International Journal of Public Policy

ISSN online: 1740-0619 - ISSN print: 1740-0600
https://www.inderscience.com/ijpp

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DOI: 10.1504/IJPP.2022.10049345

Article History:

Received:	29 November 2018
Last revised:	14 August 2020
Accepted:	07 April 2022
Published online:	08 August 2022

Analysing complex policy problems: a critical review of the literature

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Abstract: The governance of complex policy issues such as food security, climate change, global health, and migration often calls for integrative approaches, as progressing in one goal may result in either synergies or tradeoffs in others. A large body of literature has addressed concerns regarding the multiple combinations of policy instruments, cross-sectoral interfaces and conflicts, governance involving a growing number of stakeholders, governance levels, and policy goals. This study presents a cross-cutting literature review of the different concepts developed to address these challenges, along with their origins, thematic focus, theoretical approaches, and recent developments, aiming to identify their points of contact and to critically analyse their strengths and research gaps. The results are expected to support the academic debate and provide a heuristic outline for research while calling for further theorisation and the development of assessment methods and case studies beyond the traditional geographic focus.

Keywords: policy integration; policy mix; nexus approach; cross-sectoral governance; multilevel governance; literature review.

Reference to this paper should be made as follows: Milhorance, C., Bursztyn, M. and Sabourin, E. (2022) 'Analysing complex policy problems: a critical review of the literature', *Int. J. Public Policy*, Vol. 16, Nos. 2/3/4, pp.126–150.

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1 Introduction

The governance of complex policy issues such as food security, climate change, global health, and migration often calls for integrative approaches, as progressing in one goal may result in either synergies or tradeoffs in others (Candel and Biesbroek, 2016). A comprehensive body of literature has addressed concerns regarding the multiple combinations of policy instruments, cross-sectoral interfaces and conflicts, and governance involving a growing number of stakeholders, governance levels, and policy goals. Policy integration, policy mix, integrated natural resources management, policy nexus, and policy coordination are some of the concepts developed to address these issues (Candel and Biesbroek, 2016; Howlett, 2019; Milhorance and Bursztyn, 2019; Nilsson and Eckerberg, 2007; Roidt and Avellán, 2019; Weitz et al., 2017). Despite its diversity in terms of origins and thematic focus, this research agenda's recent development reflects the fragmentation of public action, which is increasingly characterised by a multiplicity of organisations, norms, and negotiation procedures (Lascoumes and Le Galès, 2004).

A series of literature reviews have already been conducted (Bouma et al., 2018; Flanagan et al., 2011; Nilsson et al., 2012; Nilsson and Persson, 2017; Persson, 2004; Ring and Barton, 2015; Weitz et al., 2017). However, most have focused on each concept separately, with the studies having been applied to distinct policy fields. This study presents a cross-cutting literature review of the different concepts developed to address these challenges, along with their scientific origins, thematic focus, theoretical

approaches, and recent developments, aiming to identify their points of contact and to critically analyse their strengths and research gaps. The results are expected to support the mounting academic debate in policy analysis and to provide a heuristic outline for further research. In addition to reviewing the interfaces of the more commonly used concepts, the text includes a critical analysis and recommendations regarding the remaining gaps in the literature, particularly in terms of theorisation and methodological development. Although these concepts are not new, the debate remains increasingly relevant to policy studies, and governments are still puzzling over ways to deal with cross-sectoral and complex policy problems (Trein et al., 2020).

The first section presents some of the key concepts, their origins, and their respective thematic focus. The second section reviews the main typologies transversally related to the concepts, factors inhibiting and promoting integration according to different theoretical approaches, and methods used for these studies. Finally, the third section summarises the remaining gaps and limitations as well as opportunities for the use of distinct concepts. A bibliographical survey was conducted using relevant databases for articles published in English.[1] Unrelated references were excluded, leading to a non-exhaustive base of 415 articles published between 1985 and 2017. They were evaluated using textual analysis programs (QDA Miner and WordStat). Then, non-Anglophone databases were consulted to strengthen the analysis. Studies published after 2017 complemented the results, particularly regarding the prospects for further research.

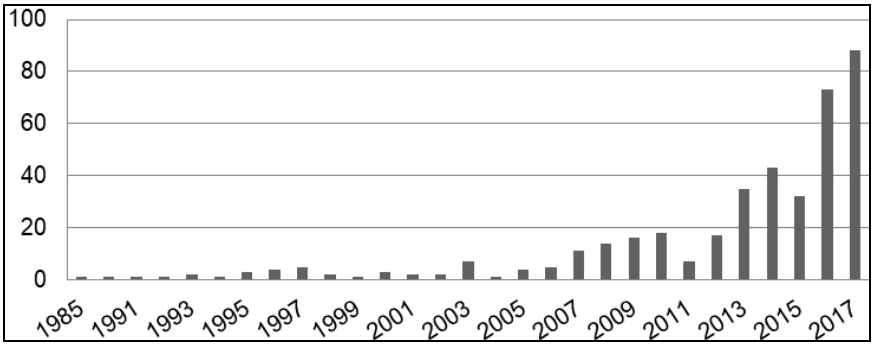
2 Mapping the different concepts and their interfaces

2.1 Authors and geographical focus: a predominantly European research agenda

Most of the studies identified were published from 2000 onwards (Figure 1), despite the earlier origins of some of them. As shown below, this is the case for concepts such as *policy mix*, which emerged in the 1960s, and even *integrated natural resources management*. However, the ambition to promote a more consistent policy has become more relevant in the 2000s amid the criticism of traditional state-centred models of policymaking and implementation (Massardier, 2003; Milhorance and Bursztyn, 2019).

