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# Combinatorial perspective on ideas, concepts, and policy change

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## ABSTRACT

The evolution of environmental policy is increasingly driven by the emergence and interaction of policy concepts and the frameworks, knowledge, and ideas they employ. We argue that policy actors' creative use of policy concepts often leads to their *combinatorial development*. In this policy process, the concepts interact and shape each other's policy relevance and future development under the influence of ideas, knowledge, and political factors. We formulate this new research approach using ideational and policy process theories. In particular, we explicate internal and contextual *combinatory elements* that enable policy change resulting from mutual development of policy concepts. For an empirical demonstration, we analyze the conceptual innovation, rise, and ramifications of nutrient recycling as a new segment of Finnish environmental policy.

**KEYWORDS** Conceptual innovations; policy ideas; policy change; environmental policy; nutrient recycling; circular economy

## 1. Introduction

'*Politics is an art of possible*' (von Bismarck; see Ratcliffe 2018) is one of the common phrases used to describe politics. In the realm of politics, 'the possible' can be created, and to that end, concepts can be effective tools. Policy concepts are small – usually a word or two long – mission-oriented packages that might carry a large set of meanings and implications for policymaking. Through concepts, actors '... apprehend the world, vest it with meaning, reason about issues, argue over the path forward, and act' (Meadowcroft and Fiorino 2017, p. 2). Nonetheless, concepts are often taken as given and used without much reflection in public discourse.

In policy studies, the role of ideas and concepts has been accentuated so heavily that there has been talk of 'an ideational turn' (Blyth 1997, Cox and Béland 2013), and thus research has been contemplating 'how ideas matter' in policymaking (Béland and Cox 2011). Meadowcroft and Fiorino (2017) approached ideational analysis in the context of environmental policy, where

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the number of policy concepts has proliferated in recent decades. Consequently, the global evolution of environmental policy is strongly driven by the emergence and interaction of policy concepts and the frameworks, knowledge, and ideas they employ (also, Warde *et al.* 2018). As their theoretical contribution, Meadowcroft and Fiorino (2017) started organizing the repertoire of environmental policy concepts and theorized the process of how a concept can become policy-relevant. The authors discuss the latter as the process of conceptual innovation in which the ‘career’ of a concept is traced in the policy sphere through its institutional embedding. This refers to the diffusion of the concept to the utterance of political intent, which different policy documents represent, and to how widely the concept is uptaken by relevant actors.

We claim that the proliferation of environmental policy concepts is producing a new tendency in public policy that is not addressed in the prevailing theories of policy change (e.g., Araral *et al.*, 2013). We call it *combinatorial development*, taking our inspiration from Joseph Schumpeter’s (1934) idea of conceptualizing innovations as new combinations and Brian Arthur’s (2009) similar ideas of technological development. In this process, policy actors use policy concepts creatively in combinatorial ways when seeking ‘the possible’ in policymaking, potentially resulting in ideational change that occurs through combinations. In combinatorial development, policy concepts interact and shape each other’s future development in a process mediated by ideas, knowledge, and political factors. The combinatorial development can be revealed by empirically analyzing the life cycles of policy concepts during long-term policy processes.

We lean on theories of policy processes and ideational change to create a framework for policy change research from a *combinatorial perspective*. The essential pieces in our approach are *combinatory elements*, and our analysis focuses on them. With combinatory elements, we refer to different types of factors that facilitate combinations of policy concepts when they are activated either by policy actors or by contextual shifts during the policy process. Hence, we argue that combinatory development depends on purposeful human action and processual dynamics, both of which influence the way in which a policy process evolves (Capano 2009, Bidart *et al.* 2013).

We came across combinatorial dynamics in our case analysis of the novel policy concept of *nutrient recycling (NR)* in Finland, and thus, we started to build our theoretical insight primarily from an empirical case study (Eisenhardt 1989). The Finnish NR policy of 2010–2019 proved to be a fruitful case of combinatorial development for several reasons. First, the case exemplifies a long-term ideational evolution in environmental policy. The idea of NR emerged as a policy solution to the long-term eutrophication problem of the Baltic Sea (Jönsson and Karlsson 2020), crucially complementing the previous science-based concept of nutrient load

measuring nutrient leaching (Schindler 2006). Therefore, our case shows how NR's influence grows and evolves through combinations in a national setting. In the middle of its journey, it interbred with the circular economy (CE), which has been one of the key environmental policy concepts in Finland since 2014 (e.g., Nylén and Salminen 2019). Combination between NR and the CE had national-level consequences and was a striking example of combinatorial development. Second, basic research on Finnish NR policy is available (Kuokkanen *et al.* 2017, Humalisto *et al.* 2020, Nylén 2021). In technical terms, NR refers to ways of processing or utilizing nutrient-rich biomasses (mainly nitrogen and phosphorus) as fertilizers (Hidalgo *et al.* 2020). Altogether, we were able to trace NR's ten-year journey from idea generation to being institutionalized as a segment of national environmental policy.

