Chapter 7
Swarm Planning Methodology

Rob Roggema

Contents

Abstract In this chapter the question how to develop a spatial plan that is able to deal with the unpredictable impacts of climate change is explored. Based on the layer-approach a Spatial Planning Framework for Climate Adaptation is developed, consisting of five layers, each with their specific time-rhythm. All spatial elements can be connected to one of the layers, depending on the pace of change they tend to change. Subsequently the five layers can be used in practice to create a climate proof spatial plan. The process in which the development of a climate proof plan can be best developed needs to appeal creativity and future thinking. Two processes

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are extremely suitable for developing these kinds of plans: Design Charrettes and the COCD-method. The success of design charrettes lies in the successful use of local expertise and the collective creativity to visualise on maps the desired climate proof future. The COCD-method is successfully used in the Swarm Planning Experiment, creating specific Swarm Plans for the Eemsdelta region in the Netherlands.

Keywords Swarm planning • Methodology • Layer-approach • Design-charrette • COCD-box

7.1 Introduction

The theory as described in Chap. 6 offers the contours for a methodological approach how to create swarming plans. In this Chap. 2 methodological aspects are highlighted: the content, e.g. what is the method that create high quality swarm plans, and the process, e.g. which working methods and planning processes can be ideally used within which swarm plans can be created? The chapter is divided in these two parts. The content part starts with a brief description of the city of two complexities (Sect. 7.2) and follows up with the development of the Swarm Planning Framework (Sect. 7.3). The process part highlights the benefits of the Design Charrettes (Sect. 7.4) and ends with a description of the SASBE special session, in which the Swarm Experiment took place (Sect. 7.5).

7.2 The Whole and the Parts

Key part of the Swarm Planning Theory is that complexity insights are used to create plans that meet the characteristics of cities and landscapes. Portugali (2000) found that the urban system as a complex system consists of two complexities. The city as a whole functions as a complex adaptive system and can therefore accordingly be approached in the form of directive steering through an active design intervention (system level). The second complexity is found at the level of the individual spatial elements, which each perform as a complex adaptive system, too. This allows these individual landscape elements the freedom to together self-organise and shape the system. The results in terms of how a future landscape looks like when directed by intervention at the system level in combination with the freedom of individual elements to self-organise, is fundamentally unpredictable. However, Chap. 6 has outlined that the system, when performing this kind of 'swarm' behaviour, reaches a higher adaptive capacity (Roggema 2012).

This theoretical basis has been used and translated into a practical approach with the five layer strategy as the centrepiece (Roggema et al. 2012), in which the first two layers identify the point of intervention, layer three arranges and defines the freedom to emerge (hence, layer one, two and three plan mainly for the system level) and layers four and five allow for the individual components to self-organise.

7.3 Swarm Planning Framework

The development of a spatial planning framework for climate adaptation (Roggema et al. 2012) finds its foundation linking the time dynamics of different elements of complex adaptive systems with different spatial 'layers', as identified in the 'layer approach'.

7.3.1 The Layer Approach

The layer approach (Frieling et al. 1998) defines three layers for different timeframes or 'rhythms'. The rhythm of the first layer (water and soil, the underground) is centuries. To a large extent the water system and the soil determine possible uses of land, including the spatial elements that can or cannot function in a certain area. The second layer (networks) has a rhythm of approximately 100 years. Transport and energy networks yet also ecology belongs to this layer, often represented as linear elements. The third layer (occupation) is linked with a timeframe of 20–50 years (one generation). The patterns derived from human use of the landscape are culturally determined: heritage, agriculture, economic functions, recreation and living. According to De Hoog et al. (1998) a fourth layer, 'the public domain', can be added to the original three. This fourth layer is meant to provide impulses at strategic points (nodes, centres) in the urban system (e.g. focal points) and is considered to have a time rhythm of 5–20 years.

The layer approach is extremely helpful in integrating long-term changes, such as climate change, because it enables the connection of different time-horizons. Each layer defines a different time rhythm, hence it can be used to allocate spatial elements according their specific timeframe over with they tend to change. The three layers of Frieling et al. (1998) with the addition of De Hoog et al.'s fourth layer (1998) have been added with a fifth layer (Roggema et al. 2012). This layer ('unplanned space'), which has the shortest time rhythm (1–5 year), aims to include highly dynamic, emergent properties of systems, we propose a new, fifth layer. The layer is process oriented, as it illustrates starting-points of developments (emergent places) and the surrounding unplanned space.

The five layers (Fig. 7.1) form the basis of the planning framework for climate adaptation and are capable to cover time dynamics of every spatial element.

The dynamics, the time rhythm and the changeability of the layers have been defined as follows (Roggema et al. 2011a):

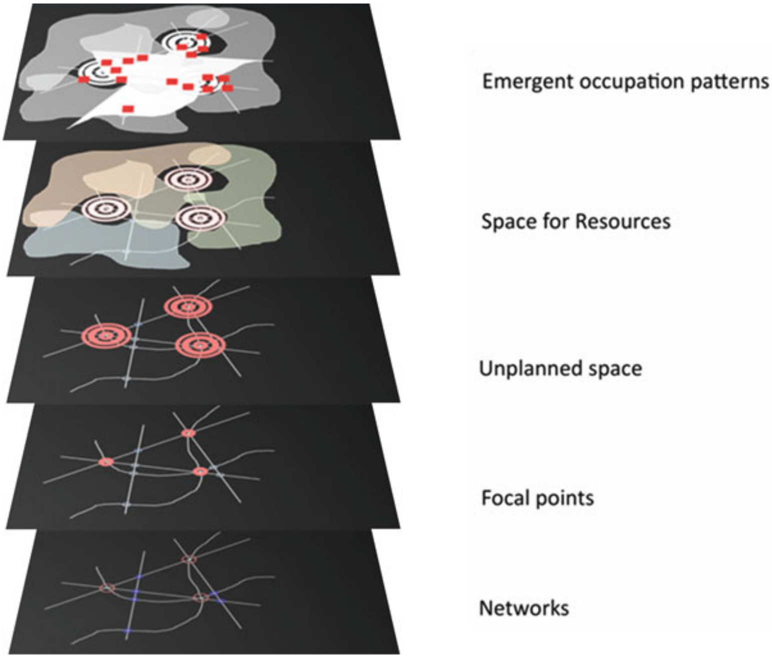

Fig. 7.1 Adjusted layer theory for climate adaptation planning (Roggema et al. 2011a, b)

