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Scale dependent synergy between risk management and open space preservation

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Abstract:
In planning processes, we employ various morphological planning concepts that deal with how to divide urban land use and open space (green belt, green wedge, infill, compact city, ecological corridor). Although with such concepts we can envisage some geographical pattern, it is often not clear on what geographical scale this pattern should emerge. It may be applied on nested levels of scale, leading to fractal patterns. Or it is superimposed from one level to another. Morphologically and functionally this may make sense.
The issue of scale, however, is crucial to the way in which such a concept can actually be implemented; planning is interaction between people, and people have limited territorial attachment. Therefore, the scale on which a concept is implemented defines how many and what type of actors are relevant. For application on a higher level of scale (regional or national), the network of relevant actors becomes quite complex and hard to influence.
Risk perception, in cases of large scale projection of a morphological concept may be a blessing because of its unifying effect. Within a context of risk management, relatively little contested strategies can be generated, unlike in case of pursuing sectoral ambitions. And a high risk could mean not developing the land at that location, synchronising ambitions for open space with risk management may yield synergy.
This paper explores the potential for synergy between flood risk and open space preservation on a high level of scale in the Dutch context. It aims to illustrate and conceptualise this synergy by interlinking the concepts of scale, actor network and convergence of interests.

1 Introduction

Hall and Pain (2006) call them 'mega-cities': intensively interlinked networks of urban cores in which citizens have extensive pheres of activity. Although intensively studied and debated upon from the urban and economic perspective, the rural perspective seems to remain underexposed. Not only does the urban fabric change in terms of shape and activities, the rural areas as well are colonised by new types of actors and subsequent interests. New forms of housing emerge in what Bruegmann (2005) calls 'exurbia' (see for instance Van den Berg and Wintjes, 2000).
This paper is about planning challenge of preserving the voids between the urban land use.It appears to be hard to control urbanisation; prevent it from invading precious green space. Urbanisation seems to be a typical example of individually rational choices adding up to consequences they collectively regret; behold the liberal paradox (Sen, 1970).

We would like to introduce a way to make individual and collective interests coincide. In this perspective, instead of regarding risk as something to block out, we could also choose to consider risk as a planning tool. Namely, trying to confine risks to the open space structures we would like to preserve.
In this paper, we first highlight the importance of open space in section 2, discerning between health effects and effects on real estate value. In section 3, we conceptualise the regulatory mechanisms that have been institutionalised in various planning cultures, mainly through sticks and carrots, and why these human constructs will never be definite. Section 4 connects this failure to the concept of scale, after which section 5 introduces the alternative, risk-employing perspective and its advantages.

2 Open space matters

Open space matters. A city needs open space for children playing, youngsters sporting, elderly people strolling and pets getting their exercise. A wide literature discusses the health effects of presence of green near dwellings (Jackson, 2003; Frumkin, 2003; Frumkin, Frank and Jackson, 2004; Pucher and Dijkstra, 2003; Louv, 2005). Looking out on and actually being in a patch of lush vegetation is known to lower perceived as well as physical (cortisol) stress levels, and increase people's average daily walking and cycling distances.
Green neighbourhoods are being perceived as less dangerous and house prices go up with decreasing distance to open space.

