	0.002	0.009	0.009
No. of cases	280	34	71	102	73

Table 6-27 Kendall's *W* for expected agreement on risk for all respondents and expected agreement per group

Kendalls W (Table 6-27) shows a very low level of concordance between all respondents together and within their chosen respondent group regarding their expectations of agreement on the risks they identified.

6.5 Attitudes towards different information or knowledge sources

The intention within this theme was to investigate the level of variation within and between respondent groups' attitudes towards dissimilar information or knowledge sources. Respondent attitudes were explored in relation to selected attributes, identified within the literature review (Section 3.3) as modifiers of audience attitude towards information sources. Respondents were asked to rate a set of six information sources *independently* against a set of eight contrasting word pairs, which could be used to describe their attributes and to score each source, on a scale of one through to seven. For example, respondents assessing an information source for the descriptive word pair 'credible-unconvincing' who considered the information source to be better described by utilising the first word 'credible' rather than the second word 'unconvincing' would score closer to the value one. If they viewed the source as being more 'unconvincing' then the score would be closer to seven. The six information sources presented to the respondents were:

- Media
- Regulator
- Academic Researcher
- Non Governmental Organisation (NGO)
- Friend or Neighbour
- Water Supplier

The eight descriptive word pairs used in the study were:

- Credible (1) – Unconvincing (7); (C – U)
- Trustworthy (1) – Untrustworthy (7); (T – U)
- Reliable (1) – Unreliable (7); (R – U)
- Impartial (1) – Biased (7); (I – B)
- Respected (1) – Not Respected (7); (R – NR)
- People Orientated (1) – Self Orientated (7); (PO – SO)
- Knowledgeable (1) – Lacking Knowledge (7); (K-LK)
- Easy to Understand (1) – Difficult to Understand (7); (ETU – DTU)

6.5.1 Response groups' mean scores for information sources per word pair

The mean scores of each response group for the eight descriptive word pairs are presented below in the form of radar charts. Each chart presents data for one word pair with the six information sources placed clockwise around the chart, whilst the score for each source is given along the corresponding value axis which runs from one to seven. Values for each of the four groups have been plotted and can be identified by referring to the legend.

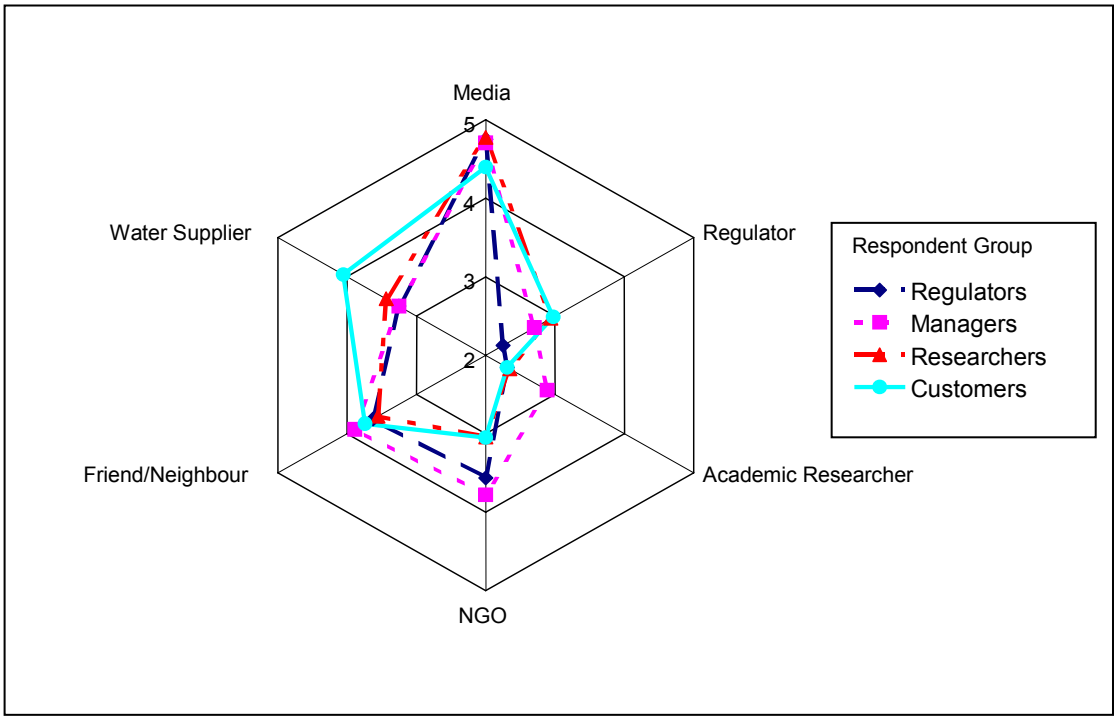


Figure 6-1 Trustworthy (1) or Untrustworthy (7)

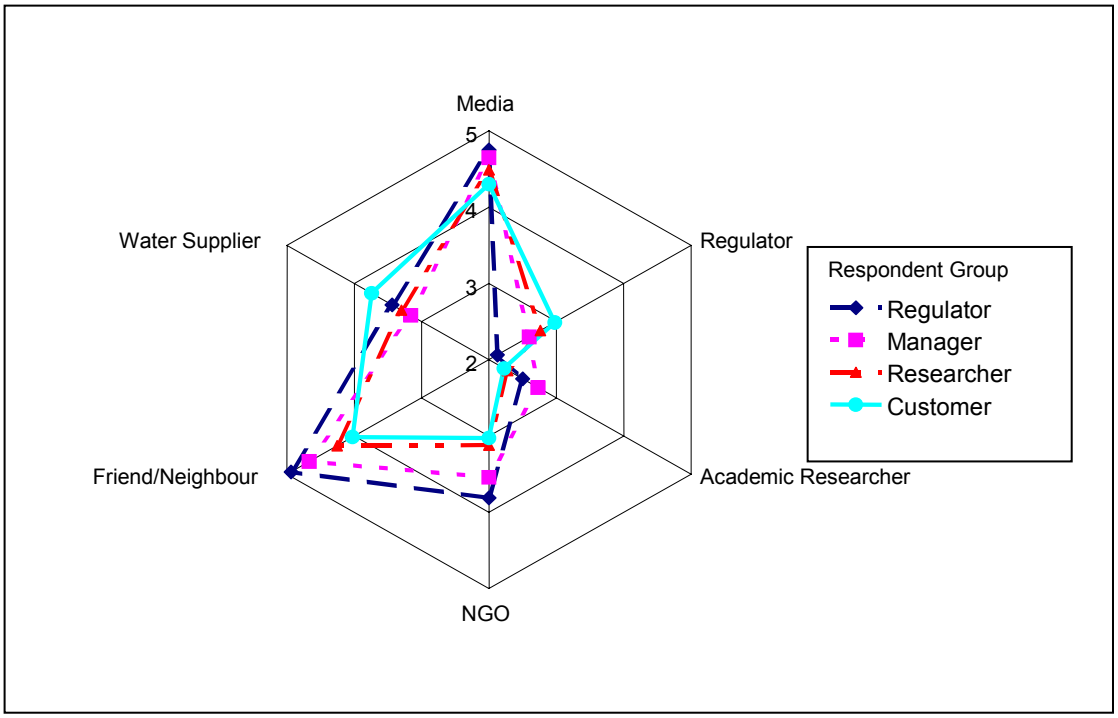


Figure 6-2 Credible (1) or Unconvincing (7)

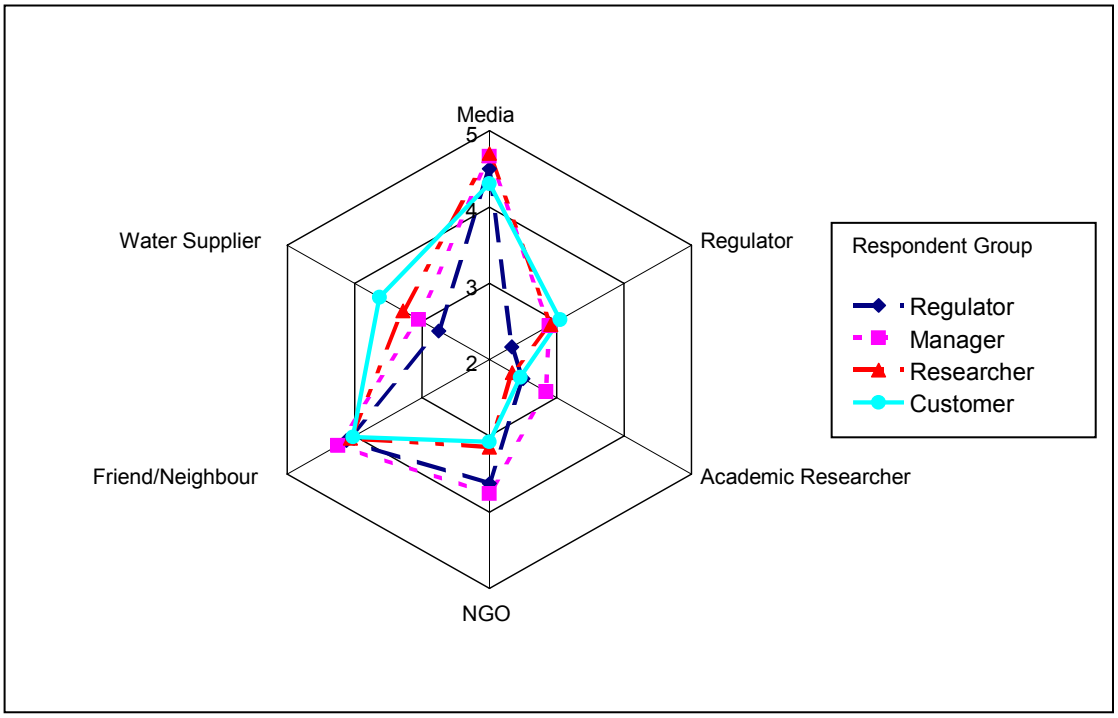


Figure 6-3 Reliable (1) or Unreliable (7)

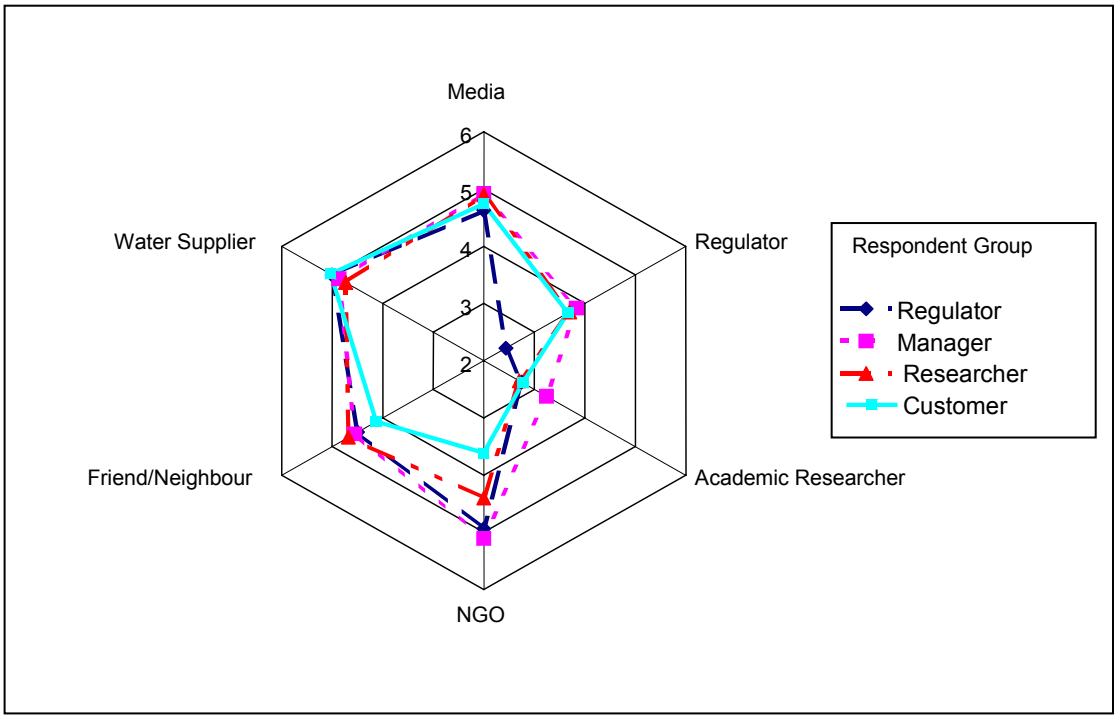


Figure 6-4 Impartial (1) or Biased (7)

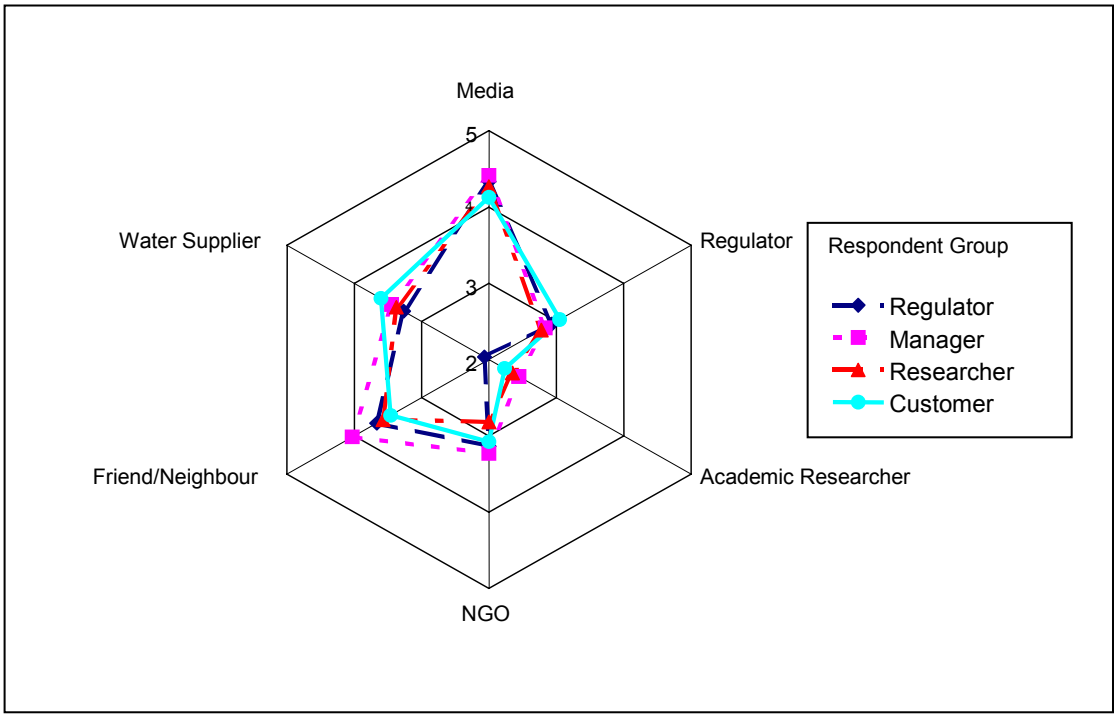


Figure 6-5 Respected (1) or Not Respected (7)

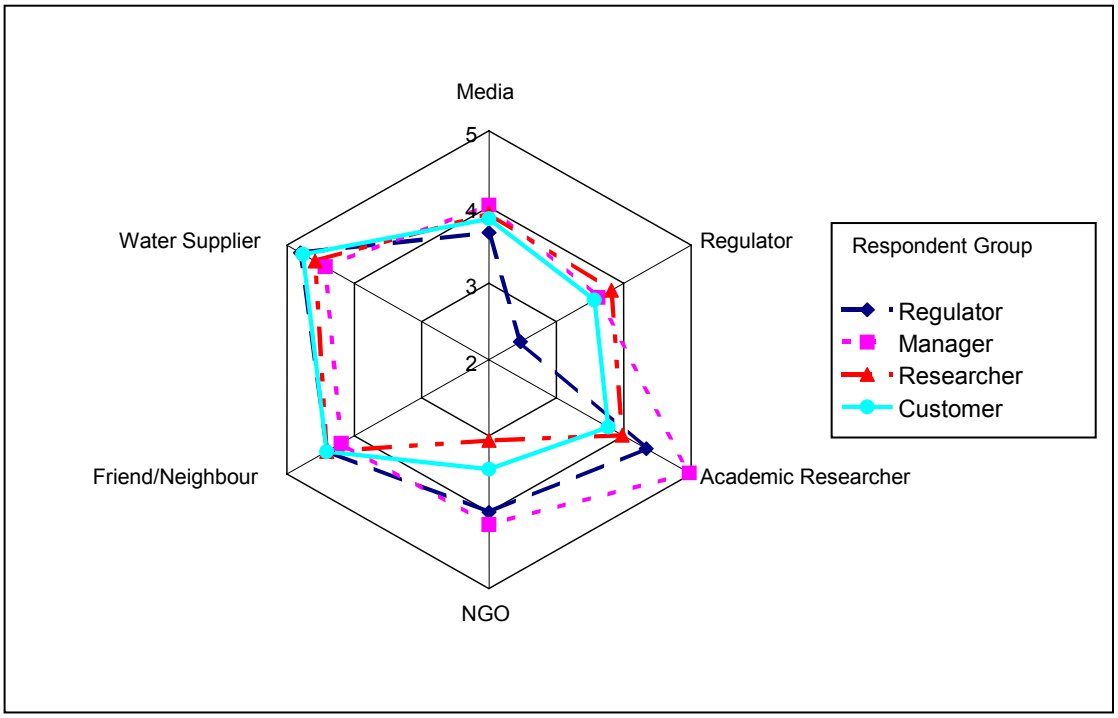


Figure 6-6 People Orientated (1) or Self Orientated (7)