- **Layer One**: *Networks* are adjustable, but remain steady over longer periods. To build a new network (a road, electricity grid) takes up to 10 years. Once these networks have been built, they hardly change a 100 years after. The ecological network is specific, as it can be manmade but generally emerges naturally. These networks remain for a long period. The transport-, water-, ecology- and energy-network are part of this layer;
- **Layer Two**: Network linkages determine the *focal points* and they can change, but also stay the same over longer periods. Changes in network patterns, which may occur every 5–20 years, direct these points. The most significant nodes, e.g. where different and intense networks cross one another, belong to this layer. These nodes are the public spaces and landmarks in the system, where interactions take place and developments can emerge. These points can be seen as bifurcation points, the points and moments where a system transforms to another stable state (amongst others: Portugali 2000). Here, spatial interventions and impulses start processes and developments that are capable of anticipating future changes and that increase the adaptive capacity of a system. By actively directing the nodes in the networks, processes of action and reaction will start and individual actors in the system will 'automatically' start to adjust in the most optimal way.
- **Layer Three**: *Unplanned space* is highly dynamic, because change needs to be possible during a hazard when this space needs to change functionality and temporarily be available. The area surrounding the focal points (layer

two) remains free of any specific function but can be occupied when a sudden event happens. For instance, when heavy rainfall causes flooding, these unplanned spaces are the areas for inundation and temporary use. Unplanned space gives room to processes of self-organisation, in which feedbacks lead to new standards of a more flexible system. Despite the fact that it is common sense to approach spatial planning in this way (e.g. keeping spatial options open for unexpected future change), the impacts of climate change are often sudden, disasters become more severe and this requires larger spaces than are provided in regular planning processes (if this is being done in current practice at all). The unplanned space will, after having been 'used' to cater for sudden climate events, return to its unplanned status and will remain unplanned until the moment it is needed again. The area changes back and forth during 1–10 years.

- **Layer Four**: The underground determines locations for *natural resources*, such as food, water, energy and nature and preserves them on the longer term. Based on existing soil and water conditions, areas for the production of food, drinking water and energy as well as the location of nature reserves can be determined. These locations are long lasting, steady and will change only after rigorous changes in circumstances, e.g. long droughts, cold periods or heat. These types of changes only occur over centuries, if at all.
- **Layer Five**: In the fifth layer *occupation patterns emerge* over time and adjust to changing circumstances. This layer is characterised as 'slow pace dynamic'. The space required to deal with climate hazards (floods, fires, heat and droughts) provides safe living environments, different mixes of functions in the landscape and in the city. They offer specific identities, landmarks and entities. It will change if new demands self-organise into new patterns, but these patterns are usually upcoming or declining over periods of 3–10 years.

7.3.2 Use in Practice

When the framework is used in practice, the five layers will not be designed simultaneously. The proposed way to use the framework is in a sequential process of several iterations (Fig. 7.2), of which the first one is mainly analytical and aiming to identify the focal points. The other stages in the process then design unplanned space (iteration two), and subsequently spaces for resources and occupation. As shown in Fig. 7.6, this must be seen as a cyclical process: in the first iteration layer one and two are connected, while in the second iteration layer three is connected to both layers one and two. The process repeats itself in iteration three, where layer four is connected to layers one, two and three, and so forth. This cyclical, iterative process facilitates setting priorities, especially by choosing the most important focal points first and then designing the required unplanned space around it. The rest will follow as a result of these first choices. Now that this framework has been defined, it can be used to develop climate-adaptive spatial plans.

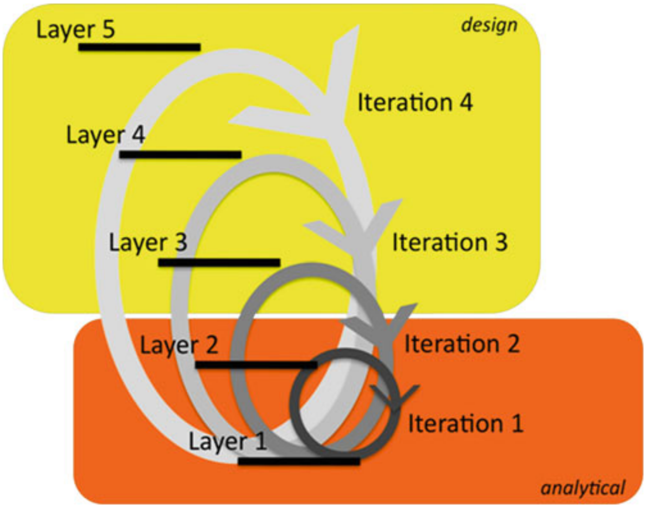

Fig. 7.2 The framework in practice

7.3.3 Application in Groningen Province

The spatial planning framework was used to develop a regional adaptive plan for the Dutch province of Groningen. The spatial planning framework discussed in Sect. 7.6 was used as a step-by-step approach to construct an alternative regional plan, aiming to improve the adaptive capacity of the area.

In the first layer the major networks were determined (Fig. 7.3). Bundles of networks, where roads, railways, energy networks, ecological corridors and waterways are combined, function as the main drivers of activities. Many of these networks are flexible and contain back-up structures, allowing the system to keep operating when parts of the network fail.

The first iteration illuminates the identification and planning of the crucial focal points. In the focal points where bundles of networks intersect (Fig. 7.4) interactions are likely to be more intense and auto-develop emergent processes. In these nodes people come together and exchange ideas. And here they anticipate and respond to future changes. When a system transformation is required to increase resilience, this is likely to start and happen here. Likewise, interventions consciously planned to enhance system change are likely to be most successful in these locations. The identification of these ‘places of intervention’ requires further elaboration, since they play a strategic role in the entire framework.

The focal points determine the places where emergent processes may start. However, these self-organising processes require unplanned space (Fig. 7.5) around them, allowing for free developments and occurrence of feedback mechanisms. These spaces are identified and designed in iteration 2. For instance, in case of flooding, these areas around focal points can transform into water storage basins. In case of a heat wave, these areas can be used to provide cooling shelters.