## 2. Theorization of combinatory elements in ideational policy change

Various frameworks of policy processes have been developed to explain why, how, and when policy changes occur (Araral *et al.*, 2013). The punctuated equilibrium model developed by Baumgartner and Jones (2009) helps to understand how environmental policy concepts affect policymaking. The model focuses on policy problems and solutions and explains how policy change occurs in bursts because of the process of issue expansion. Bursts occurs either through the mobilization of enthusiasm or criticism. In both, new ideas are driven onto the policy agenda (agenda setting), mostly by expert actors (e.g., bureaucrats, policy entrepreneurs, scientists, planners), but also by the media. As issues expand, more actors and policy venues (decision-making forums) become involved. During the wave of enthusiasm, new institutions are created (e.g., policy subsystems), which remain an institutional legacy until the surge of criticism destroys or significantly alters those institutions.

The punctuated equilibrium model highlights external perturbations that shape policymaking and its related use of policy concepts. Process sequencing (Howlett 2009, Daugbjerg 2012) is a necessary complementary approach because it more effectively explains the endogenous development of a policy process. Process sequencing emphasizes connections between events in different periods as reiterated problem solving. In problem-solving, previous events – such as policy concepts adopted in the past – are connected by the attempts of policy actors to solve present policy problems. Previous events become reactive for endogenous reasons, such as learning (Howlett 2009, Daugbjerg 2012) and can, for example, enable and guide

combinations between previously adopted and new policy concepts. The likelihood of such combinations increases under the circumstances of agenda-setting and issue expansion (Baumgartner and Jones 2009).

Together, these two models elucidate the general circumstances for combinatorial development. However, the combinatorial elements that enable combinatorial development must be specified.

First, policy actors adopt a concept if they perceive it as a potential solution to the problem. Preferably, the concept should appeal to a variety of constituencies and have some affinity with dominant ideas and practices (Mehta 2011, Meadowcroft and Fiorino 2017). Similarly, Martin Carstensen (2011) discussed ideational change with the term *bricolage*, which refers to a situation where an actor ‘... takes stock of his existing set of ideas, policies, and instruments and reinterprets them in the light of concrete circumstances’ (p. 156). Fundamentally, bricolage is about combinations. Carstensen notes that the meaningfulness of a combination depends on whether it is perceived as acceptable by different audiences or the actors themselves.

Accordingly, we distinguish *internal combinatory elements* in which we include the concept’s *idea content* and its *attractivity*. Meadowcroft and Fiorino’s (2017) contribution, and our case analysis of NR, show how environmental policy concepts are born in a process of defining problems and providing solutions (Mehta 2011) and are shaped by previous events (Howlett 2009, Daugbjerg 2012). As such, the generation of a policy concept is a combinatory process in which the most visible outcome is compressed to a single word or two, but the outcome also carries *components* of its making.

Attractivity refers to factors that make concepts *gravitate* toward combinations. Cox and Béland (2013) have discussed similar phenomena with the term *valence*. It refers to ‘the emotional quality of an idea that makes it more or less attractive’ (p. 307), which is determined by the idea’s timeliness, abstractness (and normative appeal), and usefulness to the actors. Valence clearly defines the attraction factors of a policy concept and explains why actors utilize some concepts. However, to us, attraction is not only consensual. During waves of criticism (Baumgartner and Jones 2009, Carstensen 2011), attraction factors may force combinations to take place.

Second, the *contextual combinatory elements* include media coverage, parallel policy concepts, policy instruments, and venues used by policy makers in promoting a particular solution and a wider ideational terrain, which refers to deeper sociopolitical factors favoring certain ideas and concepts at a given moment in time (Baumgartner and Jones 2009, Carstensen 2011, Mehta 2011, Carstensen and Schmidt 2016, Béland 2019).

In summary, internal and contextual combinatory elements create the theoretical core of our framework for combinatorial development research. In the discussion section, we refine and finalize the framework based on our case study findings.

### 3. Methodology

According to the methodology we developed, the analysis of combinatorial development relies on tracing the influential use of the policy concept and how various points of combinations affect the concept's policy relevance and institutionalization during the policy process. We came across combinatorial dynamics in an empirical case analysis (Thomas and Myers 2015) of NR as a conceptual innovation (Meadowcroft and Fiorino 2017). Consequently, we began to theorize the combinatorial perspective using iterative cycling among the case data, emerging theory, and research literature (Eisenhardt 1989). Refinement of combinatory elements is essential to the process. We encountered combinatory elements as preliminary patterns of empirical evidence during our tracing of NR's institutional embedding, and we used these patterns to build our theoretical constructions.

To use data triangulation and eliminate alternative explanations, we drew on the systematic process analysis developed by Claire Bidart *et al.* (2013). This analysis guided us to use process sequencing (Howlett 2009) as part of our theory building. Bidart *et al.* (2013) separated context, sequences, turning points, and driving forces from the studied process to explain what happens and why. Context can be unveiled by separating its 'ingredients' – these are situations, events, and actions crucial to the development of the process. A sequence is defined as a stable period that has a particular configuration of ingredients in a coherent but dynamic interaction. A sequence can change to another sequence by a relatively gradual change in ingredient configuration or by a radical one, which then becomes a turning point where the process takes a sudden turn. Driving forces keep the process in movement: 'the respective dynamics of the contexts, ingredients, organizations, and individuals involved in the process' (*ibid.*, p. 748), which in our analysis means combinatory dynamics triggered by policy actions.