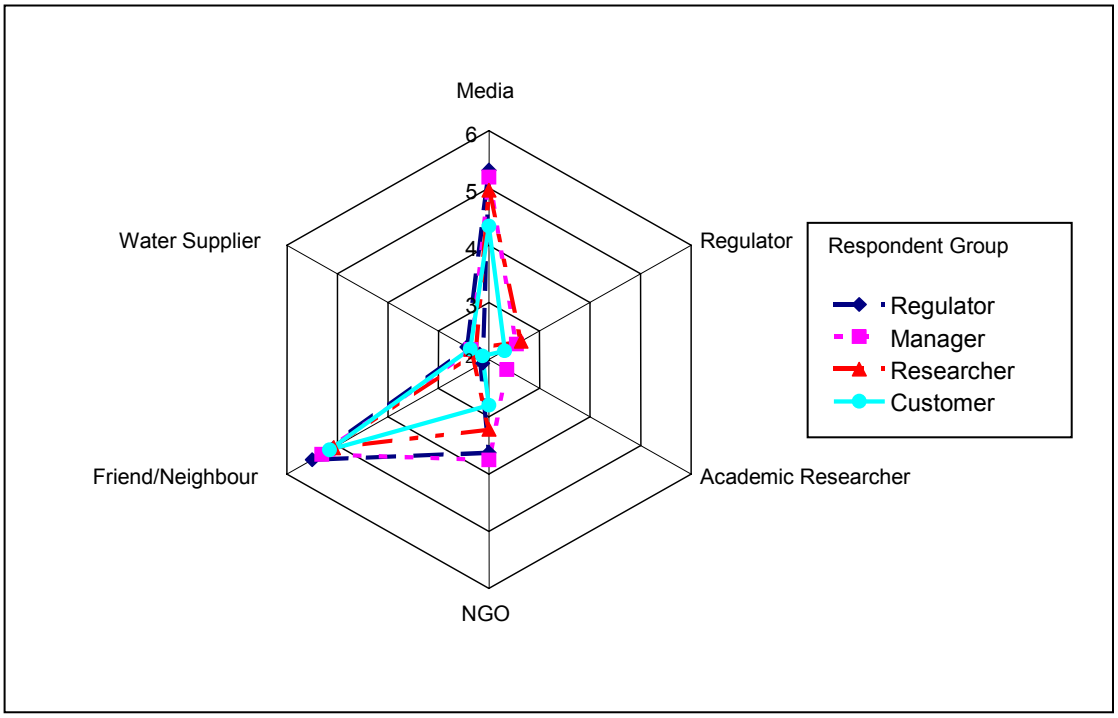


Figure 6-7 Knowledgeable (1) or Lacking Knowledge (7)

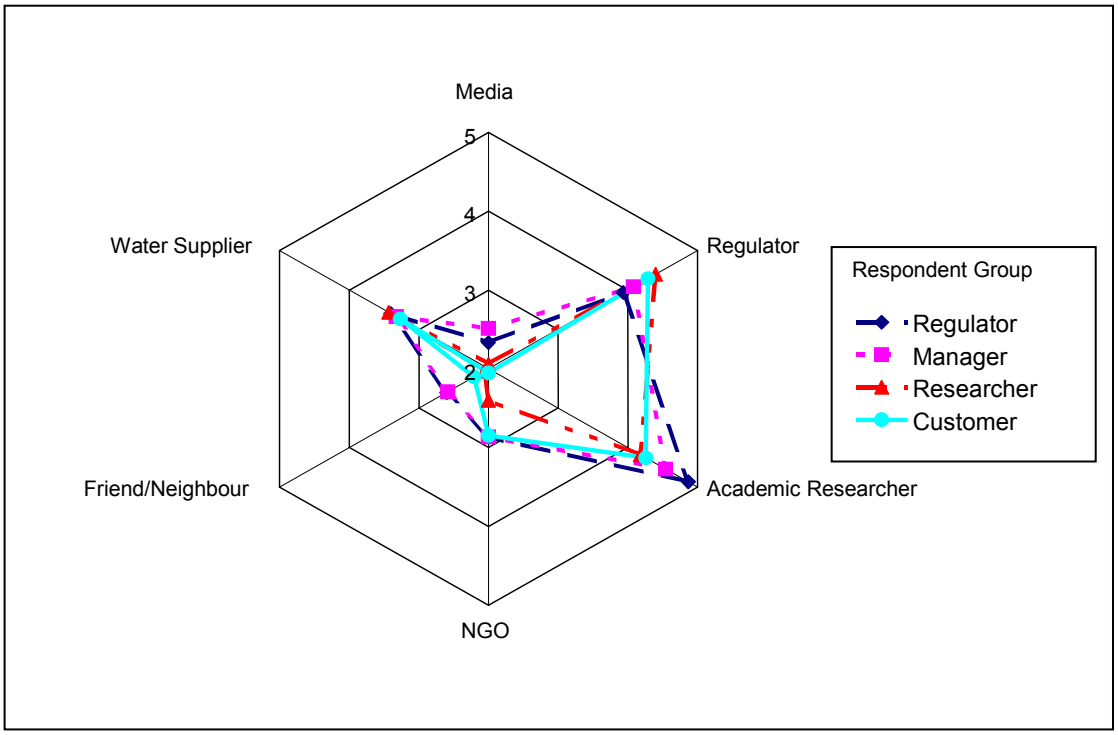


Figure 6-8 Easy to understand (1) or Difficult to understand (7)

Figure 6-1 presents results for the descriptive word-pair 'Trustworthy-Untrustworthy'. The media are generally seen by all response groups as being the most untrustworthy of the listed information sources, whilst regulators and academics are viewed as most trustworthy. Perhaps unsurprisingly, the three institutional classes of respondent view their own sectors as being highly trustworthy sources of information compared with other sources. Regarding levels of credibility (Figure 6-2) the media and friend/neighbour sources were generally viewed by all respondent classes as the two most unconvincing sources of information, whilst the regulator and academic sources are generally viewed as the most credible. For the word-pair 'Reliable-Unreliable' (Figure 6-3) there was a high degree of similarity between the groups' assessment of the media and friend/neighbour sources, viewing them as being the most unreliable sources. The regulator and academic sources were generally considered to be the most reliable.

Water suppliers and the media, for the descriptive word-pair 'Impartial-Biased' (Figure 6-4), were viewed as the most biased of the given sources by all respondent groups. Academic researchers were generally regarded as the most impartial. Also worth noting, is the difference between the assessment of (i) the regulator response group and the other respondent groups regarding the regulator source; (ii) the customer group's viewpoint regarding the NGO source's perceived level of impartiality in relation to the less positive views held by the other three respondent classes.

The media source was commonly considered as the least respected source by all the respondent groups (Figure 6-5) with the most respected being the academic researcher source. However, regarding the issue of respect there was a high degree of similarity in the groups' assessment of each source. Respondent groups' assessments of the information sources media, water supplier and friend/neighbour regarding their orientation (Figure 6-6) are all similar. There is however a noteworthy difference between the four groups' assessment of the academic researcher and NGO sources' orientation. As seen previously (in Figure 6-4), the regulator group's assessment of their own sector's orientation varies greatly from that of the other three response groups.

The media and friend/neighbour (Figure 6-7) were commonly regarded by all four response groups as the sectors most lacking in knowledge on water management. The regulator, academic researcher and water supplier sources were all generally regarded as knowledgeable. All groups viewed the academic researcher source, followed by the regulator source as the most difficult to understand (Figure 6-8). The sources viewed by the four groups as the easiest to understand overall were the media, friend/neighbour and NGOs.

Source of knowledge or information	Credible (1)- Unconvincing (7)	Trustworthy (1) – Untrustworthy (7)	Reliable (1) – Unreliable (7)	Impartial (1) – Biased (7)	Respected (1) – Not Respected (7)	People Orientated (1) - Self Orientated (7)	Knowledgeable (1) - Lacking Knowledge (7)	Easy to Understand (1) - Difficult to Understand (7)
Media	0.45	0.38	0.39	0.29	0.29	0.36	0.98	0.56
Regulator	0.85	0.72	0.72	1.40	0.28	1.35	0.76	0.47
Academic Researcher	0.50	0.58	0.50	0.54	0.51	1.20	0.71	0.69
NGO	0.79	0.74	0.68	1.49	0.41	1.10	0.96	0.47
Friend or Neighbour	0.91	0.33	0.22	0.55	0.57	0.22	0.42	0.54
Water Supplier	0.58	0.80	0.88	0.29	0.34	0.37	0.17	0.17

Table 6-28 Range of respondents groups' mean scores for each word pair per source of information

6.5.2 Range of respondents' scores in relation to information sources

In addition to the mean scores, which are representative of each respondent group's perception of the information sources, there is additional interest in the range of scores provided (Table 6-28). For example, for the descriptive words 'Credible-Unconvincing' there was significant variation in the four response groups' outlook on the friend/neighbour information source (mean range value = 0.91). There is also more inter-group variation regarding their opinion on the credibility of the regulator source (mean range value = 0.85) and the NGO source (mean range value = 0.79). For the word-pair 'Reliable-Unreliable' (Figure 6-3) the largest inter-group variation in opinion was regarding the sources: water supplier (mean range value = 0.88); regulator (mean range value = 0.72) and; NGO (mean range value = 0.68).

Regarding the word pair 'Impartial-Biased' (Figure 6-4) respondent group opinions significantly varied for the source NGO (mean range value = 1.49) and regulators (mean range value = 1.40). As stated previously, there was a high degree of similarity between the four groups estimation of the sources for the word-pair 'Respected – Not respected' (Figure 6-5). Most variation in the respondent classes' assessment of the word-pair 'People orientated-Self orientated' (Figure 6-6) arose regarding the following sources: regulator (mean range value = 1.35); academic researcher (mean range value = 1.20) and; NGO (mean range value = 1.10).

There was also a marked difference in the respondent groups' assessment of the media, (mean range value = 0.98) and NGO (mean range value = 0.96) sources for the descriptive word-pair 'Knowledgeable-Lacking Knowledge' (Figure 6-7) while the least variation between respondent classes (mean range value = 0.17) concerned their assessment of the water suppliers as an information source. Finally, for the word-pair 'Easy to understand- Difficult to understand' (Figure 6-8) the largest inter- group variation was regarding assessment of academic researchers as an information source (mean range value = 0.69) whereas there was a high degree of similarity between the respondent classes assessment of the water supplier information source (mean range value = 0.17).

When looking collectively at the stakeholder mean scores *and* the range of scores academic researchers attracted the most positive scoring from the respondent groups for six of the eight word pairs. However, they were considered to be 'self orientated' and the most 'difficult to understand' of all the sources, even by their own response group. This is in direct contrast to the response groups' attitude towards the media. There was a high level of similarity between the four response groups' assessment of the media as a source. The media source was generally regarded as 'unconvincing', 'untrustworthy', 'unreliable' and 'not respected' in relation to the other given sources. The only case where they were generally viewed more positively was for the descriptive word pair 'easy to understand – difficult to understand '. There was a high degree of similarity in the mean scores regarding the

friend/neighbour source as the one most lacking in knowledge. The media were also regarded as lacking knowledge; however the range of response group means (0.98) was more widespread in this case.

Water suppliers and the media were viewed overall as the most biased sources of information with a high degree of similarity in mean scores across the groups. However, group views differed significantly regarding their assessment on whether the 'regulator' and 'NGO' sources were impartial or biased. The regulator stakeholder group held the most positive viewpoint regarding regulators as an information source, whilst NGOS were viewed as least biased by the customers.

Water suppliers were viewed by all response groups as the most self orientated of the knowledge sources. However, there seems to be a noteworthy difference of opinion between the stakeholder groups regarding the orientation of the following information sources: 'NGO' (mean range value = 1.10) with the researcher group having the most positive view and manager group being the most negative; 'academic researcher' (mean range value = 1.2) with the customer response group having the most positive view and the manager response group the most negative view; and finally, the 'regulator' (range value = 1.35) with the regulator response group holding the most positive viewpoint and the other three respondent groups' mean scores being close together, reflecting a more negative viewpoint.

6.5.3 Statistical evaluation of responses in relation to information sources

No statistically significant differences were detected by ANOVA between the respondent groups for the following three word pairs:

- Credible – Unconvincing
- Respected – Not Respected
- Easy to Understand – Difficult to Understand

Levene's homogeneity of variances test was violated for two out of the 48 analyses:

- People orientated - Self orientated for Regulator information source (p = 0.011)
- Easy to understand - Difficult to understand for Friend/Neighbour information source (p = 0.029)

Statistically significant differences were detected between the respondent groups, using ANOVA in five of the word pairs (Table 6-29). Further analysis of these five word pairs, via multiple comparisons using Tukey's HSD test revealed statistical differences specifically between respondent groups' rating of information sources, for three of the word pairs (Table 6-30).

Word Pair	Information Source	F ratio	P
Trustworthy- Untrustworthy	NGO	2.702	0.048
Reliable – Unreliable	NGO	2.874	0.039
Impartial – Biased	Regulator	2.667	0.050
	NGO	6.448	0.000
People Orientated – Self	Academic Researcher	0.011	0.011
Orientated	NGO	0.026	0.026
Knowledgeable - Lacking	Media	2.661	0.051
Knowledge	Academic Researcher	3.331	0.021
	NGO	3.976	0.009

Table 6-29 ANOVA analysis of respondent groups' views on information sources

Word Pair	Respondent Groups	Information Source	P
Impartial – Biased	Regulator vs. Manager	Regulator	0.040
	Regulator vs. Customer	NGO	0.025
	Manager vs. Customer	NGO	0.000
People orientated-	RegulatorvsResearcher	Academic Researcher	0.045
Self orientated	Manager vs. Customer	Academic Researcher	0.010
	Managervs.Researcher	NGO	0.033
Knowledgeable –	Manager vsResearcher	Academic Researcher	0.012
Lacking Knowledge	Manager vs. Customer	NGO	0.007

Table 6-30 Significant differences found between respondent groups regarding information sources after multiple comparisons

There was a high level of concordance within each of the four respondent groups for the word pair 'knowledgeable – lacking knowledge' (Table 6-31). This suggests a good level of agreement within the groups on how they judge the knowledge levels of the information sources. The level of agreement, in relation to this attribute, between the respondents, regardless of group was also high (Kendall's W = 0.629). The lowest level of concordance within the respondent groups and for all respondents together was for the word pair 'people orientated-self orientated' (Table 6-31). The descriptive word pairs used in the study are abbreviated as follows in Table 6-31: C-U = credible-unconvincing; T-U = trustworthy-untrustworthy; R-U = reliable-unreliable; I-B = impartial-biased; R-NR = respected-not respected; PO-SO = people orientated-self orientated; K-

LK = knowledgeable-lacking knowledge; ETU-DTU = easy to understand-difficult to understand.

Word Pair		All	Regulator	Manager	Researcher	Customer
C - U	Kendall's *W*	0.359	0.495	0.451	0.376	0.293
	Chi-square	252.94	39.63	81.13	93.94	57.15
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
T - U	Kendall's *W*	0.265	0.376	0.293	0.336	0.221
	Chi-square	178.99	30.11	51.30	80.69	39.85
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
R - U	Kendall's *W*	0.322	0.478	0.360	0.390	0.240
	Chi-square	214.21	33.48	62.95	89.79	45.57
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
I-B	Kendall's *W*	0.250	0.350	0.243	0.292	0.280
	Chi-square	173.62	28.00	43.65	71.42	53.15
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
R-NR	Kendall's *W*	0.244	0.361	0.305	0.236	0.204
	Chi-square	165.02	27.07	51.88	56.70	38.76
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
PO-SO	Kendall's *W*	0.073	0.198	0.061	0.127	0.094
	Chi-square	50.190	14.86	10.96	30.48	17.83
	Asymp. Sig.	0.000	0.011	0.052	0.000	0.003
K-LK	Kendall's *W*	0.629	0.764	0.666	0.665	0.539
	Chi-square	436.89	61.14	119.90	162.89	102.37
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
ETU-DTU	Kendall's *W*	0.405	0.449	0.297	0.465	0.464
	Chi-square	277.73	33.68	53.52	113.99	85.89
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000

Table 6-31 Kendall's *W* test statistics: All information sources per word pair

In relation to information source (Table 6-32) the highest level of concordance within each respondent group is for the 'academic researcher'. However, the customer group's (Kendall's *W* = 0.323) level of concordance is below the value given for this statistic when looking at all the respondents together (Kendall's *W* = 0.435). The lowest levels of concordance in all respondent cases are for the regulator and NGO information sources. Most noteworthy is the customer group (Kendall's *W* = 0.051) for the information source 'NGO' where the

significance of the test is borderline (p = 0.054). This suggests that there is an extremely high diversity of opinion within the customer group on NGOs in relation to all the attributes investigated.

Source		All	Regulator	Manager	Researcher	Customer
Media	Kendall's *W*	0.268	0.346	0.234	0.308	0.267
	Chi-square	252.97	33.94	59.02	101.27	71.01
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
Regulator	Kendall's *W*	0.189	0.303	0.228	0.196	0.185
	Chi-square	178.73	31.81	57.55	64.41	47.80
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
Academic Researcher	Kendall's *W*	0.435	0.518	0.466	0.521	0.323
	Chi-square	417.20	54.44	117.32	171.55	88.08
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
NGO	Kendall's *W*	0.152	0.231	0.312	0.182	0.051
	Chi-square	144.78	24.28	76.46	59.76	13.82
	Asymp. Sig.	0.000	0.001	0.000	0.000	0.054
Friend/ Neighbour	Kendall's *W*	0.302	0.351	0.357	0.303	0.279
	Chi-square	287.08	36.86	87.40	99.53	76.28
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000
Water Supplier	Kendall's *W*	0.338	0.342	0.393	0.343	0.317
	Chi-square	319.81	35.95	99.14	110.32	84.29
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.000

Table 6-32 Kendall's *W* test statistics: Per information source across all word pairs

6.6 Summary

Results of the study, a questionnaire survey on wider participation in the planning and implementation of water resource management projects, have been described and presented in this chapter. The survey objectives were:

- To explore within and between respondent group variations in relation to the four themes addressed, thus providing information on important

factors that may shape or influence stakeholder engagement in participative planning.

- To provide further information on the possible process and content requirements of the four stakeholder group types, in relation to the conceptual model described in Section 3.3.

The results of the survey are summarised below in relation to each of the themes covered.

6.6.1 Questions relating to participative planning

The respondent groups' views regarding when the public should be involved during a water management project were similar on four out of the six stages listed. Respondents also shared a common outlook on how the public should be involved, with the highest level of support across all response groups shown for the public making some decisions. However, some significant differences were found between respondent groups on the issue of trust in different stakeholder groups regarding protection of individual group interests. Low values for Kendall's coefficient of concordance suggest that there is also a diversity of opinion within each respondent group regarding levels of trust that should be invested in all the different stakeholder groups they assessed.

Qualitative questions explored respondents' viewpoints regarding (i) why the public should be involved and (ii) factors which they considered major contributors to the success or failure of a project. Respondents' comments, on

why the public should be involved, were dominated by two themes common to all four groups: (i) increasing awareness or public buy in; (ii) public ownership or their right to be involved. Wider involvement was the principal subject cited across all four groups in relation to success or failure of projects.

6.6.2 Questions relating to water policy mechanisms

Regarding the questions exploring the outlook of respondents in relation to different water policy mechanisms, it is evident that there are clear differences between the groups' most preferred conservation options, but commonality between the groups' outlook regarding their least preferred option – 'imposing restrictions'. The frequency of respondents within the customer group who chose alternative or sustainable technologies as a preferred option is high and their outlook toward adoption of reuse as an alternative is very positive. The findings also reflect general agreement across the four respondent groups with the abstract concept regarding adoption of wastewater reuse as a conservation option

6.6.3 Questions relating to risks and benefits

Regarding respondents' views on risks and benefits in relation to wastewater reuse, survey results show significant variation between the groups in relation to benefits they would expect to receive from the uptake of such a water management scheme. In direct contrast, the risks expected and identified by all four respondent groups were similar. However, the levels of expected

agreement from and between different respondent groups on the risks identified are diverse.