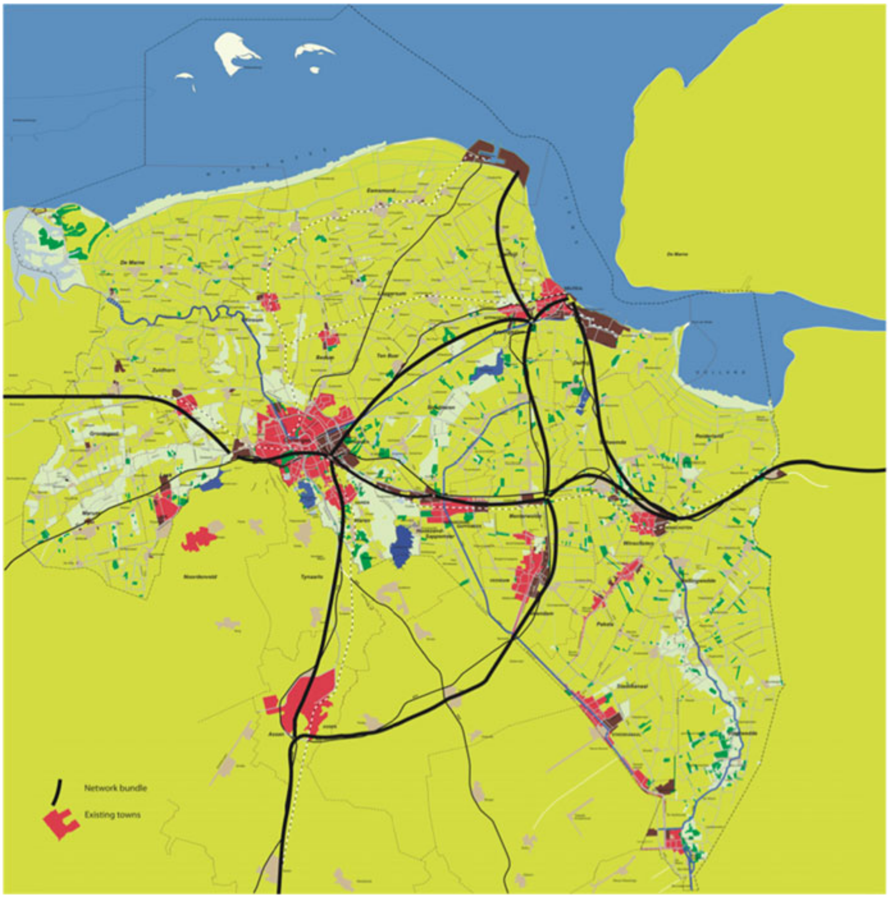

Fig. 7.3 Layer 1, main bundles of networks in the province of Groningen

Around a focal point the first zone of influence, i.e. where transformations take place most immediately is identified. Beyond this zone unplanned space is reserved to accommodate uncertain developments. If the distance between two focal points is long enough and there is space on or along the network bundle, new emergent places may develop. These emergent focal points will subsequently develop a zone of influence and unplanned space around them. Through short-term adaptation these zones connected to network bundles will be highly dynamic and capable of changing and dealing with unexpected changes.

In the areas outside the highly dynamic zones, the topography, soil and water system determine the most optimal locations for food and energy supply, water storage and ecological structures (Fig. 7.6) in the third iteration of the design process. The patterns occurring in these spatial reserves for natural resources are related to the spatial densities in the landscape: wide and open versus small and condensed. Much space is allocated for the storage of water, because both agriculture and

Fig. 7.4 Layer 2, focal points in the Province of Groningen

humans require a lot and in the future water will become scarce in summer. As a result of the allocation of spatial reserves the area will be less vulnerable and more robust to external shocks and unprecedented impacts of climate change. In rural areas the function mix ensures a great diversity and flexibility, allowing for easy adjustment and self-healing capacity in case the environment changes.

The final step in constructing a climate-adaptive regional plan, iteration four, incorporates the increase of functional differences in urban areas and the arrangement of safe areas to live (Fig. 7.7). In the Groningen case study 'safe living' mainly implies a thorough coastal defence. In the plan this was taken care of by introducing a defence zone, consisting of multiple dikes and an intermediate flood mitigation zone. Inland from this zone safety levels are much higher than current standards. Hence, the region becomes a more robust and less vulnerable system, which will also have self-healing capacity if one of the dikes breeches.

Fig. 7.5 Layer 3, unplanned space in the Province of Groningen

The other aspect of the fifth layer – emergent occupation patterns – will increase the diversity and flexibility of the system, allowing for coexistence and new standards to emerge. A mix of functions in intense urban areas will stimulate interaction within and between communities. This mix of people, social groups and urban functions increases the capability to adapt quickly and easily, enhancing the adaptive capacity.

The benefits of using the Swarm Planning Framework are threefold:

1. It enabling spatial systems to adapt to climate change;
2. It includes a range of time dimensions through structural use of the five designated layers;
3. It enriches the pallet of spatial interventions and elements that can be used to design a climate adaptive spatial plan.

Fig. 7.6 Layer 4, space for natural resources in the Province of Groningen

7.4 Design Charrettes

Specific processes are required to be able to develop climate adaptive plans, or using the Swarm Planning Framework. In contrast, regular planning processes:

- Often copy former planning processes and therefore come up with former solutions, even if problems are new;
- Are dominated by paperwork and traditional meeting formats. In this atmosphere solutions and ideas are often less innovative;
- Tend to involve the ‘usual suspects’; e.g. if a design charrette is organised designers are invited, if an agricultural expert meeting is organised farmers sit around the table. This often leads to repetitive outcomes or outcomes that could have been expected beforehand;

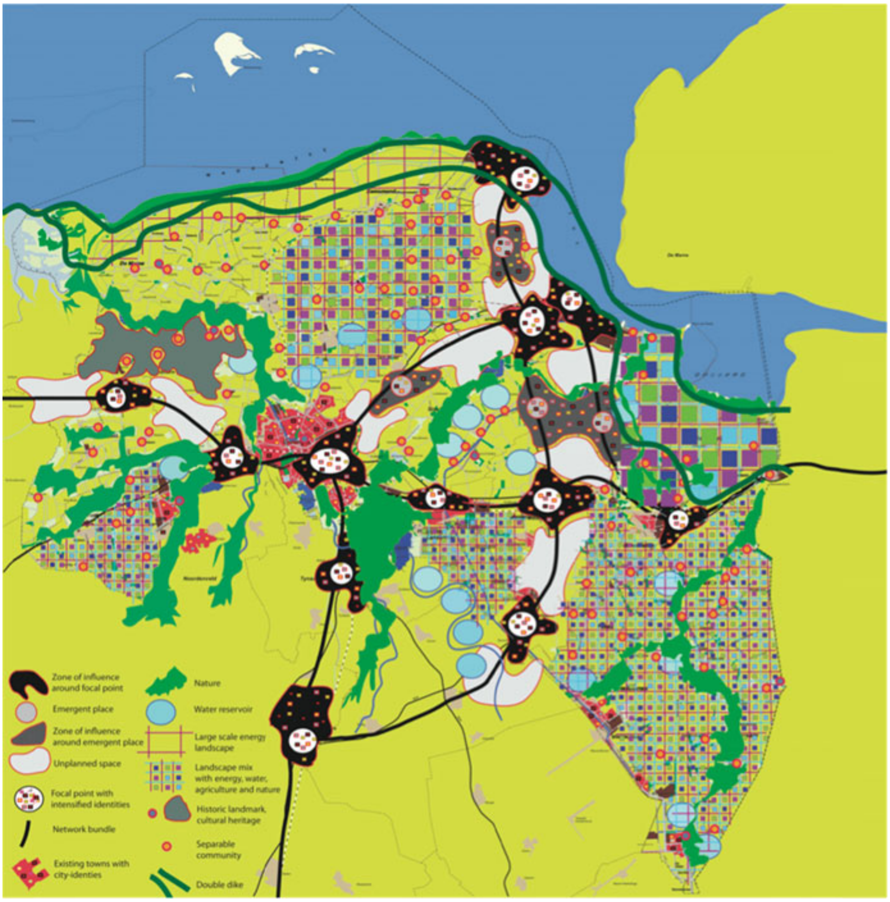

Fig. 7.7 Layer 5, emergent occupation patterns in the Province of Groningen

- Are conducted in a meeting room, leaving participants the chance to get distracted and are off-attention from the issue at stake;
- The end results are not celebrated, but seen as just another normal product 'we always come up with'. This does not motivate people during the process to make something special of it.

