THE MEANING OF BIOMASS IN LANDSCAPE MANAGEMENT AND ENERGY PLANNING: UNDERUTILISED OR OVERESTIMATED?

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Abstract

A team with representatives of private and public sectors deals with the spatial organisation of Dutch river region WaalWeelde. They care about landscape management of the river flood plains, which takes in maintenance of nature areas and water safety measures. The team calls for improvement of landscape management, due to financial cuts and inefficient practice. The concept of ecosystem services is considered as a promising concept for changing landscape practice. Biomass resulting from landscape management can be considered as one of these prospective benefits. Whereas nowadays practitioners handle organic material mainly as a cost, in future it can be handled as, for example, a renewable energy resource. Notwithstanding this promising outline, some people are cynical about the feasibility of using biomass. What is the meaning of biomass, as ecosystem service, to improve landscape management in the WaalWeelde case? In this paper, we consider biomass as a 'matter of concern' (after Latour). Biomass is a physical 'matter' that can be valued from diverse perspectives, for example, in energy potential. Moreover, the meaning of biomass in practice depends on the 'concerns' of organisations involved in landscape management: their drives, instruments, rules and boundaries define to what extent biomass can really matter. A literature review shows that the value of biomass 'matters' in the WaalWeelde case is relatively limited but can increase. For example, harvest can expand by more active management, which also increase other spatial qualities. Moreover, cooperation is useful to bundle both biomass and ambitions. Spatial planners can play a key role in organising this cooperation. Then, an impression of actual 'concerns' of key landscape managers in WaalWeelde shows a vital challenge for spatial planners. Namely, hegemonic practice, rigid legislation and prevailing habits hinder change in the field, notwithstanding sustainable initiatives around biomass and willingness to cooperate.

1. Introduction

"Because the Waal belongs to us all!"[2]

Various private and public organisations are involved in the spatial organisation of river Waal surrounding in the Netherlands. River Waal is an important transport river of the Netherlands, part of the extensive Rhine Delta in Western Europe. In addition

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[2] Vision WaalWeelde (Project WaalWeelde 2010, p.2)

to their individual spatial practices, organisations cooperate under a program called WaalWeelde, directed by the province of Gelderland (www.waalweelde.nl). 'Waal' refers to an 80 kilometres long Waal section, from the German border to the castle of Loevestein in the middle of the country, part of the province of Gelderland. 'Weelde' means richness, referring to shipping, nature, rural functions and an attractive environment for housing and business. These various spatial functions need to be preserved, utilised and managed (Project WaalWeelde, 2010) but have diverse physical and social dynamics and are organised by different owners or institutions, each having specific practices and standards.

Landscape management: financial cuts and fragmentation

Whereas many teams under the WaalWeelde program are concerned with spatial visions and implementation of projects in view of *realising* spatial quality, one team is concerned with management in view of *continuing* spatial quality. This team is 'taskforce river flood plain management', concerned with maintenance and exploitation of WaalWeelde's flood plains. Management in WaalWeelde is based on water safety, transport standards (e.g. line-of sights), ecological norms (e.g. Natura 2000), as well as agricultural practice and recreational needs. In this paper we focus on land-based management (i.e landscape management), with special focus on vegetation management.

In general, landscape management in rural landscapes is crucial for sustaining natural and cultural values (Naveh, 1994). Surprisingly, landscape management is mostly neglected in Dutch comprehensive and communicative spatial planning approaches ('hidden responsibilities', Beunen & Hagens, 2010), though most space is subjected to management rather than to new development. Moreover, Dutch national government (i.e. 'Rutte cabinet' 2010) made large financial cuts in nature policy, including landscape management; meanwhile, decentralisation of nature and spatial policy from ministries to provincial authorities started, which still causes an unsure situation about tasks and possibilities. Furthermore, landscape management of Dutch river areas needs to be improved due to inefficient practice (Bureau Stroming, 2011). Landscape management in river flood plains is hindered by fragmentation of property and responsibility[3]. This 'practical' fragmentation comes together with discursive and institutional fragmentation. Namely, stakeholders have various viewpoints on the function or functions of Dutch river floodplains (Jacobs & Buijs, 2011; Fliervoet, 2012). Likewise, river flood plain management in the Netherlands has been dominated by a battle between technocratic (i.e. safety and agriculture) and ecological (i.e. 'dynamic' nature) approaches (Van der Brugge et al., 2005), notwithstanding spatial concepts intended to integrate various functions and implemented in practices ('Plan Stork' by Van Nieuwenhuijze et al., 1986; 'Cyclic