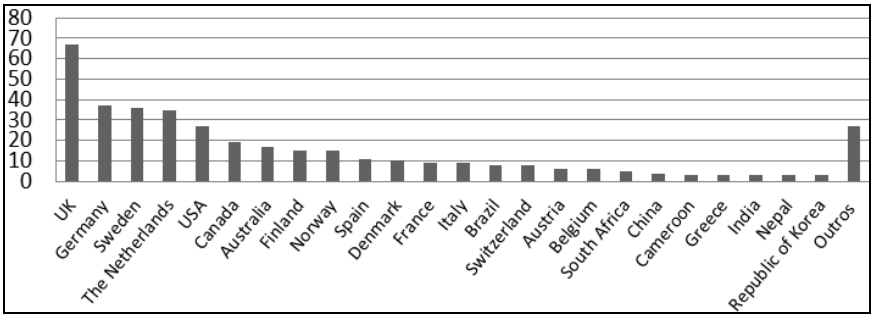
Despite the increasing relevance of these studies in the late 2000s, the results of the review show that the agenda has been mainly European in scope. Most authors are located in European countries and the main focus of these studies has been Western industrialised countries (see Figures 2 and 3). It is worth noting that the governments of these countries have been strongly urged to harmonise their national strategies with those of other European Union members (Biesbroek et al., 2010; Lafferty and Hovden, 2003). Furthermore, among the most important institutions whose members publish on the subject are Wageningen University, Utrecht University (both in the Netherlands), and the University of Sussex (in the UK). Other institutions and think-tanks also stand out, such as the Center for International Forestry Research (CIFOR), which encourages a research agenda on the concept of policy mix.

Figure 1 Number of academic publications on the integrated policy approaches per year (1985–2017)



Source: Authors, based on Scopus, Web of Science, Science Direct, World Bank and Wiley

Figure 2 Number of publication per author location* (1985–2017)



Note: *Considering the first three authors of each article.

Source: Authors

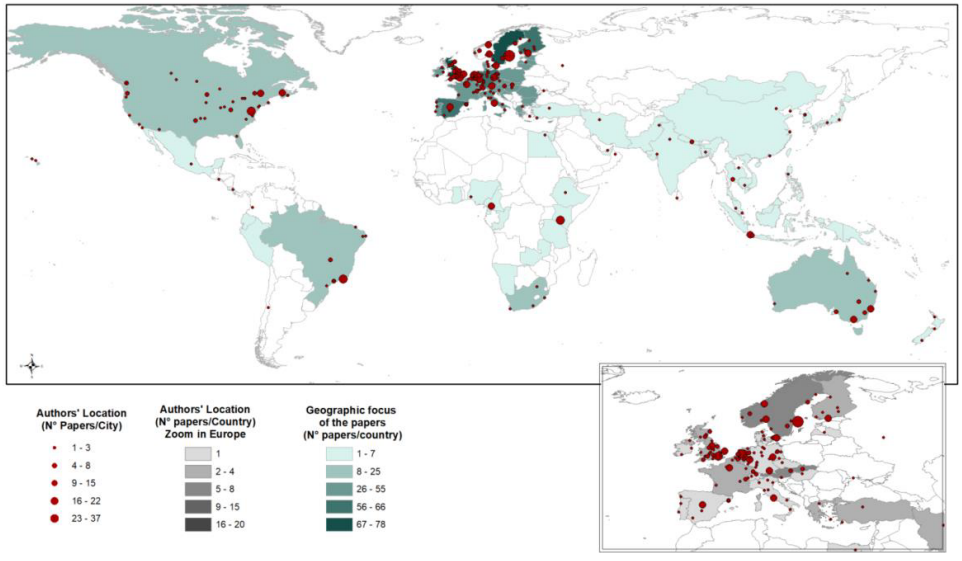
2.2 Concepts and policy fields: prevalence of environmental concerns

2.2.1 Policy integration and the mainstreaming approach

Policy integration is a key concept in this research agenda. Early studies using this concept highlighted the objective of making policy design more rational by removing inconsistencies between goals. For instance, Underdal (1980) defined policy integration as the result of a strategy in which the policy's constitutive elements are gathered and exposed according to a sole conception. The author also identified three criteria that characterise this process: comprehensiveness, consistency, and aggregation. By following a similar path, Peters (1998) sheds light on the organisational environment for integration, and Collier (1996) pointed out the importance of tradeoffs in the policy process. However, both relied on a rationalist and administrative logic for reaching policy integration – a desired outcome. Moreover, the existence of tradeoffs in policy design and implementation was developed by Collier from an economic perspective, in which Pareto optimality was promoted as a criterion for solving policy dilemmas. A common criticism

of these approaches is that most are disconnected from the decision and policymaking processes they ultimately seek to influence (Weitz et al., 2017).

Figure 3 Authors' locations* and the geographical focus of their publications (1985–2017) (see online version for colours)



Source: Authors

In the early 2000s, the policy integration concept was adopted by environmental governance studies, increasingly promoting the notion of *environmental policy integration*. Originally developed in the public management field and by international organisations (Tosun and Lang, 2017), these studies have mainly discussed the processes and outputs for mainstreaming environmental concerns into sectoral policies (Persson, 2004). Although this debate has been historically aligned with the notion of sustainable development, the environmental policy integration framework sought to provide a concrete policy strategy to achieve these goals (Hertin and Berkhout, 2003). According to Lafferty and Hovden (2003), the European Union has been one of the main advocates for the concept, notably in terms of political commitment. International organisations such as the Organization for Economic Co-operation and Development (OECD) have also fostered its dissemination; however, as noted by Persson (2004), this effort relies mainly on the debate regarding the administrative reforms needed.

These studies were partially guided by the endorsement of change in the traditional hierarchy of policy goals in which environmental concerns should be prioritised. Nevertheless, Lafferty and Hovden (2003) concluded that simply removing the contradictions between policies to highlight their complementarities was not feasible, as there are strong conflicts of interest when referring to environmental governance. The authors have assumed, thus, a normative point of view regarding the expected results of the policy processes and have introduced the notion of a *principled priority* to confirm the prerogative of environmental concerns compared to other sectoral goals.

