RESIN Actor Analysis for Urban Climate Adaptation

Methods and Tools in support of Stakeholder Analysis and Involvement

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Executive/Publishable Summary

Adaptation to climate change is a complex challenge. It is faced by a great number of uncertainties on trends and impacts, boundary problems and a diversity of stakeholders all with different interests and responsibilities. Planning for successful climate change adaptation strategies requires involvement of many different actors and stakeholders.

Different stages can be distinguished in the adaptation strategy development: understanding the context, what is at stake, what are potential actions to reduce risk and vulnerabilities, how to decide on which actions to implement and execute, and monitoring progress.

Roles and contributions from stakeholders in this planning process will likely differ from one stage to a next one. This report presents an overview of methods and tools in support of a stakeholder analysis for the various steps and stages of preparing for and developing and implementing climate adaptation strategies.

Stakeholder analysis is however only a first step. For a successful strategy development process efforts have to be in place to keep stakeholders actively engaged. Based on RESIN partners experiences, this overview presents some approaches for doing so.

First experiences with these methods and approaches will be sought in the four RESIN city cases. Eventually, and with other products of the project, the RESIN guide will collect and offer these to city planners in general.

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1. Introduction

The effects of climate change in terms of extreme weather events and the frequencies and intensities with which they occur are uncertain, but trends show that such events will occur more frequently and will be more severe. Consequences in terms of associated risks to cities, for its infrastructures and its inhabitants, depend very much on preparations, that cities have in place or are planning for, to cope with these phenomena. Adaptation strategies require actions that, for the short-medium term and for longer, provide valuable contributions in risk reduction. Such strategy development can be seen as a complex and ambiguous risk management process, that can only be carried out effectively in close consultation of and collaboration with the stakeholders[1] involved. In this document we use the broader definition of stakeholders rather than actors[2], as actors are stakeholders but not all stakeholders are actors.

Climate and resilience literature indicates that adequate stakeholder involvement is essential for the development and implementation of adaptation strategies (IRGC, 2012; SWD, 2013; ECA, 2009). The timely involvement of the right stakeholders contributes to well considered decisions for measures with impact. A well-prepared stakeholder analysis[3] is a first step to identify who needs to be involved, and to understand what are interests and positions of respective stakeholders.

This document presents an overview of methods and tools to identify stakeholders in order to involve and engage them in the various steps of preparing for and developing climate change adaptation strategies. This overview is based on literature reviews and enriched by methods, practices and experiences from RESIN consortium partners. The primary aim of this report is to support the RESIN case cities in identifying and creating cooperation with the relevant stakeholders in their city. A secondary aim is to provide city planners in general with an overview of methods and tools they can use for stakeholder analysis and engagement in their adaptation strategy development. With it go some advice and recommendations how to make use of these methods.

Chapter 2 describes the importance of professional stakeholder analysis and the general steps in the development of an adaptation strategy. Chapter 3 continues with an overview of specific methods and tools that can be used for different aspects of stakeholder analysis. Chapter 4 deals with how to actively involve and engage stakeholders. Finally, Chapter 5 provides suggestions for application of the material presented here within the further activities of the RESIN project, in particular the four RESIN city cases (WP4).

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[1] **Stakeholders** : Individuals or groups that have a stake or interest in a particular issue, affecting a decision or policy or are affected by the situation (André et al. 2012). The IPCC (2007) identifies stakeholders in this context as 'individuals and groups who have anything of value (both monetary and non-monetary) that may be affected by climate change or by the actions taken to manage anticipated risks' (Carter et al., 2007, pp141-142).

[2] **Actors** are limited to acting institutions or persons having influence on decisions made.

[3] **Stakeholder analysis"** in conflict resolution, project management, and business administration, is the process of identifying the individuals or groups that are likely to affect or be affected by a proposed action, and sorting them according to their impact on the action and the impact the action will have on them (ref https://en.wikipedia.org/wiki).

2. Stakeholder analysis for climate adaptation strategy development

This chapter describes the importance of a proper stakeholder analysis with a projection of stakeholder involvement in the various stages of the development of a climate adaptation strategy.

2.1 The importance of stakeholder analysis

Complex challenges, such as is adaptation to climate change, are characterised by a great number of uncertainties on trends and (long-term) developments, on boundaries of the problem area, on organisation and responsibilities and with a diversity of stakeholders involved. Developing a strategy and implementing a plan to cope with such a complex challenge has a higher chance of success if stakeholder engagement is done in a professional way: taking into account all interests and involving all relevant stakeholders.

André et al. (2012) stress the importance of this participatory process: a proper stakeholder analysis is the first step to identify and select relevant stakeholders for participation in the various steps of the planning process. And it may well be that stakeholders have different roles and positions at the various stages of a strategy development and implementation. Timely involvement and attention to keep them involved throughout the process, also when at some stage contributions may be limited, is crucial.

To get a clear understanding of whom to involve when and how, a systematic stakeholder mapping and analysis should be conducted. The starting point for a stakeholder analysis is understanding the issues and interests at stake. Seek for the "*Why*", the inspiration to attract stakeholders and to work together in coping with the posed challenges. This goes beyond the interests of individual parties and persons (Sinek, 2015). With that, stakeholder analysis seeks to identify and get answers to a range of questions such as:

- Who are the stakeholders and what are their particular interests
- What are potential risks
- Who is (will be) affected by that situation
- What are relationships between stakeholders
- What are mechanisms to influence other stakeholders
- Who are key parties and persons to be informed during development and implementation
- What can be said about the forms and means of communication between relevant stakeholders

- What are capabilities of stakeholders and the potential contributions they may offer

- What are the interests, available power resources (incl. positional power, coercion, etc.), competencies, etc. of relevant stakeholders?

The outcome of a stakeholder analysis is a good understanding of who is affected by and can affect a decision; who can contribute in developing potential solutions, preparing the conditions for decision making; or implementing the selected options. Without a structural stakeholder analysis it is possible that important stakeholder groups are neglected, leading to biased results and with no full support for the decisions made (Reed et al. 2009).

2.2   The climate adaptation strategy development process

The uncertainties related to climate change, the large diversity of stakeholders, and the many different disciplines involved make adaptation to climate change a complex challenge indeed. A strategy to cope with these challenges will likely contain a mix of actions and decision points over time. Hence, the development of such strategy and its implementation can be seen as a step-wise approach, aiming to reduce current and future risk related to (observed and projected) climate change. And involving the right stakeholders at the right time is a challenge in itself (IRGC, 2012; SWD, 2013; ECA, 2009).