[3] For example, Rijkswaterstaat (i.e. the executive arm of the Dutch Ministry of Infrastructure and the Environment) is a key organisation in river floodplains. Its task concerning landscape management is manifold: DG water management is, overall, owner of the river shores (i.e. summer bed to river groins); contracting authority for water and vegetation management of the river shores; sometimes owner of other parts of the river floodplains, which are mostly put out to lease; temporarily owner of project areas, which are transferred to managers after completion; always responsible for permits concerning vegetation management, based on water safety and shipping rules, in the flood plains (interview RWS, 2012).

Floodplain Rejuvenation', Baptist et al., 2004). The challenges of finances and fragmentation also apply to landscape management in WaalWeelde's floodplains. Stakeholders and experts tackled these challenges during a two-day conference in June 2011. The conference was the start of 'taskforce river flood plain management' and resulted in three innovative scenario's for future landscape management for WaalWeelde's floodplains.

The potential of ecosystem service biomass
An important direction in each WaalWeelde scenario for future management, developed during the June 2011 conference, is to make better use of the socio-physical values of the river region. In other words, people concerned with management of WaalWeelde are encouraged 'to cash' material and cultural ecosystem services (cf. Melman et al., 2010), like sand for infrastructural works or an attractive environment for recreation. In addition, regions are forced to become less dependent on standard 'central' resources and find place-related 'decentral' resources (Pinto Correia et al., 2009). During the conference, scenario-makers mention residual biomass resulting from landscape management, wood and grass, as a promising 'new' ecosystem service. Namely, nowadays, Dutch practice mostly handles organic material from landscape management as a cost, whereas it can be handled as a source for renewable energy or other high-quality products. Moreover, using residual biomass from landscape management on local-regional scale can contribute to a very small but ecologically sustainable biomass supply for a national-international bio-based economy (Ros et al., 2012). However, knowledge about energy-flows in ecosystems and energy-conscious spatial planning, especially on the regional scale, is limited (Stremke & Koh, 2010).

'The tragedy' of ecosystem service biomass?
The idea of 'cashing biomass' from landscape management, instead of considering it as a cost, will overcome a 'tragedy of ecosystem services' (Lant et al., 2008). In line with the familiar 'tragedy of the commons' about over-exploitation of an environment by misplaced investments, a 'tragedy of ecosystem services' concerns under-exploitation by 'misplaced' (i.e. *non*placed) investments (ibid). Notwithstanding a promising plea to make better use of biomass in WaalWeelde by dedicated conference participants, other participants were more cynical about the feasibility of using biomass. To better understand this struggle between 'optimism and pessimism' as well as the actual situation, we study the potential of biomass for improving landscape management in the socio-political context of WaalWeelde. The main research question is: what is the meaning of biomass, as ecosystem service, to improve landscape management in the WaalWeelde case? In other words, is the potential of biomass underutilised or overestimated?

2. A realistic approach to the meaning of ecosystem service biomass

Ecosystem service contextualised: a theoretical reflection
Starting point of improving landscape management in Dutch river region WaalWeelde is, in this paper, the use of ecosystem service biomass. Starting from a

physical issue (i.e. an ecosystem service) is a sensible step in spatial planning since the future of our landscapes is a central task of planners (Perry, 2003); nevertheless, 'landscape' itself has been narrowed down in planning theory (Graham & Healey, 1999) and is overruled by theories about procedures. The key, then, is to *contextualise* ecosystem services and to understand *why* spatial planners deal, or do not deal, with specific ecosystem services (cf. Allmendinger 2002). An ecosystem service refers to "the benefits people obtain either directly or indirectly from ecosystems" (Millennium Ecosystem Assessment in Lant, et al. 2008, p.969). People only benefit if a service is made operational: recognition of its value, incorporation in policy practice and paid for (Daily et al., 2009). The possibility of 'cashing' an ecosystem service depends on individual, market and state engagement; this engagement implies clarifying and organising 'new rules' between 'buyers' and 'providers' of a service (Vatn, 2010). Such engagement and 'new rules', however, are difficult to realise.