6.6.4 Questions relating to sources of information

Exploration of respondent groups' views toward likely sources of information available to them on water management , using multiple comparisons, revealed significant differences between specific respondent groups for three out of eight of the word pairs. Kendall's coefficient of concordance within and across the groups was generally low to medium for both information sources and word pairs. Notable differences were the levels of concordance within and across the four respondent groups for (i) the word pair 'knowledgeable – lacking knowledge', suggesting a high level of agreement within and across the groups on how they judge the knowledge levels of all the different information sources; (ii) the information source 'academic researcher' for all word pairs, reflecting reasonable within group levels of concordance on how they view that particular source.

6.6.5 Assessment of survey results

The questionnaire survey allowed the differences and similarities between four core stakeholder groups, regarding their expectations of and attitudes towards significant features of participative planning processes and specific water management issues, to be explored. Results of the survey will be critically assessed in the next chapter and used to attempt to answer the research

questions described in Chapter 4. How the research outcomes further inform the conceptual model, introduced and explained in Chapter 4, is also considered in the following chapter.

Chapter 7 : Discussion

The survey findings reported and described in the previous chapter are discussed here in relation to the core aims of the thesis. This chapter is structured by initially providing a brief synopsis of the primary thesis objectives (Section 7.1). Subsequent Sections (7.2 – 7.7) cover how the similarities and variations found within and between respondent groups relate to, and further inform: (i) the core research questions (described in Section 4.3); (ii) the literature reviewed on participative planning in water resource management within Chapters 2 and 3; (iii) the conceptual model (Section 4.2) and modifications made to its structure.

The content of this penultimate chapter also provides a discussion platform for reflecting on the implications of the research, both in general terms and in relation to participative planning in water resource management, in the following and final chapter.

7.1 Summary of thesis objectives

The thesis attempts to assess and distinguish the similarities and variations of opinion or attitude that lie between prominent and highly relevant stakeholder types. The subject matter chosen for further research within the thesis was based on issues identified in Chapters 2 and 3 as pertinent to participatory planning in water resource management. Key concerns identified and commented on at the end of each section within these two chapters helped form

the key research questions, introduced and explained in Section 4.3. These research questions provided a robust underpinning for the thesis and acted as clear guidelines for the analysis stage of the fieldwork. Based on these questions, the fieldwork, in the form of a questionnaire survey, explored the four respondent groups' (regulators, managers, researchers and customers) views on the issues identified.

The research themes were also investigated to further inform the conceptual model, as formulated and discussed in Section 4.2. The aim of the model was to depict and explore the interactions between the four constituencies within a social learning setting. The discussion regarding the conceptual model concentrates on how the research results: (i) further inform how robust the concept of a 'stakeholder group' is, in terms of having a distinct set of opinions; (ii) further inform and contribute to the conceptual model.

7.2 Preferences regarding structure of participative planning

This section discusses the research results in relation to research questions on the structure of participative planning, sequenced as follows:

- When and how the public should be involved
- Why the public should be involved
- Respondent trust levels in different stakeholder groups
- Respondent views on factors affecting project success or failure.

7.2.1 When and how the public should be involved

The research results reveal a high degree of similarity between the four respondent groups' outlook on when the public should be involved in water resources planning and management. Significant differences of opinion between the groups were only found regarding public inclusion during the latter stages of a project (monitoring and shutdown), with the academic researchers evidently more in favour of public inclusion during those stages than the other three groups. Also of particular interest was the division of opinion on public inclusion, during the planning and monitoring stages, within the customer group.

The division found within the customer group regarding involvement during the planning and monitoring stages may be a reflection of the varying levels of commitment available within that group. According to Boak *et al.* (2004), stakeholders fall into one of three categories: (i) core stakeholders who should be actively involved throughout the process; (ii) interested stakeholders who may have some influence on the process; (iii) other stakeholders and the general public within the catchment (Section 2.4.4). Boak *et al.* (2004) stress the importance of allowing actors the opportunity of choosing which category they fall into, thereby defining their level of commitment. How such a fluid structure would affect levels of stakeholder accountability, or process continuity, was not raised by them. The reality that social concerns and public opinion are dynamic and liable to evolve or change over time should also not be overlooked (Doelle & Sinclair, 2006; Houghton & Ledington, 2004). It was not within the remit of this particular study however to investigate the subject in terms of

evolving concerns and opinions, as this would require a different (longitudinal) research structure.

The research findings suggest that attitudes towards different levels of public participation support the principles discussed within the literature review. Few disputed wider inclusion of the public alongside other stakeholder groups. Regardless of respondent group, respondents thought that the public or their representatives should 'make some of the decisions'. This suggests that the majority of respondents are in favour of public involvement at higher levels of participation than simply the provision of information, or consultation.

This viewpoint is in concordance with guidance on the management strategy provided by the WFD in relation to wider participation, who determine that 'active involvement' should mean a higher level of involvement than consultation. Nevertheless, the strategy adopted by the UK regulatory body, the Environment Agency, in relation to procedures for wider involvement relating to River Basin Planning have been criticised as not adequately addressing the involvement of parties, and confusing consultation with higher forms of engagement (Le Quesney & Green, 2005).

The research results for both when and how the public should be included reveal a high degree of unanimity across the respondent groups. Why this output is observed here is not clear. Institutions are typically reticent to devolve participation and influence, whilst unrepresented constituencies are keen to

take on additional responsibilities. We conjecture that there might be two explanations which serve to dampen any extreme views on the level of participation. Firstly, institutional actors (regulators, managers etc.) now accept the claimed benefits of broader participation but still shy away from devolving too much authority; secondly, previously uninvolved constituencies simply do not seek significant decision making power, just influence.

In addition, (see Section 2.3) there are many different interpretations of what actually constitutes public participation. Terms are used interchangeably in relation to and as reference towards public involvement, and are therefore open to different perceived meanings, varying interpretation and consequently varying levels of appropriate inclusiveness (Robinson & Bond, 2003). Engagement of the public in the design of the process could ensure that suitable techniques are chosen for both the level and type of forum they would like to participate in (Doelle and Sinclair, 2006). The practice of designing and implementing adequate participatory planning and management processes could be improved by better stakeholder information provision on (SED, 2004) and wider recognition of (Stagl, 2006) the various techniques, including innovative techniques, which could be utilised.

7.2.2 Why the public should be involved

Responses to the question on why the public should be involved (see Section 6.2.4 and Appendix 6) reveal some of the factors that may be influencing the respondents' outlook on when and how the public should be involved.

Minimising the chances of conflict with the public was frequently cited by the manager group (40.5%) in comparison to the other three groups. The manager group seemed to be of the opinion that securing public support or public involvement could reduce the risk of conflict with other stakeholders.

It seems likely therefore that water managers fully recognise that exclusion of the lay public may result in exclusion of issues, which may increase the chances of conflict (see Connelly & Richardson, 2004). It was not clear whether the manager group preferred 'conflictual' or 'non-conflictual' approaches (see Section 2.4.5) to gain agreement between stakeholders. Nevertheless, managers seemed far more sensitised to the likelihood of conflict between the lay public and other stakeholders based on interest, process or interpersonal issues. One-fifth of the manager group however did view public involvement as improving the process and/or outcome of the process by their direct contribution.

Both the researcher (35.1%) and customer (28.6%) group commented on how public involvement could improve the process or outcome of the project, (and to a lesser degree the manager group) far more frequently than the regulator group. The likely improvements to process and outcome conveyed by researchers included problems being more inclusively determined through full engagement of all the stakeholders and as one respondent stated, thereby helping to define the "*technical, behavioural and institutional transformations*" (A23) required. Some of respondents from the customer group felt that better

solutions and policies could be influenced by inclusion of the public alongside other key parties. These views compliment some of the recommendations made to help improve practice based on the findings of the Ribble pilot project, which included using integrated participation procedures to draw stakeholders together during the preparation and implementation of related actions (SED, 2004).

References to public ownership or the public's right to be involved, was common across all groups, but far more frequently stated by the customer group (64.3%). Increasing public awareness was also a common remark, but was most frequently cited as a reason for public involvement by the regulator group (70.6%). Very few comments were made that rejected public involvement outright, or suggested that they should only be involved to be able to inform them of choices already made. The research findings seem to support the observations made by Walker (2004) and Green (2005) – that there seems to be an increase in stakeholders' expectations regarding their active involvement in environmental decision making.

7.2.3 Respondent trust levels in different stakeholder groups

Both customer and researcher respondent groups had a high level of trust in academic researchers, the lowest level of trust being attributed to water suppliers, whereas the manager and regulator groups' level of trust in the regulator stakeholder group was the highest.

Of note however, are the significantly different levels of trust in academic researchers between water managers vs. customers, and water managers vs. researchers. The amount of trust in the public or their representatives was also significantly different between the regulator and customer respondent groups, with regulators viewing the public as least trustworthy of the stakeholders they rated. Levels of trust attributed to stakeholder groups also seem to echo the level of dissonance or expected disagreement regarding specific risks (see Section 6.4.3), although this was not so clear cut in all cases. However, it is also worth noting that respondent groups' means for all rated stakeholders were lower than three, therefore none were viewed overall as deserving 'little trust' (Likert scale value = 4) or 'no trust' (Likert scale value = 5).

The extremely low level of agreement between the respondents within the manager group (Table 6-13) implies a very high diversity of opinion regarding levels of trust in the stakeholder groups they rated. This may be an indication of uncertainty or ambivalence within the water manager group regarding who they view as trustworthy when seeking support for their particular interests.

The survey results support previous work regarding levels of public trust in academic institutions. For example, in the literature review the reason for non-acceptance of water management issues by the public was frequently ascribed to a lack of confidence in the institutions proposing the measures. Whereas the building and maintenance of trust was identified as a critical feature of public confidence regarding decision making in relation to water resource

management (Hartley, 2005). The chances of increasing public trust are greatly improved when they are given the opportunity to be involved (Robinson & Bond, 2003). But this supposition does not address how trust in the public can be increased within the institutional groups. Issues of trust are further addressed within this chapter, in relation to different information sources (Section 7.5) and the conceptual model (Section 7.7.1).

7.2.4 Respondent views on factors affecting project success or failure

The majority of comments made regarding success of water management projects centred on the importance of issues concerning adequate or appropriate planning and management, public involvement, and stakeholder involvement (see Section 6.2.5). Some respondents provided replies which were either broad or extremely succinct; whereas a high proportion elaborated further to clarify their remarks (see Appendix 7).

Gaining agreement between different stakeholder groups regarding the aims and purposes of a project was frequently suggested by all the four respondent groups as important and influential factors of project success. Furthermore, many respondents were of the view that finding appropriate solutions should not be confined to one sector only. Nevertheless, there were some slight differences in the suggestions put forward by the different respondent groups on how this could be achieved. A high proportion of comments made by the regulators on wider involvement underlined the need for public support, acceptance, and raising public awareness with regard to the risks, benefits and

financial factors involved. Adequate recording, transmission and evaluation of project experiences were also put forward by the regulator group as important management factors.

Comments made by the researcher and manager group signalled a preference for a more integrated approach, both for the incorporation of different stakeholder groups within the process and their input on substantive details. The managers however, also cited the importance of appropriate research or technology and taking into account environmental or sustainability issues more often than the other three groups. A number of comments made by the customer group were also comprehensive in nature, taking into account the links between different factors. The customer group also made remarks concerning the importance of providing information that could be both easily understood and accessed by them so that they could make informed choices.

Reasons put forward for project failure tended to be direct opposites of the reasons given for success. Nevertheless, there were some interesting, noteworthy comments made. Dictatorial or arrogant approaches adopted by either the project managers, or regulators, were cited by a few respondents from each of the respondent groups. Project failure, related to financial issues regarding extra personal costs, were more prominent in the customer group. Some customer comments regarding financial issues were coupled with concerns expressed regarding manipulation or monopolisation of water for

profit. The regulator group on the other hand, cited inept planning or management as the most frequent reason for project failure.

The issues identified by the respondents reflect most of the common factors associated with the success or failure of participatory efforts, as commented on in the literature review (Section 2.4.2). Initiating and facilitating wider participation to provide stakeholders the opportunity to express their opinions on process and outcomes can be beneficial (Section 2.4.2) and seem to be acknowledged here in the majority of responses received. Nevertheless, we should be aware that it also has the potential to expose or initiate conflict. Conflict management is further discussed in Section 7.7.3 of this chapter.

7.3 Attitudes towards different policy mechanisms

A valid comment from a few respondents was that the choice of water policy mechanism was situation-dependent. The reasoning behind asking this question however was to identify the basic preferences of each respondent group in relation to that particular subject. The subject of wastewater reuse was used to provide respondents with a specific topic to voice their opinion, in the context of water resource management. There was general agreement across the respondent groups with the abstract concept of adopting wastewater reuse as a conservation option. This general similarity of opinion on the uptake of wastewater reuse as a viable option is encouraging, but perhaps not surprising. The majority of respondents were from European countries where water

recycling is still largely an ambition rather than a practice – consensus on the attractiveness of the option being well established.

A change of attitude is possible when consumers are faced with the reality of what the adoption of such a scheme involves (Section 3.2.2.3). On the other hand, rejection by the end user is not always the only barrier to successful adoption of alternative water conservation methods (Pirie *et al.*, 2004; Fittschen & Niemczynowicz, 1997). Major technical and operational difficulties can be encountered by the end user when there is insufficient knowledge available or instructions on usage are lacking.

In comparison to the three professional respondent groups, a high proportion of customer group members selected 'adopting sustainable or alternative technologies' as their preferred water conservation mechanism, suggesting a willingness to take up this option within this respondent group, as an alternative choice to the more traditional policy mechanisms of 'pricing' or 'imposing restrictions'. This suggests that a high level of receptivity (as defined by Jeffrey and Seaton (2004) in Section 3.1.3) towards adopting such a policy mechanism, seems to be present in the customer group.

On the other hand, this difference between the respondent groups regarding policy mechanisms may also reflect another issue - the different dimensions of various institutions, as identified in the literature review. In Section 3.1.1, Stenekes *et al.* (2004) suggest that while there has been a cognitive

(knowledge) and normative (values) shift from the traditional viewpoint on water management towards a more sustainable viewpoint, policy mechanisms are still being pursued via old organisational and institutional structures.

The research findings may also be reflecting the reticence present within different groups regarding offers of new water management technology options to consumers (as identified by Howarth (2002) in Section 3.2). A lack of impetus for change within the professional sector is also commented on by Morrison (2003), who suggests that engineering professionals prefer to avoid conflict situations with the public over new technological issues. Policy mechanisms, by their very nature tend to rely on trading off costs and benefits between stakeholders, and actors will generally favour those options which minimise risk or 'cost' to themselves. Such reactions reflect contextual self interest – that is, how fair an individual judges a situation to be on them only (Syme *et al.*, 2000).

Nevertheless, while there were clear differences between the groups' most preferred conservation option, commonality between the four groups' outlook regarding 'imposing restrictions' was evident, being the least selected option by all respondent groups. (Utilising areas of identified commonality in relation to participative planning are discussed later in Section 7.7 of this chapter in relation to the conceptual model). This theme has thus provided further information on the views of different stakeholders in relation to water policy mechanisms and the adoption of wastewater as a water conservation option.

7.4 Expected risks and benefits

Significant differences between the groups were evident regarding the benefits identified and associated with the adoption of wastewater reuse. 'Reducing primary source demand' was identified as the primary benefit by a high percentage of managers and regulators, whereas in the researcher and customer groups the most identified benefit was 'sustainability or environmental protection'. As acknowledged by Syme *et al.* (1999), fairness in the allocation of water according to respondent principles, include the rights of the environment, while economic arguments hold less importance in the overall process. In addition, Green (2005) also recently remarked on an increase in public determination to be involved in issues regarding environmental and sustainable policies.

Whether this high level of identification with environmental protection reflects an increased public awareness and sensitivity to the increasing pressures on natural resources cannot be directly determined. The level of willingness to adopt alternative or sustainable technologies as a conservation option (discussed in Section 7.3), however may indeed be an indication of heightened environmental awareness.

Health, cost, misuse, environmental and public acceptance were identified by all the respondent groups as the major risk issues surrounding adoption of a wastewater reuse scheme, with no discernable differences found between the groups' outlook on the risks they suggested. Consumers' willingness to accept

in-house water recycling is dependent on public health not being compromised. Public perception of water quality can also be swayed by its aesthetic properties (Section 3.2.2.1). Cost was also considered a dominant risk within the customer group. As discussed in Chapter 3, unproven cost benefit in relation to grey water recycling systems, make it difficult for end users to estimate whether they can recover their initial investment (Howarth, 2002; Marks, 2003). Nevertheless, recognising what different stakeholders view as important considerations could play a hand in adequately addressing stakeholder's concerns regarding potential risks (Charnley, 2000).

The second most identified risk by both the manager and regulator groups was public acceptance. There is indeed some degree of reluctance evident within professional organisations from the water sector to involve themselves in conflict situations with the public (as already discussed in Section 7.3). Environmental concern, in this instance in relation to risk, was again a leading consideration within the researcher group, as they also identified wastewater reuse of principal environmental benefit. Nevertheless, as stated earlier, no significant difference was detected between the groups regarding issues of risk which they associated with wastewater reuse.

7.4.1 Extent of expected agreement regarding risks

When considering the extent of agreement the respondent groups expected from different stakeholder groups, regarding their opinion of the risks they identified, the research results paint a very different picture. Levels of expected

agreement regarding all risks identified varied between the different respondent groups. However there was marked variability in expectations by risk type, which may reflect how much effort a specific group would expect to be required to reach agreement with other parties on that particular risk. Levels of agreement expected from water suppliers by the water manager respondent group on the risks they identified were significantly different to the researcher and customer groups' expectations.

These findings suggest that prior assumptions (discussed further in Section 7.6), made by actors regarding different stakeholder group categories may influence the level of expected agreement from other actors in relation to specific risks. The output of this theme therefore extends our understanding of different stakeholders' expectations of: (i) the risks and benefits of wastewater reuse (ii) expected agreement across stakeholder groups in relation to risks and benefits.

7.5 Attitudes towards different information or knowledge sources

There are many challenges facing the scientific community in terms of achieving a balance between the credibility, salience and legitimacy of information they make available (Cash *et al.*, 2002).In this context, knowing and understanding the information requirements and viewpoints of stakeholders, in relation to the attributes of different information sources within water resource management, is an important consideration (as discussed in Section 3.3). The research findings (Section 6.5) contribute towards the characterisation of stakeholder

perspectives of different information sources in terms of more than just a single attribute, as recommended by Frewer *et al*. (1996).

The research findings suggest a relatively high degree of concordance in respondents' opinions of academic researchers as an information source. This group were viewed as (relatively) credible, trustworthy, reliable, impartial, respected and knowledgeable, but difficult to understand. They agree with other research conducted on levels of trust and further support the views on trust (as identified in Section 6.5). Petts (1998) comments that many surveys imply that industry and government officials are the least trusted, whereas sources perceived as more independent which include doctors, academics and non-profit making voluntary organisations rank among the most trusted. This does, of course, raise the question of how trust can be established by those information providers who perform less well in the rankings (Enserink and Monnikof, 2003).