There exist many different frameworks[4] that could be followed for developing an adaption strategy. At this initial stage of the project RESIN has not yet adopted a framework to align its activities and results. This will be decided upon at a later stage. In general terms though, the different steps that can be distinguished in the development and implementation of a climate change adaptation strategy, aim at:

1. Understanding the context: the impact of climate change on the city and its structures (t (environmental, social, economic, governance)

2. Assessing what is at stake (risks and vulnerabilities), now and in the future

3. Identifying potential measures to reduce risk and vulnerabilities (with timelines)

4. Deciding for which of these measures to develop option(s) for implementation

5. For selected measures developing concrete action plans

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[4] Climate change and resilience literature shows different headings for respective phases in the development and implementation of adaptation strategies, such as:
- Scoping, Analysis, Implementation (IPCC 2014)
- Getting started, Assess risk and vulnerability, Identify adaptation options, Assess adaptation options, Implement adaptation options, Monitor and evaluate adaptation options (EEA 2012)
- Where and from what are we at risk, what is the magnitude of the expected loss, how could we respond, How do we execute, what are the outcomes and lessons (ECA, 2009).
- Set up, Risks and Vulnerability, Identifying adaptation options, Choosing adaptation options Implementation, Monitoring and Evaluation (SWD, 2013).
- the IRGC framework (IRGC, 2012) uses risk assessment, risk management and risk communication, and stresses relevance of social, institutional, political and economic contexts important for risk-related decision-making.

6. Implementing actions, including the provision of appropriate conditions
7. Monitoring progress and evaluate

The process follows a cyclic path with quasi - continuous feedbacks from one step to another, due to uncertainties that only gradually will be resolved.

Where other RESIN documents will present content driven models, tools and data in support of the different steps in this process, this report is about methods and tools for stakeholder analysis to support stakeholder involvement and engagement. Table 1 summarizes the focus and challenges of respective steps in the strategy development. From this it can easily be understood that stakeholders may play quite different roles from one step in this process to another. Stakeholder involvement is needed to gather knowledge about their concerns, perspectives on risk, the (social) response to risk, to create (risk) awareness and trust, to collect (local) knowledge, and to contribute to risk reduction (IRGC, 2012; SWD, 2013; ECA, 2009). Hence, a good understanding of stakeholder's interests and position is essential as will be addressed in more detail in the next section.

Steps	Focus	Specification
1. **Understand the context**	Understanding (and scoping) the playing field: including the problem and issues, climate change/extreme weather risk, stakeholders and stakeholder perspectives.	context at different levels: social, institutional, political, economic, environmental. barriers to implement adaptation options (e.g. policy frameworks, institutional capability, and organization) stakeholder perspectives on climate risks, their consequences and climate adaptation.
2. **What is at stake**	Risk to climate change/extreme weather is assessed (short and long-term): including the vulnerability, exposure and probability of occurrence, threats and opportunities, impacts (indirect and direct) Also public concern is assessed (concerns that people associate with these and other causes of risks.)	Take into account: - uncertainty and knowledge gaps - socio-economic development - opportunities arising from climate change
3. **Identify potential adaptation measures**	Collect and develop possible adaptation measures to reduce the impact of climate change and/or extreme weather on society. This may include infrastructure and construction measures as well as regulatory, governance actions and awareness raising activities.	Take into account: - opportunities and benefits - previously identified concerns - social response to climate risk related to social values and norms and publics acceptability and tolerability - potential trade-offs between risks, benefits, risk reduction measures - impact of risk-reduction options

			- compare impact-gain
4.	**Decide on options for implementation**	Determine appropriate adaptation options based on the assessment of the related value added (including cost-benefit comparison and other criteria) and constraints (resources, regulation, and other)	Take into account: - identified adaptation options - barriers to implement adaptions options - complexity and uncertainty - ensure long term effectiveness - preferences stakeholders - feasibility: financial, technical, no-regret options, legal conditions
5.	**Develop options into concrete measures of action**	The transformation of an option into a solution requires not only technical capabilities, but also meeting financial, administrative and legal requirements	Take into account: - technical requirements - financial arrangements - legislation - governance - public Space
6.	**Implement actions**	Implementation of developed solutions (project planning, timeliness and (intended) revenues)	Take into account: - effectiveness - efficiency - equity - legitimacy - unintended and intended impacts - challenges, complexity and uncertainty
7.	**Monitor and Review**	Monitoring progress of implementation and effects achieved (also input for a next planning cycle)	- achieved results and real contributions to risk reduction

Table 1 - Steps to develop a climate adaptation strategy (based on IRGC, 2012; SWD, 2013; ECA, 2009).

The composition of stakeholders will likely change over time, and the roles they play will differ from one step in the adaptation planning process to a next step. Therefore, stakeholder analysis should be a recurring activity throughout the planning process. The next chapter continues with specific methods and tools for stakeholder analysis, addressing the various perspectives and issues that analysis aims for to clarify.

3. Stakeholder analysis methods and tools

In chapter 2 we have expressed the requirement for proper stakeholder analysis when dealing with complex challenges, and what are the different steps to be taken in the development of a sound climate adaptation strategy. Here, in this chapter, we present a range of methods and tools that can be used for such stakeholder analysis efforts, and offer some advice for use.

Before going into further detail it is to be said that there is a great number of methods and tools available for stakeholder analysis. And quite a few scientific publications do provide overviews of actor analysis methods and supporting tools (e.g. Reed et al, 2009; Enserink et al, 2010; Hermans LM, 2005, Hermans and Thissen, 2009). The methods presented here below stem from experiences of RESIN consortium partners in applying such methods.

Before going into further detail we first adopt a distinction in purpose for a stakeholder analysis. In his paper Reed et al. (2009) distinguishes three main activities. A full stakeholder analysis will address all three. These are the following:

1. Identification of stakeholders
2. Differentiation between and categorization of stakeholders
3. Identification of relationships between stakeholders

For each of these activities there are several tools and methods around. Figure 1 shows a selection of methods and tools for these respective activities. These methods and tools are all quite different and highlight different aspects of the stakeholders' position. Which approach (method/tool) to make use of depends on objectives and context (complexity and uncertainty), on time and budget available, and on knowledge and skills needed to apply such method.