Change, as engagement with a 'new' ecosystem service biomass in WaalWeelde to improve landscape management, is sensible in nowadays political-economic situation (section 1, this paper; cf. a 'trigger event': Kingdon, 2003). It may not only deliver financial support for landscape management but may even 'mobilise power' and create new coalitions of individual, market and state (Healey, 2006), which break through rigid spatial planning (Hajer & Zonneveld, 2000) and fragmented landscape management practice (section 1, this paper). The use of ecosystem service biomass on regional Waalweelde scale fits in a prospective energy perspective on planning (Stremke & Koh, 2010) yet needs to battle against existing hegemonic nature and safety perspectives (cf. Disco, 2002). Likewise, change depends on the flexibility of existing structures and procedures, as well as the will of existing authorities to release power if necessary (Moulaert et al., 2007; cf. 'fallacy of centrality', a lack of curiosity and ignorance of new ideas: Westrum, 1982; cf. 'self-referential' systems, in reference to Luhmann: Van Assche, 2007). In order to get a realistic picture of the meaning of ecosystem service biomass in WaalWeelde we accordingly need to investigate 'new' power and ambitions in local-regional spatial practice in relation to hegemonic planning practice.

Biomass as a 'matter of concern': an analytical framework

In this paper, in line with our theoretical reflection, we study an ecosystem service as a 'matter of concern' (after Latour, 2004). An ecosystem service is a physical 'matter' that can be valued from diverse perspectives, for example, in financial terms, energy potential or cultural significance. Moreover, the meaning of an ecosystem service in practice depends on the 'concerns' of owners, landscape managers, users and organisations involved (i.e. its system); their drives, instruments, rules and boundaries define to what extent a service can really matter. For example, organic material from landscape management was often categorised as 'waste' by legislation and needed to be dealt with accordingly (Senternovem, 2005; see www.agentschap.nl for new European Waste Legislation). And, for example, logging techniques in relation to accessibility of a site define the actual availability of biomass (Kuiper & De Lint, 2008).

For a realistic picture of the meaning of biomass in river region WaalWeelde, we study the *combination* of matters and concerns. For simplification, though, we sketch four -theoretical- possibilities, based on a combination of scores for 'matters' and 'concerns' (see table 1). Ecosystem service *matters* hover between little and high potential, taking in socio-physical values of the service. Ecosystem service *concerns* refer to the effort and input of people and related institutions to 'cash' a service (cf. Vatn, 2010), which hover between passive (i.e. ignorant, prioritising other issues) and committed (i.e. eager, capable, organising) systems.

Figure 1 The meaning of an ecosystem service in practice

The meaning of an ecosystem service in practice Hagens 2012		**'matters'** potential, including values	
		little	**high**
'concerns' efforts & input	**passive system**	A. unfeasible	B. underutilised
	committed system	C. overestimation	D. feasible

Four -theoretical- scenarios emerge:

A. *Scenario unfeasible*: the amount and value of biomass is limited and the system is reluctant to use biomass for, for example, energy-production (i.e. a dark scenario);
B. *Scenario underutilised*: the, hidden, potential of biomass is considerable but has little meaning since individual, market and government are not willing or capable of utilising its potential;
C. *Scenario overestimation:* the expectations and willingness to participate in the exploitation of biomass are high but the actual amount of biomass is of little value;
D. *Scenario feasible*: both the potential biomass and the possibility and willingness to invest in using biomass are sufficient (i.e. an ideal scenario).

With these framework, we can specify two mediocre scenario's of an ecosystem service, which are essentially different in problem and solutions, being either an 'underutilised' or an 'overestimation' scenario.

The case of biomass in WaalWeelde: research material
We investigate biomass 'matters' in the context of landscape management in WaalWeelde by literature review (Spijker et al., 2007, Kuiper & De Lint, 2008, national explorations; Stroomlijn, 2011, a study about cost-effective management in Dutch river regions). Detailed research into the availability of biomass in WaalWeelde's floodplains, in an ideal scenario, is ongoing (Caspers, 2012). We

investigate biomass 'concerns' in the context of landscape management in WaalWeelde by interviews with representatives of key organisations in landscape management, as well as additional literature.