Expectations other than trust were investigated, and the results show, for instance, a marked difference between the response groups' opinion regarding the orientation of academic researchers as an information source. A difference of opinion between the four respondent groups' views on regulators as an information source was also evident, especially in terms of their orientation of concern and levels of impartiality. Furthermore, while water suppliers were viewed as an informative and knowledgeable source, they were also judged as biased and self orientated. The importance of the orientation of concern over

other attributes that an information source may possess has also been emphasised by Covello (1992b), while levels of knowledge and concern have been shown by Rosati and Saba (2004) to be two important determinants of trust. Trust is also based on shared values which can lead to "*productive stakeholder involvement and mutually beneficial cooperation*" (Earle (2004, p181). Indications from other research also show that government institutions are frequently viewed as being insensitive to the information requirements and the concerns expressed by the public (Hunt *et al*., 1999). Levels of concern shown by a particular group engaged in the dissemination of information coupled with the orientation of that concern seems to be of vital importance to the recipients of information.

In the case of NGOs significant differences were found between the four groups' views on five out of the eight word pairs used (Table 6-26). A high diversity of opinion regarding NGOs was also present within the customer group (Table 6-29). Why this variation is present cannot be easily determined. One possible explanation is that the meaning and usage of the acronym 'NGO' has broadened. Another possible, but cautious, explanation could be that in recent history, some NGOs which are predominantly focused on environmental and sustainability issues, hold strong opposing views on contemporary issues. For example, their opinions may vary on how to address climate change, or their role and acceptable level of communion with large multi-national corporations. Differences of opinion, between some NGOs and prominent environmentalists

which may or may not be members of a particular NGO, have been made highly public and consequently could be highly influential regarding public sentiment (for example: www.monbiot.com/archives/2002/05/29/interview-with-ephemera; Monbiot & Porritt, 2000). NGOs have also successfully fought and won over legal issues involving government (e.g. Greenpeace, 2007) or multi-national companies.

An important and widely recognised issue - the dilemma of providing accurate and pertinent scientific information, while making it understandable to a wider audience is also reflected in the results of this research. Whilst it is evident that the quality of information emanating from academic and regulator sources is held in high regard respondents, including those in their own sector, find the information made available to them by academics difficult to understand. According to Enserink and Monnikof (2003), if such a problem is encountered and not adequately addressed then the likely outcomes are severe delays in both participatory process and the full and active inclusion of the public in policy outcomes. Given that the boundary between science and policy is already acknowledged as complex, then the framing of problems and acknowledgement of different values (Stagl, 2006) could be further compounded by lack of provision of comprehensible (yet precise) information.

In this respect it is worth noting respondent views regarding the media. Views held by respondents about the media as a knowledge source were generally negative. On the other hand, the media were viewed as easy to understand,

which may be a direct reflection of the importance of the 'least effort principle' (Zipf, 1949) and levels of accessibility, (Pinelli *et al.*, 1993) when conveying information.

7.5.1 How certain factors may influence the acceptance or rejection of an information source

It is worth considering further a point (see Section 3.3.3) made by Cantwell (1998) regarding information sources. He describes two different ways that the information or 'scenario' put forward by a source could be treated by the recipient, in that it could be either: (1) dismissed in its entirety if wrong, or (2) that each piece of information be treated separately, therefore allowing the source to be wrong in some respects and right in others.

Based on these assumptions, the research results discussed here, and the work of Poortinga and Pigeon (2004) on prior beliefs, could it be that a recipient's attitude towards the information or knowledge they receive from a given source is formed by a combination of (i) their expectations of the source (and if so, are some expectations more important to the information recipient than others); (ii) the actual information or knowledge received by them from that source? Figure 7-1 is an attempt to depict how the interdependency of these two factors may come together and influence the acceptance or rejection of an information source by an information recipient.

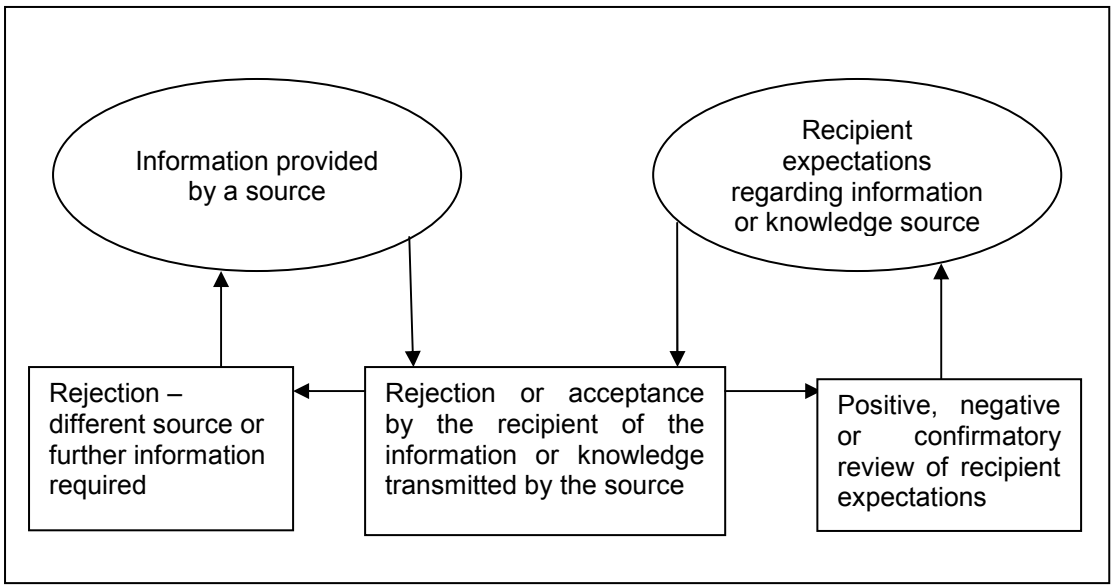


Figure 7-1 Factors that may influence the acceptance or rejection of an information source (drawing on Cantwell, 1998; Poortinga & Pigeon, 2004)

The low variation between the four respondent groups views on different information sources reflect, perhaps surprisingly, more similarities than differences between their attitudes towards the information sources' relative attributes. The research results (Section 6.5) suggest few consistently significant differences between specific respondent groups regarding their attitudes towards particular sources, with the notable exception of NGOs and, to a lesser degree, academic researchers. Such a finding provides further support for the low variation already seen in relation to some of the questions raised in the preceding sections on the other three themes investigated.

7.5.2 Significance of research output on different knowledge sources

Knowing where the differences and similarities lie between stakeholders' opinions of the multiple attributes that an information source may or may not

have is important in a number of contexts, for example, risk management, participatory planning, communication within science and policy. However, the findings reported here are pertinent in relation to two specific areas of practice.

Firstly there are lessons to be learned by some of those groups associated with the information sources used in the study. Water suppliers are clearly seen as biased sources of information whereas regulatory bodies and academics need to improve the clarity of information they provide.

Secondly, the lack of any real variation in respondent group opinions of information sources raises questions about current models of participatory planning and management. These points will be discussed further in the following section in relation to how they inform the conceptual model. The research results for this theme provide further information and a better understanding of how different stakeholders view information and knowledge provision from sources that may be directly involved in or can influence water resource management.

7.6 Level of stakeholder group uniformity

The research findings will be discussed here in terms of how robust the concept of a 'stakeholder group' is in terms of it having a distinct set of opinions and attitudes. As raised within the concluding remarks of the former section, the research findings show that whilst there appears to be much common ground *within* the respondent groups on issues of significance for water resource

management, the extent to which there is no significant difference *between* stakeholder group attitudes also attracts attention. There appear to be substantial areas of debate around which the opinions of groups of stakeholders are indistinguishable. What is perhaps a surprising find from the research results therefore is that there seems to be more common ground shared by the different respondent groups than would be normally assumed

The level of uniformity across the four respondent groups was high in relation to most aspects of both the structural and content elements of participative planning as explored by the research themes. However, there are some obvious respondent group concerns regarding levels of trust that can be attributed to certain stakeholder categories in relation to representing and protecting respondent groups' interests.

The *expectation* of disagreement from certain stakeholder types regarding specific risks identified by the respondent groups is also apparent. Yet there were no significant differences between the four groups on the risks they identified. The research theme investigating preferred structure of participative planning also revealed a high degree of similarity of opinion on when and how the public should be incorporated.

It seems that some prior assumptions are therefore made by actors about the outlook and preference of certain stakeholders in relation to water resource management. This supposition is further supported by recent work published by

Poortinga & Pidgeon (2004), who consider how influential and important people's prior attitudes, termed 'confirmatory bias' can be when assessing an issue. Their findings suggest that people with strong preconceived ideas do not easily change their attitudes, or their allegiance of trust, as they tend to interpret situations so that they fit in with their previous attitudinal position.

This also echoes a fundamental point made by Bandura (1986) regarding social learning, that "*people interpret what they see and hear in terms of their pre-existing beliefs and knowledge structures"* (p217). Sztompka (1999) also speaks of social praxis and how it can affect change through self amplification, via either a self enhancing 'virtuous loop' of trust, or a 'vicious loop' where a culture of distrust results in trust being withheld and further generates a culture of suspicion.

On the other hand, Schusler *et al.* (2003) observed, during a social learning based search conference, that "*several participants were surprised by the degree to which common ground existed among individuals with diverse interests in resource management*" (p316). The research findings suggest that the different stakeholder groups are not aware of the commonality of their views on certain aspects of water resource management, tending to assume that their viewpoints are more distinct from each other. It is a reasonable extrapolation to make therefore, that if stakeholders are not made aware of their shared salient beliefs, then the opportunity to:

- Avoid unnecessary conflict could be missed.
- Promote positive collaborative dialogue and lay foundations for further open discourse and joint decision making could be lost.

7.7 How the research results further inform the conceptual model

It is evident from the research findings that the quality of information emanating from academic and regulator sources is held in high regard (Section 7.5). However, all the respondent groups found the information made available to them by these groups difficult to understand.

Yet, within the literature review it was established that there was some reluctance within the scientific community to replace scientific terminology with terms that may be more accessible to the general public, for fear of losing precise or accurate scientific meaning. Dialogue between technical and non-technical communities can be severely hampered by the unfamiliarity of non-scientists with the scientific terms used, resulting in them feeling excluded by their use (Glicken, 2000). In addition, poor communication between professional groups engaged in water quality, was attributed to their different frames of reference by Bruvold, back in 1975.

Lack of familiarity with relevant terminology (Section 6.1), compounded by and coupled with poor communication, could become a barrier, negating effective discourse between different stakeholders. And, (as discussed in Section 3.3) managing boundaries between different forms of knowledge is critical to

establishing participation from both sides of that boundary by transferring and translating information across those boundaries and coordinating corresponding expertise (Cash *et al.*, 2002). These issues are important in the context of participatory planning based on social learning, as meaningful dialogue is highly reliant on knowledge transfer and increased understanding between different actors.

If actors are expected to work collaboratively, and to use the opportunity to "*develop shared heuristics, joint objectives and shared knowledge and meanings*" (Innes and Booher, 2004, p429) there are lessons to be learned by some groups associated with the information sources used in this research (as already discussed in Section 7.5.2).

7.7.1 Trust issues and the conceptual model

According to Ferguson *et al.* (2004), various levels of confidence in different sources of information can lead to poor communication between stakeholders. The research findings also suggest that levels of respondent trust in different stakeholder groups vary (Section 7.2.3). For example, the lowest level of trust from both customer and researcher respondent groups were attributed to water suppliers, whereas regulators viewed the public as least trustworthy. Considering the interactions required between stakeholders jointly engaged in a project, varying levels of trust between the different stakeholders present could be detrimental.

As discussed in Section 2.4.3 – trust between people is crucial as a means of acquiring other things of value and if trust is withheld it may impair our ability to learn from others (Kant, 1785). Mutual benefits, which could not be achieved independently, may also result from mutual trust and collective agency (Bandura, 2000; Newell & Swan, 2000). Collaborative relationships according to Schulser *et al.* (2003) may also be developed in one of three ways:

- Strengthening existing relationships
- Transforming adversarial relationships
- Creating new relationships

Trust could therefore be viewed as a necessary precursor, enabling individuals or groups to (i) enhance or build relationships; (ii) learn from, or create new knowledge within, multidisciplinary networks. Based on the literature reviewed on trust between different parties, and the research findings reported here, the model developed and introduced in Chapter 4 (Figure 4-1), has been modified (see Figure 7-2) to take into account the need for trust building among stakeholders, alongside social learning and relationships.

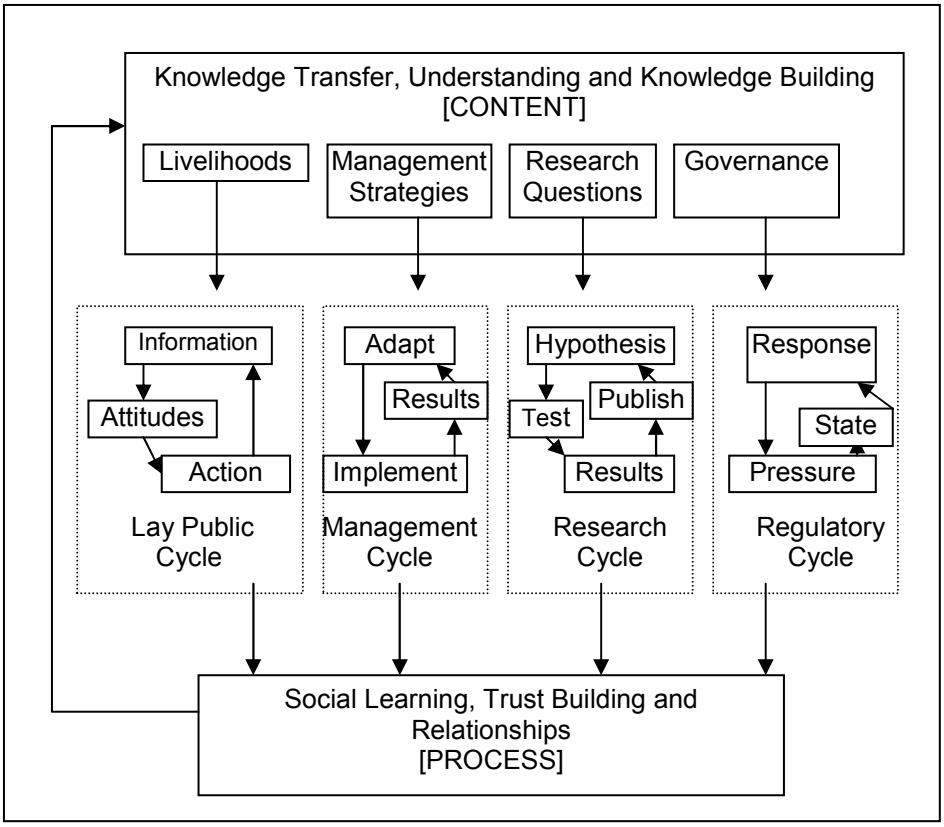


Figure 7-2 Conceptual model after modifications made based on research results

Trust, however, is a multi-dimensional concept (Mayer *et. al.*, 1995) and Newell and Swan (2000) underline the importance of developing different kinds of trust (companion, competence or commitment) for collaborative knowledge sharing or creation. Further attributes, associated with trust, which affect audience attitudes to different sources of information, were explored within the research. These attributes, in association with different information sources, according to the research findings, may also vary.

For instance, water suppliers were generally regarded as knowledgeable, suggesting that trust in their levels of competence were high. However, they were regarded as highly biased and self orientated, which could be associated

to companion trust, i.e. the judgement of benevolence. A degree of suspicion, in association with water supplier's intentions, was also expressed in some customer responses to the qualitative question exploring factors affecting the success or failure of projects. The 'friend or neighbour' group, in relation to the question on information sources, were generally assigned low levels of credibility and knowledge, suggesting little competence trust. The type of trust that needs to be built seems therefore likely to vary from stakeholder group to stakeholder group.

7.7.2 Participative planning issues and the conceptual model

The responses received regarding the questions on participative planning also seem to support the view that decision making related to water management should be more inclusive. Stakeholders it seems from the responses received, should be more integrated regarding the process and outcome of planning objectives. Delivery or transfer of information and knowledge between different stakeholders via open, transparent and effective communication channels was often cited as an important consideration. That is the delivery, transfer or reception of information or knowledge was not seen as a one way process from one stakeholder to another but more as a form of knowledge exchange.

Röling *et al.* (2004) and Ison *et al.* (2004) are also of the opinion that the process of multi-stakeholder learning can aid both individual and institutional behaviour change by helping people involved in natural resource management gain further understanding of each others roles in the process. The original

Bosch *et al.* (2003) model (Figure 2-4), used as the basis for the model used in this thesis (Figure 4-1) also illustrated and described a framework for adaptive management, based on ongoing knowledge building through collaborative learning and improved information management.

As discussed in Section 2.6.1 of the literature review, this is not meant to indicate that when social learning is applied other, more traditional approaches, should become obsolete. Merely, that these different approaches can be incorporated within a broader understanding of how knowledge and issues are constructed and employed in policy processes (Collins & Ison, 2006). Nevertheless, situations where considerable complexity and uncertainty are likely and where multiple stakeholders are involved may benefit from the adoption of social learning techniques to identify and fulfil the process and outcome requirements of a water management project. Furthermore, different actors would be provided with the opportunity to find out and discuss how different policies would affect the different stakeholders involved. Evidence from other research outputs also suggest when there is a shortage of available technical information then the more collaborative forms of stakeholder involvement may lead to more informed decision making (Darnall & Jolley, 2004).

Based on the findings of the research reported within this chapter and the literature reviewed regarding participative planning and social learning, then the model introduced and described in Section 4.2, has been further modified (see

Figure 7-2) to take into account the need for knowledge building among stakeholders, alongside knowledge transfer and understanding.

7.7.3 Constructive conflict and the utilisation of common salient issues

The research results suggest that one cannot, or should not, assume because an actor is from a particular category of stakeholder that their views will not be concordant with those of actors from different groups. While this finding may be interesting in its own right, the ability to establish where the possible areas of stakeholder agreement, or dispute, lie could also be of practical use in relation to: (i) participative planning and joint decision making in relation to the conceptual model, and (ii) the utilisation of social learning as an alternative policy mechanism, for the following reasons.

The identification of commonly held salient beliefs on water resource management could supply topics for initial discussion between the four stakeholder constituencies, which in turn could provide the basis for further discourse on areas of dispute, or issues that need further elaboration. It is possible that an iterative and perpetual process, based on emerging and transformed understanding, could help resolve differences detected in a timely and appropriate manner. For example, in relation to the differences of opinion identified within the research results regarding whether the public should be involved during the *latter* stages of a water management scheme.