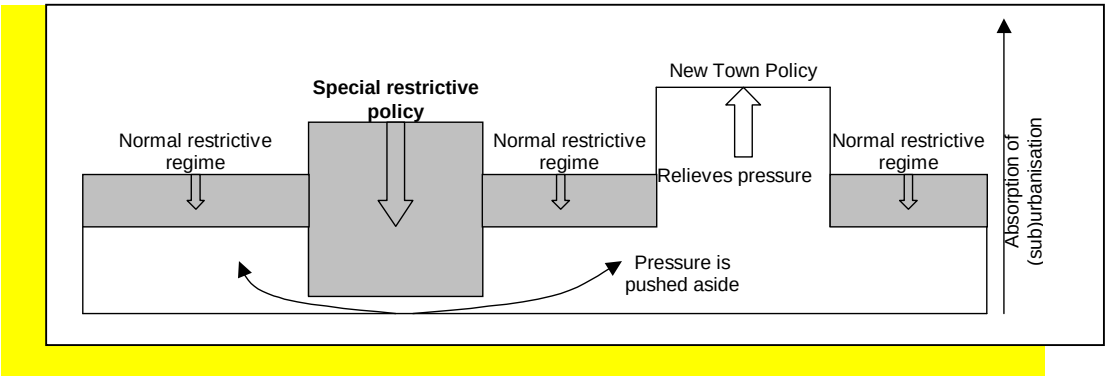
3 Artificial sticks and carrots

Planning pertails institutions of a social nature to adapt autonomous individual behaviour with regard to the use of the land. A fundamental concept underlying all kinds of intervention in social reality, that stems from experimental psychology and is a basis for many behavioural studies, is the carrot versus stick distinction. The carrot represents the reward someone will get from performing or not performing an activity. The stick represents the punishment.

Government action is some way or another always comes down to deploying carrots or sticks. In fact, any power-relationship whether within a family, or any commercial, non-profit or statutory organisation entails control through carrots and sticks. Therefore, educational and managerial theories use the concept extensively. One of the first publications that gives the concept this name is by Deci and Ryan (1985).

Redistribution at most

Why would planning be unsatisfactory? One reason the inconsistency across places. Red and green are typically planned separately. Objectives may be conflicting, resulting in unpredictable outcomes. For instance, containment by restricting urban development will only partly result in higher densities of housing. Above a certain threshold housing density will not rise any further, but the urbanisation pressure will be pushed to an area where the restrictions are less severe. Therefore, restricting in fact means redistributing.



It would be best compared to laying slates of stone on an inflatable mattress. The more resistance you want to create, the heavier the slate is. Unfortunately, the slate (restrictive policy) does not only raise the pressure (population density) directly underneath, it also just pushes the air (new housing) to other areas where, under conditions of unchanged weight (regime), pressure and height (urbanisation) will eventually increase. A carrot in the guise of new-town policy may relieve the pressure as it pulls the upper sheet of the mattress up in order to lower the pressure by creating an outlet.

Therefore, whenever a monofunctinoal 'green' choice is made to protect an area, it inevitably means that surrounding areas will have to face a higher urbanisation pressure. Choosing for protection is choosing for redirecting urbanisation to areas elsewhere, not knowing where and how it will occur. Such effects are referred to as 'leap frog development' and 'spill-over effects'.

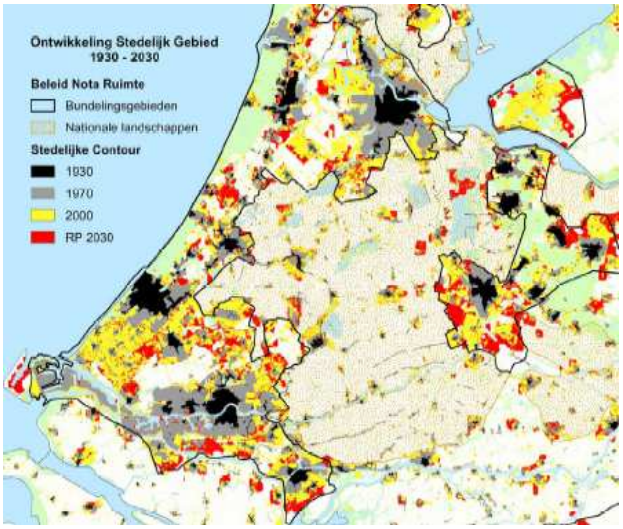


Figure 1: Dutch policy succeeded in making regulations curbing urbanisation within the designated Green Heart area. In this simulation, the success of this artificial restriction is assumed to sustain.
Source: De Nijs *et al*, 2005