3. The results of a 'matter of concern' analysis of the meaning of biomass in Waalweelde

Basic material: biomass 'matters'
Biomass in flood plains comes, of course, from the vegetation present. According to succession models, vegetation development on exposed bars in temperate European river areas is initiated by pioneer species, followed by willows and poplars, and potentially converting to oaks (Francis et al. 2008). In a landscape mainly dominated by river dynamics, diverse development stages can be found at the same time (Geerling et al. 2006). The vegetation nowadays present in the flood plains of the Waal river is defined by Dutch history of civil engineering, manifested in dike building and cut off of river bends, in relation to creating a safe environment and economic development. Moreover, vegetation is defined by nowadays policy decisions and approaches in landscape management (see section 1, this paper). Overall, five main categories of habitats are related to floodplains of the Waal river (Bureau Stroming, based on Schipper & Siebel (eds.), 2009). These categories take in both vegetation and management characteristics (see table 1).

Table 1 Habitat and management characteristics in WaalWeelde's floodplains (based on Schipper & Siebel (eds.), 2009 & Bureau Stroming, 2011)

Habitat category	Typical vegetation	Spatial and management characteristics
River- and wetland	grassland, wetland vegetation, alluvial wood	- Influenced by flooding - Dynamic landscape - Grazing
Wetland	grass, reed, reed grass	- Transition stage, from water to land - Dynamic water level is essential - High water quality is essential
Herbaceous and fauna-rich grassland	grass with herbs and mosses, brushwood, shrubs	- Extensive land use - Often a temporarily situation
Oat grassland	oat grasses, flowers, a diversity of herbs	- Landscape with gradients (elevations) - Rare habitat; habitat of European importance - Mowing regime; clippings is removed
Grasslands of overwintering birds	grassland	- Productive landscape - Foraging area - Nutrient rich grass land

Various issues define the amount of organic material available in WaalWeelde's floodplains for products instead of 'waste'. Firstly, the total production depends on physical issues: the area and rate of growth of vegetation present (Spijker et al., 2007; Kuiper & De Lint 2008). Consequently, harvest out of the total production is defined by some practical and strategic issues (ibid). Namely, in case of Dutch river floodplains, management is mostly defined by water safety and ecological targets

(see section 1, this paper). In general, water safety promotes harvesting, whereas ecological targets can either promote or restrict harvesting (e.g. Stroming, 2011). Moreover, in the Netherlands, harvest by sometimes remains on spot, especially in forests, due to nature conservation legislation and is, therefore, unavailable as biomass (Kuiper & De Lint 2008). Another issues that influences harvest of organic material is grazing; by grazing, vegetation is transformed into another ecosystem service as meat. That is, in the case of WaalWeelde, 'wild' horses and cows (Stroomlijn, 2011). Furthermore, accessibility of sites and harvest techniques define the amount of organic material (Kuiper & De Lint, 2008). The current harvest is not equal to the potential harvest: there is organic material that can be 'activated'. For example, in case of Dutch wood from forest and landscape elements about a quarter of potential harvest that is not yet harvest in current practice (Kuiper & De Lint, 2008). Spijker et al. (2007, p.12) estimate that in the Netherlands in total "an annual amount of 1.9 million tons dry matter biomass can be harvested in nature by 2020, based on the current management practices". In the case of WaalWeelde's floodplains, a preliminary estimation is that 'natural floodplains' can produce, in an ideal scenario, 31937 tons dry matter per year (Caspers, 2012). That will, then, be a small 2% of the national amount of biomass from nature in the Netherlands (as presented by Spijker et al. 2007).

Only part of the vegetation harvest is, in the end, suitable as biomass that can be transformed into useful products. There is a difference between the biomass-chain of wood on the one hand and grass and reed on the other hand. Stroming (2011) presents an optimal scenario for landscape management of alluvial wood (taking in 400 present hectares plus 200 future hectares of alluvial wood, of almost 9000 hectares river Waal floodplain's). In this scenario, landscape management is cost-effective, provides sustainable energy, advances biodiversity, within water safety targets (ibid). Of course, the feasibility of this scenario depends on the willingness and necessity to change of current organisations (see 'concerns' in this section, this paper), as well as market prices, market development and governmental subsidies (Spijker et al. 2007). In many Dutch studies, wood from landscape management is related to energy; these studies follow a national 'energy agenda' with reduction of greenhouse gas and promotion of sustainable energy (e.g. Spijker et al. 2007). However, part of wood can be used in a more effective way; that is, with smaller amounts, one can produce more high-quality products in, for example, the forestry industry (in line with the 'cascading principle', e.g. Kuiper & De Lint 2008).