Unequivocally, with more time and resources available and having the required skills on board, more thorough understanding can be achieved. Next sections (3.1, 3.2 and 3.3) will present these methods in more detail. Section 3.4 then follows with some further methods and tools; section 3.5 concludes this chapter with some advice to take note of when preparing for stakeholder analysis activities.
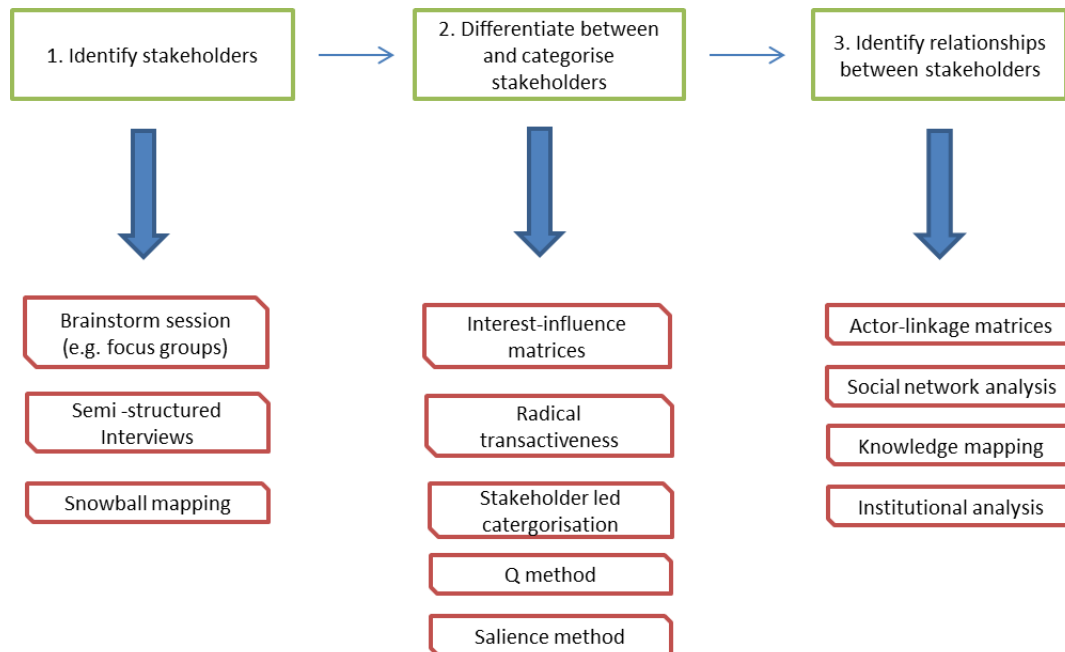
Figure 1 - methods and tools for various activities for stakeholder analysis (Reed et al. 2009).

3.1 Stakeholder Identification

In general terms, the identification of stakeholders aims to provide information on who can contribute to making a decision for the adaptation strategy, or to implementing a decision made. Also, who may or will be affected by such decision. Further criteria to identify stakeholders can be based on roles, responsibilities, and functions that stakeholders can provide, what relevant know-how and knowledge they have, or at what scale (local, regional, national, global) a stakeholder is active. And should hierarchical levels be taken into account. This all is to avoid the inclusion of stakeholders that are not affected by or have no effect on the adaptation strategy (Reed et al. 2009; Hermans, 2005).

It is recommended to have in mind the particular stage in the development of the adaptation strategy (see section 2.2) for which the stakeholder analysis is carried out; the outcome will likely differ from one step to another.

We now present some methods and tools for the identification of stakeholders.

Stakeholders for cities climate change adaptation planning

- authorities (local / national)
- civil protection
- construction companies
- Consultants and experts
- environment agencies
- finance and (re-)insurance
- health and emergency services
- infrastructure operators
    o energy
    o water,
    o telecommunications
    o transport
- investors
- project developers
- spatial planners
- ....

- CITIZENS

3.1.1 Brainstorm Session (Focus Groups)

The main purpose of Brainstorming is to stimulate group discussion to examine an issue in-depth and to understand from a group's perspective what underlies the views expressed in the discussion. Focus groups examine not only the 'what', but also the 'why' dimensions of a specific issue. The focus group methodology [5] creates qualitative and quantitative data through group interaction on a pre-determined topic of interest. Table 2 presents the main characteristics of this method.

The focus group methodology can be used to gather data across different contexts to examine the same topic with the use of standardised procedures and understanding of the potential obstacles to avoid or overcome. Furthermore, focus groups:

- Encourage participants to explore issues of importance to them and using their own vocabulary. Issues are not discussed in isolation but within a particular context. In support of this, Strategic Spatial Management (SPM) is an approach to identify and visualise the interests that respective stakeholders have with issues at hand. This serves to find common grounds and shared interests amongst stakeholders for cooperation (Paul and Wesselink, 2015). This can be organised relatively easily within a group meeting. Within a rather short time one can explore a wide range of perspectives.
- Allow participants to react to and build upon the responses of other group members. Comments from one participant often triggers a chain of responses from other.
- Add to the understanding of an issue by participants.
- Encourage participants to contribute alternative ideas without necessarily being forced to defend, follow through or elaborate on it as the focus is on the group rather than the individual.

Purpose	Resources	Strengths	Weaknesses
Provide a way to examine not only 'what', but also 'why' dimensions of a specific issue.	Adequate preparation; High quality facilitation; room hire; food and drink; facilitation materials e.g. flip-chart paper and post-its Time/Budget : Low/Medium Skills: facilitation	Rapid and hence cost-effective; adaptable; possible to reach group consensus over stakeholder categories; particularly useful for generating data on complex issues that require discussion to develop understanding.	Less structured than some alternatives so requires effective facilitation for good results

Table 2 - Characteristics Focus group for stakeholder analysis (Reed et al. 2009; Hermans, 2005).

An important notion is that differences are welcomed to help stimulate the discussions; the

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[5] Tips for organising Focus Groups can be found (amongst others) at Business Analyst Learning http://businessanalystlearnings.com/ba-techniques/2014/1/15/10-tips-for-organizing-focus-groups

aim is not to seek group consensus. All views are valid, there is no right or wrong answer. Collecting the range of different views from a range of different people in the group is of high interest.

A skilled facilitator is necessary to guide and stimulate focus group (and brainstorm) sessions. It is beneficial for the process to have facilitators that are familiar with the case. However, there are also problems to be avoided. A facilitator too closely involved in a case may move away from the role of facilitator into the role of participant. Facilitators must be aware of this pitfall, and reflect on their role throughout the sessions. The facilitator is to remain neutral and stay in the background except when seeking clarification on issues (using follow up questioning).

The facilitator must also ensure that all participants who wish to contribute to the discussion, indeed can do. This may become of a problem when some participants in the group dominate the discussion, and in extreme situations, even silence other group members by talking over and interrupting. One solution for this is to make use of supporting software tools[6] to give voice to all participants.

3.1.2 Semi-structured interviews

For Semi-structured interviews a series of (well-prepared) open questions on specific topics is basis for discussion with stakeholders. This is an effective way to carry out surveys and is useful when broad issues need to be understood and participants' reactions cannot fully be anticipated. This approach provides reliable, comparable and qualitative data on stakeholders' roles, interests, perceptions, their problems, issues they have and challenges they see (Reed et al. 2009; Hermans, 2005). Table 3 presents its characteristics.

Using this method helps to collect profound information on stakeholders interests and position, to have a good understanding of the different stakeholders and who to select for further stakeholder engagement and involvement. It has to be understood that the method is time-consuming.

Purpose	Resources	Strengths	Weaknesses
Collect information on the context, the interest and perspectives of the stakeholders and the different stakeholder roles	Preparation and Interview time; transport between interviews; voice recorder Time/Budget requirements: High Interview Skills	Useful for in-depth insights to stakeholder relationships and to triangulate data collected in focus groups Can be used when there are conflicting interests of stakeholders Open interview giving space for new ideas; Flexible method for interviewee and interviewer; both	Time-consuming (for interviewer and interviewees), hence costly; difficult to reach consensus over stakeholder categories

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[6] Internet searches (keywords - will reveal many software packages that support brainstorming and group facilitation. (Bostrom et al , 2002) gives recommendations for group facilitation when using such packages.

can anticipate and come up with new ideas and things to share.	