Flaws of traditional regulation

Van den Brink, *et al* (2006) are at pains to point out why traditional open space planning, having been effective for so long in the Netherlands, now shows signs of decay. First, urban and open space are not governed consistently; being officially is part of the integrated regime of spatial development, in practice it is left to the Ministry of Agriculture, Nature and Food Quality. Secondly, governance is in flexible as 'green' subsidies are granted to 50% and sometimes even 100% of operational costs based on complete, detailed project plans for a large area; a method unsuited to the requirements of planning in a highly dynamic urban

environment, where market forces become more important. Thirdly, because the policy instruments applied in open space originate in agricultural land consolidation, most city officials are unfamiliar with them, and flexibility is low due to the protection of property rights and land use rights.
In addition, municipal expansion policy appears to divert from national and regional plans. The hierarchic system has two fundamental flaws for actually being as effective as it theoretically seems to be:

The municipal plans are not timely updated. Although there is a legal obligation for renewal, there is no enforcement of this obligation. In case an old zoning plan holds more space to build than would be allowed under current national policy, it is advantageous for the municipality not to renew the zoning plan as renewal would probably mean reduction of possibilities for building.

Legally in exceptional cases building activities may be executed despite conflicting land use regulations in the zoning plan (a so-called 'paragraph 19 procedure'). Although this was meant for giving flexibility in case pressing circumstances would occur, this paragraph has been used quite extensively. So, even if a zoning plan is recent and thus complying to national policy, a municipality can still decide differently.

Simultaneous to legal flaws, there is quite a strong financial incentive for municipalities to ignore non-building policies. Each municipality receives from the national government a budget for performing its tasks, depending on the number of inhabitants – the bigger the city the more money it logically gets. So, growing is profitable, but in fact inevitable because the total budget for all municipalities together is fixed, meaning that a city that does not grow would get less money every year.

Upcoming liberalisation

Despite of (or maybe: due to?) the disputed effectiveness of policies on open space preservation, a tendency to down grade government intervention can be observed. The Netherlands is just one example of a country where managerialism (or 'New Public Management as it is generally called: Lane, 2000; Bevir *et al*, 2003) has a firm grip on how public services at large, and spatial planning in particular, are provided – its firmness growing under right-wing governments, at the same time being increasingly criticised for its intrusive bureaucracy and rising overhead costs.
Although the argument that the Weberian approach to bureaucracy faces severe problems of leadership as well as efficiency, and although more flexible and less hierarchical forms of governance are widely debated in a theoretical sense (Pierre and Peters, 2000; Cars *et* al, 2002; Hajer and Wagenaar, 2003), the ultimate question is whether new governance forms or institutions actually deliver (Weaver and Rockman, 1993; March and Olsen, 1995; Lane, 1995).

4 Regulation and scale

Tummers and Tummer-Zuurmond (1997, p. 118) classify parks from over the world into approximate diameters: 1, 2 and 4 kilometers. The parks with a 2 kilometer diameter (Hyde Park, London; Prospect Park, New York) and more (Bois de Boulogne, Paris; Central Park, New York; Richmond Park, London) are structuring elements in the urban fabric. They are sufficiently large form a rural enclave in an urban landscape. We would like to add a category of 4-10 kilometers in diameter, representing large-scale enclosures of landscapes in the metropolis.

Fractal morphology

Open space is thus a fractal morphology (Frankhauser, 2004; Batty and Longley, 1994; Benguigui, *et* al, 2000; Mandelbrot, 1977) present on many nested levels of scale that are mutually interdependent in several ways. In terms of people's satisfaction, for instance, the lack of city parks may be compensated by large and lush private plots. People that find sufficient tranquility directly around their house might have less need for visiting city and regional parks. This may also be true the other way around where the high density blocks of housing (in for instance London or Paris) or off-set by extensive city parks. The nested levels also mean that all is relative: what is infill, supply of open space, population density, rurality all depend on what geographical scale the statement relates to.