Organic material harvested from natural reed and grassland is mostly used as cattle feed, dried, or composted (Kuiper & De Lint 2008). Experts estimate that about a third of reed and grass harvest is treated as waste. The use of grass and reed for bio-energy is very limited in the Netherlands (Spijker et al., 2007). Logistics are complex since there are only two cutting-moment per year, which requires pre-processing and storage (Kuiper & De Lint 2008). Moreover, due to the chemical composition of grass it is, until now, still difficult and expensive to convert it into bio-energy (Spijker et al., 2007).

An impression of biomass 'concerns'
The potential value of biomass 'matters' in WaalWeelde is also defined by existing 'concerns' around landscape management and biomass (section 2 & figure 1, this paper). Therefore, we explore the practices of key organisations in landscape management in WaalWeelde's region, floodplains and surrounding, taking in their habits, ambitions and structures concerning removal and use of biomass. The impression of 'concerns' is based on interviews with representatives of four key organisations: Rijkswaterstaat (i.e. the executive arm of the Dutch Ministry of Infrastructure and the Environment), Staatsbosbeheer (i.e. Dutch National Forest Service), Agricultural Nature Management Organisations of the WaalWeelde river region (organised in 'SpAN') and Waterboard Rivierenland of the WaalWeelde river region. Interviews were held in February and March 2012. The description of 'concerns' of key organisation is based on these interviews, as well as other references (mentioned in the text).

The role and position of Rijkswaterstaat in floodplain management is major but diverse (see footnote 3, this paper). For Rijkswaterstaat, water safety and shipping conditions are leading objectives in management (e.g. reducing hydraulic resistance and clearing line-of-sights, by the removal of vegetation). The actual management is, in the case of river Waal, mostly carried out by a large contractor, based on multi-annual management. On 'top level', sustainable processing of biomass is promoted though not primary. A focus on biomass is absent 'in the field'; above all, management needs to be feasible and affordable. Likewise, management decisions and activities are mostly focused on a 'short term' efficiency philosophy, rather than on a sustainable but unsure 'long term' philosophy. A shift towards sustainable management requires a huge and difficult cultural shift within Rijkswaterstaat (cf. Van den Brink 2009). Similarly, a 'financial' argument for sustainable management will make more sense than a 'green' argument. Interestingly, a small team of Rijkswaterstaat developed a 'self supporting river system' scenario for the Dutch IJssel river. Self supporting implies a low-cost form of management, by new coalitions, using ecosystem services as 'blue energy', recreation values and biomass (Hamilton-Huisman et al., 2011). The concept of 'self supporting river system' is an ambitious but unusual plan within the technical practice of Rijkswaterstaat. In the 'self supporting river system' scenario, biomass is considered a substitute for petroleum-based materials, instead of a cost (ibid). This idea, however, cannot catch up with the actual planning and implementation of urgent 'Streamline' program of Rijkswaterstaat, which is designed to realise removal of vegetation that hinders straightforward river runoff. The actual owners and managers are responsible for implementation of 'Streamline', like Staatsbosbeheer, being another key organisation in landscape management of WaalWeelde's floodplains.

Staatsbosbeheer is the Dutch National Forest Service; it is an independent administrative body, privatised but commissioned by the government (http://forestportal.efi.int). Staatsbosbeheer is manager of about 60% of the area in Dutch floodplains designated as Ecological Network (i.e. nature policy; that is about 25% of floodplains covered with vegetation, i.e. about 17% of total floodplain area in

the Netherlands). Thereby, it is considered as a major landscape manager in floodplains, together with major player Rijkswaterstaat. Staatsbosbeheer has a pragmatic or adaptive approach to its management task: notwithstanding its main focus on nature, it connects with other land use functions that are 'on the agenda' and accordingly cooperates with other players in spatial policy. In the case of WaalWeelde, recreation, nature and water safety targets are combined. With regard to processing of biomass, Staatsbosbeheer can be considered as an experienced player. Staatsbosbeheer has considered biomass as a product of its main task instead of as a waste for years. Biomass, wood and grass, has accordingly 'a positive value'. For example, wood is used in wood products as paper, as well as sold for the production of bio-energy (www.staatsbosbeheer.nl). Staatsbosbeheer has a subsidiary company, Biomassa BV and is also involved in BioEnerco BV (www.staatsbosbeheer.nl). These companies facilitate agreements between wood supplier and processors, taking in mostly Staatsbosbeheer's wood but also wood from 'third parties' to fulfil agreements. In line with legislation, Energiehout BV has restricted its transactions of wood from 'third parties' (ibid). This restriction will be supported by entrepreneurs in the Dutch wood sector (www.avih.nl); however, this restriction may complexify the possibilities of cooperation with other, smaller, biomass suppliers. An example of a small biomass supplier are farmers.