Table 3 - Characteristics semi-structured interviews for stakeholder analysis (Reed et al. 2009; Hermans, 2005).

The combination of interviewing stakeholders and observing[7] them in their daily work environment is very effective in gathering valuable in-depth information for further system development. It allows for the analyst to focus attention on specific key areas of interest.

3.1.3 Snow-ball mapping

Snow-ball mapping is an approach to develop a more complete overview of the stakeholder arena. Starting with some first stakeholders they are asked to identify new stakeholders categories and to provide further contacts (see Table 4). This method is mostly used in combination with other stakeholder analysis methods and tools, such as in combination with semi-structured interviews. In this way, the range of relevant stakeholders can be extended and included in the overall stakeholder analysis.

To what extent further stakeholders should be included is a matter of time and budget available, with also the notion of what can be value added of having additional parties involved. For a good understanding it is recommended to objectively and critically analyse who are the stakeholders that eventually are to be included in the analysis (and who are not) (Reed et al. 2009; Hermans, 2005).

Purpose	Resources	Strengths	Weaknesses
Identify stakeholder categories and contacts.	New respondents from stakeholder categories are identified during interviews with earlier identified ones Time/Budget Requirements: Low	Easy to secure interviews without data protection issues; fewer interviews declined A good way to get when required more stakeholders in the sector .	Sample may be biased by the social networks of the first individual in the snow-ball sample

Table 4 - Characteristics Snow-ball mapping for stakeholder analysis (Reed et al. 2009; Hermans, 2005).

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[7] This method is called '**On-site observation'**. It discovers the stakeholders' world by observing them during their working hours in their daily environment. Added to this is a so-called '**contextual inquiry'**. This is a field data-gathering technique that examines in-depth some carefully selected individuals to arrive at a fuller understanding of the work practice across all stakeholders. This technique is however, resource intensive (time, budget).Skills required concern interviewing skills, analytical observation skills and information visualization skills. Analytical observation skills are needed in order to be capable to structure detail-oriented qualitative data (Reed et al. 2009; Hermans, 2005).

3.2   Stakeholder Differentiation and Categorization

There are likely many stakeholders that all have different views on and perspectives of how to handle the complex challenge at hand. And certainly they will have different roles and interests to address the problems. Example categories of stakeholders are operational, governance, management, scientists and experts, and other. Stakeholder categorization and differentiation helps to find a good representation of all interests at stake when involving parties; and to avoid over-representation of one category or another.

Next sections describe some stakeholder differentiation and categorization methods and tools. Before carrying out this differentiation analysis, it is recommended to have carried out the stakeholder identification exercise first. This will lead to a more comprehensive and in-depth stakeholder analysis as input for an effective selection which of the stakeholders to actively involve (in the next steps of the adaptation strategy development).

3.2.1 Influence matrices

Influence matrices are used to show the relative position of different stakeholders and so visualise power dynamics. Different scales can be used, such as level of influence, level of interest, level of importance and other. An illustration is given in Figure 2. Based on their positions within such matrix, a strategy for future stakeholder involvement and activities can be determined (Reed et al. 2009; Hermans, 2005).
The method is a simple and fast way for collecting information on power dynamics, but is not sufficient for an in-depth analysis on stakeholders issues, roles and challenges (see also Table 5).
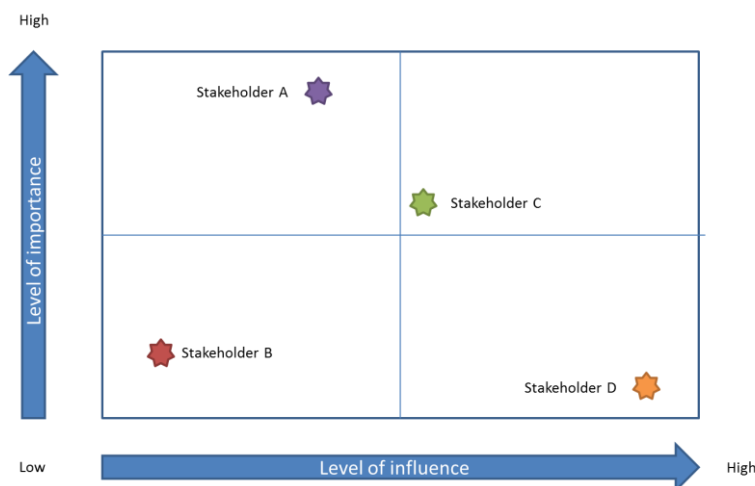

Figure 2 Example of stakeholders placed in a influence matrix

This positioning can be done either by individuals who know the playing field and understand

the context and the stakeholders roles and perspectives; or by the stakeholders themselves during a stakeholder session. Whether this is done in a session or by a single person, it is highly recommended to get feedback on the outcome from third parties in the field (e.g. experts). Of course, for this exercise it has to be known who are the key stakeholders.

Purpose	Resources	Strengths	Weaknesses
To visualize information about power dynamics	Can be done within focus group setting, or individually by stakeholder during interviews (see above) or by researcher / practitioner Time and Budget: Low	Possible to prioritise stakeholders for inclusion; makes power dynamics explicit	Prioritisation may marginalise certain groups; assumes stakeholder categories based on interest–influence are relevant This method does not give in-depth information about stakeholders roles, their perspectives, the problems, issues and challenges. Does not give much information on background/roles/issues and challenges etc.

Table 5 - Characteristics influence matrices for stakeholder analysis (Reed et al. 2009).

3.2.2 Radical transactiveness

Radical transactiveness (RT) is a dynamic capability which seeks to systematically identify, explore, and integrate the views of stakeholders on the "fringe"—the poor, weak, isolated, non-legitimate, and even non-human—for the express purpose of managing disruptive change and building imagination about future competitive business models (Hart and Sharma, 2004). RT is a way of snow-ball sampling to identify fringe stakeholders. It identifies stakeholders and issues that might otherwise be missed and minimizes risks to the future of the project. The drawback is that it is time-consuming (Reed et al. 2009; Hermans, 2005).

3.2.3 Stakeholder-led stakeholder categorisation

In this method stakeholders themselves create categories to position (other) stakeholders. As this is based on perceptions of the individual stakeholders, a drawback of this method is that respondents placed stakeholders in different categories, making categories less meaningful (Reed et al. 2009; Hermans, 2005).

3.2.4 Q methodology

Q-methodology provides a foundation for the systematic study of subjectivity, a person's viewpoints and beliefs. Persons are presented with a sample of statements about some topic. They are asked to rank-order the statements from their individual point of view and by doing so reveal their subjective viewpoints or personal profile. The analysis allows social discourses to be identified and so to categorise stakeholders (van Exel and de Graaf, 2005; Reed et al. 2009; Hermans, 2005). See the main characteristics in Table 6.