Main mechanisms differ with scale

The issue of scale, however, is crucial to the way in which such a concept can actually be implemented; planning is interaction between people, and people have limited territorial attachment. Therefore, the scale on which a concept is implemented defines how many and what type of actors are relevant. For application on a higher level of scale (regional or national), the network of relevant actors becomes quite complex and hard to influence. Moreover, as the objective moves away from the personal living context and is institutionalised in a governmental programme, mechanisms of disobedience to the public interest come into play – being the *raison d'être* of planning. The fundamental concepts tragedy of the commons (Hardin, 1968), prisoner's dilemma (Axelrod, 1981) and Liberal Paradox (Sen, 1970) all point to this schism.

Problem-scales and administrative scales

The scale of an administrative body ideally should coincide with the scale of the problems it addresses. An dynamic environment thus will eventually have to search for appropriate structures of governance for coping with urban development processes. Although the relationship between people, government and geography generated a large literature (Cox, 1991; Taylor, 1993; Harloe *et al*, 1990; Paddison, 1983; Kaufmann *et al*, 1986), studies focusing on the mega city morphology are less common.

Very early specific discussions on governing the metropolis were initiated by Ostrom et al (1961). More recent contextual debate can be found in the extensive list of references Bromley and Daniels (2001) give on US discussions on metropolitan governance, whereas Hesse (1990) reviews European literature on local governance. Williams (1999) describes how Manchester, Melbourne and Toronto dealt with this issue and the tensions it generated, Adam (2003) outlines the administrative structures that German metropolitan regions adopted, Alexander (2002) focuses specifically on metropolitan planning in Amsterdam. Sellers (2002), after analysing eleven urban regions in France, Germany and the US, concludes that policies and institutions addressed to urban governance made more of a difference for outcomes than integration at the national level.

There is no fixed answer to governing big cities. Cultures obviously differ, but more importantly the array of problems and problem perceptions is so wide that there is no clear overall equilibrium.

5 Natural sticks and carrots

The main claim we try to sustain in this paper is that the force of directing urbanisation can also come from *natural processes* instead of socially constructed institutions.

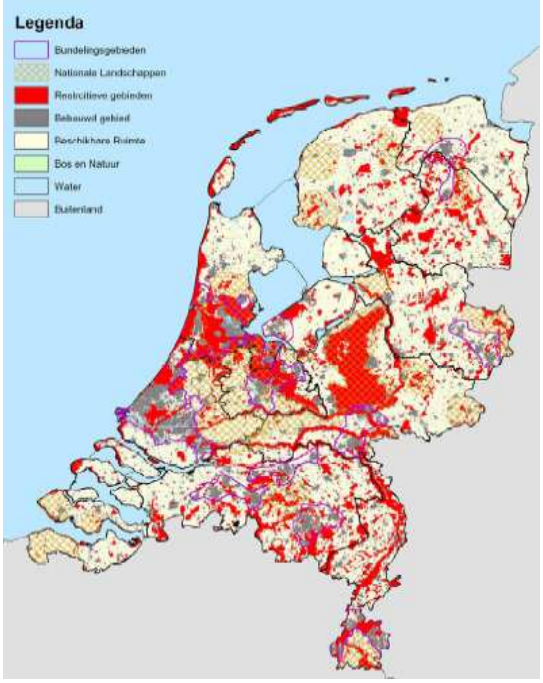


Figure 2: The red colours on this scenario map are restrictive areas – urbanisation is unlikely. Some risk areas coincide with restrictive areas: a process of codification. Source: De Nijs *et al*, 2005

Relevance of social constructs

Before we turn to the natural processes relevant to open space preservation, we want to point to our non-mechanistic opinion on regulation through laws and rules. Application of a rule on a case may have as an undesirable effect that other subjects want to avoid the implications of the rule by avoiding circumstances that would make them subject to the rule, although they may be agreeing on the objective of the rule. This 'shadow of the law' already makes Dutch farmers reluctant to stimulate biodiversity on their properties. Although they personally would like to put effort into nature conservation, the prospect of rare species present on their land evokes fear of being restricted in their land management.