Three underlying problems occurring in regular planning processes prevent the development of innovative plans, dealing with the complex issue of climate adaptation:

1. Spatial planning and design aims to provide solutions for relatively straightforward, 'tame' problems (Conklin 2001), while climate adaptation is seen as a 'wicked' problem (Rittel and Webber 1973; VROM-raad 2007; Commonwealth of Australia 2007) for which no definitive solution exists because these problems are dynamic and ever changing (Roggema et al. 2012).

2. The second problem lies in the way stakeholders are involved in regular planning processes. In the majority of cases stakeholders are 'consulted', which means they are approached with an already well thought through and well-developed design proposal. The role left for the stakeholders is in general to accept or reject such proposals. Real influence or a contribution in the form of suggestions is often not possible, nor welcomed.
3. The third problem is that different stakeholders are separated in different processes. The stakeholders involved in climate adaptation (the 'environmentalists') differ from the ones involved in spatial planning (the 'designers'). Depending on the subject of the process, specific sub-groups of stakeholders show up *and* are invited. Exchange and learning rarely takes place. There is no joint 'framework of operations'.

These three problems inhibit the inclusion of the Swarm Planning Frameworks and realisation of climate adaptive plans. Existing practice separates climate adaptation and urban planning, prevents stakeholders from early involvement with the potential of dividing different stakeholder groups denying the opportunity of considered and well-accepted plans. Therefore, an alternative method is required, which can function as a platform for sharing the climate adaptive vision. Such a method has been found in the form of *design charrettes*.

Not only is climate adaptation seen as a wicked problem, design and planning problems are also identified as being wicked (De Jonge 2009). The combination of both wicked problems of design and climate adaptation is one of the reasons why integration of climate adaptation in spatial designs is proven to be difficult and why an alternative approach needs to be found. The charrette approach, which does not focus on the one final solution for the problem, offers the space within which *'an interactive exploration of potential strategies aiming to facilitate a future spatial development towards a status of improved adaptation to the impacts of climate change'* can take place. In this space, one-on-one technical-rational solutions are rare and different future thinking techniques are explored. As climate change predictions come with a broad margin of certainty, so do designs. A wide range of designs is able to provide improvements for one single problem.

7.4.1 Involvement Through Design

The charrette originates from France. At the end of the nineteenth century the Architectural Faculty of the *Ecole des Beaux-Arts* issued problems that were so difficult few students could successfully complete them in the time allowed. As the deadline approached, a pushcart (or 'charrette' in French) was pulled past students' workspaces in order to collect their final drawings for jury critiques while students frantically put finishing touches on their work. To miss the charrette meant an automatic grade of zero. The NCI defines the charrette as: "a collaborative design and planning workshop that occurs over 4–7 consecutive days, is held on-site and

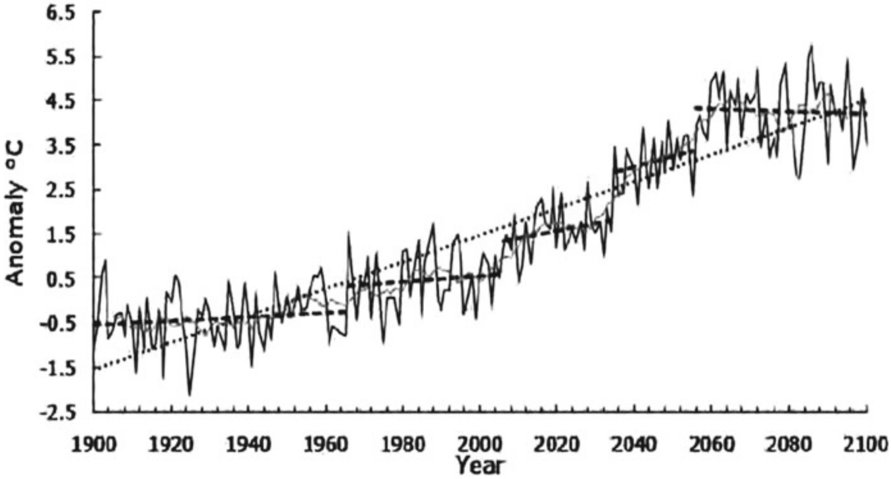

Fig. 7.8 Step and trend analysis, based on dummy data, illustrating one of many analyses showing the 'staircase' behaviour of climate change (Jones 2011)

includes all affected stakeholders at critical decision-making points" (Lennertz and Lutzenhiser 2006). Building on this Condon formulates it as: "a time-limited, multiparty design event organised to generate a collaborative produced plan for a sustainable community" (Condon 2008). As highlighted elsewhere a wide variety of design charrettes has been executed, especially in North Western Europe and North America (Roggema et al. 2011a, b).

Dealing with the wicked character of a changing climate, requires the generation of new knowledge. In dealing with unexpected step changes, which, as an example can be illustrated using temperature data of recent decennia (Fig. 7.8) (Jones 2011) existing knowledge does no longer satisfy as it produces the same solutions for fundamental new problems as it id for past problems. This generation of *new knowledge* helps to adapt to a future, not yet particularly clear, environment as it supports the design and the *transformation* of regions towards climate proof urban and regional areas. People need to become *engaged* to develop this knowledge and these future visions. In general, people have difficulties in dealing with wicked problems and uncertainty, even if they are professionals. Through direct involvement in the design process the capacity of people to deal with uncertainty of future climate change increases.

Hence, in order to develop a successful design charrette the following aspects are brought together:

1. *Knowledge creation*: Generation of new tacit knowledge. Tacit knowledge, opposite to explicit knowledge (transmittable in formal, systematic language), has a personal quality, which makes it hard to formalise and communicate. Tacit

knowledge is deeply rooted in action, commitment, and involvement in a specific context (Polanyi 1966, cited in Nonaka 1994). This type of knowledge creation, which is useful in dealing with far from logic, formal and systemic phenomena such as climate change, can be encouraged through (1) construction of the field: building self-organising team, (2) sharing experience, (3) conceptualise, (4) crystallise in the form of product (facilitated by encouraging experimentation) and (5) justification. In the process, in order to create successfully new knowledge, there needs to be a certain level of creative chaos and redundancy of information, making it possible to provide new information. A good example of both involvement and new knowledge creation has been carried out in the city of Tromsø, Norway, where the design is seen as a (creative) experimentation, involving people and defining planning as an inclusive process, whilst breaking with institutionalised practices (Nyseth et al. 2010);