Our main data consist of relevant policy documents and key actor interviews, complemented by newspaper data (Table 1). The document data include 12 policy documents and policy-relevant studies that we evaluated as primary to NR policy. The documents were analyzed qualitatively from the perspectives of why the document was made; how the document, or parts of it, contributed to NR policy; and how the document reflected the state of NR policy at the time (Appendix 1).

**Table 1.** Research data for the case study analysis of Finnish NR policy.

Data type	Number
<b>Newspaper articles</b>	
Helsingin Sanomat	44
Maaseudun Tulevaisuus	117
<b>Documents</b>	
NR-related policy documents	12
<b>Interviews</b>	
Ministry of Environment (MoE)	2
Ministry of Forestry and Agriculture (MoF&A)	1
Politicians (former ministers)	2
The Finnish Innovation Fund: Sitra (think-and-do tank, influential in national agenda setting)	1
Baltic Sea Action Group (NGO working for Baltic Sea preservation, well-connected to the Finnish policy makers)	2
The Central Union of Agricultural Producers and Forest Owners (MTK) (Interest group)	1
LUT University (had a system change research project initiated by NR policy)	1
Chemical fertilizer producer company	1
NR entrepreneur/researcher	1

We conducted semi-structured interviews with 12 key actors from 2016–2019. They represented the primary institutions active in NR policy; thus, all the interviewed actors had been able to influence NR policy. Five of the informants also practiced NR by farming and/or selling NR products. For the selection of interviewees, we utilized document data and the snowball method. The newspaper and document data informed the thematic interview questions, which included themes of the development of NR policy and how the actor became involved, NR as a policy concept, NR as a field of industry, and reflections and assessments of NR policy thus far. The questions varied slightly depending on the interviewee. The aim of the interviews was to gain a more nuanced view of the proceedings of NR policy and how they are perceived by key actors and institutions. The interview data were transcribed before the qualitative content analysis.

Newspaper data were gathered from *Helsingin Sanomat* (HS) and *Maaseudun Tulevaisuus* (MT, ‘The Rural Future’). The focus of MT is on the forest and agriculture sectors, but it also reports on the news. In 2018, the estimated readership of MT (print and digital) was 509,000 per week. HS is the leading newspaper in Finland, with 1,716,000 readers per week (Media Audit Finland 2019). As a data source, HS represents the national news threshold and public discourse, while MT represents the discussion of NR within its own sectors. Articles were searched for in the newspaper’s archives using relevant Finnish keywords for NR (‘ravinteiden kierrätys’, ‘ravinnekierto’, ‘ravinteiden kierto’). Science articles on nutrient cycles were excluded from the data.

We used frame analysis to examine topics in each news article; these topics can be understood as building blocks in the framing of NR for readers. Framing is one of the central activities of the news media (Jönsson and

Karlsson 2020). Media reporting and framing are typically the most active when the issue–attention cycle is rising. In turn, the interest of the news media most likely declines when policies are in place (Bakaki *et al.* 2020). We also used content analysis to study the volume and frequency of media attention. For this purpose, we organized the topics in an Excel spreadsheet (separately for HS and MT) to obtain the total counts of each topic and their temporal variance.

To understand the combinatorial development of Finnish NR policy and the role of different combinatory elements in it, we used two operative research questions: (1) How did the key actors, media attention, and events influence the concept? (2) Why and how did the NR concept maintain policy relevance during its life cycle?

The limitation of our study is that it relies on a single case study. However, the reliability of our results and arguments derives from our informative case selection, systematic analysis, valid data selection, and triangulation along the iterative research process, as well as the extensive use of central research literature.

## 4. Analysis

The analysis consists of four subsections. The first three help to extract points of combinations and combinatory elements from the policy process (timeline, media attention, and features that draw combinations). We conclude the analysis with a presentation of NR policy's combinatorial development and explain why NR became a forceful policy concept.

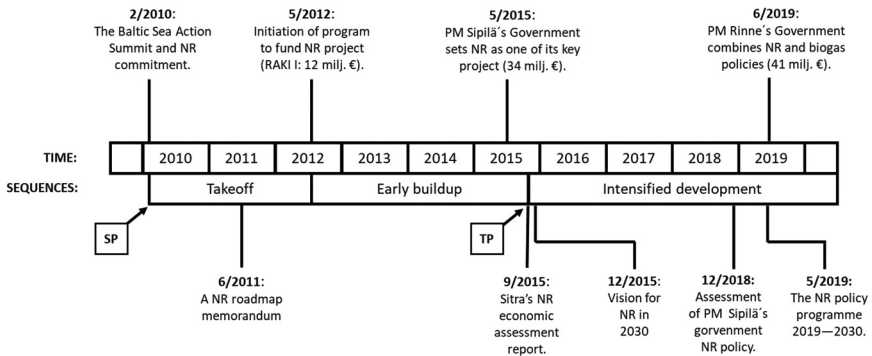
### 4.1 Processual development of Finnish NR policy

Figure 1 presents the timeline and sequences of Finnish NR policy. Next, we analyze the evolving arrangements that shaped the specific dynamics of the policy process, which occurred in three sequences.

#### 4.1.1. Starting point

Finnish NR policy began in quite an unorthodox manner. In February 2010, NR was set as a policy objective at the international Baltic Sea Action Summit without much background work, even though the origin of the policy, eutrophication, had been a persistent problem for decades. Earlier efforts focused on how to protect and mend the water from nutrient overload (PM's Office, 2009). This history makes NR a symbiotic complement to two science-based concepts from the last century: eutrophication and nutrient load (Schindler 2006).