Such an approach has been criticised for neglecting how this conceptual priority is rarely translated into concrete policies. It has also been criticised for not considering the

existence of different 'environmentalisms' shaped by diverse sets of norms and priorities (Bastos Lima et al., 2017). Despite criticism, some of these studies have endorsed policy integration's normative approach while acknowledging the political conflicts that prevent it being realised. For instance, Persson (2004) argued that the tradeoffs are so inherent to environmental policies that they should be incorporated conceptually in policy analysis. Furthermore, later studies have highlighted the governing and learning processes underlying policy integration (Nilsson and Eckerberg, 2007).

The focus on mainstreaming environmental concerns into sector-based policies has also been adopted by climate policy. The notion of *climate policy integration* follows these earlier studies; however, most of their contributions rely on a less normative and rationalist logic and shed light on the politics of policy design and implementation (Adelle and Russel, 2013; Di Gregorio et al., 2016). Nevertheless, both environmental and climate policy integration studies have presented typologies to evaluate progress toward integration, rather than approaching it as an inherently dynamic concept. This option has been criticised by authors such as Candel and Biesbroek (2016), who provided tools to address the integration process from a dynamic perspective and to extend the framework beyond the dominant domains of environment and climate change.

2.2.2 Interfaces between multiple policy fields

In addition to the mainstreaming approach presented above, the complex relationships between multiple policy sectors and issues have also been addressed by this body of literature. Drawing on the notion of *policy nexus*, several studies have emphasised the interfaces of sectoral strategies in a given territory or policy field (Howells et al., 2013). The focus on issues of vulnerability, security, risks, and livelihoods has directed most of the literature to elucidate the complex interactions between water, energy, and food securities. It is often argued that sector-based strategies can restrict capacities or increase risks in another location or sector, and that the interactions between these systems affect their availability (Biggs et al., 2014; Rasul and Sharma, 2016).

Associated with a heuristic approach rather than a theoretical concept, the water-energy-food nexus evolved from the debate on *integrated water resources development and management* in the 1970s. Owing to this origin, the notion has traditionally emphasised the centrality of water resources while identifying trends and systems that could negatively impact the nexus, including urbanisation, population growth, and climate change. Even though recent studies have adopted a more resource-centred perspective, most of them address the issue of competition for water use (Wichelns, 2017).

Compared with a new 'buzzword' (Biba, 2016; Wichelns, 2017), the water-energy-food nexus was widely disseminated as a policy concept in the late 2000s, particularly in the context of the 2007–2008 food global crisis. It became popular in international organisations and conferences, including events promoted by the German government, such as the Bonn Conference in 2011 (Allouche et al., 2014; Artioli et al., 2017).[2] Recent studies have provided a stronger theoretical foundation for this framework by combining the literature on livelihoods, climate risks, and environmental security in the notion of *Nexus+*. In addition to incorporating the conflicts of the decision and policymaking processes, and providing a territorial development for the concept, these studies have considered the socio-environmental dimension as structural in their analyses (Milhorance and Bursztyn, 2019; Weitz et al., 2017).

It is worth mentioning that the notions of *territorial planning* and *territorial development* were not included in this survey; however, the value of these studies for analysing cross-sectoral dynamics and conflicts at the territorial scale have been recognised (Eggenberger and Partidário, 2000; Stead and Meijers, 2009), particularly in the fields of urban development (Momm-Schult et al., 2013; Wamsler et al., 2014), transport policy (Dirgahayani and Nakamura, 2012), and marine and coastal management (Howlett et al., 2017). Moreover, this territorially oriented approach reinforces environmental policy integration studies with an assessment of the implementation processes at the local level (van Stigt et al., 2013).

2.2.3 Multilevel dynamics and governance

Despite analysing the coordination between different jurisdictions, policy integration studies have mainly focused on the challenges at the national and supranational levels. Likewise, the nexus and integrated natural resources management approaches have elucidated the cross-sectoral interfaces at the territorial level. The interplay of actors and policy instruments across levels of action has been more systematically addressed by the notion of *multilevel governance*. Widely adopted since the 1990s by a variety of studies concerned about the process of integration within the EU, the concept sheds light on the fragmentation of authority and competence for policy design across governance levels – subnational, national, and supranational (Bache and Flinders, 2004; Hooghe and Marks, 2001; Marks, 1991). The term was coined to describe and account for a number of institutional and political transformations in the process of European integration. It was conceived on the understanding that European policymaking was taking a fluid, non-hierarchical, uneven, and partially disorderly form, characterised by continuous negotiations among nested governments at several governance levels (Hooghe and Marks, 2001; Tortola, 2017).

Multilevel governance became a key concept for both policy studies and international relations fields in the 2000s, providing a framework for examining the interactions between the state and non-state actors in policy networks, and for connecting national policies with global agendas, such as climate change and food security. In this context, it also proved useful for addressing the challenges of governing global common resources and for diffusing policy instruments (Armitage, 2007; Betsill and Bulkeley, 2006; Hadjiisky et al., 2017; Milhorance, 2018).

The multilevel governance notion adds to the policy integration agenda, as it provides tools for analysing vertical policy integration, that is, between administrative levels. It captures both the multiple levels of governance and the myriad of actors and institutions that are simultaneously involved in the policy process. Scholars also suggested that multilevel governance can be understood in different scopes, jurisdictions, and epistemologies (Stevens, 2018). Finally, the entanglement of scales in multilevel governance opens a debate on the types of authority (e.g., formal and informal) along with the enabling conditions and capacity to influence governance results (van Straalen and Witte, 2018).

2.2.4 Coherence, consistency, and coordination

Finally, improving policy coherence has been one of the major subjects of these studies. However, several concepts pointing to the same issue (e.g., policy integration, policy

coherence, policy coordination, consistency) have sometimes been used interchangeably (Cejudo and Michel, 2017). Scholars have recently contributed to distinguishing some of these concepts, which are often seen as loosely equivalent and understood as types of coordination that seek to achieve compatibility among the objectives of different policy areas (Adelle and Jordan, 2014; Adelle and Russel, 2013; Cejudo and Michel, 2017).