Dutch farmers involved in landscape management often cooperate in Agricultural Nature Management Organisations; in river Waal region, these organisations are in turn organised in a support centre (i.e. 'SpAN'). Farmers can deliver biomass from maintenance of landscape elements in WaalWeelde floodplains, as well as from horticulture and arable crops in WaalWeelde surrounding. The total amount of biomass, however, will be restricted in comparison to other suppliers. In WaalWeelde's farming practice, organic material is collected by contractors, against payment. In part of the river region, willow material is collected by people from the regional zoo, for free. The willingness of farmers to change this practice into a more sustainable and efficient way is limited. A practical restriction is the actual small amount of biomass. Moreover, it is difficult to compete or connect with larger biomass suppliers as they have binding agreements with other companies. A possible scenario for farmers in WaalWeelde is to focus on high-quality products, as aspirin from willows, rather than on energy production; this scenario requires innovative techniques but small amounts of biomass. Finally, the Agricultural Nature management Organisations will be inspired or assisted by innovative initiatives concerning sustainable processing of biomass by other landscape managers. An example of an innovative initiative is the 'Energy Factory' concept of Waterboards.

Dutch Waterboards are owner and/or responsible for management of a network of waterways and embankments, roadsides and dikes. In the specific case of WaalWeelde's river floodplains, Waterboard Rivierenland is responsible for management of river dikes. Normally, management is outsourced to contractors; contractors, thereby, become holder of organic material. These contractors are not yet bounded to rules about the processing of organic material; however, setting green conditions is a sensible possibility. Contractors mostly compost green material; wood

is processed as either waste or in the wood industry. Waterboard Rivierenland is not directly intended to build digesters herself; the private sector needs to take the lead, in line with Waterboard's public -therefore restricted- function. This caution to extend its function is led by risks in legislation and investments. Companies are willing to produce energy and contact Waterboard Rivierenland but most initiatives do not succeed. Nevertheless, Waterboard Rivierenland joins some regional digesting initiatives, as cooperation with farmers (e.g. providing manure as essential adding to organic material in digestion). Transport is considered as a possible breaking point of regional initiatives, trust as a requirement. Moreover, Waterboard Rivierenland investigates sustainable methods for processing its 'green flows' as an alternative to conventional methods; this exploration is rooted in a climate and energy agenda but mostly led by financial drives. Finally, in contrast to its reserved attitude towards new functions, various Waterboards have the ambition to realise sludge digesters in combination with sewage water treatment (i.e. an 'Energy Factory', an idea rooted in a challenge of the Dutch Association of Regional Water Authorities, Kiestra et al., n.d.). Accordingly, Waterboards will become energy producers (ibid). Biomass other than sludge, however, does not play a key role in the Energy Factory concept.

4. Conclusions & discussion

Limited 'matters'

WaalWeelde's biomass 'matters' take in wood, grass and reed. Preliminary results show relatively small amounts of potential biomass in WaalWeelde (Caspers, 2012). However, studies show that current harvest of biomass from nature and landscape in the Netherlands can be increased by different, more active, management (Spijker et al., 2007, Kuiper & De Lint, 2008). This is an interesting assertion in the light of WaalWeelde's spatial qualities: different management can increase biomass harvest, as well as improve landscape quality and water safety (cf. Stroming, 2011). Moreover, part of biomass harvest in the Netherlands is still treated as a waste (Spijker et al., 2007, Kuiper & De Lint, 2008). In theory, biomass is processed in an optimal way if one follows the cascading principle, striving for 'high-quality' products. In practice, 'low-quality' product bio-energy is on the Dutch policy agenda, whereas the actual market, logistics and techniques are still negative. In the end, in the light of making landscape management in WaalWeelde more efficient, it is crucial that profit is invested in landscape management and not lost 'outside'. Overall, we indicate the total value of biomass 'matters' in the case of WaalWeelde, at the moment, as *little* (figure 2). 'High potential' can be reached by improvement in logistic and energy-processing techniques. In addition, cooperation between various landscape managers within WaalWeelde's floodplains (as 'taskforce river flood plain management'), as well as on regional WaalWeelde scale (cf. Stremke & Koh, 2010) can bundle biomass value and push WaalWeelde's position in comparison to other Dutch regions. The willingness and necessity of landscape managers to cooperate depends on the 'concerns' of organisations involved.