2. *Governance*: A traditional 'top-down' policy approach, in which the State directs, manages and takes care of all citizens is, given the wicked character of climate change and the urge for enhancing adaptive capacity in society, suboptimal or even contra-productive. The roles of and relations between State and its citizens, more often organised in strong network relationships within and outside specific societal groups, needs to be redefined. Adaptive capacity can be enhanced if flows of resources and information between individual elements in the network as well as outside these networks can flow freely and a mutual relation between State and society is established (Adger 2003);
3. *Transformation*: It seems evident that with sudden and unexpected changes in global and regional climates, urban regions and landscapes need to undergo a transformation in order to be able to deal with those surprising circumstances. Such transformations are not new. Larger cities, in preparation for mega-events did transform, using marketing tools and urban planning and design as instruments to shape an image of the region after transformation. Good examples are Glasgow in its preparation to become Europe's Cultural Capital (García 2005) and Barcelona, preparing for the'92 Olympics [www.mt.unisi.ch]. Several basic drivers are identified to be able to enforce transformations of urban regions. Urban transformations, as outlined in Chap. 4 find their origin in (1) pressure from the outside landscape (the general context), (2) dissatisfaction with the current, stable regime, and (3) start as novelties and niche developments, which ultimately lead to breakthroughs in the existing regime (Geels 2002, 2005, 2011).

In conducting design charrettes Condon (2008) defines nine general rules for a good process. The four we acknowledge as the most significant are:

1. Design with everyone: Despite the fact that becoming a designer requires thorough training and very specific skills, the design process as undertaken during charrettes is integrative and contains a variety of possible solutions. This is partly an intuitive and judging activity, which makes it accessible for many individuals. In this sense, everyone is a designer;

2. Start with a blank sheet: If the group of participants are standing around the table, on which a large map of the site is laid down, the simple action to overlay this map with a blank piece of transparent paper will do. The invitation and the challenge lie before all. Everyone is invited to fill in the future and a shared vision will, in the hours to follow, fill up the formerly empty paper;
3. Provide just enough information: Too much information causes decision paralysis and too little produces bad proposals. Just enough is mainly arranged through the expertise of the participants and will be provided during the charrette in a concise and accessible manner (maps, schemes);
4. The drawing is a contract: All drawings produced during the charrette embody the consensus as experienced and achieved by the charrette team. They form a well-understood agreement, or contract, in images amongst the group. The drawings cannot be broken without consent of the group and function as such as a very strong commitment.

7.4.2 The Groningen Charrettes

A specific charrette approach has been developed for Groningen province, in the context of the Hotspot Climate-proof Groningen project (Roggema 2009a). Instead of executing a weeklong or multiple-day charrette, the process consisted of several separated charrettes, lasting for a day. Each of the charrettes were organised separately, but were well-connected through the participation of s small group in every charrette. After the kick-off, several thematic charrettes were held, in which a specific group of experts visualised their optimal climate adaptation future for the specific theme. The themes were the coast, agriculture, water management, nature, water supply and energy. After these series the results were collected and documented on maps. These individual maps were subsequently integrated in one climate adaptation map for Groningen province. Meanwhile two design charrettes were conducted to develop integrated future scenarios. The participants in these charrettes consisted of a mix of people: experienced policy-makers, experts and generalists, in combination with students and people with local knowledge. This group used coloured clay to visualise their optimal future (Fig. 7.9).

The main outcome out of these exercises were a set of integrated future scenario's, the so-called 'wishing-cards', representing the desires of the participants to best make Groningen climate-proof (Fig. 7.10). These scenarios formed the background of possible long-term futures, against which the climate adaptation map could be judged.

This judgement brought several tension areas to the fore, specific areas for which the climate adaptation map was not satisfying in one or more of the scenario's. These areas were designed in more detail in an ultimate Design Charrette and further integrated in two climate proof perspectives: Give Up, in which the potential

Fig. 7.9 Policy-makers in action during the Groningen Charrettes

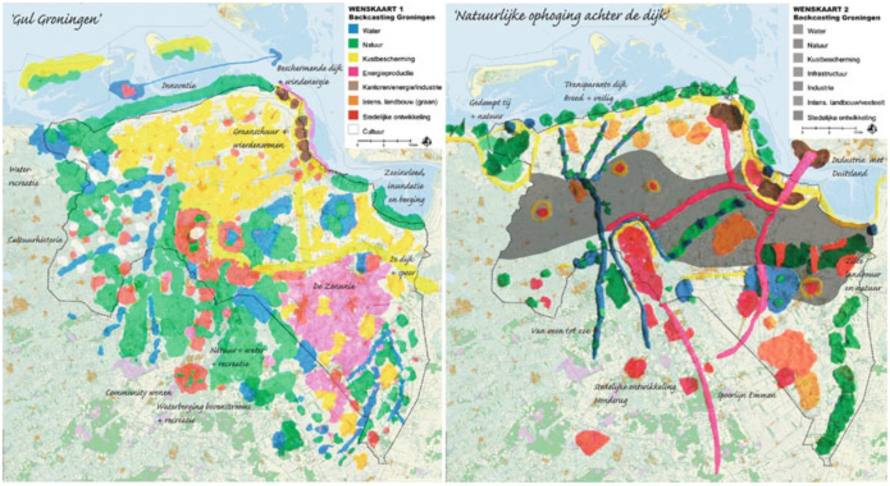

Fig. 7.10 Working with coloured clay: two 'wishing-cards' in the Groningen Charrettes

threat of a flood urges the people to retreat, and Sustain, in which a 'superdike' of 200 m width protects all assets, making it possible to adapt every function to extreme changes in climate (Fig. 7.11).

A couple of specific decisions regarding the process were made. In the first place all raw material that resulted from each individual charrette, was redrawn in precise and beautiful maps. A mapmaker was put in place to produce all this important work. Secondly, for each of the charrettes a specific venue was chosen. The water supply charrette was held in a historic rural estate (a '*borg*'), the agricultural charrette on a farm and the coastal defence one in a hotel on the outside of the dike (Fig. 7.12).