Building on this conceptual weakness, Cejudo and Michel (2017) compared policy integration with policy coherence and coordination. According to them, policy integration refers to a process of making strategic and administrative decisions to solve complex problems, which exceeds the programs' and agencies' individual goals. Alternatively, policy coherence is defined as a process in which policymakers design a set of policies that allows them to achieve larger goals in a specific policy area. Finally, coordination refers to distinct organisations defining tasks, allocating responsibilities, and sharing information for the efficient implementation of policies and programs.

Several origins and developments can be found for policy coherence. Indeed, the idea of promoting harmonisation and consistency of public policies has historically been a key principle in public administration; however, policy coherence as an approach to policy analysis was developed mainly in the international cooperation debate of the 1990s. This notion was particularly promoted by the OECD's Development Assistance Committee as a means of promoting coordination between international donors and sector-based organisations in recipient countries (Forster and Stokke, 2013). Coordination across national policies, international donors, and European bodies has been a key subject, which has evolved to the debate on *development policy coherence* (Carbone, 2008; Hoebink, 2013; Larsen and Powell, 2013). This literature often focuses on global development challenges, particularly global health, the Millennial Development Goals (MDGs), and the Sustainable Development Goals (SDGs) (Nilsson and Persson, 2017; Ruckert et al., 2017). Its main contributions include the attention given to the need to build on existing institutional structures for cross-sectoral coordination (Larsen and Powell, 2013).

In the policy studies field, the issues of coherence, coordination, and consistency between policy instruments have also been addressed by the *policy mix* literature. Originally developed in fiscal and monetary policies of the 1960s, the concept became known in the 1990s and the 2000s as it was extended to other public policy fields, such as innovation, environmental economy, energy transition, and economic policies (Flanagan et al., 2011). For instance, the concept has been widely used to analyse payments for environmental services and other political and economic mechanisms relevant to biodiversity conservation (Ring and Schröter-Schlaack, 2011).

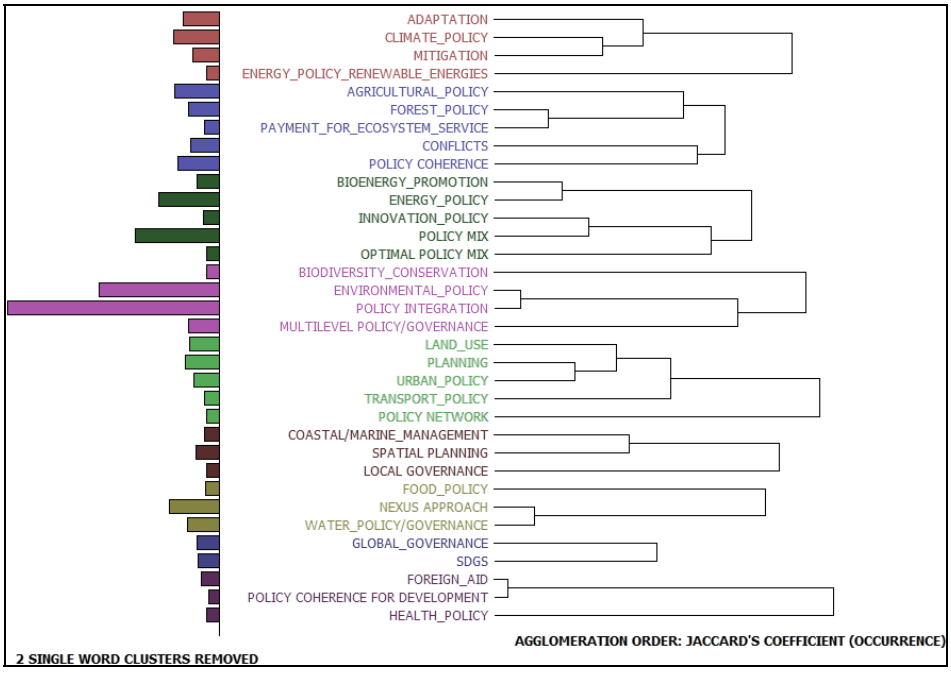
Although the early studies were limited to the definition of an 'optimum policy mix' (Bahn et al., 2015), this is currently recognised as not only the result of combining policy instruments but also the processes from which these instruments emerge and interact (Ring and Barton, 2015; Rogge and Reichardt, 2016). Building on the same argument, Howlett and del Rio (2015) recorded that these mixes – or portfolios – typically involve much more than functional logic linking tools to a goal. They also deal with ideological or even 'aesthetic' preferences in instrument choices and goal articulation. These studies have focused on policy design and the evolution of these mixes in time, which affect policy resilience and robustness (Howlett, 2019; Ring and Schröter-Schlaack, 2011). Distinguishing a policy mix from a 'policy mess' or a 'policy bundle' has been a concern in the literature (Bouma et al., 2018; Howlett and del Rio, 2015). Studies exploring policy

mix have recently converged with policy integration studies to analyse how different instrument combinations deal with the multiple goals of policy strategies and benefit from potential synergies (Ring and Barton, 2015). Nevertheless, in both areas of study, assessing policy outcomes remains a methodological challenge (Bouma et al., 2018).

2.2.5 A longitudinal perspective

Figure 4 illustrates the connection between each concept and the main policy fields found in the systematic review. As mentioned, it was drawn from the textual extraction of the abstracts, titles, and keywords of the surveyed articles. By using WordStat 7, it was possible to analyse not only the frequency of occurrence of each concept and subject, but also their relations. Policy integration is the main concept found in these studies, followed by environmental policy integration. The policy mix approach had the third highest frequency, in which the studies mainly focused on aspects of 'optimum policy mix', energy policy, and innovation policy. The analysis does not deal with the complexity and particularities of each concept, but provides a summarised and graphical view of the literature field.

Figure 4 Dendogram of concepts and thematic focus of reviewed studies (see online version for colours)



Source: Authors

This section shows that despite the different origins and policy fields, many of the concepts converge in an attempt to characterise the interactions between policy instruments, the fragmented government actions, and the difficulty of sector-based policies in dealing with increasingly complex policy problems. Moreover, despite the multiplicity of tools and concepts, addressing these cross-cutting problems remains a key

academic and practical challenge. As mentioned, policy integration and policy mix are the most common, and their analytical frameworks are complementary, although theorisation has lagged in both cases.