Purpose	Resources	Strengths	Weaknesses
Stakeholders sort statements drawn from a concourse according to how much they agree with them, analysis allows social discourses to be identified.	Materials for statement sorting; interview time; transport between interviews	Different social discourses surrounding an issue can be identified and individuals can be categorised according to their 'fit' within these discourses	Does not identify all possible discourses, only the ones exhibited by the interviewed stakeholders

Table 6 - Characteristics Q methodology for stakeholder analysis (Reed et al. 2009).

3.2.5 Salience model

The salience model seeks to distinguish between stakeholders who should be directly involved in a participatory process and who should not. This is done by scoring stakeholder types based on three attributes: legitimacy, urgency and power. It is a simple and fast way of positioning stakeholders, it does lack an comprehensive analysis to understand stakeholders interest (Reed et al. 2009; Hermans, 2005).

3.3 Identifying relationships between stakeholders

In section 3.2.1 we have already described the power dynamics approach to show relative positions of stakeholders. Further identification of relationships between stakeholders seeks for interdependencies, communication levels, customer relationships, trust and influence, competitors, conflicts, financial dependencies, and other. This provides insight whether stakeholder relations are of conflict, complementary or cooperation (Reed et al. 2009). Understanding these relations is relevant to (better) know who, how and when to involve at a particular stage of the planning process. Methods and tools for the identification of relationships between stakeholders are described in the next sections.

3.3.1 Actor-linkage matrices

In actor-linkage matrices, stakeholders are tabulated in a two-dimensional matrix and their relationships described using codes. It is a relatively easy method, but its weakness is that it can become confusing and difficult to use if many linkages are described (Reed et al. 2009; Hermans, 2005). Such exercise can be done within a focus group setting, or individually by stakeholders during interviews, or by a skilled researcher/practitioner.

3.3.2 Social Network Analysis

Social network analysis (SNA) is the mapping and measuring of relationships and flows between people and organizations. The nodes in the network are the people and groups while the links show relationships or flows between the nodes. This allows to identify the network of stakeholders and measuring relational ties between stakeholders. For information

structured interviews and/or questionnaires are used[8]. The outcome shows the relations in the actor field. Table 7 presents the main characteristics of this method. See also Wasserman and Faust (1994) for standard work on SNA.

Purpose	Resources	Strengths	Weaknesses
Used to identify the network of stakeholders and measuring relational ties between stakeholders through use of structured interview/ questionnaire.	Interviewer, questionnaire, training in the approach and analyses, time, software Time/Budget : Low/Medium Skills: facilitation	Gain insight into the boundary of stakeholder network; the structure of the network; identifies influential stakeholders and peripheral stakeholders	Time-consuming; questionnaire is a bit tedious for respondents; need specialist in the method.

Table 7 - Characteristics social network analysis for stakeholder analysis (Reed et al. 2009).

3.3.3 Knowledge mapping

Knowledge mapping is used in conjunction with social network analysis. It involves semi-structured interviews to identify interactions and knowledge. It identifies stakeholders that would work well together as well as those with power balances (Reed et al. 2009). See Table 8 for more information on its main characteristics.

Purpose	Resources	Strengths	Weaknesses
Used in conjunction with SNA; involves semi-structured interviews to identify interactions and knowledge	Same as semi-structured interviews	Identifies stakeholders that would work well together as well as those with power balances	Knowledge needs may still not be met due to differences in the types of knowledge held and needed by different stakeholders.

Table 8 - Characteristics social network analysis for stakeholder analysis (Reed et al. 2009).

3.3.4 Institutional Analysis

A particular topic for stakeholder relationships lies in the institutional arrangements and settings. What are the formal and informal rules of society that shape the behaviour of people and organisations or facilitate coordination amongst them? What are rules relevant to a specific policy field and, based on this– ex-ante – what are (institutional) obstacles for effectively implementing policies or management approaches? It can also be used to identify (institutional) obstacles with respect to the design process of policies or management

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[8] Such analysis can also be done interactively (Participative Network Analysis, PNA). Participants are invited to draw lines towards others with which they have a relationship. Can be applied with an audience to is receptive to creative, informal methods.

approaches (Hollingsworth, 2000).

There is a wide range of empirical tools and methods that can be used to identify, describe, and assess relevant institutional arrangements (formal and informal), stakeholder interests: identifying and analysing relevant published research, legal documents, planning materials, policy documents, and other written sources. Further, exploratory (open) and/or semi-structured interviews with relevant actors/stakeholders as well as focus groups, workshops, and surveys might be useful. Such analysis will likely be resource intensive with skills and expertise required on Institutional knowledge, knowledge about relevant legislation, but also norms and other informal rules.

3.4 Some advice for stakeholder analysis

The methods and tools we have presented in the earlier sections of this chapter together aim to develop a good understanding of who is affected by decisions to be made, who has the power to influence the decision making, and who can contribute to the implementation of the decisions made. We conclude this chapter with some advice based on experiences from RESIN partners in how to prepare for and carry out stakeholder analysis activities.

First we mention some tools that are supportive to various steps of the Stakeholder Analysis. Making use of visualization **tools** is recommended to simply show and present outcome of particular stakeholder analysis efforts. Examples are:
- *Venn Diagrams* that can be used to illustrate relationships between stakeholders,
- *Spider Diagrams* that illustrate the capacity of a stakeholder organisation.
- *Matrices*, a commonly used method to visualize the categorization of stakeholders. They map different dimensions of information about stakeholders such as: influence and power, or interest and trust.

Keep track of stakeholders and their requirements for which *Logbook* and *Factsheets* are useful tools. *Customer Requirements Specifications* (CRS) for Systems Engineering (SE) is used for showing the effects of different alternatives. Visualizing and communicating the effects of different choices is a key factor for successful stakeholder engagement. To induce cooperation and enthusiasm it is important to speak in terms of solutions, opportunities and finding mutual gains.

It is important to start a stakeholder analysis in an **early phase** of a decision making process that has to deal with a complex situation. To know right from the start who, when and how to involve will certainly contribute to a sound and well-accepted adaptation strategy.

Having said that, stakeholder analysis should be repeated as if **an iterative process**. As the process of strategy development evolves over time stakeholders' roles and positions are likely to change, hence regular updates of the stakeholder analysis are useful.

Issue and interest: the key starting point for a stakeholder analysis are the interests at stake, not the opinion/position of stakeholders relative to the issue. This means start with defining the issue at stake. This is then followed by examining which stakeholders are affected by this issue. Only then you do determine what are the interests of these stakeholders. With this information is easy to determine what are *shared* interests.