**Figure 1.** The evolution of the Finnish NR policy process, including starting point (SP), three sequences, and turning point (TP).

The summit gathered high-level decision makers from coastal states of the Baltic Sea and actors from the private and third sectors. The idea of the summit was that each participant would present a so-called ‘Baltic Sea commitment’ of measures to improve the state of the sea (BSAG 2021). In the beginning, the drafting of the Finnish Baltic Sea commitments followed the lines of ‘water protection policies,’ but during the drafting process, two of the summit’s organizers, the Baltic Sea Action Group (BSAG) and PM Matti Vanhanen, with his staff, saw an opportunity to raise the thematic level of the commitment from water protection to include ideas of nutrient recovery and closed loops. This combination led to the inclusion of NR as one of the commitment’s highlights (PM 2010). This was surprising to interviewees who were not involved in the drafting.

The idea of NR was not completely unanticipated. The first public contribution to NR was in an op-ed article, ‘*The Baltic Sea is a test site for sustainable development*’ (HS 1999). The article proposed that nutrient recovery should be emphasized as a method to improve the state of the Baltic Sea. One of the article’s writers was a co-founder of BSAG, the same Finnish NGO that later put forward the idea of the summit to the PM and the president.

#### 4.1.2 Takeoff and early buildup

After the summit, the first policy measure was the formation of a working group to produce a roadmap (MoA&F 2011) for fulfilling the NR commitment. The group included key stakeholders, and it received surprising prestige as it was led by the then-former PM Vanhanen (Centre Party, the main agrarian party in Finland), who had resigned from office on 22.6.2010. Additionally, the roadmap process instituted an advisory board called the ‘RAKI-group,’ which managed measures for the NR policy. The

RAKI-group consisted of the Ministries of Environment, Finance, Agriculture and Forestry, Economic Affairs and Employment, and Business Finland (funding institution). The NR policy's takeoff turned into an early build-up when the first funds for NR projects were made available (MoE 2012). This meant that grassroots-level actors were mobilized to develop NR.

#### 4.1.3. *Turning point to intensified development*

In 2015, the NR policy took a significant step forward, which we understand as a turning-point event. First, the government of PM Juha Sipilä (Centre Party) set NR as one of its key projects (PM's Office 2015) and thus channeled more funds to the NR policy, initiating over 100 NR-related projects with an emphasis on sustainable business and technology (Ramboll 2018). Second, the nationally influential think tank Sitra contributed by publishing a report (Sitra 2015) on the economic value and opportunities of NR. This started to change the way NR was seen: (1) it clearly attached NR to the Finnish CE movement, which Sitra has promoted since 2014 (Nylén and Salminen 2019), (2) it emphasized the economic and business opportunities of NR, and (3) it receded from the formerly evident link between NR and water protection. The report also analyzed bottlenecks inhibiting the NR transition, but a consult study (Kristiina Mikkola consulting, & Fiant 2014) conducted such analysis more thoroughly. The consult study examined regulatory constraints, economic feasibility, and whether project funding was too uncoordinated a method for the NR transition.

The turning point started the co-evolution between NR and CE. As NR gained traction, and more actors contributed to its promotion, the RAKI-group concluded they need to intensify policy steering. First, the RAKI-group (2015) prepared a vision for NR to avoid dispersal communication and an overlap of actions. The line ministries, MoE and MoA&F, then commissioned an analysis of the status of NR, the adequacy of the government's performance, and the measures needed for NR transition (Marttinen *et al.* 2017, Ramboll 2018). This helped the RAKI-group (2019) to outline an NR action plan. In 2018, a guide to NR product manufacturers (Tampio *et al.* 2018) showcased how NR was being established as a business, but it once again discussed inhibiting factors of NR transition. The government tenure<sup>1</sup> of PM Rinne (Social Democratic Party) began in June 2019, and his cabinet also placed NR on the agenda (PM's Office 2019).

## 4.2. The role of media attention

The print media provided publicity and discussed NR in a wide range of topics during the research period. In [Table 2](#), each topic and its occurrences are placed in one of seven categories, and the percentage of each category is calculated based on the occurrences.

Different readership volumes and profiles of the papers were evident in the data. Articles in MT discussed the subject more widely and in detail. For example, in the ‘Problems to solve’ category, MT focused more on the practical issues of turning the idea of NR into agricultural practices (e.g., logistics:  $n = 10$ , harmful substances:  $n = 8$ ), while HS focused more on the environmental problems that NR tries to solve (e.g., eutrophication:  $n = 11$ , sufficiency of phosphorus:  $n = 7$ ). In ‘Political steering,’ op-eds and opinion pages in HS were used as argumentation forums by decision makers and experts. Overall, six op-eds, 14 opinion pieces, 21 news articles, two columns, and one satire piece were published in HS. Meanwhile, in MT, 73 articles were news articles, and 44 articles were editorials, op-eds, opinion pieces, columns, or announcements.