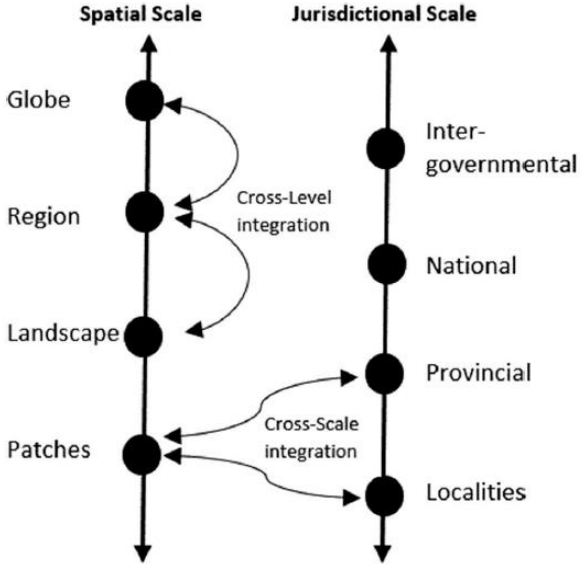
These aspects are discussed in the next section.

3 Convergence and divergence of the analytical frameworks

3.1 Analytical typologies: a heuristic frame

The first decisive aspect in analysing the interaction of multiple policy instruments is the identification of relevant typologies in the analysis. Policy integration studies offer a number of heuristic typologies. First, the relationships between policy goals can be distinguished between 'horizontal' (across sectors) and 'vertical' (across administrative levels) (Di Gregorio et al., 2016; Jordan and Lenschow, 2010; Lafferty and Hovden, 2003). Second, climate policy integration studies underline the importance of analysing consistency not only between climate mitigation and adaptation strategies related to other development policies, but also between these two policy goals (Locatelli et al., 2015). In this sense, coherence within an individual sector (e.g., between mitigation and adaptation to climate change) is called 'internal', and the coherence across sectors (e.g., between climate and agricultural policies) is regarded as 'external' (May et al., 2006; Nilsson et al., 2012).

Figure 5 Integration involving levels and scales



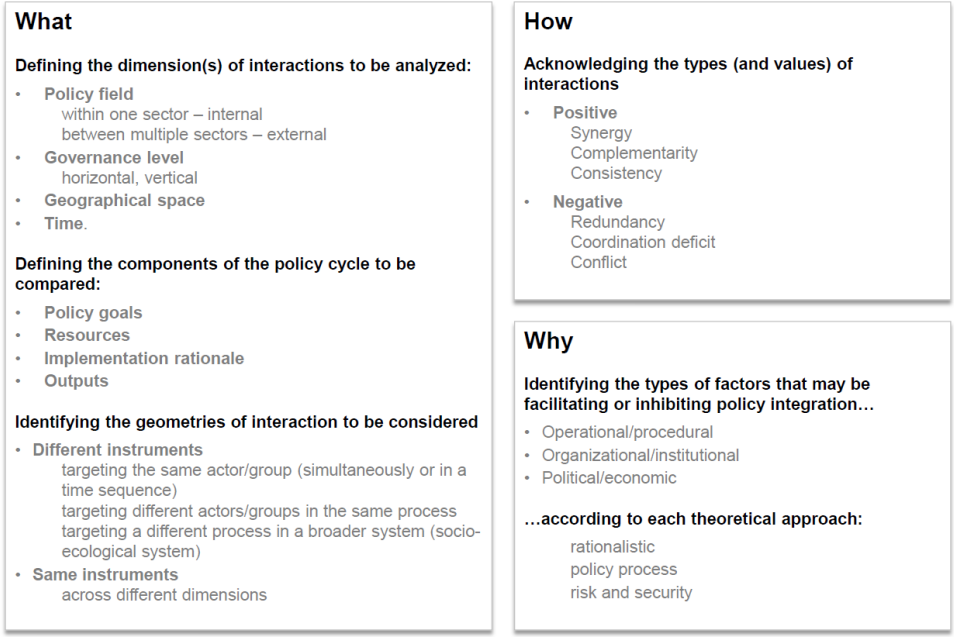
Source: Stevens (2018)

As previously presented, multilevel governance studies have also contributed to this point by problematising the concept of vertical integration. Stevens (2018) draws his argument on the distinction between 'scales' and 'levels' in the definition of vertical integration. According to the author, scales represent cognitive constructions used to analyse social

and biogeophysical phenomena: spatial, temporal, jurisdictional, institutional scales, and so on. Although levels are defined as analytical units placed in different positions of the scale, the jurisdictional scale can be, for instance, divided into intergovernmental, national, regional, and local levels (see Figure 5). Such distinctions are useful for specifying what is being analysed.

In nexus studies, horizontal integration is the main subject. These studies focus on the interactions between same-level institutions and the coherence between the policy goals of distinct sectors (water, energy and food) (Weitz et al., 2017). The challenge here is the governance of water-energy-food conflictive sectors or systems to promote sustainability and risk management (Artioli et al., 2017).

Figure 6 Heuristic outline of policy interaction research



Source: Authors, based on Flanagan et al. (2011), Howlett and del Rio (2015), Ring and Barton (2015), Rogge and Reichardt (2016) and Sorrell et al. (2003)

The policy mix literature is the most complete in terms of providing analytical typologies. In these studies, one may acknowledge not only the direction of policy interactions (vertical, horizontal, internal, external), as highlighted by studies of policy integration and coherence (Lafferty and Hovden, 2003; Carbone, 2008), but also the important contributions to the types and dimensions of interactions. For instance, Flanagan et al. (2011) described the dimensions and forms of interaction between policy instruments as well as their potential sources of tension. Flanagan's framework has been revisited by several authors (Howlett and del Rio, 2015; Ring and Barton, 2015; Rogge and Reichardt, 2016; Sorrell et al., 2003), who have provided more detailed heuristic outlines for analysing the mix. A complementary contribution of the policy mix studies refers to the idea of a 'policy-scape' that connects the sectoral and multilevel integration concerns with the landscape scale. The concept is defined as the spatial distribution of a mix of

instruments. It incorporates such aspects as biophysical features and local actors' perceptions, interacting in response to a combination of applied norms in the landscape (Ring and Barton, 2015).