Common sense and flexibility: Stakeholder analyses are very much about using common sense, which requires a pragmatic and human approach. Another key message is to be very flexible in stakeholder analysis processes. Even when a first identification of stakeholders has already been made, be prepared to include more stakeholders at a later stage if this is deemed necessary.

The **combination of several stakeholder analysis methods** and tools can be very effective in collecting information on stakeholders perspectives, problems and issues, roles and interest. For example, data research and policy research (literature/desk study) can be followed up by semi-structured interviews to verify the information to be correct and to determine which other stakeholders are important (snowball sampling).

4. From stakeholder analysis to stakeholder involvement

With the outcome of the stakeholder analysis, the process to develop an adaptation strategy has only just begun. Guidelines on developing adaptation strategies from the European Commission state: "*Member States acknowledge that without effective communication and awareness-raising, implementation of the adaptation strategy and associated actions will be very challenging*" (SWD, 2013, pp6). So, next steps must be taken to create trust and gain commitment from those (to be) part in the process of developing and deciding on adaptation plans. Stakeholders must be engaged to participate in this iterative process. This is a challenging process that requires continuous efforts and a well-tailored approach.

This chapter provides experiences from RESIN partners with some supporting approaches to indeed engage, create trust and seek commitment to involve stakeholders and keep them involved throughout the process of strategy planning and implementation. For that, we first provide some general lessons (section 4.1). Then, in section 4.2, we present some advanced approaches for stakeholder involvement and engagement.

4.1 General advice for active stakeholder involvement

It is important to keep stakeholders informed and engaged, also when their role at a particular stage is not crucial. At a later stage that may change again. This asks for continuous attention and effort across all stages in the strategy development process. A strategy for communicating with the stakeholders throughout the process is key.

Start with Why": seek for the inspiration that brings parties together: It is not about solving the technical challenges to reduce risk from climate change, but to contribute to an attractive and liveable city (Sinek, 2015).

Communication is key: In stakeholder engagement, everything starts with communication between people. Four levels of communication can be defined: (1) Content, (2) Process & structure, (3) Relations and atmosphere and (4) Emotions. In practice we tend to only use the first two levels, but it is important to also address the levels 3 and 4; prepare for how to deal with these levels. One way to do so may be to ask stakeholders to describe their emotions or feelings about certain issues, thereby visibly recognizing these, and to include this information in the decision-making process. Open communication, to inform stakeholders, respecting different views and interests, transparency of process, fairness, are all crucial (Slob, 2015).

Relationship and expectation management: The biggest problems occur when stakeholders are not informed or included insufficiently in a process. A thorough stakeholder analysis at the beginning of a project (followed by careful stakeholder engagement throughout) usually results in smooth sailing later on.

Hence, a key aspect of all stakeholder engagement processes, is creating and maintaining trust and relationships. Trust is an important carrier for collaboration between stakeholders. Managing expectations is also an important factor influencing the relationships and trust between stakeholders to achieve inclusive participation (Slob, 2015).

Working together. Many processes are driven by competition. However, cooperation and collaboration are not driven by the same principles of competition. At the beginning of a collaboration process it is important to define the principles on which you plan to work together. In essence, when a group of stakeholders is trying to reach a common goal, the rules of the game must be defined for how to treat each other and behave when communicating with each other. Examples of such rules are:

- always share all relevant information,
- ask questions and listen to really understand the point someone is trying to make,
- respect each other, regardless of what the other thinks or does,
- keep a record of all the different opinions.
- Chatham House: don't quote partners outside the meeting

These rules are meant to stimulate effective behaviour instead of only trying to realize efficiency or trying to strive for individual gain.

Stakeholders and stakeholder interaction are essential to make results applicable: In the Dutch research project INCAH[9], methods to assess the vulnerability of infrastructure to climate change and extreme weather were tested and applied in a case study area. In interactive sessions with involved stakeholders, researchers and policy makers, the results of the vulnerability assessment were discussed. By doing so all those involved (researchers, operators and policy makers)[10] developed knowledge and exchanged perceptions and visions. Focusing on the questions of the stakeholders, they actively participated and so became and remained committed.

Key lesson is that stakeholders contribute to making scientific research results applicable for policy makers and for infrastructure operators. Matching demand and supply for information is crucial. Research results (vulnerability assessment and recommended measures) are accentuated and will be more complete due to the shared scientific and local knowledge.

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[9] INCAH: Infrastructure and Networks, Climate Adaptation and Hotspots, research project of Knowledge for Climate, carried out by TNO, TU Delft, Deltares, VU and KWR. See also http://www.knowledgeforclimate.nl/urbanareas
[10] infrastructure operators, scientists, local policy makers, representatives from national agency of public works and water management, and from the security region Rijnmond

Add to table: Rebuild to design

Refer to appendix (see appendix 4)

This is an example of achieving integral solutions through the involvement of stakeholders of different disciplines and sectors and so combining scientific knowledge with stakeholder knowledge. A secondary outcome of this stakeholder involvement process is the increased awareness of climate change risk on infrastructure networks. And the issue of vulnerability and risk of infrastructure due to climate change is set on the agenda of the municipality (Geerdink et al. 2014).

Capacity building: To cope with and be prepared for the effects of climate change asks for long term and huge investments on city infrastructures to become adaptive and climate-inclusive. Projects therefore not only have to bring 'resilience' for the city, they have to be cost-effective and create return on investment for the investors. This asks for breakthrough projects, that do not go without high level capacity and competences of stakeholders involved (be it for situational awareness, preparedness to cooperate, or operational capabilities). From experience this is not always the case. Assessing these competences (ref Investing in right level of competences), both for the public and the private parties involved, is crucial to get these demanding projects launched and running (Schellekens, 2015).

4.2 Some approaches for stakeholder involvement and engagement

For the benefit of the (adaptation planning) process and to keep pace in its progress, it is essential that participating parties have constructive attitude. This will be encouraged where individual and collective interests come together. Table 9 summarises some approaches that are supportive to this process, in building trust and finding common goals stakeholders are motivated and prepared to contribute are. These are based on experiences of the RESIN consortium.

Approach	Description
Mutual Gains Approach	The Mutual Gains Approach to negotiation (MGA) is a process model, based on hundreds of real-world cases and experimental findings, that lays out four steps for negotiating better outcomes while protecting relationships and reputation. A central tenet of the model, and the robust theory that underlies it, is that a vast majority of negotiations in the real world involve parties who have more than one goal or concern in mind and more than one issue that can be addressed in the agreement they reach. The model allows parties to improve their chances of creating an agreement superior to existing alternatives. It is a philosophy that can be applied in situations where there is a need to develop alternatives in which multiple stakeholders are involved and have a vested interest.[11]
Participation Ladder	A classical approach to stakeholder management and communication follows the participation pyramid, that distinguishes four levels: (1) inform stakeholders, (2) involve stakeholders, (3) co-create and (4) co-decide.