Figure 3. The risk of flooding is one of the most important risks in the Netherlands.

When a rule is applied, the driving force for the application may not be what is was actually meant for. Again referring to nature conservation legislation, law suits on species endangered by building activities may be issued with a different reason than those species. A new runway of Amsterdam's airport was blocked by using the Dutch Forest Law. People that did not like the idea of more noise because of air traffic bought a little piece of land and planted a small forest on it. An other example is the new EU directive on air quality, that triggered store owners to contest plans for competing stores nearby, by pointing toward the polluting effects of the additional traffic that it would generate.

Rules are thus prone to manipulation, avoidance, unintended consequences etcetera. Choosing for natural processes to structure urban networks counters these disadvantages.

Employing basic instincts

Given the impossibility of devising a watertight regulatory structure for regional-scale open space preservation, one might try to transfer the poblem ownership from the public to the private domain. In other words: make it an individual wish not to live in a target area of open space preservation.

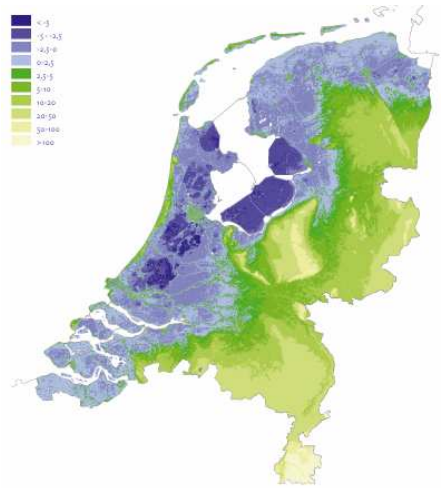


Figure 2: Depth below sealevel is one an indicator of flooding risk. The Dutch economic heart lies in the deepest part of the country. Rotterdam and Schiphol are several meters below sealevel.

Let's make areas where people don't *want* to build their house. Risk perception, in cases of large scale projection of a morphological concept may be a blessing because of its unifying effect. Within a context of risk management, relatively little contested strategies can be generated, unlike in case of pursuing sectoral ambitions. And a high risk could mean not developing the land at that location, synchronising ambitions for open space with risk management may yield synergy.

Examples

A Dutch example is the fairly quick process of implementing an ecological main structure in the floodplains. This idea was born in the Plan Ooievaar (stork-plan) in 1986 (Van Nieuwenhuize *et al*, 1986). By using the yearly flooded plains along the main rivers for nature development, a unique structure of wet nature specific to the Netherlands in a favourable contiguous pattern could be realised. The power of the plan was that it used marginal agricultural land that because of the flood risk did not draw building-ambitions and subsequent land speculation. The flood risk was, and still is, a blessing for keeping urbanisation at bay.

In American metropoles, we see similar patterns. When you take a map of a arbitrary American city, the green spots are either golf courses or places people don't want to live because of risks. In plain areas (Houston, Dallas), the green structures tend to coincide with stormwater channels. In mountanous areas (Washington, Seattle), the green structures coincide with steep slopes that may erode, creek gorges that during rainfall flood or even strips of land under powerlines.

Limits of synchronising risk with open space

Of course, risks are to an important extent naturally located. Its location cannot be changed as we like. In particular slope-related features are obviously fixed. Other risks do allow some training – concentrating flood risks in specific areas may save areas nearby from being flooded.

6 Conclusion

This paper explores the potential for synergy between flood risk and open space preservation on a high level of scale in the Dutch context. It aims to illustrate and conceptualise this synergy by interlinking the concepts of scale, actor network and convergence of interests.

Figure 5: A flooding corridor may serve two effects at the same time: channelling stormwater and structuring urban mass.

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