Figure 6 summarises the key dimensions provided by policy research on cross-sectoral problems while the next section describes the main explanatory factors of policy (dis)integration.

3.2 Main approaches and theories to explain (dis)integration

Different explanations are offered in the literature as to the reasons for the fragmented policies and the outcomes of this phenomenon. The first perspective is guided by economic and administrative rationalities. Here, the consistency of policy instruments is understood as leading to improvements in the cost-effectiveness of policies and efficiency in the use of resources by further optimising the allocation of resources between sectors and scales. In nexus studies, it is argued that coherence is promoted by the identification of more efficient adjustments between water, energy, and food resources (Weitz et al., 2017). In this context, Rogge and Reichardt (2016) pointed out that the criteria commonly used to evaluate individual policy instruments – that is, efficacy, efficiency, equity, and feasibility – are not fully applicable to the evaluation of policy mixes. Other criteria to consider include consistency, coherence, credibility, and comprehensiveness. The authors followed a line similar to the one proposed in the first studies of policy integration and several others that followed (Lundqvist, 2004; Underdal, 1980).

As summarised by Weitz et al. (2017), in this perspective, coherence is doomed because of differences in the institutional apparatus employed in each sector, divergent policy goals, lobbies, a lack of communication, and a lack of clarity regarding sector competencies. Governance issues, in this case, are mainly related to technical and administrative problems; hence, better coordination of information between sectors is considered sufficient for improving or optimising the performance of systems. Consequently, the responses to fragmentation create challenges in terms of rationalistic approaches, which are mainly organisational. These include the need to strengthen cross-sectoral cooperation, improve communication, and establish dialogue platforms or other interagency mechanisms or procedures, such as strategies, action plans, and systematic impact assessments (Howlett et al., 2017; Persson, 2004). Moreover, environmental policy integration studies often identify normative factors as explanatory variables for integration (or a lack thereof); such factors include the absence of political leadership or a political culture.

Rationalist perspectives have reduced analyses to economic rationalities and administrative processes, which are not necessarily neutral, and for disconnecting studies from the policymaking processes that the relevant literature ultimately seeks to influence (Weitz et al., 2017). Bastos Lima et al. (2017) brought further empirical criticism to the rationalist approach, showing that despite instruments such as payments for environmental services being quite coherent from a rational point of view, integrating aspects of environmental conservation and rural development resulted in their impact being often limited by the lack of involvement of the dominant actors in the agricultural sector.

Along this line of thinking, tradeoffs and conflicts should be considered inherent to cross-level/cross-sectoral public action and not simply the result of fragility in the administrative process; therefore, they should be integrated into a governance analysis (Stevens, 2018). An approach that considers policy fragmentation as a political process that requires negotiation between actors with different perceptions, interests, and practices emerges (Adelle and Russel, 2013; Allouche et al., 2014; Rogge and Reichardt, 2016). This approach contrasts with the rationalistic perspective by viewing variations in policy design not as a deviation from an optimal outcome, but as a response to institutional and political factors in a given context (Jordan and Lenschow, 2008). The main barriers to policy coherence are conflicts of interest – both on domestic and international scales – and the asymmetric distribution of power, information, and resources, as well as the capabilities of actors and institutions (Weitz et al., 2017). By approaching policy integration as a political and multifaceted process, it is possible to provide a more refined analysis of complexity and policy change (Artioli et al., 2017; Candel, 2017; Rogge and Reichardt, 2016).

The concepts presented in the previous section can be linked to different theoretical backgrounds. For example, in nexus studies, an aspect presented by Artioli et al. (2017) is the need to politicise the concept by bringing it closer to the political economy and political ecology approaches that deal with power structures and inequities. Studies identified from this perspective are largely concerned with issues such as equity and social progress, highlighting that technical solutions used in natural resource management can often generate unforeseen and negative impacts in other policy areas (Stringer et al., 2014). An additional example is the mobilisation of Elinor Ostrom's institutional analysis framework to understand the processes and results related to payments for environmental services in many countries (Barton et al., 2017). The advocacy coalition framework and other policy process theories can also be applied to these studies, as a strong body of knowledge has shown that effectively implementing cross-sectoral and multi-level strategies can be conflictual and costly because of the involvement of multiple actors with diverse interests, beliefs, and values, that come with the redistribution of power and decision-making authority (Baulenas and Sotirov, 2020; Milhorance and Bursztyn, 2019).

Finally, a perspective that is more specific to nexus studies focuses on the precepts of risk and security related to natural resources required for human livelihoods. This perspective is based, according to Weitz et al. (2017), on the idea that the absence or poor quality of connections between water, energy, and food security can aggravate the scarcity of resources and induce conflicts. Thus, the limited emphasis of policy design on the interfaces of the natural resources relevant to increasing social and environmental resilience may lead to contradictory interventions and inefficient use of these resources (Howells et al., 2013). This perspective aligns with the notion of *sustainable livelihoods*, that is, that the development of sector-based strategies can lead to increased vulnerability (Biggs et al., 2014; Rasul and Sharma, 2016). In this case, the strategies suggested for reducing risks and insecurities refer to the inclusion of risk management strategies in the political agenda, the promotion of cross-sectoral dialogue, and the isolation of certain sectors from the impact of others.

Table 1 summarises these aspects, showing that there are gaps and some overlap between such classification systems.