Such an approach could lead to a more robust participatory framework by improving the quality of discussion and decisions. For example, it was evident from the research results that the vast majority of all respondent group members either strongly agreed or agreed with the concept of adopting wastewater reuse as an alternative water conservation option. Furthermore, they would prefer not to have restrictions imposed as a conservation measure, thus identifying commonly held prominent views on policy options which could be used to initiate discussion.

On the other hand, constructive conflict is also recognised as having some benefits and is probably inevitable or even necessary when communication between different parties is open and transparent. Nevertheless, conflict needs to be well managed and facilitated if it is to be of value in the process, and to stop it from becoming dysfunctional (Priscolli, 2003).

The research findings show that the expectation of disagreement between the different respondent groups regarding the risks they identified, and the aversion of water managers towards possible conflict with customers, indicates the respondents' anticipation of where conflicting views may arise, when few conflicting views may actually be present. Commonalities of viewpoints between different stakeholders, and the expressions of agreeable surprise by those stakeholders, when made aware of their commonly held views or beliefs, have also been recorded by Schulser *et al.* (2003). While this approach does not address fully how conflict may be better managed, it does however address

how commonality of views may be utilised to dispel wrong assumptions, within a social learning framework. Furthermore, replacing wrong assumptions with the mutual understanding gained from recognition of shared views could possibly reduce some uncertainties in relation to choice of appropriate water policy and management.

7.7.4 Recognition of stakeholder constituencies

The research findings challenge the viewpoint that different stakeholder types possibly hold highly polarised views on issues relating to water management. It is vitally important however that relevant stakeholder groups are identified for their involvement in participative planning events. Different stakeholder constituencies are very likely to have different information needs and different roles to play within the process. Common views are shared on certain issues, as ascertained by the research findings. Yet the individual 'drivers' behind those viewpoints are embedded in either areas of different professional expertise, or, as in the case of the lay public, views or needs of individuals or local communities.

As already ascertained in this section, improving the dialogue between different stakeholder constituencies could help clarify both the 'procedural' and 'substantive' requirement of each constituency. In turn this could help them form a meaningful alliance and take joint action in the planning and management of water resources. A second and equally valid case for retaining and recognising stakeholders is its potential role in the monitoring and evaluation of: (i) the

process, (ii) fulfilment of stakeholder requirements, and (iii) attitudinal changes within the individual constituencies as depicted within the model.

7.8 Summary

The focus of this chapter has been on how the research results reported in Chapter 6 further inform and contribute to: (i) existing literature on participative planning in water resource management; (ii) the conceptual model developed and illustrated in Section 4.2. The research findings support the principles discussed within the literature review - that few would dispute wider inclusion of the public alongside other stakeholder groups in the process of planning for and deciding on water management issues. However, as highlighted in Section 2.3 and discussed in this chapter, there are many different interpretations of what actually constitutes public participation, therefore furthering the need for dialogue with the public to fully understand their preferred style and level of involvement in a particular participatory planning event.

The level of uniformity across the four respondent groups was high in relation to most aspects of both the structural and content elements of participative planning as explored by the research themes. However, there were some obvious respondent group concerns regarding levels of trust that can be attributed to certain stakeholder categories in relation to representing and protecting respondent groups' interests and the *expectation* of disagreement from certain stakeholder types regarding risks identified by the respondent. The

conceptual model was revised to include trust building and knowledge building between stakeholders as necessary features.

The findings challenge the supposition that different groups also represent polarised positions and distinct attitudes and opinions. Recent studies of participatory processes (e.g. Schusler *et al.* 2003; Ryan, 2006) have also provided similar evidence, placing stakeholder perspectives and opinions in much closer alignment than might be expected.

In relation to the conceptual model these research findings further support the need for open communication, knowledge transfer and knowledge building between different actors, as discussed within Section 7.7 and depicted between the four stakeholder groups in the revised conceptual model (Figure 7-2). The findings suggest that the different stakeholder groups are not aware of the commonality of their views on certain aspects of water resource management, tending to assume that their viewpoints are more distinct from each other.

Exploring the perceptions held by different stakeholders, as demonstrated within the research presented, may therefore lead to a greater understanding of their needs and requirements when participating in such schemes and help focus attention on areas where further effort is required to improve social learning and knowledge transfer between stakeholder groups.

The thesis output thereby supports the following premise "*that environmental concerns are grounded in issues and not disciplines, therefore in order to clarify what issues are salient it is essential to identify, interact with and understand how stakeholders perceive such processes"* (Lemon & Oxley, 1999, p232).

7.8.1 Thesis contributions

The research findings presented in this thesis contribute to the body of literature already available in this field by:

- Providing further information on the views of both customer and professional stakeholder groups.
- Demonstrating that similarities and variations between different stakeholder groups can be detected and qualified.
- Revealing that there may be more similarities shared by different stakeholder constituencies than might be assumed.
- Demonstrating how the detection of similarities and variations in stakeholders' attitudes and opinions may be of practical use in participative planning.
- Providing further information to clarify and improve the conceptual model.

The next and final chapter within this thesis will address the implications of the study in relation to participative planning, reflect on the design of the study and suggest further areas of research that could be relevant and worth pursuing in relation to the findings reported here.

Chapter 8 : Conclusions and implications for research and practice

This final chapter initially revisits and reasserts the research objectives of the thesis. Subsequent sections concentrate on: (i) the implications of the study in relation to the research and practice of participative planning; (ii) the suitability of the conceptual model used within this thesis as a planning or management tool within a social learning setting; (iii) the design of the study; (iv) suggestions for further areas of research that could be relevant and worth pursuing in relation to the research findings.

8.1 Research objectives

Whilst the argument for extending the constituency of consultees is now widely accepted, further understanding is required of how the process of participatory planning and management can best be structured and facilitated. In particular the who, when, how and not least 'what' of participative planning cannot be effectively facilitated unless a broad picture of the various interest groups' existing opinions and attitudes can be ascertained (de Garis *et al.*, 2003).

Within Chapter 2 and Chapter 3 of this thesis it is established, through the review of relevant literature, that certain significant factors relating to participative planning in water resource management can influence the effectiveness of the process. Based on the literature reviewed, the objectives of this research and relevant research questions were developed in Chapter 4 to (i) explore whether the views of different prominent stakeholder groups on

significant features of participative planning processes and water management issues identified actually vary; (ii) how the research findings, explored via the former objective, further informed a conceptual model based on social learning, in the context of water resource management. The research questions specifically addressed:

- Preferred structure of participatory planning
- Attitudes towards different water policy mechanisms
- Expected benefits and risks
- Attitudes towards different information or knowledge sources

The final research questions, as given below, related the research findings in terms of how they may improve our overall understanding of the conceptual model developed in Chapter 4:

- How robust is the concept of a 'stakeholder group' in terms of it having a distinct set of opinions and attitudes?
- Can an understanding of the variation in stakeholder group opinions be used to better structure the process and content of participatory planning based on the social learning model?

8.2 Implications of research

The research results reported in Chapter 6 and discussed in Chapter 7 reveal that whilst there is much common ground shared by the respondent groups on

issues of significance for water resources management, the extent to which there is no significant difference between group attitudes also warrants attention. There appear to be substantial areas of debate around which the opinions of groups of stakeholders are indistinguishable.

The lack of any real variation found in stakeholder group opinions, in relation to the information sources available raises certain questions. If the information used for learning and dialogue is accredited via (i) stakeholder expectations of the information source and (ii) the nature of the information received, then the findings suggest that most of the information sources are assigned similar levels of value by all stakeholders. Perhaps this is evidence of a mature, open and information rich society, where the amount of information available about sources effectively creates a level playing field where all parties are equally sceptical or appreciative of a specific information source? The sharing of comparable technical information between different constituencies comprising of experts and the general public may indeed cause related risk rankings to converge, as suggested by Darnall and Jolley (2004).

If the research results are robust then there may be benefit in encouraging discussion within participative processes about, not only the content of information, but also about who supplies the information. Inter-stakeholder agreement on the attributes of information sources could provide a basis for agreeing the value of the information itself, thereby providing some legitimacy for its use in deliberation and debate. As demonstrated by Poortinga and

Pidgeon (2004) it is possible that the more negative the information receiver's initial expectations are of an information source, the less likely it is that the content of the message or communication will be accepted. Frewer *et al.* (2003) also conclude that perhaps the content of information provided by an information source may influence perceptions.

Given that trust is a vital component of knowledge uptake and building, then a further question is how different types of trust can be established by those information providers who performed less well in the rankings (Enserink and Monnikof, 2003), but are an essential and integral stakeholder constituency of the participative process? For example, the friend/neighbour group received consistently low scores in relation to their knowledge competency.

The amount of information or knowledge input required on a given subject does indeed depend on the level of competence already attained by an individual. Nonetheless, the research findings reveal there are lessons to be learned by some of the professional groups associated with the information sources used in this research. Not least academics and regulatory bodies, who need to improve the clarity of the information they provide within their own and other stakeholder communities, and water suppliers who are clearly seen as biased sources of information, while NGOs are predominantly viewed as biased by the professional sectors.

Paying attention to the requirements of public participation regarding interdisciplinary communication and the problems associated with knowledge transfer is a necessity if this field is to be developed further (Webler, 1998). Another important issue further verified within the research findings is the need for engagement of the lay public, alongside other key stakeholders, in choosing suitable levels of and techniques for their participation.

Exploring the attitudes and expectations held by different stakeholders, as demonstrated within the research presented, could lead to a greater understanding of their information and communication needs and their preferences regarding procedural and substantive details when participating in water resource management schemes. In addition, it could help focus attention on areas where further effort is required to improve social learning between stakeholder groups. These points are important, as in the absence of end user input researchers will rely on generic meanings whereas managers, in general, will look for the best known solutions within a particular context (Bosch *et al*, 2003).

It was also evident from the research results that while the four respondent groups shared similar opinions on a number of risk issues they assumed that some stakeholder groups would not agree with the issues they believed to be salient. Furthermore, within the research findings there were some indications that water managers preferred to reduce the likelihood of conflict with the lay public by securing their support or involvement in the process. However, it could

not be determined from the findings whether they would prefer to minimise the likelihood of conflict among stakeholders using 'conflictual' or 'non-conflictual' approaches (as described by Connelly & Richardson, 2004). Suggestions have been made that technical water professionals rather avoid the risk of conflict with customers (Section 3.2.2.3) frequently manifesting itself by their reluctance in adopting, or verifying the sustainability of, technically innovative infrastructures (Morrison, 2003).

Yet the research findings show that over half of the customer group view the adoption of sustainable or alternative technologies as the most efficient way to conserve water amongst the other policy options given. Could it be then that conflict with other stakeholders could be unintentionally precipitated by providers trying to avoid what is assumed to be a highly controversial option?

A case in point regarding customer receptivity to technological innovations in our recent history is, for example, increasing computer usage and accessibility. The features and benefits of computing have been easily transcribed and are frequently updated by end users to fit the needs of modern life. Customer receptivity to change is however reliant on high quality information being made available in order to make an informed decision, as identified both in the literature review and the research findings. While there is no guarantee that a better informed and engaged lay public would be more supportive - they are more likely to be aggrieved if they are expected to blindly agree to a pre-determined outcome (Creighton, 2005).

As discussed in Chapter 7, identifying common salient beliefs shared by all the stakeholders and making them aware of that commonality of opinion could provide topics for initiating discussion on the style and content of the participative planning process, providing a more robust platform for further discourse. To some extent this is a different direction to other approaches regarding conflict management, where the instigators of participative planning either seek or hide conflict.

Raising awareness of their commonality of views could in itself becomes part of the 'mutual learning' and 'transformation' required to change stakeholders' initial positions by the multilateral recognition of areas where differences are assumed rather than actual. At the same time this could help narrow down and concentrate time and effort on actual areas that need further elaboration and input. This approach therefore recognises not only the value of social learning for 'opening up' issues but also on 'closing down' the required analysis and deliberation "*over best options and information for policy* decisions" (Stagl, 2007, p5). This point is also particularly relevant regarding the requirement to meet deadlines associated with the development and implementation of water resource management objectives, which are often tight and extremely challenging (DEFRA, 2002; Tippett *et al.*, 2005).

Drawing predominantly on the work of Bosch *et al.* (2003), a conceptual model was developed specifically for this thesis. The aim of developing this model

was to illustrate and explore the effective interactions and relationships required between four prominent stakeholder constituencies and their particular concerns in water resource management, within a social learning setting. As a result of the research findings, modifications were made to the conceptual model (see Figure 7-2) to acknowledge the need for (i) trust building among stakeholders, alongside social learning and relationships (Section 7.7.1); (ii) knowledge building among stakeholders, alongside knowledge transfer and understanding (Section 7.7.2).

As implied in the literature review, social learning not only shapes who we are and what we do, but also how we interpret what we do. Social learning is therefore "*a feature of knowing and doing and at the same time an emergent property of the process to transform a situation"* (SLIM, 2004, p19). Social learning models of participation are frequently characterised as iterative and perpetual processes comprising several loops which serve to strengthen the adaptive qualities of a socio-ecological system (Tippett *et al.*, 2005).

In relation to the conceptual model, and the similarities and differences of the stakeholders' attitudes and expectations identified within the research results, it is possible that an iterative and perpetual process, based on emerging and transformed understanding, could help utilise the similarities and resolve the differences or uncertainties identified in a timely and appropriate manner. As, for example, the differences identified in stakeholder opinion regarding whether the public should be involved during the *latter* stages of a water management

scheme – thereby acknowledging and allowing outcomes to evolve out of joint participation (Collins & Ison, 2006).

It is also recommended that if models are to be utilised they should have adequate flexibility, thereby allowing for the dynamic character of participatory processes (Loucks, 1990; Ubbels & Verhallen, 2000). The conceptual model developed, introduced and discussed within this thesis has a high degree of flexibility. While the model has not been tested in a perpetual process, the importance of maximising the opportunity to harness and utilise the unique contribution that each stakeholder constituency can bring into a participative planning process is not overlooked within its framework. Yet the framework also allows for the likelihood of different projects having a different set of issues to resolve. Furthermore, the model endeavours to address concerns regarding the description and inclusion of relevant stakeholders in models currently used, which frequently only depict two groups, "*experts and lay persons, experts and interest groups* (Abels, 2006, p2).

It is possible that the model's framework could be further researched, tested and developed to allow the incorporation of further stakeholder constituencies and their constituency concerns, if required, in relation to water resource management. While the conceptual model was specifically used here to address stakeholder concerns in relation to the management of water resources, and notwithstanding the need to test its suitability for other forms of collaboration, it is conceivable that its basic framework could also be extended,

developed and adapted to reflect stakeholders associated with other forms of natural resource management.

The output of this study thus (i) further identifies the needs and expectations of each of the stakeholder groups as identified and depicted in the conceptual model (ii) puts forward suggestions as to how the similarities and differences present within and between the stakeholder constituencies could be utilised to further social learning and address uncertainties, and (iiI) further supports and informs the process of participative planning within a social learning setting, when stakeholder preferences are not well defined (Collins & Ison, 2006). Finally it contributes to the call for more research which shows how obstacles to collective participation can be overcome (Booher & Innes, 2004) and the development of cultures that support, and are familiar with when, and which, participatory planning method is the most suitable (Stagl, 2006).

8.3 Design of the study

The research questions were explored via a cross-sectional study of the attitudes and expectations of four stakeholder types in relation to issues pertinent to participative planning in water resource management in general. The survey was not related to a specific project and it is acknowledged that this style of investigation involves 'expressed' rather than definite impacts and that longitudinal studies might reveal a different profile of attitudes (Poortinga & Pidgeon, 2004). The reality that social concerns and public opinion are dynamic

and liable to evolve over time and should not be overlooked (Doelle & Sinclair, 2006; Houghton & Ledington, 2004) is also recognised.

An acknowledged limitation of this research study is that relatively simple measures were used to characterise stakeholder opinions. Consequently, the author supports the view that gaining knowledge on the detailed patterns of perception could help "*structure and implement informational and educational measures in a beneficial manner"* (Renn, 2004, p412).

8.4 Further research

Further research could back up the veracity and reliability of these findings. If upheld, the implications are significant - in particular with regard to the design and management of participatory planning activities. The effectiveness of participatory processes in resource management has indeed been prone to varied results, and consequently is a cause for concern among both practitioners and potential adopters. Solutions are required, both to improve participatory process selection, and the process itself and ensuing outcomes. As discussed within the two former sections of this chapter, suggested areas of further research in relation to the findings of this study are thus:

- Not only how different sources of information are viewed by different stakeholders, but also the content of the information they provide
- Stakeholders opinions and expectations regarding different approaches to managing conflict to gain agreement

- Longitudinal studies of the variation in different stakeholders' opinions and expectations in relation to the issues within specific water resource management projects.

8.5 Conclusions

This chapter has reviewed the research conducted, concentrating on the implications of the study in relation to the practical application of and further research in certain core elements that constitute participative planning. The research findings challenge the supposition that different stakeholder groups, as depicted and represented in the conceptual model used, represent polarised positions and distinct attitudes and opinions. Similar evidence has recently been provided by other studies (Schusler *et al.*, 2003; Ryan, 2006) placing inter-stakeholder group perspectives and opinions in much closer alignment than might be expected. Whilst the existing literature on participatory planning has little to say about how existing views do, or should, be factored in to a particular process, there are clear implications for models of participation that are founded on ideas of social learning (Bandura, 1971).

A better understanding, acknowledgement and integration of viewpoints and expectations, not only of the public but of all participants (therefore including the professional actors), in a participatory planning event may further clarify our understanding of the processes required to ensure the development and implementation of suitable water resource management and policy practices. We agree with many previous statements about the usefulness of eliciting and

characterising the nature and extent of variation between different stakeholders' viewpoints and expectations. Without such information, "*policymakers must rely on an intuitive understanding of why people support, oppose or are unsure*" (Routhe *et al.*, 2005, p893). This research does suggest however, that we should not assume that stakeholder 'groups' necessarily have divergent views on key issues.

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Appendix 1 – Survey Questionnaire

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Cranfield UNIVERSITY
The School of Water Sciences

What are your views regarding wider participation in the planning and implementation of water resource management tools?

This questionnaire survey, conducted by the School of Water Sciences at Cranfield University UK, is being carried out as part of the AQUAREC project on 'Integrated concepts for reuse of upgraded wastewater'. The aim of this questionnaire is to explore your views regarding wider participation of the public and other stakeholders in the planning and implementation of water resource management projects.

Your response is important in helping us to understand the perceptions of different stakeholders and identify their needs and requirements for participating in a water management project. Your cooperation in completing this questionnaire is greatly appreciated.

All responses will be kept strictly confidential.

Further details of our approach to Data Protection and Ethical Research Practice protocols are provided on the last page of this questionnaire.