Media attention helped NR policy by framing NR as a worthy topic and reflecting its wide usefulness. Through this agenda-setting, the media became part of the NR policy process (cf. [Wanta \*et al.\* 2004](#)). Reporting was initially sparse in 2010. Both newspapers published five NR-related articles. During the turning point in 2015 ([Figure 1](#)), NR received the highest coverage (HS: 2015,  $n = 13$ ; MT: 2015,  $n = 20$ ; 2016,  $n = 20$ ). Only some minor doubts (economic and agricultural) arose in the opinion pages of HS ( $n = 4$ ) when [Sitra \(2015\)](#) defined NR as one of the CE’s key initiatives.

After the peak in 2015–2016, the coverage was relatively low, which is in accordance with the expectation that policy outcomes would decrease media attention ([Bakaki \*et al.\* 2020](#)). After 2015, HS published 10 articles on NR, of which six were news, while between 2016 and 2019, MT released 31 articles that were mostly news of studies, projects, and NR business investments. It seems to us that NR’s institutional embedding was well advanced in 2019, when the role of NR did not emerge in reports on negotiations for the government program of PM Rinne, even though NR policy received a bit more funding than before. In contrast to the previous cabinet, this government program emphasized economic stimulus instead of austerity and combined the idea of NR with biogas production instead of a stand-alone top policy initiative (PM’s Office [2019](#)).

Table 2. Results of newspaper data analysis.

	Political steering	Raw material for NR	Problems to solve	Measures & Technologies	Objectives	Links to other industries	Links to other phenomena
<b>Helsingin Sanomat</b>	10	5	8	6	8	7	1
Number of topics							
Number of occurrences of topics	35	24	27	10	20	19	1
<b>The percentage of the categories</b>	<b>26</b>	<b>17</b>	<b>20</b>	<b>7</b>	<b>14</b>	<b>14</b>	<b>1</b>
<b>Maaseudun Tulevaisuus</b>	16	8	18	8	10	10	12
Number of topics							
Number of occurrences of topics	59	61	71	29	42	46	16
<b>The percentage of the categories</b>	<b>18</b>	<b>19</b>	<b>22</b>	<b>9</b>	<b>13</b>	<b>14</b>	<b>5</b>
<b>Examples of topics</b>	Policy measures; European Union; The Baltic Sea commitment	Manure; Sewage; Urea	Eutrophication; Logistics; Sufficiency of phosphorus	Product development; Phosphorus recovery; Pilots & experiments	The circular economy; Improvement of soil; Carbon sequestration	Biogas; Fishery & fish farming; Forestry & forest industry	Bioeconomy; Clean tech; Proteins

### 4.3. Policy features activating combinatory elements

#### 4.3.1 Attraction

During its lifecycle, NR has been an attractive policy concept for four reasons. First, it combines productively with policies of the environment, economy, and security. For the environment, eutrophication is the biggest issue. As most nutrient leaching from the point load is controlled, the focus has turned to the diffuse load from agriculture. More nutrient load control is expected from the agricultural sector, leading to a demand for solutions like NR that can temper the debate. However, eutrophication of the Baltic Sea is a complex issue, and solving it requires more measures than efficient NR (e.g., Kuokkanen *et al.* 2017).

Economically, NR policy is expected to create new markets for NR products and practices. The new solutions would be environmentally sound and generate additional economic value, new business opportunities, jobs, and exports.

For security, NR is seen as an opportunity to localize one of the key resources of agriculture: fertilizers. This is supported by political consensus that national food production is a security issue (e.g., PM's Office 2015, PM's Office 2019).

The second reason for its attraction is that NR is experienced as 'apolitical enough'. One of the interviewed politicians illustrated this:

I haven't recognized [the] same kind of passions which are present, for example, when employment measures are discussed . . . [With NR] there is a trust that officials and research institutes produce proposals which are good. There isn't [a] politically right or wrong way to recycle nitrogen or phosphorus.

Third, NR was set to a self-reinforcing path with a running start courtesy of the NR commitment. The interviewed politicians assessed NR carried weight for future government agendas because the concept was initiated as international commitment. Consequently, NR's policy relevance grew along the way (Figure 1: roadmap, project funding, government's key project). This 'enlargement' gave NR the gravity needed to attract more actors to make sense of, develop, and implement it.

The fourth is popularization. This is the forte of the two policy intermediaries, Sitra and BSAG (Table 1), which have introduced NR to a larger audience. For example, a co-founder of BSAG published six op-ed articles about NR in MT from 16.1.2013–6.7.2016. More importantly, BSAG funders started a company to show how NR can work as a business, and it received media attention.

### 4.3.2. Connectivity

Despite NR's wide attractivity, it still raises the question of why a specific part of the food system has received so much political attention. One reason is that NR acts as a connector, which means that it engages with other political objectives or acts as a steppingstone to other agendas.

NR technologies and practices started to build an industrial symbiosis by linking NR to other industries. Therefore, NR had ideational compatibility with the CE – which, in short, promotes ‘a closed loop economy’ – that was activated by Sitra (2015) as they framed NR as a spearhead application of the CE in Finland. The most apparent link was between NR and biogas because biogas production produces nutrient-rich waste streams. This link was also activated in PM Marin's government program (PM's Office 2019), continuing the political efforts to promote biogas production since the 1990s.

Because of the NR policy's strong link to measures for water protection, the subject arose frequently in interviews. Most discussed was applying lime and gypsum to fields to decrease nutrient leaching. Experiments with gypsum have been funded through NR policy (SAVE 2021).