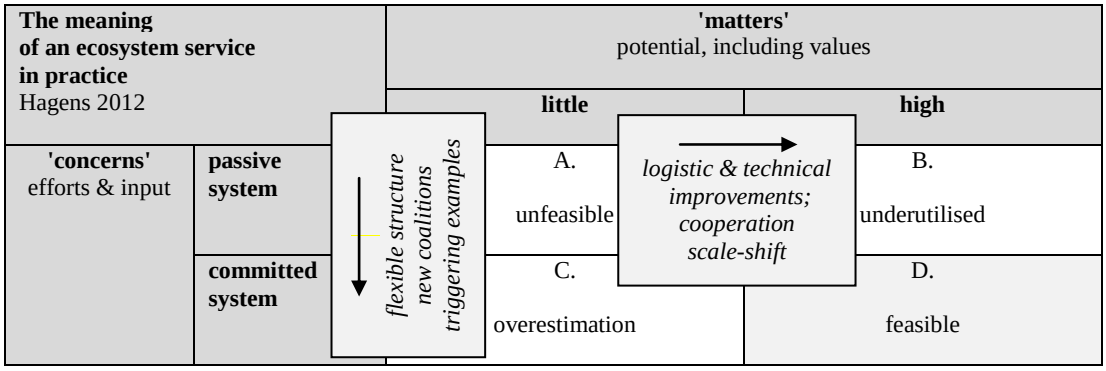
A hesitant system

Participants of WaalWeelde's river flood plain management conference were enthusiastic and had ideas about the use of biomass to improve landscape management (see section 1, this paper): they had high expectations, though some were cynical. Then, a more detailed analysis of the 'concerns' of key organisations involved in WaalWeelde's landscape management shows a more complex reality. Each organisations is willing to use biomass in a more sustainable or cost-effective way. These ambitions, however, are not easy to realise. For example, initiatives risk stranding on 'top level' (case of Rijkswaterstaat). Other ideas are often too 'small' to compete with other initiatives (case of Agricultural Nature Management Organisations & Waterboard). The willingness or necessity to cooperate is sometimes hindered by legislation or binding agreements. Likewise, change is difficult if practices have strong but inflexible structures and discourses (cf. Moulaert et al., 2007). In the case of landscape management in WaalWeelde, a 'biomass and energy' discourse is inactive and overruled by the hegemonic battle between 'nature' and 'water safety' discourses. Overall, based on the impression of 'concerns' of key landscape managers, we define a small part of the system as *committed* due to some biomass initiatives but most part of the system as *passive* due to rigid structures in practice.

Spatial planners and ecosystem service biomass

The current meaning of ecosystem service biomass is, without change, *unfeasible*. Directions towards a feasible scenario are summarised in figure 2.

Figure 2 The meaning of an ecosystem service in practice: towards a feasible scenario



In short, a feasible scenario requires cooperation between both old and new planning participants. Spatial planners can play a key role in organising this cooperation. Likewise, they are essential in realising a feasible ecosystem service. Starting point is to relate the potential of ecosystem services with nowadays planning problems. Moreover, planners need to show how existing structures can be 'opened up', without losing functional power.

Discussion
Is it right to explore, market-based, alternatives for governmental financial cuts in landscape management? Likewise, does a 'utilitarian calculus' neglect esthetical and ecological perspectives (cf. Spash, 1997), which are vital to beautiful and sustainable landscapes? Is it right to promote 'green energy' from biomass, which may not be the most sustainable solution? As spatial planners, in research and practice, it is our job to present and discuss 'unthinkable' alternatives. The meaning of ecosystem service biomass in the case of WaalWeelde's management seems limited but the exploration in fact shows vital conditions for making other ecosystem services operational in dealing with planning challenges.

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