If you have any questions or problems regarding the questionnaire or the research project, please contact Sue Baggett.
When you have completed the questionnaire, please return via the Freepost envelope provided to:

Sue Baggett
School of Water Sciences, SIMS, Cranfield University, Cranfield, Bedfordshire, MK43 0AL, UK.
Email address: s.b.baggett@cranfield.ac.uk
Tel: +44(0)1234 750111 extension 3334.

In the following questionnaire you will come across the terms 'water management' and 'wastewater reuse'.

- **By 'water management' we mean the control, treatment or utilisation of water resources, *for example*, water quality enhancement and flood control are water management activities.**
- **'Wastewater reuse' means when wastewater that has already been used for one purpose is appropriately treated and then reused for another purpose.**

Please write your answers in the space provided or put a cross next to the relevant options as indicated.

Q1.In the context of the management of water or water use do you:

(please choose one from the following)

	Work for an organisation that is orientated towards:
	Regulation
	Management
	Research
	Community representation or lobbying
	Other (Please specify):
	OR If you do *not* have a formal role in water management are you a:
	Domestic Customer
	Industrial Customer
	Agricultural Customer

Your job title is:

Please base all further responses on the perspective you have selected above.

Q2. Have you ever been involved in, or are you currently involved in, the planning or management of a water management project or scheme?

Yes	**No**

If you answered No to this question then please go to Q4.

Q3.The water management project(s) or scheme(s) that you have been or are involved with have been concerning *(please tick all categories relevant to you)*:

	Water quality
	River protection or restoration
	Reuse,recycling, sustainable methods
	Irrigation
	Industrial wastewater
	Urban wastewater
	Recreational waterways
	Flood defence
	River basin management
	Other(Please specify):

Q4.Please indicate which of the following options you consider to be the most efficient way to conserve water *(Please choose only one of the following)*:

	Pricing
	Imposing restrictions
	Increasing general awareness
	Adopting sustainable or alternative technologies
	Other (Please specify):

Q5. Please indicate which of the following names and terms are familiar to you in the context of water management:

	Water Factory 21
	Professor Takashi Asano
	Greywater
	EU Water Framework Directive
	Faecal Coliforms
	Membrane Bioreactors
	Eutrophication
	None of the above

Q6.To what extent do you agree or disagree with the following statement?

"The appropriate reuse of wastewater is a desirable option as a means of conserving water resources".

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Q7. What do you consider to be the primary potential benefit of wastewater reuse?

Primary benefit is:

Q8. What would you consider to be the two most important risks of a wastewater reuse project or scheme?

Risk 1:

Risk 2:

Q9.To what extent do you think the following stakeholder groups would agree or disagree with what you consider to be the two most important risks identified in Q8?
Risk 1:

Water Suppliers or Distributors would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Academic Researchers would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Regulators would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Public or their representatives would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Risk 2 :

Water Suppliers or Distributors would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Academic Researchers would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Regulators would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Public or their representatives would:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Q10. At what stage(s) of a water management project or scheme do you think the public or local community should become involved?

	Pre-planning (scoping)
	Planning
	Construction or implementation
	Operation
	Monitoring
	Shut down

Q11. Why do you think the public or local community should be involved in a water management project at the stage(s) you indicated in question 10?

Answer:

Q12. *How* do you think the public or local community affected by a project or scheme should be included in the project planning?

Please choose from one of the following:

	Make all the decisions *(Full delegation of all decision making and actions to the people).*
	Make some of the decisions *(Some power is delegated to the people).*
	Be consulted *(People given a voice, but no power to ensure their views are accountable).*
	Be informed *(People are only told what will happen, is happening or has happened).*

Q13.What would you consider to be the main factor(s) that could contribute to a water management project succeeding?

Main factor(s) for success:

Q14.What would you consider to be the main factor(s) that could contribute to a water management project failing?

Main factor(s) for failure:

Q15.If you were involved in the planning or management of a water management project, to what level would you trust *each* of the following groups to protect your interests?

Water Suppliers or Distributors	Strong trust	Some trust	Neutral	Low trust	No trust
Academic Researchers	Strong trust	Some trust	Neutral	Low trust	No trust
Regulators	Strong trust	Some trust	Neutral	Low trust	No trust
Public or their representatives	Strong trust	Some trust	Neutral	Low trust	No trust

Across the top of the following table you are given the names of different sources of information or knowledge (from Media to Water Supplier). Along the left hand side of the table there are eight pairs of words that could be used to describe these sources of information or knowledge.

Q16.How do you rate the following as sources of knowledge or information on water management?

Please score each knowledge source (column headings) *independently* for each descriptive word pair (row headings) on a *scale of 1 through to 7*. For example, a score of '1' would indicate that you feel the knowledge source is most like the first option of the word pair and a score of '7' would indicate that it is most like the second option of the word pair. Please enter a score for each knowledge source and word pair combination in the corresponding box.

	Media	Regulator	Academic Researcher	Non Governmental Organisation	Friend or Neighbour	Water Supplier
Credible(1)-Unconvincing(7)						
Trustworthy(1)-Untrustworthy(7)						
Reliable(1)-Unreliable(7)						
Impartial(1)-Biased(7)						
Respected(1)-Not Respected(7)						
People Orientated(1)-Self Orientated(7)						
Knowledgable(1)-Lacking Knowledge(7)						
Easy to understand(1)-Difficult to understand(7)						

Q.17 Are you:

Male	Female

Q18. What is your age?

: years

Q19.What is your country of primary residence?

If you would like to make any further comments then please use the space below.

Comments:

Would you like a copy of the executive summary of the survey emailed to you when it becomes available?

Yes, please email it to me at:	No	

Your contribution to this survey will make a difference.
Thank you for participating!

More information about the AQUAREC project can be found at www.aquarec.org

Appendix 2 – Data Protection Document

Protection of data provided by survey respondent

07/7/04

1. Storage

Access to the electronic data will be password protected and securely stored. Any printed paper copies of the data held by the researcher will be ensured the equivalent level of security.

2. Usage of the collected data

Confidentiality will be maintained as far as possible, so that the interests of the individual respondents are protected. No respondent will be individually identified in the resulting thesis or associated reports and publications. The researcher however, cannot be held responsible for any participants that freely choose to reveal their participation in the survey.

3. Destruction of data

The data provided by the survey participant will be transferred to a database so that the returned questionnaires may be collated and analysed. Once all the data has been transferred, collated and analysed, all the original completed copies of the questionnaire will be destroyed.

4. Dissemination of survey results to respondents

If respondents express an interest in receiving the final survey results then this will be made available to them.

Ethical Responsibilities

1. Ethical responsibilities with regard to the research of survey participants.

- Research participants will explicitly agree to take part in the study and will not be forced to participate or misled so as to gain their consent. Pressing the “submit questionnaire” button will mean that the participant has agreed to take part in the study.
- Participants are provided with the necessary information about what they are expected to take part in so that they can make an informed decision on whether to participate or not.
- The researcher, to the best of their ability, will ensure that no harm will be done to the respondent due to their participation in the survey.
- Confidentiality and anonymity. The personal identifiers (name, email/address) of the participant will not be disclosed to a third party*. The anonymity of the participants within the thesis, reports or any other publication arising from the research will be maintained. However, please note that the names and addresses of the participants are not requested within this survey. Only the sex, age range, type of respondent and job title are requested within the body of the questionnaire as personal data.
- *Third parties will not contact the participants, unless prior consent has been obtained from the participant.

2. Ethics with regard to the scientific community, colleagues, sponsors and the general public.

- Scientific community and colleagues. A proper acknowledgement of the contributions made to the research from other sources will be referred to as appropriate. Sufficient information on the research will be included in the details so that other researchers can properly evaluate and if required, replicate the work.

- Sponsors. The research sponsors and their involvement in the research will be included.

- General public. Sufficient information will be given so that the findings are not misleading. Readers will be provided with details on the methods used, how the data collection and sampling were carried out and analysis of the data.

Appendix 3 – Data code book for questionnaire survey

Q1: In the context of the management of water or water use do you work for an organisation that is orientated towards:

Valid codes:	1	Regulation
	2	Management
	3	Research
	6	Customer
Missing values:	98	No response
	99	Invalid response

Q2: Have you ever been involved in, or are you currently involved in, the planning or management of a water management project or scheme?

Valid codes:	1	Yes
	2	No
Missing values:	98	No response
	99	Invalid response

Q3: The water management project(s) or schemes(s) that you have been or are involved with have been concerning (please tick all categories relevant to you).

Valid codes:	1	Yes
	2	No

Q4: Please indicate which of the following options you consider to be the most efficient way to conserve water (please choose only one of the following).

Valid codes:	1	Pricing
	2	Imposing restrictions
	3	Increasing general awareness
	4	Adopting sustainable or alternative technologies
	5	Other
Missing values:	98	No response
	99	Invalid response

Q5: Please indicate which of the following names and terms are familiar to you in the context of water management.

Valid codes:	1	Yes
	2	No
Missing values:	98	No response
	99	Invalid response

Q6: To what extent do you agree or disagree with the following statement?

"The appropriate reuse of wastewater is a desirable option as a means of conserving water resources".

Data type:		Numeric
Valid codes:	1	Strongly agree
	2	Agree
	3	Neither agree nor disagree
	4	Disagree
	5	Strongly disagree
Missing values:	98	No response
	99	Invalid response

Q7: What do you consider to be the primary potential benefit of wastewater reuse?

Data type:		Qualitative
Valid codes:	1	Reduce primary source demand
	2	Augment supplies
	3	Non potable reuse
	6	Sustainability or environmental protection
	11	Increase awareness
	14	Economic benefits
Missing values:	98	No response
	99	Invalid response

Q8: What would you consider to be the two most important risks of a wastewater reuse project or scheme?

Data type:		Qualitative
Valid codes:	1	Health
	2	Cost
	3	Misuse
	4	Environmental
	7	Technology
	8	Acceptance
	11	Monitoring
	15	Reliance
	17	Lack of information
	26	Other
Missing values:	98	No response
	99	Invalid response

Q9: To what extent do you think the following stakeholder groups would agree or disagree with what you consider to be the two most important risks identified in Q8?

Data type:		Numeric
Valid codes:	1	Strongly agree
	2	Agree
	3	Neither agree nor disagree
	4	Disagree
	5	Strongly disagree
Missing values:	98	No response
	99	Invalid response

Q10: At what stage(s) of a water management project or scheme do you think the public or local community should become involved?

Data type:		Numeric
Valid codes:	1	Yes
	2	No
Missing values:	98	No response
	99	Invalid response

Q11: Why do you think the public or local community should be involved in a water management project at the stage(s) you indicated in question 10?

Data type:		Qualitative
Valid codes:	1	Minimise conflict
	2	Increase awareness/public buy in
	5	Public ownership/right to be involved
	9	Process/outcome improved
	14	Only to inform of choices already made
Missing values:	98	No response
	99	Invalid response

Q12: How do you think the public or local community affected by a project or scheme should be included in the project planning?

Data type:		Numeric
Valid codes:	1	Make all the decisions
	2	Make some of the decisions
	3	Be consulted
	4	Be informed
Missing values:	98	No response
	99	Invalid response

Q13: What would you consider to be the main factor(s) that could contribute to a water management project succeeding?

Data type:		Qualitative
	1	Planning/management
	2	Public involvement
	3	Stakeholder involvement
	4	Financial
	5	Research/Technology
	6	Construction/operation/maintenance (COM)
	7	Environmental/sustainability
	8	Benefits/risks
Missing values:	98	No response
	99	Invalid response

Q14: What would you consider to be the main factor(s) that could contribute to a water management project failing?

Data type:		Qualitative
	1	Planning/management
	2	Public involvement
	3	Stakeholder involvement
	4	Financial
	5	Research/Technology
	6	Construction/operation/maintenance (COM)
	7	Environmental/sustainability
	8	Benefits/risks
Missing values:	98	No response
	99	Invalid response

Q15: If you were involved in the planning or management of a water management project, to what level would you trust *each* of the following groups to protect your interests?

Data type:		Numeric
Valid codes:	1	Strong trust
	2	Some trust
	3	Neutral
	4	Low trust
	5	No trust
Missing values:	98	No response
	99	Invalid response

Q16: How do you rate the following as sources of knowledge or information on water management?

Data type:		Numeric
Valid codes:	1 to 7	Score attributed to each source for each word pair
Missing values:	98	No response
	99	Invalid response

Q17: Are you male or female?

Data type:		Numeric
Valid codes:	1	Male
	2	Female
Missing values:	98	No response
	99	Invalid response

Q18: What is your age?

Data type:		Numeric
Missing values:	998	No response
	999	Invalid response

Q19: What is your country of residence?

Data type:		Qualitative
Missing values:	98	No response

Q21: Would you like a copy of the executive summary of the survey emailed to you when it becomes available?

Valid codes:	1	Yes
	2	No
Missing values:	98	No response
	99	Invalid response

Appendix 4 – Conferences and meetings where questionnaire circulated

British Hydrological Society conference, 'Hydrology: Science and Practice for the 21st Century'. 12th - 16th July 2004, Imperial College, London.

4th IWA World Water Congress and Exhibition. 19th - 24th September 2004, Marrakech, Morocco.

International Commission on Irrigation and Drainage, Seminar on 'Tools for public participation, conflict resolution and decision making in water resources'. 14th October 2004, ICID British Section, London.

Appendix 5 – List of organisations contacted for linking to online version of the questionnaire

Category	Organisation Name	Website Address
Research	AQUAREC	www.aquarec.org
	Foundation for Water Research	www.fwr.org
	Key Water	http://keywater.baufinf.tu-cottbus.de
	Med Reunet	http://med-reunet.com
Managerial	Accepta	http://www.accepta.com
	British Water	http://www.britishwater.co.uk/
	CIWEM	http://www.ciwem.org/about/
	European Water Association	http://www.ewaonline.de/pages/ewmn.htm
	IWA	http://www.iwahq.org.uk/template.cfm?name=home
	IWMI	http://www.iwmi.cgiar.org/
	UK WIR	http://www.ukwir.co.uk/anim/default.asp
	Water Management Inc. (US)	http://www.watermgt.com
	Web 4 Water	http://www.web4water.co.uk
Regulatory	DEFRA	http://www.defra.gov.uk
	DWI	http://www.dwi.gov.uk
	Scottish Environmental Protection Agency	http://www.sepa.org.uk
	Water Reg'ns Advisory Scheme	http://www.wras.co.uk
	UK Environmental Law Association	http://www.ukela.org
	Sustainable Development Commission	http://www.sd-commission.gov.uk
Lay Public	Acumen Fund Inc. (US)	http://www.acumenfund.org/index.html
	Friends of the Earth	http://www.foe.co.uk
	River Network (US)	http://www.rivernetwork.org
	UK Rivers	http://www.ukrivers.net
	River Net	http://www.rivernet.org/
	Surfers Against Sewage	http://www.sas.org.uk
	Water Customer	http://www.watercustomer.org/watercust/web/site/home/hom
	Water Aid	http://www.wateraid.co.uk
General	UK Centre for Economic & Environmental Development	http://www.ukceed.org/
	Water Page	http://www.thewaterpage.com/advertising.htm
	Water Watch	http://www.waterwatch.org.uk/

WWF	http://www.wwf.org.uk/researcher/issues/freshwater/index.as
Water Info (US)	http://www.waterinfo.org/lstsrv.html
ICIJ	www.icij.org/water
NWPA	www.nwpa.freeserve.co.uk/H20.html
Global Water Research	www.globalwaterresearchcoalition.net
Clean Water Action (US)	www.cleanwateraction.org
CIRIA	www.ciria.org.uk/water.htm
People's world water forum	www.pwwf.org
River Basin Manager's website	www.catchment.com
Water chat (US)	www.waterchat.com

Appendix 6 – Survey participants' responses to Question 11

R = Regulator; M = Manager; A = Researcher; C = Customer

Respondent	Response	Category
R1	To become aware and make representations about their concerns.	2,5
R2	So that they know that all ideas have been looked at and the reasons why a particular option was chosen	14
R3	Public perception (outrage potential) is usually inversely proportional to their knowledge, hence by enhancing understanding the public will have greater likelihood of being supportive.	1, 2
R4	So they have a say in how a project would affect their community, and they would get a chance to understand all the issues involved	2,9
R5	Because such projects directly affect their lives and impact on the environment	5
R6	It is extremely important to get risk communicators involved to gain public confidence and acceptance in the course of technologies and approaches chosen. It is also necessary get public support for funding. Public involvement in monitoring is similarly important to maintain public support (financial, political).	2
R7	The public have a right to know about the entire project and all the potential effects it may have on their mental and physical health.	5
R8	Involvement of the public is one of the most effective ways of raising awareness of water resource issues. The general public still do not believe that there is a need to use water resources sustainably due to flooding incidents over the past few years. Flooding leaves a much stronger memory of plenty than a drought does of depleted resources.	2
R9	To obtain awareness at the beginning for the scope of the plan or project and then following growth of project as more and more details become available (both positive and negative).	2
R10	To provide input to proposed ideas once options have been put forward.	14
R11	To grow the awareness	2
R12	I think that the public should be involved from the planning process to be aware what planners are going to do and what is the advantage and disadvantages of the reuse project. In addition they should indirectly be involved in the operation and monitoring phase to see the quality result as they will be the customers.	2,5
R13	Familiarity breeds acceptance. That is, the more folks know about and are involved in a project, the more they 'own' it and the less problematic it is. The majority of	1,2,5

	people are negative in the face of unknowns, but are neutral to positive when given sufficient information and opportunities for involvement.	
R14	It will be THEIR project. They deserve to have input. Plus, it will pay dividends in increased acceptance later on.	2,5
R15	The sooner people become involved the more they understand the issues and decisions to be made – and feel part of the process i.e. they can influence.	2,5
R16	To encourage support by those it should be benefiting and it is likely that impending EU requirements on public participation in certain environment projects may require input at this stage in any event.	2
R17	Planning: communication of the plans and potential benefits; discussion of local implications; thorough exploration and understanding of local concerns; active involvement in refining plans. Construction: communication of project progress and local issues; resolving potential 'hiccups' with local community. Operation: demonstration of the water management benefits, resolving operational difficulties.	1, 5, 9
M1	Despite the view that public/local community involvement is 'non-expert involvement', I think that the earlier the stakeholders, any stakeholders, are involved then the better will be the process and the outcomes.	9
M2	To engage them early to ensure their requirements or concerns can be addressed and alleviated.	2
M3	Best to reach a common understanding early, and for all stakeholders to be informed of all the 'drivers' of the project. More conflict if radical changes proposed later in project planning.	1,2
M4	Public awareness and acceptance of change is essential for any sustainability initiative.	2
M5	So they can become a part of the project. Pre-planning is too soon. Need to have two to three viable alternatives with all pros and cons before public is involved.	1,14
M6	Tax dollars are properly spent.	9
M7	Transparent process essential for success.	2
M8	Public acceptance is a key element in getting a project developed and funded.	2
M9	So that the project has full community approval right from the start, so resources and money is not wasted on a project that may get derailed to community opposition at a later stage. It also gives the community a sense of ownership.	1,5
M10	Because the public and local community are a key stakeholder in large water management projects and without their support and understanding of the issues it may not be possible for a scheme to go ahead.	1,5
M11	No public involvement in the first two stages could result in a 'white elephant'. Public involvement in the operation and monitoring stages is required for users to gain (further) appreciation of the ongoing issues (avoiding	1,2