NR was a steppingstone for LUT university researchers to apply a ‘system change’ perspective and tools to push food systems toward sustainability through research. NR was an entry point to this (LUT University 2014). Furthermore, BSAG has modified the idea of NR to include climate policy, and to them, this combination is called *carbon farming* (*hiiliviljely*). It refers to regenerative farming as a carbon sink (Carbon Action 2021). This represents an ideational evolution of NR into a new conceptual innovation that combined the carbon cycle with the cycles of nitrogen and phosphorus. Additionally, one of the promotional arguments for NR has been that the carbon content of NR products improves the growing conditions of farmlands (Hidalgo *et al.* 2020, Kinnula *et al.* 2020).

NR has started to diffuse from fixed-term project funding programs into more permanent structures. One of the interviewed officials saw ‘The Development Fund for Agriculture and Forestry (MAKERA)’ as an important example:

The key project [of PM Sipilä's government] is a small thing and MAKERA is a big thing. [MAKERA] provides counseling [for farmers], investment aid and initiates different kinds of cooperative experimentations ... Through MAKERA, [NR] can spread to practices in the whole country.

Finally, NR policy connected relevant ministries through the advisory board (RAKI-group). The board lobbied during negotiations for government programs to ensure that NR stayed on the agenda.

### 4.3.3. *Controversies at the edges of the concept*

In the whole data set, nobody contested the idea that nutrients should be recycled. Even though one of the ideas of NR is to replace chemical fertilizers (CF), the interviewees from the CF company stated that the company is willing to develop NR products and has already launched them. However, we found several subjects of controversy at the edges of the concept of NR, which undermined the transition toward NR or argued that more should be done to accelerate it.

These struggles are derived from the physical, chemical, and economic nature of NR products. As such, CFs have various benefits for farmers. CFs are lightweight concentrated grains that are distributed to the field during sowing. This ensures that fertilizers are in the right place at the right time to give a growth boost to the crop (Huttunen and Oosterveer 2017).

Regarding the physical nature, some actors argued that NR products should be developed into physical forms of concentrated grains, such as CFs. Most NR products are currently nutrient-rich biomasses. Meanwhile, proponents of NR articulated that NR products not only fertilize but also improve the state of the field by adding carbon to the soils. This was contested by one interviewee, who argued that carbon content and soil fertility are not problems in Finnish fields. Overall, in four interviews, agronomy was used as an argumentative resource for determining the best method of fertilizing.

The chemical nature of NR products was tied to concerns about cleanliness and harmful substances, and the focal point of the controversy was the utilization of sewage (cf. Ekman Burgman 2022). Controversy escalated in 2017, as a few large Finnish mills refused to accept crops that had been fertilized with NR products that included sewage (Tampio *et al.* 2018). Some of the interviewees saw this as a niche issue blown out of proportion, while others saw it as the right measure for ensuring the cleanliness of Finnish fields.

The economic reality of NR products is that their prices are mostly higher than CFs' and markets are local because the cost of logistics limits their economic feasibility. Often, the business model for NR revolves around the fact that somebody can save the costs of waste management, which is usual in waste-to-resource business models (Nylén and Salminen 2019). Proponents of NR argue that this would not be the case if externalities were included in the prices of CFs, and such measures should be imposed:

I haven't seen any structural changes towards price control for CFs or NR products. And it is still possible to incinerate various good biomasses, like wood fibers . . . Such issues should be addressed [with banning] if there is a will to promote NR.

Against the backdrop of these controversies, there was debate about the future directions of the agriculture. One of the visions was the technology-driven model, which is based on increasing the accuracy of cultivation by giving an exact dose of fertilizers to plants at the right time for their growth. Partially related was the

vision of carbon farming (see Section 4.3.2). The final vision was more futuristic and surfaced twice in the data (interview and MT 5.1.2018). It was about shifting from open-field agriculture to a greenhouse type of arrangement, where the dosing of nutrients and light is automatized. A nationally known marine researcher promoted this idea in a newspaper interview for water protection reasons (MT 2018):

NR can be reasonable from the economics perspective, but it won't solve the problems of the waters. The origin of nutrient[s] is irrelevant for the waters if dosing [of fertilizers], acreage and cultivation practices remain the same.

#### 4.4 Combinatorial development of Finnish NR policy

The case of NR illustrates how surprisingly a novel policy concept can rise to a position where it creates a new segment of national environmental policy and then 'leads' this new policy. Figure 2 presents the combinatorial development of Finnish NR policy and shows the interplay of combinatory elements during the process.

Key combinations in the process were the generation of the concept and the interbreeding of the NR and the CE. Both combinations were *catalyzed* by *policy venues*. At the beginning, the Baltic Sea Action Summit gave the actors an opportunity to initiate new policy concepts as an international commitment. In this setup, ideas of nutrient recovery and a closed loop were combined with the objectives of water protection, resulting in the concept of NR.