Table 1 Examples of facilitating and inhibiting factors of policy integration according to different approaches

Approach	*Facilitating factors (examples)*	*Inhibiting factors (examples)*	*Source*
Economic/ administrative rationality	*Organisational:* • Standardised processes, allowing for better supervision. • Similarity of structures and competencies of the organisations involved. • Coordination capacity and positive record of organisational collaboration. • Shared understanding of the benefits of coordination within the organisation. *Processual:* • Geographical proximity, facilitating interaction and communication between decision-makers and staff. • Complementarity in the functions of staff and institutional mandates. • Mechanisms to anticipate, detect, and solve conflicts at the beginning of the process. • Existence of a political strategy so that sectoral policies are consistent with objectives and global priorities. • Harmonisation between political priorities and fiscal imperatives. • Proceedings of flexible implementation and monitoring mechanisms capable of adjusting policies. • Systematic intersectoral dialogue.	*Organisational:* • Bureaucratic levels, leading to communication problems. • Large institutional and organisational differences, increasing operating costs. • Fragmentation of governance spheres, leading to contradictory mandates and regulations • Technical staff inadequately trained and high turnover. • Lack of macro vision on sectoral matters • Institutional fragility and inability to resolve conflicts. • Weak historical and negative evaluations of coordination processes. • Difficulty achieving a common understanding resulting from non-convergent approaches (techniques) and languages. • Poor interpersonal relationships between key actors and different work styles. *Processual:* • Infrequent, inadequate communication or lack of systematic dialogue between sectors. • Bureaucratisation in accountability or differences in procedures between institutions. • Fragility or absence of management mechanisms. • Different planning cycles of budgets and resources between sectors. • Direct and opportunity costs involved in personnel management dedicated to establishing and sustaining transversal work mechanisms. • Competition between departments by jurisdiction or resources.	Candel and Biesbroek (2016), Lafferty and Hovden (2003), Lundqvist (2004), Pittock et al. (2013), Stead and Meijers (2009) and Underdal (1980)

Source: Adapted from Stead and Meijers (2009) and mentioned references

Table 1 Examples of facilitating and inhibiting factors of policy integration according to different approaches (continued)

Approach	*Facilitating factors (examples)*	*Inhibiting factors (examples)*	*Source*
Economic/ administrative rationality	*Normative:* • Change in organisational culture. • Prioritisation of resource allocation in cross-cutting sectoral issues.	*Normative:* • Absence of political leadership. • Incorporation of specific (environmental) concerns into the policy and administrative decision-making processes of sectoral agencies.	Candel and Biesbroek (2016), Lafferty and Hovden (2003), Lundqvist (2004), Pittock et al. (2013), Stead and Meijers (2009) and Underdal (1980)
Political process	*Political/economic/institutional:* • Definition of problems, professional ideologies, and convergent interests. • Relatively equivalent status among organisations involved in coordination. • Influence gain over other sectors. • Commitments of integration by political leaders and/or key actors. • Ability to identify a global vision and cross-cutting issues. • Perception of gains in resources (time, financial resources, information, raw material, legitimacy, etc.). • Sharing costs and risks associated with the implementation of certain policies. • Change in the political culture. • Social learning: interactions through which actors within and between subsystems learn about the (cross-cutting) nature of the problem and its governance. • Formation of coalitions, aligning powers within and between subsystems.	*Political/economic/institutional:* • Insufficient recognition of the diversity of actors and issues present in the network. • Coalition-dominated political system against change/ integration and lack of political priorities, support, or leadership. • Diverse priorities, interests, ideologies, and objectives among actors, leading to a lack of consensus on the nature of the problem and the solutions. • Perception of loss of organisational power, strategic position, prestige, or authority. • Differences in status and asymmetries of scale between sectors and sectoral objectives above transversal ones. • Contrast between short-term political aspirations and time needed for integration. • Loss of autonomy over the results of policies and services.	Adelle and Russel (2013), Artioli et al. (2017), Jordan and Lenschow (2008), Rogge and Reichardt (2016), Stead and Meijers (2009) and Weitz et al. (2017)

Source: Adapted from Stead and Meijers (2009) and mentioned references

Table 1 Examples of facilitating and inhibiting factors of policy integration according to different approaches (continued)

Approach	*Facilitating factors (examples)*	*Inhibiting factors (examples)*	*Source*
Risk and security	• Correspondence between real needs, common benefits, and scarce resources. • Communication among stakeholders regarding risk minimisation strategies. • Agreement on acceptable levels of risk. • Establishment of strategies and means of monitoring ecological performance in terms of resources used and results achieved in relation to the objectives of the sector.	• Asymmetry of power and resource utilisation across sectors.	Biggs et al. (2014), Candel and Biesbroek (2016), Lundqvist (2004) and Weitz et al. (2017)

Source: Adapted from Stead and Meijers (2009) and mentioned references

4 Research prospects: addressing the theorisation and methodological gaps

Numerous studies concerning different aspects and approaches to policy interactions have been acknowledged; however, they still lack theorisation and robust and flexible analytical typologies. Several questions remain, such as:

1 How does one assess the degree of integration across policies and instruments?

2 How can the substance and politics of this process be compared?

3 How can the outputs and implementation practices adopted by integrative policy approaches be assessed?

4 How should one theorise the drivers of (dis)integration?

5 How does one assess the impacts of a policy mix?

6 Under which conditions do integrated policies really contribute to tackling complex policy problems?

7 How do policy mixes evolve and affect policy resilience and robustness (Biesbroek and Candel, 2019; Howlett, 2019; Milhorance et al., 2020; Trein et al., 2020)?

On the one hand, progress has been made in improving the theorisation of policy integration as a particular policy field (Biesbroek and Candel, 2019; Candel and Biesbroek, 2016). For instance, by adopting a processual perspective, scholars have recently provided a framework to compare policy integration with specific measurements that link strategic (political), substantive (content), and procedural (organisational) aspects (Candel and Biesbroek, 2016; Cejudo and Michel, 2017). They also showed that policy integration is not linear and that contextual conditions such as politico-economic orientation can trigger mechanisms that increase or decrease it over time (Biesbroek and Candel, 2019).