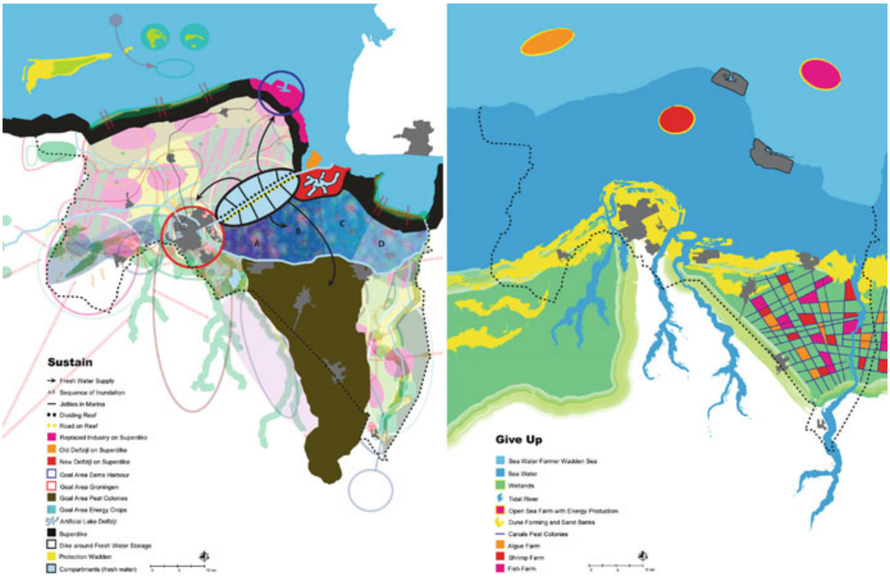

Fig. 7.11 Final result of the Groningen Charrettes: sustain and give up scenarios (Roggema 2009a)

Fig. 7.12 The venue of the 'Coastal Defence' Charrette: Delfzijl seaside hotel

7.4.3 The Victorian Design Charrettes

The design charrette approach, used in three case studies in Victoria, Australia, indicates through action research how people can connect with their future climate and together design future landscapes. The design charrettes in Victoria were

Fig. 7.13 Experts in action during the Bendigo Design Charrette

specifically tailored for the specific context they're held in (Roggema et al. 2010). The method used in Victoria consists of five phases: preparation, design charette 1 (visioning), appraisal, design charrette 2 (implementing) and reporting. After the preparation, in the first design charrette future scenarios for climate adaptation are developed. These scenarios must be seen as charcoal sketches of the future: abstract in scale, but clear in content. The results of the first charrette are then appraised. The quality of the proposed scenarios in terms of their environmental, economic and social value is assessed and this information is used in the second charrette. This charrette aims to design the region in a more detailed way, defines strategic catalyst projects and formulates an investment strategy. This design-assess-design approach is used in three regions: City of Greater Bendigo (a central Victorian major centre, vulnerable for bushfires), and the town of Sea Lake in Buloke Shire (a farming community under threat of droughts, heat and occasional heavy rain).

Both design charrettes are shaped in a very intensive and efficient 2-day meeting. The reason behind this is, apart from the time constraints of individual participants, to create a true intense and highly dynamic session, in which people are more committed and 'into it'. The fact that in regional communities, many people already know each other makes a process of getting to know each other in these cases superfluous.

The standard Victorian charrette program consists of the following key elements: an introductory session in which the urgency of the assignment becomes clear, several design sessions, each of different character, intermediate internal presentations (Fig. 7.13), final design session and presentation of results to an executive panel. In the final design session the optimal climate design is visualised by the participants making use of plasticine (Fig. 7.14), which not only makes it fun to work with but it gives also a 3D-dimension to the work. Each of the separate sessions is highly visual, makes use of mapping or other visual techniques to ensure creativity and thinking beyond the 'window of no'.

During the charrettes, people collaboratively co-design on several levels in attempts to achieve and formulate responses to a complex climate adaptation problem, develop landscape design concepts that respond to future climate change, shape icons that bind, shape and construct models using tacit tools and shape relationships that last.

Fig. 7.14 Results of working with plasticine; Bendigo Charrette

7.4.4 *Key Success Factors*

Experiences with both design charrette processes in the Netherlands and Australia reveal the following success factors:

1. *Deal with complex issues*: The first, and maybe most important advantage of working in a design charrette, is that it is possible to make complex issues, such as climate adaptation concrete and conceivable. In the context of a design charrette people easily become creative and will come up with proposals that go beyond the expected and accepted.
2. *Give reason*: The second element of success is the way the results of the charrette are linked and becoming part of regular planning projects after the charrette is finished. In order to enhance this linkage support of the responsible people within the government is essential. When these people make the importance of the subject dealt with in the charrette clear, the sense of urgency in the entire organisation will be felt.
3. *Atmosphere*: The sphere in which the charrette takes place is important, because in a relaxed, but serious environment people tend to perform best. The atmosphere created is one of intensive work and creativity, working towards end results and presentations, and enjoying the work. Benefit of this atmosphere is that boundaries between organisations and people will drop over the course of the charrette. Where in regular circumstances relations are often based on power and interests, the charrette environment provides an atmosphere to engage in a positive discussion on the basis of expertise and the content. The value to step outside routines and planned behaviours allows

participants to connect on a personal level with each other and their environment.

4. *The venue*: When the venues of the design charrettes are deliberately chosen, are special and well connected to the topic, they force participants to step out of their normal routines and open their minds for a creative and intensive session. Participants more easily develop a joint feel of collaboration.
5. *Visual techniques*: The use of maps, clay and plasticine offer an easy way to capture ideas that otherwise might have been forgotten. Moreover, it challenges people to open their minds to new ideas. These techniques stimulate people to use their left, creative and intuitive brain-side. This opens the way to creation of new joint visions on the desired future.
6. *Engage people*. The right mix of people to participate in the charrette depends on the attractiveness of the charrette. There must be a serious reason why it is interesting for people to take part. Apart from this the program must be short, intensive and offer opportunities to network. Key factors in composition of the participants are representation of a mix of experiences, background, ages and places, involve people with an open mind and certainly not to limit the group to only designers. If, for whatever reason, this combination of people could not be secured, it is better to cancel the charrette.
7. *Celebration*: At the end of a charrette the results must be celebrated. The focus in the celebration lay on illuminating the new and exiting ideas that had came up during the process and the fact that all participants could be proud of the achievements made during the process.

7.5 Swarm Planning Experiment

During the Scientific conference 'Smart and Sustainable Built Environments (SASBE)', which has been held in June 2009 in Delft [www.sasbe09.com], a special session was organised to explore the concept of Swarm Planning (Roggema 2008a, b, 2009b; Roggema and Dobbelsteen 2008). A group of approximately 30 scientists were invited to take part in the event and apply the Swarm Planning concept to the Eemsdelta region in the Netherlands. The session consisted of short introductions by several experts in the field and, for the major part, of a '*Living Lab'*, examining the concept and using it in a case study. A Living Lab is a user-driven open innovation (eco)system, which enables users (in this example: the scientists) to take an active part in the research, development and innovation process (European Commission 2009; Pallot 2009; http://livinglabs.mit.edu).

Central rules of the game for a creative thinking session are: postpone judgements, be open within the group and obey privacy outside it, and be modest and build on and enrich the ideas of others. The process consists of a couple of subsequent diverging and converging phases, which, as time passes, come closer to conceptualisation and realisation (Fig. 7.15).