	complacency with respect to the risks and mutual obligations).	
M12	The people who might be affected should be given an opportunity to say their meaning.	5
M13	One needs information from the public during the planning stage, such as water consumption figures and patterns, as well as predictors of future water demand.	2,9
M14	Often useful to have public participation early. If there is a strong opinion against then the scheme should possibly be re-examined.	9
M15	The public should be involved at all stages so that they understand the water resources issues and have their concerns addressed. This will help with buy-in to projects that truly address the needs of the public.	2,5
M16	Opportunities to communicate the need, cost and tradeoffs inherent in the project.	2
M17	Consumer resistance to substitution of reclaimed water for their usual source.	1
M18	Public acceptance is crucial to implementation	1,2
M19	In the planning stage the public may express its needs and restrictions, while in the monitoring stage, local community will verify quality of operation and discuss further improvements.	5,9
M20	Public participation reduces unnecessary conflict and hostility between them and other stakeholders particularly water suppliers and regulators. The public are the direct water users and they should have a say in the design and implementation of the activities affecting their water supply. Besides that, they should be able to contribute ideas to improve water management projects.	1,5,9
M21	The success of any project depends on buy-in by the local community and a sense of ownership. Therefore, the public should be given an opportunity to participate at every major stage of project planning and implementation.	2,5
M22	Consultation is the only way to get the demand for the project.	5
M23	Local ownership of scheme.	5
M24	Evidence is clear that without public involvement from project inception reuse projects are exposed to elevated risk of failure.	1
M25	Early acceptance of the concept and principles are imperative.	2
M26	To avoid problems with the project in the local community.	1
M27	The public should not be involved, as it is not when a hospital, for example, is planned, built and operated. This has to be done by the professionals and public only introduce perturbation, delay in the implementation, confusion and background noise. Chances are given to people looking for notoriety and really not interested in the project. Moreover, most people do not care about the origin of drinking water – which is much more relevant, so there's no need to compulsory inform them about the	14

	origin of reclaimed water as long as it complies with the required standards.	
M28	In order to facilitate acceptance of a scheme people need to feel involved in the decisions. If they feel the project is a 'fait accompli' they may or may not like it, but if they don't like it they won't feel they can change it to fit what they want.	2,5
M29	If not the project will not achieve its purpose and never contribute to the overall objective, or it will fail.	1,5
M30	To avoid the worst risk, conflict with citizens.	1
M31	If the user is not taken in at inception it may happen that the project will be stillborn.	1
M32	It will involve works in their locality. There are likely to be environmental or social concerns to be resolved. Planning application/ other concerns need to be discussed at an early stage to address any issues.	2,5
M33	All community engagement research demonstrates the need for community involvement at all stages, particularly at the beginning, to ensure community ownership/acceptance of such projects.	2,5
M34	The public/local community are the customer and have a stake in the local environment as a whole. The ramifications of not having public support depend upon the nature of the market and operators, but an unhappy public/local community is never a good situation for any business. As potable water becomes more scarce in many countries, the support of the community is vital in securing water options into the future.	1,5
M35	Planning: to contribute to and understand feasible project objectives. Operation: should be paying for service and understanding nature of costs. Monitoring; to see and establish service is provided economically.	2,9
M36	Both to gain some 'ownership' of the scheme, which allows for sustainability, also to allow for critical changes to be made to the design.	5,9
M37	Because without the publics' acceptance the project will never be able to succeed.	1,2
A1	Appropriate design, scheme = fit for use, ownership. Good governance, user feedback to high quality of scheme. Ensure high level of public awareness/empathy and actions to promote sustainability.	1,5,9
A2	For the success of the project long term.	1
A3	Water management is by nature a public concern and should not be privatized. The security for this is that the public take part in the whole process of management.	5,9
A4	Acceptance has to be achieved to minimise potential ? costs.	2
A5	It is for them! No one can judge the benefits better than the people who are the target beneficiaries. Some education may be needed! A minor fraction may never agree to anything but if the local community is involved, there will be less conflict.	1,2,5

A6	Wastewater reuse is not familiar with the public, although natural reuse is going on. Education of people first.	2
A7	Total commitment and choice as the community has to fund and live with outcomes and operation.	5
A8	They need to (a) understand, own and support project and perhaps change their behaviour. (b) contribute local knowledge (c) learn and develop own capacity to act indep, and informed way in WRM.	2,5,9
A9	No comment	99
A10	Public awareness is essential for proper acceptance and maintenance of re-use schemes.	2
A11	You need to know how the community feels i.e. if there is no hope of agreement.	5
A12	Civil society should participate or be represented at all stages. The project will be designed and implemented to a higher standard, corruption is less likely etc.	5,9
A13	Early public information/participation will increase public awareness and acceptance and facilitate responsible decisions.	2,9
A14	Best scope for project. Env. Awareness. Avoids misinformation.	2,9
A15	Right to opinions to be taken into account. More effective solutions and ownership of the solutions leading to acceptance.	2,5
A16	Water = a common well, a familiar well, a shared resource between all the humans. The local level = a good level to hear to concentrate implementation of management plans with the contribution of all patrons.	5,9
A17	To ensure public support understanding and acceptance of water recycling/reuse. Dispel myths about water quality and impacts on health.	2
A18	Public buy-in is essential for any successful project	2
A19	In order to become aware of the needs, benefits, risks and cost involved.	2
A20	To define objectives, to take part in the discussion on how the objectives will be met in a way that the public accepts. To check that the project actually meets public expectations.	5,9
A21	To feel the project as its project and realise the importance of its participation in the successfulness of the project.	5,9
A22	Assuming they will be impacted in some way by the presence/absence of the project - because of public health, economic, environmental and social consequences.	2
A23	Obligations under WFD, competing claims on the same resource cannot be resolved without some form of process involving society. Technical, behavioural and institutional transformations need to be brought into concerted actions.	5,9
A24	The beneficiaries must be clear about what they want, how the systems work and what the risks and implications	2,9

	are. They may also have relevant and useful information that should be incorporated in the project.	
A25	Apart from the initial scoping it is important that local communities have an 'ownership' in 'their' scheme. This aids monitoring and protection and prevents mis-use.	5
A26	It is for and by the public.	5
A27	Since the project is likely to be implemented to benefit the local community or it will have some impact on it, they should have the maximum opportunity to influence it.	5
A28	Because the project is intended for the public and its long term water security. The public has a right and an obligation to be involved, especially at the earliest planning stages when alternative sources are being evaluated and compared. It is a mistake to make the initial decisions and then inform the public.	5,9
A29	No comment	99
A30	No comment	99
A31	Improve level of acceptance (buy in).	2
A32	Primary stakeholders	5
A33	I think they will feel more relaxed when they are kept informed with projects taking place in their community and directly affect them. At the same time they always may raise important points that should be taken into consideration.	2,9
A34	Information about the scope of a project and its control are essential for creating confidence.	2
A35	For a widely accepted and effective plan you need to involve public at all stages.	2,5
A36	Enhances sustainability of outcome; builds awareness; builds trust; problem more inclusively defined; shared meaning becomes possible (although public involvement can yield undesirable consequences for all parties too).	2,9
A37	I think that the local community is the end user of the treated water and so the public or local community should be involved in a water management project.	5
A38	No comment	99
A39	To provide information about the needs before the project or feel part or owners of the project and to use the results of the project efficiently and learn best practices.	5,9
A40	Water recycling depends greatly on people doing the right thing. The community including water suppliers, users and general public should be engaged early in the decision making process so that they all can take ownership. Ownership means that all sections of the community will ensure appropriate risk management. The process should be an engagement process rather than a consultation process.	5,9
A41	Because it would be a project that affects their lives and they are entitled to have the right to express their opinion and usually their observations about the project will include some good points and thus it would make it easier for the company or the authorities to carry out the project.	5,9

A42	Water is a national asset. Planning which affects the national or local water assets (e.g. dam, use of lake water, transfer of water to another part of the country etc.) should take into consideration the public attitudes. Public input at the planning stage would enable incorporation of just demands before irreversible or costly steps are taken.	5,9
A43	No comment.	99
A44	The public needs to understand what problems are being solved and why the project will improve things and not degrade their quality of life. The public will always agree to improving their quality of life.	2
A45	If you involve members of the public from the start then hopefully they will know exactly what the project will entail in the future. Citizens do not like to be faced with any unpleasant surprises near their homes and would perhaps be more accepting of a treatment plant for example than if they were not told about it in the first place. I think the public should be informed and listened to at every stage of the planning process.	1,2,5
A46	As early as possible to provide the input from public perception and therefore more acceptance of the outcome.	2,5,9
A47	No comment.	99
A48	The public or community need to be involved early on because they need to be engaged in deciding what is an appropriate project to develop – to fit their needs. This also helps engender ownership of the process and the product and better support overall.	2, 5,9
A49	They must accept the consequences of such decisions.	2
A50	They are the primary consumers.	2
A51	No comment.	99
A52	Environmental management and specifically water charges are going to require an increasing level of participation, understanding and cooperation from the public at large. Hence full public involvement is essential to ensure increased awareness of the issues involved, the practical difficulties faced by government and industry in managing water and the cost/benefit analysis that informs decision on the use of water.	2,5
A53	It is of high interest for the people.	5
A54	Fully open process is vital to acceptance – no closed door meetings.	2
A55	I strongly think that public need to be involved in water issues. They need to see clearly what potential benefits or consequences are. Public would not accept projects or facilities which they were not agree with in the first place. Then ,they could evaluate and follow operations because of what they mean in their real circumstances and lives.	5
A56	They are affected by it. Acceptance will depend on public opinion – if they don't want it it can't come, at least in my country.	1, 2
A57	To create confidence and increase acceptance. People	2

	may be more ready to accept a slight risk if they are presented with the constraints on water and other resources and the advantage.	
C1	If no initial sense of ownership is created, rejection is more likely.	1,5
C2	General public need to be involved to make sure that supply is as pure as possible.	5
C3	Early involvement can reduce objections at a later date.	1
C4	There are normally serious problems in acceptance by final users like farmers.	1
C5	To get from pre-planning to planning you need to limit public consultation otherwise good (and bad) proposals will be delayed. Public consultation is essential at the planning stage.	2, 14
C6	Because they are the ones who are actually going to use the water, therefore they need to be involved soon in the project to see it meets their requirements, but also during the project, so that management team gets regular feedback to improve the process.	5,9
C7	Because in that way the risks 1 and 2 would be covered appropriately. At the time of shutdown to ensure the appropriate decommissioning of the facility.	5,9
C8	Because it affects them directly, they are the main receptors of the outcome.	5
C9	To have an early dialogue with the local community, and iron out problems at as early a stage as possible.	5
C10	Right thing to do. Lack of public trust and understanding hampers water conservation anyway, in connection with impure water doubt will be much greater, let alone if solution is foisted upon community.	5
C11	I believe in public and/or community ownership and control of all shared infrastructure.	5
C12	Awareness will reduce opposition and give much better understanding of the project. Open planning will improve the standard (quality) of the project.	1,2,9
C13	No risks involved.	98
C14	Options can be assessed	9
C15	It's very important to take into account the concern and view of all stakeholders.	5,9
C16	In the developed world, there is no way that any planning or construction can be done without public consultation, and there are 'public interest' groups who see it as their mandate (self acquired) to insist on it.	1,5
C17	To combat negative public perception, to develop ownership of the project, to educate them, it would encourage efficiency among them, it would help them value the project.	1,2,5
C18	Depends on the type of project.	98
C19	To ensure water resources are managed sustainably and put pressure on the water industry to overcome reluctance to change.	9
C20	Because early acceptance is vital for any progress and	2

	openness is an important component of this.	
C21	Most water supply is perceived to be local. Local water uses change.	5
C22	To ensure that local water uses are considered, and that the local community is fully aware of its role in the scheme.	2,5
C23	Why not is my question? Natch it is for public safety and I have concerns about major hoarding of water and control of water pricing given huge mega-corps are buying up water.	5
C24	Because they are the ones benefiting or losing with its implementation.	5
C25	Because as in most plans that are usually unpopular to the local populations, but better for the greater good, the local people have to be informed and familiarise early enough, but not too early so as to stop the project, but also, if such schemes are somehow profitable (e.g. creating jobs) for the area, they will be welcoming even if population strongly believes it destroys the area (e.g. industries).	2, 5
C26	Need to be aware of local factors affecting the scheme; people's perception of the project (this would affect what types of wastewater could be used i.e. people maybe happy to water their garden but not flush the toilet with greywater); the readiness of people wanting to utilise the project.	5,9
C27	They don't know enough to plan the project but should be consulted for the implementation as they will be the first users.	5
C28	Because the public must know what is done to improve his everyday life.	2
C29	To know what is going on, to feel involved in such an important decision and to trust the benefits and how safe or not it is.	2,5
C30	Water has a direct effect on the community – the process start to finish would benefit from local involvement.	5,9
C31	Because it must be in general project which involved everyone.	5
C32	Because people in the local community use the water and it is fundamental for our everyday life.	5
C33	To improve public awareness in the pre-planning phase. Because it is part of their life in stages 4 to 6. I would not involve them in planning and construction because you will always face misunderstanding and disagreement.	2,5
C34	Every local problem requires local attention.	5
C35	Pre-planning for the optimum management efficiency.	9
C36	Because they are the person who are going to make use of the resource (water).	5
C37	Because they would like to be aware of the project's effectiveness and safety aspects.	2
C38	Why not? If they are relevant further down the line then they might as well be in from the start for consultation	5,9

	purposes so they can be integrated into decision making processes by constructive means.	
C39	Construction and implementation will somewhat affect the public life.	2
C40	The active participation of local community likewise allows the gradual incorporation of the program's learnings into government policies and decisions. The purpose of the pilot study is to document practical experiences and lessons learned in the community management of water resources to provide support to local communities in improving their water management processes and system for better implementation of management project. Provide support to local water users associations and community development institutions to enhance their capabilities in implementing integrated water resources management.	5,9
C41	If the common sense issues about adoption are not taken onboard by the stakeholders then it will not happen except by mandate (e.g. building regs/planning permission).	9
C42	Awareness during planning; and to stop disruption during construction.	1,2

Appendix 7 - Survey participants' responses to Questions 13 & 14

R = Regulator; M = Manager; A = Researcher; C= Customer

Respondent	Responses for Question 13	Category
R1	Goodwill	98
R2	Public acceptance a local driver (e.g. economic or environmental factor) which means the public also see value a reliable monitoring programme which is open to public view.	2,4,7
R3	Appropriate pricing of the primary resource so that the full opportunity cost is realised.	4
R4	No response.	99
R5	Agreement across proposer, regulator and public as to the aim and purpose of the project.	3
R6	Sufficient funding; sufficient preliminary research to assure cost/effective selection and application of appropriate technologies and management schemes; public support.	2,4,5
R7	Public outreach program with full disclosure about where the water will be used and how the public will be protected from any potential harmful effects.	2,8
R8	Proper planning utilising a cost/benefit appraisal of the different options both from a qualitative and quantitative perspective. Inclusion of all the correct people, including local wildlife trusts and parish councils. Keeping people informed of the progress and allowing input and advice to be given at all stages of the project. Proper post implementation evaluation: otherwise a lot of knowledge and experience will be lost.	1,2,3,4
R9	Scope has to be at their level, solving their problems. General awareness of the need for the project. Possible also advantages for the general public (f. i. also recreational use).	2,8
R10	Communication and clear objectives.	1
R11	Good technology and good organisation processes and support from public.	1,2,5
R12	Good plans reliable on quality and quantity. Public awareness, acceptance of farmers.	1,2,6
R13	Obvious public benefit. Limited public costs or risks. Adequate public communications and involvement.	2,4,8,
R14	Quality treatment, disinfection, operation. Project experience – other project success stories.	1,6
R15	Ownership of the issues/problems and management by local communities.	1,2
R16	Wiling participation (through consultation and provision of information) by those who should be benefiting from it.	2
R17	Clear concise and transparently agreed benefit goals.	1,8
M1	Scientific basis firstly and secondly the involvement of	2,5

	interest groups and the public from as early as possible.	
M2	Taking into account the needs of ALL key stakeholders.	3
M3	Relevance, addresses a known and understood problem.	1,5
M4	Public support; economic feasibility; reduce environmental footprint.	2,4,7
M5	Proven technology, best possible design and construction. High quality and well trained operators and managers.	1,5,6
M6	Trust and confidence – basically strong leadership (not retired military officers totally unqualified).	1
M7	Real benefits well understood by all stakeholders.	3,8
M8	Technically and economically sound. Needed and accepted by the public. Environmental viable.	2,4,5,7
M9	Community consultation and involvement in being involved along with the engineers/planners of the most suitable scheme.	1,2,3
M10	Consultation with all key stakeholders (regulators, pressure groups, public/local community etc.). Use of appropriate technologies.	3,5
M11	In order of decreasing importance: public involvement as per above, appropriate technical support and public involvement in operation and monitoring and robust and appropriate technology in the scheme itself.	2,5,6
M12	Broad consensus among the people affected and the decision makers (politicians) of the need and the benefits of the project.	2,3,8
M13	Production of high quality water. Uninterrupted supply of water. Sufficient water pressure in the supply network.	5,6,
M14	Stakeholder involvement. God for the environment. Reasonable cost/benefit relationship.	3,4,7,8
M15	Clearly defining the need for the project and obtaining the public's input early. Make that the public understands the decision process and sees that it is objective and transparent.	1,2
M16	Clear need for the project which is communicated to stakeholders and bought into by them.	1,3
M17	Allow sufficient time for planning and delivery of project. Involve all potential stakeholders at an early stage.	1,3
M18	Public acceptance.	2
M19	Commitment of stakeholders.	3
M20	Active stakeholder participation. Environmental education at all levels.	3,7
M21	Effective public participation. Transparency and accountability by the decision makers. Adequate resources. Realistic and clear goals and objectives. Flexibility/adaptive management.	1,2
M22	Communication.	1
M23	Adequate planning and public acceptance.	1,2
M24	Financial viability. Public perception.	2,4
M25	Consultation with general community and scientific/academic members within that community.	3
M26	Good public information. Good sustainable planning.	1,2,7