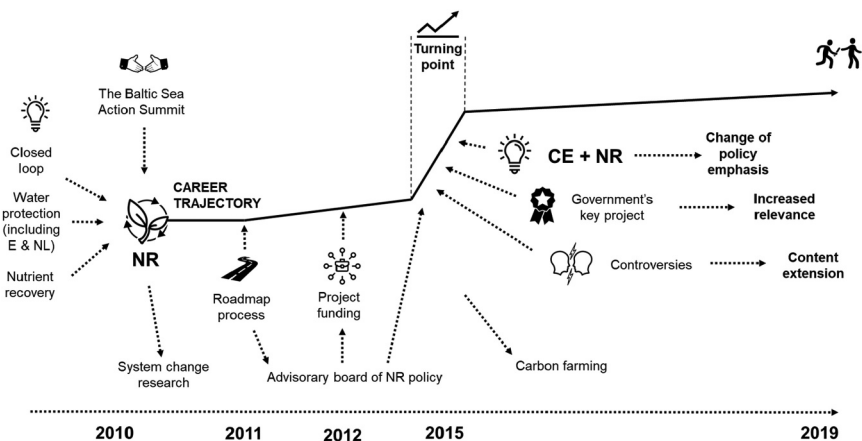


Figure 2. Combinatorial development of the Finnish NR policy (E: eutrophication, NL: nutrient load, NR: nutrient recycling, CE: circular economy).



Despite quite a grandiose initiation, NR did not get much media attention in its early years, but it did attract actors to realize its vision via two *policy instruments*: roadmap and project funding. The roadmap process also initiated the advisory board for the policy. We understand it as a *policy venue* in which different ministries found synergy from NR (aspects of environment, economy, and security) and thus promoted the idea.

At the turning point in 2015, combinations of NR and CE occurred. This was *catalyzed* by PM Sipilä's government program (PM's Office 2015) and Sitra (2015) NR report. Consequently, NR's policy relevance grew significantly and thus increased its *gravity*. This meant that NR diffused to institutional structures (e.g., MAKERA, future images of Finnish agriculture), brought adjacent ideas into its orbit (e.g., gypsum experiment), acted as a stepping stone for new concepts (carbon farming), enhanced developments outside of official NR policy (popularization of NR by Sitra and BSAG), and invoked controversies that affect the *content* of the concept (physical, chemical, and economical perspectives of NR products).

Initially, NR attained success through its affinity with the ideas of eutrophication and nutrient load. Later, it was the combination of NR and the CE that provided longevity for NR policy. This is because the CE made the NR policy recede from its strong link with the water protection policy. Outcomes of NR policy would arguably remain slim if measured by a decrease in nutrient leaching or nutrients recovered from the water. By adding elements such as business, livelihood, and self-sufficiency to the mix, the CE diversified what was expected from the NR policy and resulted in conceptual ramifications, such as carbon farming.

The wider context that we call *ideational terrain* favors NR. From the outset, the Baltic Sea issue demanded novel solutions, and as such, NR was adopted quickly. NR's combination with the CE further paved the way because the CE enhanced ideas like sustainable business, the closed loop, and recovery. Consequently, NR was perceived as an apolitical subject, and its controversies remained at the edges of the concept. The *media coverage* highlighted this interpretation by discussing the usefulness of NR from various angles.

## 5. Discussion

The purpose of our research was to examine the combinatory elements through which policy concepts shape each other and thereby drive ideational change in policy processes. The need to understand these mechanisms is greater than ever before because policy concepts increasingly drive environmental issues onto the policy agenda.

We describe the general conditions for combinatorial development by using the ideas of issue expansion (Baumgartner and Jones 2009) and process sequencing (Howlett 2009, Daugbjerg 2012). Importantly, while path dependency may have explanatory power in some cases of policy concept evolution (e.g., Fitch-Roy *et al.* 2020), our framework takes another line of reasoning. In the case analysis, we found that NR gathered combinatory momentum from the ideas of eutrophication, nutrient load, and the circular economy through reactive sequences and embedded conjunctures, not from path dependency (Howlett 2009).

The conceptual innovations approach (Meadowcroft and Fiorino 2017) provides a rich understanding of the evolutionary mechanisms of how policy concepts are born, thrive, and decay because of other concepts and political contexts. However, this research stream prefers to speak about competition, resonance, and linkages rather than straight combinatorial mechanisms between policy concepts. More broadly, ideational and institutional analysis have made significant contributions to the understanding of policy change and stability (e.g., Béland and Cox 2011, Béland 2019). We agree with Carstensen (2011) that ideational research requires a micro-theory on the specifics of how change occurs.

**Table 3.** Typology of combinatory elements.

Combinatory elements	Mechanisms	Processual dynamics
Content components of the concept	Content production by experts and policy makers: the concept gains its content from connections with ideas, knowledge, and perspectives; these constantly retain, challenge, or reframe the concept's meanings and/or its perceived implications.	Internal
Attraction factors of the concept	Gravitation of the concept: features of the concept that create attraction towards it, draw contestation, and/or enable concepts diffusion to institutional structures.	
Ideational terrain	Structures of ideational terrain in the policy sphere that steer and nudge toward a certain combination, including reoccurring patterns such as policy cycles and issue expansion.	Contextual
Media coverage	Effects of media discussions on a policy concept's relevance based on how its meaningfulness and implications are framed and how intense the reporting is.	
Catalysts	Policy instruments and venues, activated by policy makers, as processual drivers enabling combinations to occur.	
Parallel concepts	The nexus of the process takes place at the moments when at least two policy concepts resonate, find synergy (or controversy), and shape each other's futures.	

The combinatorial perspective attempts to offer an understanding of micro-theory and how ideational policy change occurs and provides tools – combinatory elements – to analyze such processes in detail. [Table 3](#) finalizes our theorization of combinatory elements by discussing their operating mechanisms.