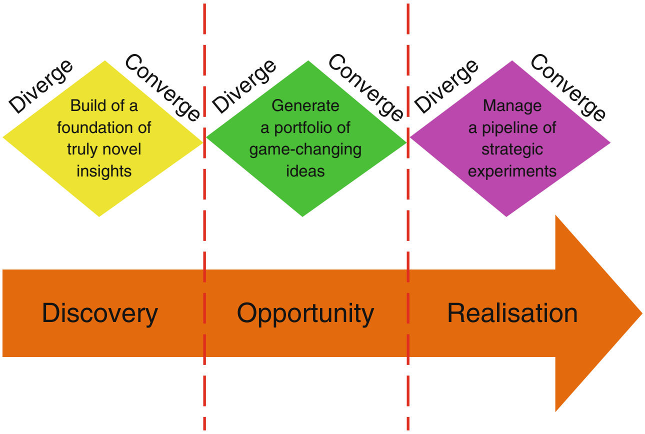

Fig. 7.15 Phases of subsequent divergence and convergence (Van Haren and Starmann 2009)

Fig. 7.16 Scientists at work during the 'Swarm Planning Experiment', SASBE-Conference, Delft

The framework of the Swarm Planning Experiment consisted of several elements, mainly derived from the COCD-box methodology [www.cocd.org/nl/node/53].

The sessions started with four short presentations in which the scene was set. The talks (Geldof 2009; Timmermans 2009; Foliente 2009; Roggema 2009c) informed inspired and opened the minds of the attendees for creativity. After these introductions the first diverging phase of collecting ideas started. In this first step of the process, four groups of participants (Fig. 7.16) tried, in 7 min, to come up with as many ideas as possible, answering four questions. In a second round, the next group built on the ideas of the first group, by adding as many new ideas as possible. This process was repeated until every group had the opportunity to add ideas to each of the four sub-questions.

In the next (converging) step ideas were selected. The tool used during this step was the COCD-box [www.cocd.org/nl/node/53; http://newshoestoday.com]. This tool was developed by the COCD (Centre for Development of Creative Thinking). At the cradle of every paradigm shift there stands an impossible or unsuitable idea. The COCD-box helps to prevent falling into the Crea-Dox: The moment someone thinks

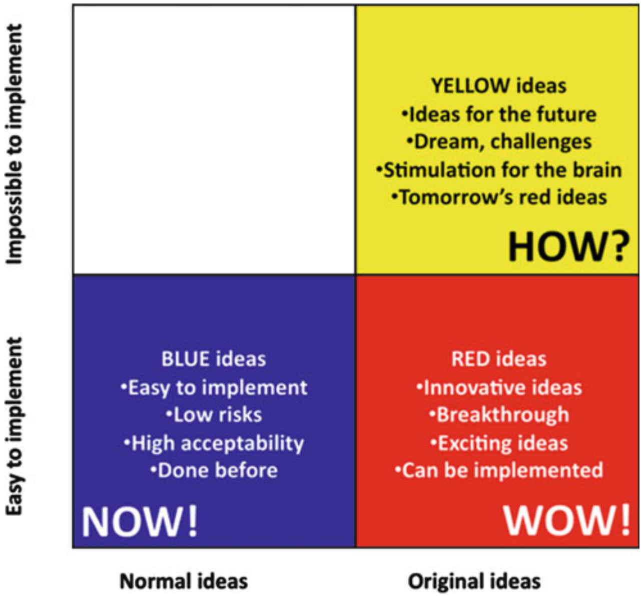

Fig. 7.17 The COCD-box (After: www.cocd.org)

of nice new ideas, he/she remains with the old (known) solutions. To prevent that, a classification can be made using a matrix: the COCD-box (Fig. 7.17). The box has two axes: the originality of ideas and the ease of implementation of ideas. Original and not (yet) feasible ideas are placed in the yellow square, original and feasible in the red square, and feasible and already known ideas are put in the blue square. The box makes it possible to subdivide all ideas and not to lose any idea, something that happens often in regular processes in which especially the yellow ones are easily forgotten. The participants, using yellow, red and blue stickers, select the best ideas in every category by putting the coloured stickers on the ideas of their liking. After this has happened an overview over the best ideas, as seen by the participants, emerges.

The next step in this process is to create concepts out of the selected ideas (Fig. 7.18). The most valued red ideas are put in the upper-left square of the COCD-box and are subsequently enriched with both *dreams* (yellow ideas that strengthen the red idea) and *quick-wins* (the blue ideas that strengthen the red idea). The combination of original ideas with dreams and quick-wins leads to a set of ideas that can be conceptualised into one comprehensive concept for every red idea.

This step is followed by the application of the developed concepts in a spatial design. Originally, this step was not part of the COCD method. Every group takes up one concept and develops a design for this concept on a topographical map of the case study area. This results in four spatial distinct concepts of Swarm Planning for the Eemsdelta region. The results are discussed in Chap. 8. The Swarm Planning Experiment ends with flash presentations by the four groups, illuminating their newly designed concepts (Fig. 7.19).

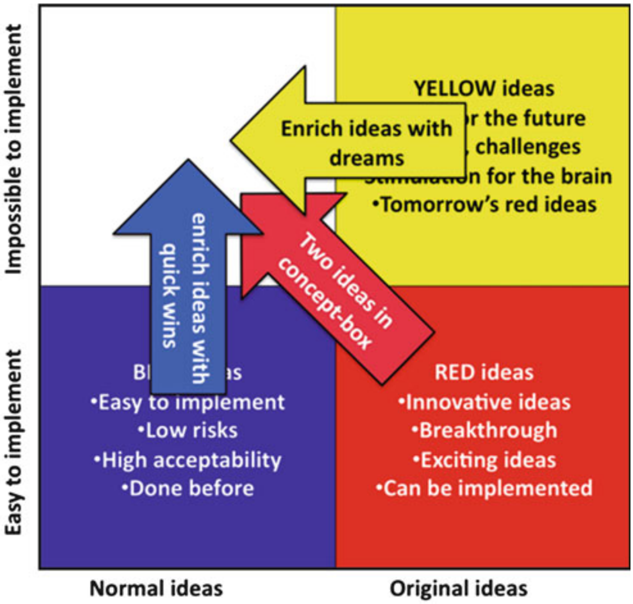

Fig. 7.18 Enriching the original ideas with dreams and quick wins (After: Van Haren and Starmann 2009)

Fig. 7.19 Presenting the results: Wim Timmermans and Greg Keeffe (*left*) and Nils Larsson and Chrisna du Plessis (*right*)

7.6 Conclusion

The Swarm Planning concept is a complex theory. Therefore, the development of a methodology, which makes the application of the concept possible in a practical way, is important. Swarm Planning theory leans heavily on complex adaptive systems theory and focuses on linking time dynamics, or the pace things change, with specific spatial elements in the landscape. The layer approach, which attaches spatial elements to several time-rhythms, is an excellent way to achieve the connection. In this chapter the development of a Five-Layer Framework has been developed, which makes it possible to connect every spatial element to one of the layers. The five layers, networks (1), focal points (2), unplanned space (3), resources (4) and occupation patterns (5), can also be used as a methodology to create a climate adaptive design.