[11] 'CBI's Mutual Gains Approach to Negotiation' (2015), Consensus Building Organization, URL: http://www.cbuilding.org/cbis-mutual-gains-approach-negotiation

	These levels imply that every form of stakeholder engagement builds on the foundation of shared information (level 1). The next level implies a shared problem definition phase. Level 3 implies the combined definition of possible solutions to the problems as defined at level 2. The 'highest' Level 4 is shared decision making. This implies that government does not steer towards certain solutions, but, for example, provides stakeholders with adequate funding and capacity building to solve the problems as they decide upon in concert.
Rebuild By Design	A collaborative research and design that can be used to design implementable solutions for a regions which want to increase their resilience. It is an innovative process that places local communities and civic leaders at the heart of a robust, interdisciplinary, creative process to generate implementable solutions for a more resilient region. It keeps communities connected to the implementation of the funded designs; explores changes needed in policy, regulation, and operations; and researches the best practices in developing resilience. The key added value to this approach is that it is collaborative and participative, creating ownership and cooperation from key stakeholders.[12]
Context of Use Analysis	Context of use analysis is a commonly used tool in the development of products /software. It is employed in order to provide the information necessary to plan and design products that fit their future user's needs, requirements and – as the name says – the products' context of use. The main idea underlying this approach is that a thorough understanding of the environment in which a product is to be used will contribute to creating an end result that is well fitted to the task at hand and well accepted by end users and other stakeholders (See Annex A for more information on this method, with references).
Capacity Building (CAP4PE)	An evidence-based system for capacity development which has been used in many cities and municipalities in Europe, by major development agencies outside Europe and by governments to assess and enhance institutional capacity to deliver the change programmes necessary for effective responses to climate. It is used to assess and raise the level of capacity and competences of stakeholders to be capable to carry out breakthrough projects, aiming at: Vision and Leadership, Preparedness to cooperate and Capabilities to contribute and execute.[13]

Table 9 - Beyond stakeholder management methods and tools (Based on experiences of RESIN consortium).

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[12] Rebuild by Design (2014), URL: http://www.rebuildbydesign.org/project/big-team-final-proposal/

[13] Adaptation Strategies European Cities (ASEC-project) en The Resilience Pathway (CAFCA-project)

5. Application within RESIN

This overview of stakeholder analysis methods and tools provides a starting point for the RESIN project. In next phases of the project the RESIN city cases will be launched. With the respective steps that are to be dealt with in a strategy development process (see chapter 2) it offers suggestions and ways forward for the four RESIN city cases.

The four city cases within the project aim to discuss with their stakeholders the potential of the RESIN products in the context of developing adaptation strategies for their cities. A first step is to make use of the analysis methods offered here for stakeholder analysis and engagement.

A preliminary overview of where in the process of strategy development the RESIN activities and deliverables can be positioned, is presented in Annex B. The stakeholder analysis methods and tools presented here in this document will be used to further stimulate and guide the stakeholder engagement processes as felt appropriate in respective cities. Eventually, further feedback and experiences on the use of these methods will be included in the RESIN guide.

Abbreviations

ASEC   Adaptation Strategies European Cities
CRS   Customer Requirements Specification
ECA   Economics of Climate Adaptation
EEA   European Environmental Agency
IPCC   Intergovernmental Panel on Climate Change
IRGC   International Risk Governance Council
NGO   Non-Governmental Organizations
PNA   Participative Network Analysis
RT   Radical Trans Activeness
SNA   Social Network Analysis

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Annex A   Context of use analysis

Context of use analysis is a commonly used tool in the development of products / software. It is employed in order to provide the information necessary to plan and design products that fit their future user's needs, requirements and – as the name says – the products' context of use. The main idea underlying this approach is that a thorough understanding of the environment in which a product is to be used will contribute to creating an end result that is well fitted to the task at hand and well accepted by end users and other stakeholders.

The focus of the approach is on understanding "the context of use for the product i.e. the goals of the user community, and the main user, task and environmental characteristics of the situation in which it will be operated" (Maguire, 2001). It reaches that understanding by extensive information collection and analysis of stakeholder concerns within the framework of their overall work context and the systemic constraints they find themselves in.

Methods within the approach can be combined from a toolbox according to project needs. Options include semi-structured interviews and on-site observations in the manner of a contextual inquiry, but potentially focus group discussions, workshops and surveys as well. In past projects RESIN partners acquired extensive experience with all of these.

For the intents and purposes of RESIN and especially the city cases, contextual inquiry techniques seem a good way to go. (Beyer & Holtzblatt, 1998) define contextual inquiry as "a field data-gathering technique that studies carefully selected individuals in depth to arrive at a fuller understanding of the work practice" across all stakeholders. It combines semi-structured interviews and on-site observations to obtain rich and realistic analysis data and reveal hidden work structures. Thus, this approach is highly applicable for large and complex projects.

Usually, users are first asked standardized questions before being observed and interviewed while performing typical tasks. Contextual inquiry consists of four principles (Beyer & Holtzblatt,1998).

- Context: go to the stakeholders' workplace to get the most valid data
- Partnership: help stakeholders express their work experience
- Interpretation: assign a meaning to the stakeholders' words and actions
- Focus: keep the conversation on topic by a clear focus

Purpose

The purpose of the method is to understand the context in which a tool is going to be used in adaptation terms: for which challenge a way forward (adaptation option) is sought for. This includes stakeholder needs and requirements as well as context constraints. This knowledge contributes to the development of good tools / suitable adaptation options)

The approach serves its purpose best when used in the early stages of a project: In the

developmental phase it is necessary to understand what kind of system or tool the stakeholders need and why. In this stage, information that is essential for requirements definition, design and further planning of other user-centered design steps is gathered from stakeholders in their context to help shape first outcomes.

Within a user-centered process throughout the whole project, information gained in a use context analysis needs to be complemented by expert knowledge on the proposed content of the adaptation solution. In later stages of the project, when both expert knowledge and use context information have come together to shape the first ideas and when first prototypes may already be available, it is very useful to revisit stakeholders and test these work results with them. This ensures that the development is on the right track throughout.

Suggested approach

1st phase Situational Awareness

In the context of the RESIN framework, we suggest to carry out a context of use analysis in the manner of a contextual inquiry, i.e. to conduct semi-structured interviews, followed by on-site observations in "apprentice mode". It is of great importance to perform these methods with actual RESIN end-users (the cities and their stakeholders).

Method 1: semi-structured interviews - background information
- Interviews are suitable to gain in-depth data in specific domains and are among the fastest and most widely used and accepted methods
- As different interview types – particularly unstructured, semi-structured and structured ones – gather different type, detail and validity of data, selection of the interview type should be made with regard to project needs
- Interviews should cover a wide range of users, opinions, tasks but needn't be statistically representative.
- Limitations of this method in terms of biased participants' reactions and the difficulty to interpret resulting data can be overcome by complementing the approach with on-site observations

Method 2: on-site observations in "apprentice mode" – background information
- Again, different types of observations – in this case direct observations at stakeholders' workplaces and indirect observations e.g. through the use of a video recorder – are suitable for different project needs.