Separation of combinatory elements according to their processual dynamics helps to structure the analysis of combinatorial development. Internal elements focus on the evolving gravity of a concept and on the components from which the concept is generated. As process sequencing and bricolage suggest, these components can be subject to reinterpretation during the policy process (Howlett 2009, Carstensen 2011, Daughjerg 2012).

Contextual combinatory elements account for the dynamics of the policy process. Hence, the contextual elements explain how ideational terrain favors some combinations, how catalysts enable or are imposed to produce combinations, how policy concepts interact and shape each other, and how the media can enhance or derail the career of the concept (Baumgartner and Jones 2009, Mehta 2011, Carstensen and Schmidt 2016).

Media coverage and catalysts are quite clearly demarcated entities, but the rest are more fluid. Most obviously, a parallel concept can turn into a content component of a novel concept, and the attraction factors are not only internal features per se. Instead, what we try to capture with gravitation is the reciprocal influence of policy concepts. The ideational terrain can be the most difficult element to analyze (cf. Mehta 2011). It consists of institutional structures of the moment but also ideas that influence combinations indirectly (Carstensen and Schmidt 2016). Finally, the entire process of combinatorial development is affected by reoccurring patterns, like government tenures, and bursts of policy activity explained by the process of issue expansion (Baumgartner and Jones 2009).

## 6. Conclusion

In this paper, we have attempted to broaden the scholarly discussion on ‘why ideas matter’ with a combinatorial perspective. We see the combinatorial perspective as a fruitful angle of inquiry into public policies because policy concepts and ideas used in policymaking are combinations of ideas, knowledge, and political factors, and they also change through combinations. Tracing how and why actors make these combinations indicates, for example, how the emphasis on policymaking changes in terms of perceived problems and solutions and how some actors and ideas have authority over others. The categorization we present in [Table 3](#) is based on single-case research. It can be used and further developed as a framework for a systematic study of combinatorial policy development from ideational and policy concept perspectives.

We see the combinatorial perspective as especially useful to the analysis of environmental policy because the field is in intensive flux in terms of its conceptual repertoire (Meadowcroft and Fiorino 2017). New concepts are frequently created, like carbon farming in our case, some concepts become outdated (two-degree climate target), and some are reframed, such as changing the term from climate change to climate crisis. Hence, more theoretical insights and greater analytical richness are required for environmental policy research. For instance, as Kern and Rogge (2018) conclude, policy process theories do not address the real-world policy mixes that are needed to manage sustainability transitions toward comprehensive societal change. The combinatorial perspective is potentially helpful because it uncovers how policy concepts can be modified and directed to drive ideational change in cross-sectoral ways.

## Note

1. PM Rinne resigned on 10.12.2019 and the new government of PM Sanna Marin (Social Democratic Party) governs with the same government program.

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## Appendix 1. Summary of document data analysis

Document	Reference	Document's contribution to NR policy
Challenges of the Baltic Sea and on Baltic Sea policy. Government report.	PM's Office (2009)	Report to outline Finland's Baltic Sea policy. Stated that most nutrient discharges to coastal waters originate from agriculture (P 60% & N 50%).
PM Vanhanen's Baltic Sea Commitment	PM (2010)	Finnish governments Baltic Sea commitments: (1) the state of the Archipelago Sea must be made good by 2020, (2) Finland aims to become a leading region practicing NR.
A roadmap to make Finland leading country in the NR.	MoA&F (2011)	Working group drafted a roadmap of measures to meet NR commitment.
Program to promote the recycling of nutrients and to improve the status of the Archipelago Sea 2012–2015	MoE (2012)	Funded projects to improve the state of Archipelago Sea and developing of the NR technologies and practices.
Study of NR of manure and organic fertilizers nationwide project.	Kristiina Mikkola consulting, & Fiant (2014)	Discussed extensively difficulties that NR policy confronts.
Finland, a land of solutions. Strategic Programme of Prime Minister Juha Sipilä's Government	PM's Office (2015)	PM Juha Sipilä's government programme placed NR as one of its key projects.
The economic value and opportunities of NR for Finland	Sitra (2015)	Report places NR as an integral part of the CE and assessed the NR's potential annual added economic value.

(Continued)



Document	Reference	Document's contribution to NR policy
Vision for NR in 2030	RAKI-group (2015)	Articulated vision of the state of NR in 2030: <i>"There has been a breakthrough in NR, nutrient discharges are minimal, and recycling is efficient. Discharged nutrient are returned from the waters to productive use, and the amount of imported fertilizers is small. The NR has created new business opportunities."</i>
Study: 'Towards the NR breakthrough'	Marttinen <i>et al.</i> (2017)	Study analyzed a status of NR and gave recommendations on how to develop policy instruments and measures to effectively further NR transition.
The assessment of PM Sipilä's governments measures of furthering NR and water protection	Ramboll (2018)	An assessment of Sipilä's governments NR and water protection policies.
A guide for producers of NR products	Tampio <i>et al.</i> (2018)	Provided information of NR products (raw materials, process technologies, regulations and marketing) and discussed issues of NR raised by producers.
NR action plan 2019–2030.	RAKI-group (2019)	Action plan present politico-administrative measures how "vision for NR in 2030" is reached.