The use of a Swarm Planning Framework requires a specific process. Both the creative thinking, used in the Swarm Planning Experiment as well as the design charrettes offer valuable and useful process methodologies, within which the creativity of participants is triggered and the required swarming attitude can be further developed. Especially working with visual techniques, in the form of maps, drawings and the use of clay and plasticine, opens up the left brain-half and allows people to contribute innovative solutions, which normally stay out of reach.

In dealing with the uncertain and wicked issue of climate adaptation these approaches are essential, because regular planning processes are build on former experiences, limited through existing policies and dominated by organisational interests. The issue of climate change adaptation is too pressing to let old-fashioned habits, procedures and solutions stand in the way of an innovative climate-proof future.

References

Adger WN (2003) Social capital, collective action, and adaptation to climate change. Econ Geogr 79(4):387–404

Commonwealth of Australia (2007) Tackling wicked problems; a public policy perspective. Australian Government/Australian Public Service Commission, Canberra

Condon PM (2008) Design Charettes for sustainable communities. Island Press, Washington, DC

Conklin J (2001) Wicked problems and social complexity (p 11); CogNexus Institute. [online]: http://cognexus.org/wpf/wickedproblems.pdf, visited 13 Dec 2010

De Hoog M, Sijmons DF, Verschuuren S (1998) Laagland. Eindrapportage HMD werkgroep Herontwerp. Gemeente Amsterdam, Amsterdam

De Jonge (2009) Landscape architecture between politics and science. An integrative perspective on landscape planning and design in the network society. PhD thesis Wageningen University and Research Centre. Uitgeverij Blauwdruk/Techne Press, Wageningen

European Commission (2009) Living labs for user-driven open innovation, an overview of the living labs, methodology, activities and achievements. European Commission, Brussels

Foliente G (2009) Urban sustainability transition & adaptation – frontier challenges in complexity. Presentation during SASBE09 special session. SASBE09, Delft

Frieling DH, Hofland HJH, Brouwer J, Salet W, de Jong T, de Hoog M, Sijmons D, Verschuuren S, Saris J, Teisman GR, Marquard A (1998) Het metropolitane debat. Toth Uitgeveij, Bussum

García B (2005) De-constructing the city of culture: the long term cultural legacies of Glasgow 1990. Rev Issue Urban Stud 42(5/6):1–28

Geels FW (2002) Technological transitions as evolutionary reconfiguration processes: a multilevel perspective and a case study. Res Policy 31:1257–1274

Geels FW (2005) Processes and patterns in transitions and system innovations: refining the co-evolutionary multi-level perspective. Technol Forecast Soc Chang 72:681–696

Geels FW (2011) The multi-level perspective on sustainability transitions: responses to seven criticisms. Environ Innov Soc Trans 1:24–40

Geldof G (2009) Climate change and complexity. Presentation during SASBE09 special session. SASBE09, Delft

Jones R (2011) Planning with plasticine. http://2risk.wordpress.com/2011/11/30/planning-with-plasticine/. Accessed 30 Nov 2011

Lennertz B, Lutzenhiser A (2006) The Charrette handbook. The essential guide for accelerated collaborative community planning. The American Planning Association, Chicago

Nonaka I (1994) A dynamic theory of organizational knowledge creation. Organ Sci 5(1):14–37

Nyseth T, Pløger J, Holm T (2010) Planning beyond the horizon: The Tromsø experiment. Plan Theory 9(3):223–247

Palot M (2009) Engaging users into research and innovation: the living lab approach as a user centred open innovation ecosystem. Webergence Blog. http://www.cwe-prpojects.eu/bscw.cgi/1760838?id=715404_1760838

Polanyi M (1966) The tacit dimension. Routledge & Kegan Paul, London

Portugali J (2000) Self-organisation and the city. Springer, Berlin/Heidelberg/New York

Rittel H, Webber M (1973) Dilemmas in a general theory of planning. Policy Sci 4:155–169. Elsevier Scientific Publishing Company, Inc., Amsterdam [reprinted in Cross N (ed) (1984) Developments in design methodology. Wiley, Chichester, pp 135–144]

Roggema R (2008a) The use of spatial planning to increase the resilience for future turbulence in the spatial system of the Groningen region to deal with climate change. In: Proceedings UKSS-conference, Oxford

Roggema R (2008b) Swarm planning: a new design paradigm dealing with long-term problems associated with turbulence. In: Ramirez R, Selsky JW, van der Heijden K (eds) Business planning for Turbulent Times, new methods for applying scenarios. Earthscan, London/Washington, DC, pp 103–129

Roggema R (2009a) DESIGN, Hotspot climate proof Groningen, Final report. Province of Groningen and Climate Changes Spatial Planning, Groningen

Roggema R (2009b) Adaptation to climate change, does spatial planning help? Swarm planning does! In: Brebbia J, Tiezzi S (eds) Management of natural resources, sustainable development and ecological hazards. WIT Press, Southampton, pp 161–172

Roggema R (2009c) Swarm planning principles. Presentation during SASBE09 special session. SASBE09, Delft

Roggema R (2012) Developing a planning theory for wicked problems: swarm planning. In: Van den Dobbelsteen A, Stremke S (eds) Sustainable energy landscapes. CRC/Taylor & Francis, Abingdon

Roggema R, van den Dobbelsteen A (2008) Swarm planning: development of a new planning paradigm, which improves the capacity of regional spatial systems to adapt to climate change. In: Proceedings world sustainable building conference (SB08), Melbourne

Roggema R, Horne R, Martin J (2010) Design-led decision support for regional climate adaptation; VCCCAR research proposal. VCCCAR, Melbourne

Roggema R, van den Dobbelsteen A, Biggs C, Timmermans W (2011a) Planning for climate change or: how wicked problems shape the new paradigm of swarm planning. In: Conference proceedings, 3rd world planning schools congress, Perth, 4–8 July 2011

Roggema R, Martin J, Horne R (2011b) Sharing the climate adaptive dream: the benefits of the charrette approach. In: Refereed proceedings of the 35th annual conference of the Australian and New Zealand regional science association international, Canberra, 6–9 Dec 2011. Edited by Paul Dalziel AERU research unit, Lincoln University, Lincoln, New Zealand

Roggema R, Van den Dobbelsteen A, Kabat P (2012) Towards a spatial planning framework for climate adaptation. SASBE 1(1):29–58

Timmermans W (2009) How to understand planning by surprise? Presentation during SASBE09 special session. SASBE09, Delft

Van Haren R, Starmann I (2009) Creative problem solving for wicked problems and swarm planning. Presentation during SASBE09 special session. SASBE09, Delft

VROM-raad (2007) De hype voorbij, klimaatverandering als structureel ruimtelijk vraagstuk. Advies 060. VROM-raad, Den Haag

Websites

http://livinglabs.mit.edu. Accessed 14 Dec 2010

http://newshoestoday.com

www.cocd.org/nl/node/53. Accessed 14 Dec 2010

www.sasbe09.com

www.mt.unisi.ch/pages/barcelona.pdf. Urban Transformation and 92’ Olympic Games, Barcelona. Accessed 30 Jan 2012