Typical procedure:
- The analyst discovers the stakeholders' world: after some standardized questions in the beginning he observes them during their working hours in their daily environment
- Based on the observed, the analyst continuously asks specific questions and discusses possible scenarios with the stakeholders

- The social situation is often compared to the analyst representing an apprentice learning from an expert

- The interviewees are encouraged to reflect on their strategies of action to reveal expert knowledge

Within this approach, usually data in six key areas relevant for system development is collected:

- Stakeholder characteristics and goals, e.g. needs and expectations, roles and responsibilities, interdependencies

- Tasks & strategies of action, e.g. typical tasks, proven solutions and different strategies, frequency & duration of tasks

- Artefacts, e.g. used documents, tools and the purpose, structure and content of these artefacts

- Organizational and social environment, e.g. influencing stakeholders and current codes of conduct & values

- Physical environment, e.g. workplace environment and distances

- Technical environment, e.g. Hardware

2nd phase: Assessment and Evaluation

With first ideas and prototypes having been shaped they can be evaluated in a potential next step. Conducting the evaluation phase in the city cases with RESIN end-users constitutes the basis for high quality of information and potential adaptation measures necessary for a successful final outcome.

Functional Requirements

- As emphasized above, it is of high importance to have access to relevant stakeholders to ensure that the approach's benefits are reflected in the outcomes

- The stakeholders need to take the time necessary for one-on-one interaction and need to be open about their work and concerns, without interference (e.g. it is not appropriate to conduct interviews in the presence of the interviewees supervisor)

- The project focus and goals need to be clearly defined before analysis phase starts so that the interviews / observations can be tailored to project demands

- The method can provide the framework for the construction of a tool, i.e. the benefits / features expected by the stakeholders and the constraints given. It does not deal with the expert knowledge necessary to develop a decision support tool (e.g. knowledge on algorithms to predict consequences of climate change) and it can't replace input by experts

Pitfalls / Disclaimer

- The outcomes of the system development process can only be as good as the stakeholder input

- The core of our approach is to provide context knowledge for the later development of RESIN tools. Specific expert knowledge about climate change parameters needs to be shared and added by qualified experts and stakeholders

Typical outcome

Depending on the focus of the project, the outcome usually have profound effects on system development. Typical results of this process include:

- Stakeholder description and classification

- Usage scenarios for future tools

- User interface mockups / prototypes for future tools (as results not only of analysis, but also of cooperation with technical experts)

First thoughts on stakeholder categorization

A potentially relevant stakeholder categorization that can be utilized for a use context analysis in the manner of a contextual inquiry could be by decision chain:

- "Procurement" (i.e. the roles that decide whether a tool is acquired or used)

- "Users / Experts" (i.e. the roles that actually work with a tool, in this case for example city planners)

- "Decision makers" (i.e. the roles that put recommendations from Users / Experts into action, in this case for example city mayors)

Only if the end result of the project convinces these three stakeholder types in this order good policies will be implemented.

Advantages

Superior quality of data: the combination of asking stakeholders about what they need and observing how they currently deal with related issues ensures that we collect hard facts, not just subjective opinions as

- It allows us to counter peoples' natural subjective bias in answering interview questions with the objective facts about how their work / decision making processes are structured

- This approach provides contextual validity of findings. (Maguire, 2001)

- Psychological research shows that subjects are not able to retrieve all knowledge that they apply in a specific situation. Therefore, data collected when observing users perfectly complement interview data as the combination of the methods aims at 'hidden information' and at examining the reasons and relations behind the observed. (Richter & Flückiger, 2010)

- In general, aggregation of data eliminates subjectivity

Highly engaged stakeholders: this is made sure by involving actual end-users right from the beginning of a project through the development phase to define a system:

- In the beginning: stakeholders find that their expertise is appreciated and that they can give input to shape the project results as participants of the development process

- In later stages: stakeholders get to review first ideas and prototypes. They see how their input will be represented in the system thereby enhancing their sense of ownership. This in turn will make them much more willing to use the system when it is completed and to advocate for its' use within their peer group

Detailed analysis & well-founded understanding of
- the role of the stakeholders involved,

- their tasks,

- stakeholder interdependencies,

- needs and expectations of different stakeholder-groups with regard to a tool,

- context and constraints they need to work within

Disadvantages

Results are mostly qualitative, detail-oriented data which means that analysis is time consuming

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Annex B   RESIN and the adaptation strategy planning process

This annex indicates in short where to position contributions from RESIN Work Packages to respective phases in the climate adaptation strategy planning process.

Phase	Focus	Specification	RESIN
1. Understand context	Understanding (and scoping) the playing field: including the problem and issues, climate change/extreme weather risk, stakeholders and stakeholder perspectives.	Context at different levels: social, institutional, political, economic, environmental. Barriers to implement adaptation options (e.g. policy frameworks, institutional capability, and organization) Stakeholder perspectives on climate risks, their consequences and climate adaptation.	WP1 – SotA 1,2,3 WP6
2. What is at stake	Risk to climate change/extreme weather is assessed (short and long-term): including the vulnerability, exposure and probability of occurrence, threats and opportunities, impacts (indirect and direct) Public concern is assessed (concerns that people associate with these and other causes of risks.)	Take into account: - uncertainty and knowledge gaps - socio-economic development - opportunities arising from climate change	WP1 – SotA 4; WP2 WP6
3. Identify potential adaptation measures	Collect and develop possible adaptation measures to reduce the impact of climate change and/or extreme weather on society. This may include as well infrastructure and construction measures as well as regulatory,	Take into account: - opportunities and benefits - previously identified concerns - social response to climate risk related to social values and norms and publics acceptability and tolerability - potential trade-offs between risks, benefits, risk reduction measures - impact of risk-reduction options	WP1 – SotA 5, WP3 WP6

		governance actions and awareness raiding activities.	- Compare impact-gain	
4.	Decide on options for implementation	Determine appropriate adaptation options based on an assessment (including cost-benefit comparison and other criteria).	Take into account: - Identified adaptation options - barriers to implement adaptions options - complexity and uncertainty - ensure long term effectiveness - Preferences stakeholders - Feasibility: financial, technical, no-regret options, legal conditions	WP3 WP6
5.	Develop options in concrete measures of action	The Engineering of an option into solution requires not only technical capabilities, but also preparing for the financial and other conditions	Take into account: - Technical Requirements - Financial arrangements - Legislation - Governance - Public Space	WP3, WP4, WP6
6.	Implement options	Implementation of developed solutions (project planning, timeliness and (intended) revenues	Take into account: - effectiveness - efficiency - equity - legitimacy - unintended and intended impacts - Challenges, complexity and uncertainty	WP6
7.	Monitor and Review	Monitoring progress and effectiveness and reviewing the selected options.	- Achieved results and real contributions to risk reduction	WP2, WP3, WP6