On the other hand, policy process frameworks have been traditionally used to address some of these cross-sectoral governance problems and provide their specific typologies. However, the typologies of these studies could be more specifically combined. For instance, Faling and Biesbroek (2019) drew on the *policy entrepreneur* typology – developed in the advocacy coalition framework (Sabatier, 1993), punctuated equilibrium theory (Baumgartner and Jones, 2009), and punctuated equilibrium theory (Kingdon, 2014) – to address the linkages across policy subsystems. Moreover, the multilevel governance approach has its own body of theory in the European integration tradition (Hooghe and Marks, 2001; Tortola, 2017), but these are less related to the issues regarding the interplay of policy instruments across scales (Stevens, 2018).

In terms of methods, most studies have relied on documentary analyses and qualitative and descriptive case studies. Process-tracing has been used in some of these cases, drawing on the systematic examination of a temporal sequence of events, aiming to reconstruct the process of policy change (Candel, 2017). An additional method involves defining coherence measures through network analyses (Adelle et al., 2015; Ahlström and Cornell, 2018; Ingold and Balsiger, 2015; Milhorance et al., 2020). For example, Ahlström and Cornell (2018) analysed governance structures associated with regulation for effects on global nitrogen and phosphorus flows, seeking to assess the levels of connectivity and interactions between scales. Adelle et al. (2015) showed that the

coordination capacity of policy networks depends, in part, on the type of network for each political field. Most of these studies are based on the interactions between policy actors, but analyses of the interactions between mixed policy instruments have also been developed (Feindt, 2010; Jørgensen et al., 2017; Milhorance et al., 2020; Sarvašová et al., 2013).

Rationalist studies have produced scenarios and econometric analyses (Costantini et al., 2017; Dumont, 2017; Purkus et al., 2017; Suardi and Kurian, 2015), environmental analyses (SWOT) (Fertel et al., 2013), and economic and environmental modelling (AbdelHady et al., 2017; Collste et al., 2017; Dhaubanjar et al., 2017; Kaddoura and El Khatib, 2017; Khan et al., 2017) to define the optimal combinations of policy and economic instruments. They have been complemented by budget allocation models in order to quantitatively analyse the consequences of the use of multi-objective policy instruments in agri-environmental policy mixes (Schader et al., 2014). Spatial computing tools have also been used to support scientists – based on spatial life cycle analyses – in visualising the interconnections and interdependencies of nexus resources at different levels (Eftelioglu et al., 2017). Danaeefard et al. (2017) advanced a tool of consensus building among experts to identify the factors inhibiting policy coherence in Iran.

As a final point, Nilsson et al. (2012) recommended a three-step analytical approach based on theories of institutional interaction, consisting of an inventory of policy objectives, a screening matrix, and a more in-depth analysis of key interactions. Then these authors developed a simplified framework to classify (between –3 and +3) the relationships between the different SDGs (Nilsson et al., 2016). They presented a typology of interactions that have been quantified both in relation to policy objectives and specific interventions and instruments; however, it remains subjective because the scoring system was defined too broadly, failing to use specific criteria or punctuation procedures (Collste et al., 2017).

5 Conclusions

This paper presented a review of the main concepts related to the analysis of cross-cutting governance problems and policy interplay. The attempt was not to build a new framework, but rather to systematise relevant points of convergence between a vast body of literature, concepts, methods, and policy fields, and to provide a heuristic research outline that could inform future studies.

Although this literature is diverse in terms of origins and developments, the research agenda was advanced mainly in Europe, while each concept emerged from different policy fields. For instance, the policy mix concept has been more commonly used in environmental economics, innovation, and fiscal policies; the policy integration approach is usually adopted to analyse the mainstreaming of environmental and climate goals into sector-based policies in industrialised countries; the water-energy-food nexus addresses several challenges related to risks to livelihoods, but it has mainly adopted in water resources management studies; concepts such as policy coherence have been widely promoted in international development agendas; and multilevel governance has been developed in European studies. The review also showed that most studies have addressed environmental issues. An effort to build an analytical framework that goes beyond these fields has only recently been made (Biesbroek and Candel, 2019). Drawing on this

concern, an argument was advanced in this study to combine the typologies of policy integration and policy mix literatures to provide a heuristic framework of analysis.

Furthermore, this review supports the argument that addressing policy coherence as a merely technical or procedural issue would mean neglecting fundamental aspects related to the governance of natural resources or cross-sector issues that the literature ultimately seeks to influence (Weitz et al., 2017). Although communication, or its lack, and other organisational aspects are fundamental to integration efforts, this is not sufficient to assess fragmentation in policy goals and implementation. Inconsistencies become visible in the ownership of the political agenda or in the implementation processes.

Finally, despite the range of approaches and typologies, there is still a gap in methods that are both robust and accessible. Efforts to better theorise the drivers of (dis)integration beyond the simple listing of explanatory factors or to assess the concrete impacts of integrated policies and mixes are still weak, and governments are still struggling to discover ways to deal with complex problems (Milhorance et al., 2020; Trein et al., 2020). Complementing case studies with new research tools and methods, applying geographic focuses to areas other than Western Europe and the United States, and assessing the applicability of these concepts and frameworks to a broader range of cross-cutting policy issues beyond the environmental field could amount to a meaningful contribution of future research.

Acknowledgements

The project leading to this publication has received funding from the European Union's Horizon 2020 Research and innovation programme under the Marie Skłodowska Curie (Grant Agreement No. 691053), from Brazil's CNPq/Capes/FAPDF (Project INCT No. 16-2014 ODISSEIA), and from the Association Nationale de la Recherche (ANR) under the project ARTIMIX (ANR-17-CE03-0005).

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Notes

1 Research for keywords in titles, abstracts, or keyword lists of the articles produced *policy integration*, *policy mix*, *policy coherence*, *cross-sectoral policy*, *multilevel policy*, *policy mapping*, and *nexus approach*. Databases used were Scopus, Web of Science, Science Direct, World Bank, and Wiley.

2 The 'Bonn 2011 Conference: The Water Energy and Food Security Nexus – Solutions for the Green Economy' produced one of the first documents conceptualising the nexus approach.