M27	Being professional and being aimed at solving people's problems.	1,2
M28	Being appropriate to the situation.	1
M29	Planning, foresight, resources, stakeholder acceptance, sustainability and support, effective monitoring.	1,3,5,7
M30	To ensure economic and environmental sustainability.	4,7,
M31	Integration, awareness and education.	3
M32	Sound scientific, engineering and environmental data. Engage stakeholders at early stage.	3,5,7
M33	Proactive community participation throughout the project life and beyond.	2
M34	Support of the community, a clearly thought out and well researched business case, a proven sustainability path, the use of the most appropriate technologies for the applications, an integrated approach to all water issues – not focusing on a single issue.	1,2,5,7
M35	Service provided is defined and beneficial. Resource use sustainable. Finance adequate.	4,7,8
M36	Public ownership and acceptance that the scheme is needed.	2
M37	Regulatory approval (obviously) and public acceptance.	2,3
A1	Technically feasible within budget limits. Appropriate design, incorporating participation.	1,2,4,5
A2	Stakeholder participation. Information dissemination.	1,3
A3	That water management is looked upon as a structured societal problem and not as a problem of individuals.	1,3
A4	Agreement among all parties on necessity.	3
A5	If it benefits the maximum number of people locally first and then regions around them and negatively impact the least number of people – again locally first and then in regions around the resource.	2,8
A6	People understanding.	2
A7	Community support, government endorsement, private sector driven.	1,2,3
A8	Clear explanation of need to undertake project.	1
A9	All stakeholders participation.	3
A10	Transparency and user co-operation.	1
A11	Community involvement/ownership.	2
A12	No response.	99
A13	Large information/debate campaigns.	1,2
A14	Flexible process and commitment to resolve problems raised during process.	1
A15	Inclusiveness, integrating all factors.	3
A16	Good knowledges – awareness campaigns.	1,2
A17	Public support. Cross government support. Environmental and economic benefits. Contribution to supply security (long term)/	
A18	Public buy in. Adequate funding.	2,4
A19	Right pricing of alternatives. Firm determination of public authorities to prevent non authorised withdrawals from water bodies.	1,4,7

A20	All options have been assessed against expectations/objectives. Public/local community has been involved n the project (understanding and support).	1,2,3
A21	Involve deeply public or local community.	2
A22	Agreement between at least all the main stakeholders.	3
A23	Strong clear framework conditions; social learning adopted as a process/procedural principle; sufficient people with the new skills required (e.g. facilitation, joint learning); process costs funded.	1,4
A24	Buy in and personal interest brought to bear by all the participants, including the beneficiaries.	2,3
A25	Involvement of the local communities so they have ownership (even if this is a small %).	2
A26	Involvement of stakeholders.	3
A27	Financial viability. Acceptability to users.	2,4,
A28	Public (political acceptance). Economic feasibility and financial capability. Technical feasibility including O&M capability.	2,4,5,6
A29	Integrated approach including social impacts.	2
A30	No response.	99
A31	Information of the public about basic problem to be addressed and options for solutions and continuous involvement of the public in the project.	2
A32	Pubic engagement and transparency.	2
A33	Good and reasonable planning. Participation of different stakeholders. Economy.	1,3,4
A34	No response.	99
A35	Involving public and government in all stages. Taking into account all local conditions (social, cultural, economical etc.).	2,3
A36	Involvement of stakeholders in all (esp. early) stages of planning and implementation.	3
A37	Involve the community prior to conception. Authorities involved and process used to engage the community have to be honest and transparent. Accurate and complete information on water issues should be updated and made available to the public, media and educators on a continual basis. Risk communication needs to be integral part of this information process. Identification of possible environmental justice issues. Understanding of perceived economic advantages.	1,2,3,4,7,8
A38	No response.	99
A39	The conciliation of the interest of the users and the planners.	3
A40	Money, risk management, public acceptance, appropriate drivers – not just for the sake of it.	1,2,4,8
A41	Ensure sustainable development, upgrading the welfare of the people.	7,8
A42	Real necessity (no reasonable alternative). Full awareness of consequences. Public acceptance.	1,2,5
A43	No response.	99
A44	Identifying a problem to be solved. Working with the	1,2,5,6

	public to identify the most appropriate solution to solving the problem. Appropriate planning, design and construction.	
A45	Full commitment from all stakeholders involved until the project reaches its completion.	3
A46	Quality, cost, consultation re. public perception.	2,4
A47	No response.	99
A48	It depends what type of project it is as there are particular local circumstances to each. Getting the commitment of institutional leaders, managers/engineers, stakeholders and the public would be one of the most important elements of success. Need to understand and engage people over the long term to develop trust and support.	3
A49	Transparency and technical competence	1,5,
A50	Public acceptance and support provided the benefits are clear and the price is right.	2,4,8
A51	No response.	99
A52	Appropriate funding to support the project; and sufficient resources to ensure public participation and understanding.	1,2,4
A53	Sufficient amount of money must be available.	4
A54	Understanding, acceptance, involvement, adequate risk disclosure and discussion in context of other risks. Adequate monitoring and assessment.	1,2,8
A55	Social agreement. Stakeholders mean concerns. They look at each other and evaluate suggest or even implement tasks to make. Then, public represented may exert their rights and give regulators a bit of pressure. I think more objectives would get accomplished. Local regulations should be flexible enough to be changed with conditions over time. Long term decisions may be set to 20 years; mid-term 10-12 years, short term 3-5 years. This organisation may be coupled I think with land and other resources managers.	1,2,3
A56	Good planning and monitoring with inclusion of important stakeholders.	1,3
A57	Need of water is certainly a strong motivation. Depending on the location nutrients contained in wastewater may be highly valued. Protection of water resources through water conservation may be another motivation with an educated public.	2,7,8
C1	Devolution.	3
C2	Through research.	5
C3	To be seen as desirable and possible.	5,8
C4	Price policy.	4
C5	Public information and consultation.	2
C6	Involvement of people, they have to feel concerned about the subject, to believe that they will get something positive out of it.	2,8,
C7	Increase in general awareness about reuse of wastewater and water management. Community involvement.	2
C8	Public acceptance. High quality engineering. Centralised	1,2,6

	ownership and management (i.e. government, not private corporations). Strict and ruthlessly enforced regulation of water supply companies.	
C9	No smells from the treatment works.	6
C10	Demonstrable benefits.	8
C11	Good research and planning including the costs to decommission. Correct implementation. Appropriate maintenance.	1,4,5,6
C12	No comment.	99
C13	Not only PDCA but also prepare. Thinking in systems instead of processes is the secret. Long term thinking with helicopter view = respect, with wisdom is you can tell the people.	
C14	Consensus among stakeholders.	3
C15	Involving all key stakeholders in water policy formulation.	3
C16	Proper planning and development includes public consultation and response to expressed concerns by a sensitive, competent professional body. It does not require the delegation of decision making authority from duly constituted, competent, professional bodies.	1,2
C17	Money, resources, leadership, expertise, active involvement of stakeholders, a viable project, clear indications of the benefits, environmental improvement.	1,3,4,7,8
C18	Good analysis of the problem.	1,5
C19	Political champion. Community informed and aware of water quality and treatment well in advance of any consultation. Informed media. Trust in water providers, regulators.	1,2,3
C20	Demonstrable need generally accepted.	3,5
C21	Highlight the need. Highlight the timescales required. Get government involved. Make sure you have a solution before you go public.	1,2
C22	Co-operation between local authority and company undertaking the project. Willingness of local community to help the project.	2,3
C23	Full public involvement and agreement (consensus).	2
C24	Good planning and implementation. Users approval and support, because if not they have the capability of making it fail.	1,2,6
C25	Minimum obvious unwanted side effects on an area, public voice consulted, advertising of the long term and general benefits.	2,7,8
C26	Efficient system which works well from the offset. Public feel like they are doing their bit to save the planet's resources. Push the 'green' button.	2,6,7
C27	Information to the public.	2
C28	Awareness.	98
C29	People not knowing how it works, this topic is not easy to accept, and they will not trust the people in charge of that neither the reasons to use it.	1,2
C30	No response.	99
C31	Involvement of the public – showing the results (the	2,8

	benefits I hope so) every 6 months.	
C32	Prevention of the flood.	99
C33	Being efficient/being accepted by local people/keeping people informed.	1,2
C34	Local involvement. Cost analysis.	1,4
C35	Improved facilities and scientific methods.	5,8
C36	Good knowledge of the local environment issues, good knowledge about the particular community needs, cooperation of all the involving agents.	1,2,3,5,7
C37	Public acceptance by involving people and informing them about the benefits in an easily conceivable way.	2,8
C38	Good project management and stakeholder support.	1,3
C39	Proof of the quality of the water.	
C40	Sanitation and hygiene education. Financing for water infrastructure and services. Poverty reduction. Community organisation and development.	2,4,8
C41	No response.	99
C42	N o response.	99

Respondent	Responses to Question 14	Category
R1	Ill will	98
R2	Arrogance on the side of the regulator or project manager. A strong anti-bloc.	1,2
R3	Failing to develop the confidence of the public in respect to potential risks and hidden subsidies on the primary resource making the use of the secondary resource appear to be excessive and uneconomic.	2,4,8
R4	No response.	99
R5	Secrecy and lack of communication by parties involved in the project.	3
R6	Insufficient funding for operation and monitoring; system breakdown in operations; failures to meet water quality and quantity.	4,6
R7	Lack of public disclosure and the inclusion of the public in the decision making process will be the death of any recycled water project.	2
R8	Insufficient planning and not including all the right stakeholders or groups. Vital information could be missed and as a consequence the project plan might not be suitable for its purpose and therefore likely to be less successful.	1,3
R9	Only disadvantages for the surroundings; no possibility for finding additional information; a purely technical process.	1,2,8
R10	Poor communication and unclear objectives.	1
R11	No response.	99
R12	Acceptance of farmers to cooperate, fresh water price.	2,4
R13	Bad idea – limited benefit, unreasonable economic and/or social costs. Inept planning and/or management.	1,4,8
R14	Lack of quality. No precedents – no track record – it's new and unknown.	1,5,6
R15	Bad project design through lack of understanding of the major issues.	1
R16	Apathy or a failure to demonstrate tangible benefits.	1,8
R17	Lack of planning. Lack of local involvement. Marginal project benefits.	1,2,8,
M1	Inadequate public acceptance.	2
M2	No response.	99
M3	Lack of perceived benefit inc. cost benefit.	4,8
M4	Lack of integrated governance by major players. Lack of support by public.	2,3
M5	Experimental or not proven technology. Poor design, construction and operations.	5,6
M6	Lies and statistics.	1
M7	Flaws in project rationale. Opposition by stakeholders.	1,3
M8	Too expensive. Lack of public support, such as seen as growth inducing. Seen as environmental threat.	2,4,7
M9	Lack of community awareness and agreement.	2
M10	Lack/poor consultation.	3

M11	Under resourced ongoing education, operation and monitoring, including public involvement in these matters.	2,6
M12	Disagreement between people and politicians of the needs and benefits of the project.	2,3,8,
M13	Sub-standard product, water quality. Price of water. Regular water supply interruptions.	4,5,6
M14	Ignoring warning signs that pop up. Too visionary.	1,5
M15	Not being thorough and open in documenting the need and ignoring the public's concerns.	1,2
M16	Project driven through in the face of local opposition which becomes organised and resists in consequence, through lack of information.	2
M17	Consumer resistance to substitution of reclaimed water for their usual source.	2
M18	Public acceptance.	2
M19	Lack of enough money.	4
M20	Lack of consultation and participation. Insufficient awareness-raising and education.	2,3
M21	Lack of consultation with affected stakeholders. Unrealistic timeline and over ambitious goals. Lack of indicators to measure progress and monitoring. Not recognising local realities i.e. implementing a project that worked in a major European city to a city within Southeast Asia without taking into consideration whether it is technologically, socially, culturally or economically appropriate.	1,2,4,5
M22	Lack of the above.	1
M23	Poor planning; failure to consult where necessary.	1,3
M24	Financial viability- lack of. Public perception – lack of.	2,4
M25	Failing to involve the community at all, at any level.	3
M26	Bad public information. Bad sustainable planning.	1,2,7
M27	Not being professional – things nor working as planned; not having the will to solve people's problems and involving the general public into this sort of projects. The range of responses that one may get will greatly delay – and possibly block – many projects which are objectively beneficial for the community and/or the environment.	1,2,7,8
M28	Being inappropriate for the need.	1
M29	Not including the right people/organisations.	3
M30	Conflict with citizens.	2
M31	Top down approach.	1,3
M32	Not addressing key issues/ concerns of stakeholders in advance of formal applications.	1,3
M33	Inadequate community engagement of the kind that is meaningful for the community.	2
M34	Lack of community support, wrong technology for the application, the business case was not sound, poor project management, unsustainable application, doesn't include all aspects of the water cycle – moves a problem or enhances a problem.	1,2,5,7
M35	Poor service; resource use not sustainable; financial collapse (poor O&M etc.).	4,6.7

M36	Financial.	4
M37	Regulatory non-approval and public non acceptance.	2,3
A1	Bad design.	1
A2	Lack of transparency; being based on only one interested party.	1,3
A3	The overwhelming power of big corporations like Vivendi, Suez, RWE etc.	3
A4	Quarrels about distribution of costs.	4
A5	If a top down approach is followed.	1
A6	Economic analysis and cost.	4
A7	Uneconomic, unsustainable put in without community endorsement.	2,4,7
A8	Failure to provide clear explanation of need for project.	1
A9	Lack of info.	1
A10	Lack of appropriate follow-up after scheme set-up.	1
A11	Non ownership of the project by the community.	2
A12	No response.	99
A13	Wrong decisions.	1
A14	Technical fixes.	5
A15	Narrow focus – e.g. just on irrigation etc.	3
A16	Bad knowledges – awareness campaigns.	1,2
A17	Poor consultation. Poor management. Lack of government co-ordination. Funding.	1,2,3,4
A18	Lack of public participation.	2
A19	Lack of power of competent authorities. Poor public awareness. Strong concentrated and diffused contrary interests.	1,2,3
A20	No response.	99
A21	When the public or local community does not like or need the project.	2
A22	Ignorance.	98
A23	Absence of above; emphasis placed on ‘talking together’ rather than ‘learning together around concrete actions’.	1,4
A24	Top down imposition of goals and methods, along with poorly implemented accountability of project managers.	1
A25	Imposition by central government together with too authoritarian and blinkered management.	1
A26	Lack of awareness.	98
A27	Poor economic forecasting. Inadequate matching of needs to delivery.	1,4
A28	Poor design, inadequate public consultation, political agendas of certain politicians, economic insufficiency.	1,2,4
A29	No response.	99
A30	No response.	99
A31	Negation of the answers to Q13.	2
A32	Lack of disclosure.	1
A33	No response.	99
A34	No response.	99
A35	Not considering participation of public and government. Non-sustainable solutions (in an environmental and economic way).	2,4,7

A36	Lack of transparency/involvement of community/trust.	1,2
A37	If one of the above factors (Q13) fail, this could contribute to a water management project failing.	1,2,3,4,7,8
A38	No response.	99
A39	Miss-planning.	1
A40	Lack of money. No risk management processes. Not accepted by the public. No real reason for it.	1,2,4,8
A41	When adverse effects on peoples' lives in the long term more than the short term benefits.	8
A42	Deprivation of resources from the public, contrary to the majority stand. Other alternatives could have been chosen. Justification in doubt.	1,2,5
A43	No response.	99
A44	Not identifying the problem being solved or not communicating it to the public. Not communicating with the public soon enough. Not involving the community in the decisions. DAD – decide announce defend. Not considering all the alternatives.	1,2,5
A45	Withholding details from members of the public regarding the project.	2
A46	The reverse of Q13.	2,4
A47	No response.	99
A48	Being seen to impose a solution or solutions on people with which they are not comfortable.	2
A49	Lack of transparency and technical competence.	1,5
A50	Inefficiency, costs outweigh benefits.	4,8
A51	If people don't want to use reuse water.	2
A52	Lack of the above factors.	1,2,4
A53	No public interest.	2
A54	Closed doors and manipulation of public opinion by the divide and conquer philosophy. Failure to understand concern and tolerance of risks. Failure to fully evaluate risks. Management failure. Communication failure.	1,2,8
A55	Bad planning. Not to consider public or social agreement. Incorrect awareness of local conditions, including land use, practices, managers and land use tenure regimes, further development of towns or cities, and so.	1,2
A56	Opposite of Q13.	1,3
A57	Opposition by a part of the stakeholders, for whatever reason. The reasons are manifold: fear of losses in turnover for the utility with just fear of decentralised schemes, fears of risks by authorities, politicians, the public. A major setback may be expected with real problems occurring, which are or could be linked to the scheme.	3,8
C1	Lack of consultation.	3
C2	Making sure that trials (research) are absolutely safe.	5,8
C3	Poor planning and too many foreseeable problems.	1
C4	Price policy.	4
C5	A dictatorial attitude by the management.	1
C6	Misunderstanding of the reasons why it is	2

	necessary…people de-motivated.	
C7	Only having people involved who are 'environmentalists' and do not see the other side and the reasons for possible resistance to water management projects.	3
C8	Infiltration by water companies who may want to (i) attempt to establish/maintain a monopoly in water supply; (ii) manipulate the supply/demand rates and, ultimately (iii) make water an expensive and highly profitable commodity.	1,4
C9	Not a big enough supply of water.	6
C10	Lack of financial control or commitment (e.g. short term funding expired). Lack of environmental control (or inadequate impact assessment). Lack of openness/transparency.	1,4,7
C11	Poor communication. Inexperience.	1
C12	No comment.	99
C13	To let cost be more important than quality.	4
C14	Lack of information or coercion.	1
C15	Excluding key stakeholders in water policy formulation.	3
C16	Lack of comprehensive planning prior to making a commitment to proceed. Failure to my mind also would include cost over-runs.	1,4
C17	The opposite to the above.	1,3,4,7,8
C18	Bad analysis of the problem.	1,5
C19	Lack of above, particularly the political champion.	1,2,3
C20	Lack of acceptance.	3
C21	Not having people involved and charging customers to extra water efficiency.	2,4
C22	Commercial implications for the water company.	3,4
C23	Keeping it secret from the public and then some investigative reporter reveals truth and raises suspicions.	2
C24	Same as in the previous section.	1,2,6
C25	Destroying of local habitat, billing, bad management or lack of constant funding.	1,4,7
C26	Bad public image/bad press. Technological failings so the system doesn't work efficiently from the start. Negative health effects from the scheme.	2,5,6,8
C27	Public not enough aware of what's going on.	2
C28	Avoidness.	98
C29	Capitalization of the water without control.	1,4
C30	No response.	99
C31	A lack of communication.	1
C32	Pollutions in rivers and seas.	7
C33	Opposite of previous answers.	1,2
C34	No response.	99
C35	Lack of control or incomplete research in methods used.	1,5
C36	Lack of appropriate knowledge. No experience of relevant issues. Disagreement among the involving agents.	1,3,5
C37	Disturbance of the public during construction without prior notice. High costs that will be charged on the local community.	2,4

C38	Poor project management and lack of stakeholder support.	
C39	Fail to proof.	5
C40	The lack of partnership between the community and government is not the best way to approach the management of water resources and local government.	2, 3
C41	Cost/ease of implementation/available suppliers of solution in locality/lack of tax or other financial incentives.	1,4
C42	No response.	99