EXPLAINING THE ROLE OF GOAL AMBIGUITY IN COPRODUCTION PRACTICES: THE CASE OF GEORGIA STATE REGIONAL WATER PLANS

by

YOUKYOUNG JEONG

(Under the Direction of Gene A. Brewer)

ABSTRACT

Coproduction has gained popularity in recent decades in reaction to scholars' and practitioners' optimism about providing public services based on a more collaborative relationship between the public sector and society. Previous literature on coproduction has emphasized normative perspectives on the topic, but relatively little empirical evidence has been presented on its substantive aspects, particularly its obstacles and outcomes. This dissertation study focuses on one possible challenge that coproduction of public services might face: increased goal ambiguity in multiple-actor settings, which could harm coproduction outcomes. Expanding the concept of goal ambiguity into the coproduction domain, this study investigates how goal ambiguity affects coproduction outputs in the case of Georgia regional water councils.

Two empirical analyses were conducted using the official proceedings of Georgia regional water councils and data from the Georgia Environmental Monitoring and Assessment System. The findings of these analyses are as follows. The first analysis, employing a mixed method approach, reveals that goal ambiguity has a negative impact on the elicitation of local knowledge input, which is an essential outcome in co-designing

regional water programs. The second analysis, employing ordinary least squares regression and multilevel analysis, indicates that higher levels of goal ambiguity are negatively related to efforts to reduce gaps between water supply and demand, which is the main output of co-delivering regional water programs. This result confirms that goal ambiguity is present in coproduction processes, and that it negatively affects coproduction outputs. Hence, this study contributes toward a better understanding of goal ambiguity not only in organizational contexts but also in coproduction settings.

INDEX WORDS: Coproduction, Public Management, Public Service Delivery, Goal Ambiguity, Local Knowledge, Environmental Resource Management

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CHAPTER 1

INTRODUCTION

1. Background to the study

1.1. A shift in public service delivery: from competition to collaboration

Since the 1980s, public management policy reform has surged in most developing as well as developed countries. So-called “wicked” problems full of complexity and ambiguity have prevailed in the public domain (Fung, 2006; Maiello et al., 2013; Rittel & Webber, 1973); government budget deficits and administrative burdens have soared (Weber & Khademian, 2008); and social needs for high quality public services has increased (Kekez et al., 2019). All these developments require the government to change its orthodox, unilateral, and provider-oriented approach toward service delivery in the public sector.

New Public Management (NPM) brought the market into the public sphere under the banners of “marketization”, “privatization”, and “public-private partnerships (PPPs)” (Mörth & Pierre, 2021; Pollitt & Bouckaert, 2017; Warner & Hefetz, 2008). NPM policy reform started from the sentiment that governments are inherently inefficient in implementing public policies (Kekez et al., 2019). As a solution to improve the efficiency of public service delivery, NPM stressed competition between public service providers, increasing options for citizens – who were referred to as 'customers’, and reliance on market mechanisms rather than bureaucratic remedies (Rhodes, 1996, 2016).

This market-oriented approach that seemed to dominate the public sphere for decades has been questioned recently because little empirical evidence has confirmed its overall effects on enhanced efficiency and cost reduction in public service delivery. For example, Andrews and Van de Walle (2013) studied the relationship between NPM practices in United Kingdom (UK) local governments and citizens' perceptions of efficiency, responsiveness, equity, and effectiveness. The authors found no evidence that NPM reduced the cost for public service delivery. Another study covering 30 years of NPM reforms in the UK insisted that the absolute cost of providing public services has increased, along with soaring numbers of complaints from citizens (Hood & Dixon, 2015).

Receiving mixed reports about NPM-based reforms (Lapuente & Van de Walle, 2020), governments across the world turned to "new governance", an alternative approach to public service delivery that increased diversification of public service providers. This approach focuses on collectively defined outcomes that can be achieved through a collaborative synergy between different agencies and governments, and among groups of public, for-profit, non-profit, and civic actors (Ansell & Gash, 2008; Osborne, 2010a, 2010b). Often called collaborative governance, new public governance, or network governance, this new governance approach has emerged as a promising supplement to NPM by shifting market-based public service delivery towards collaboration-based public service delivery (Hansen et al., 2022; Kekez et al., 2019), implying the shift from competition towards collaboration (Agranoff, 2014; Entwistle & Martin, 2005).

1.2. Coproduction and citizen participation in public service delivery

Entering the twenty-first century, discussions among scholars and practitioners about collaborative governance systems for public service delivery have increasingly focused on "coproduction" (Nabatchi et al., 2017a). First introduced during the late 1970s based on the works of Ostrom and her colleagues about citizen contributions toward urban governance (Ostrom, 1972; Ostrom, 1996), coproduction is defined as the "involvement of citizens, clients, consumers, volunteers, and/or community organizations in producing public services as well as consuming or otherwise benefiting from them" (Alford, 1998, p. 128). Thus, increased collaboration is seen as a remedy to market-based, competitive governmental reform, and it has received increased attention as a new way to deliver public services (Bovaird et al., 2019; Brandsen & Honingh, 2016; Nabatchi et al., 2016, 2017b; Voorberg et al., 2015).

Coproduction focuses on the role of individuals as active "co-producers" who can take part in the public service delivery process (Alford, 1998; G. P. Whitaker, 1980). Under the coproduction, citizen participation is not limited to the end users of public services, but rather extends into the overall processes of its delivery, including formulation, execution, and evaluation of public policy related to the services citizens use (Pestoff et al., 2006a; Verschuere et al., 2012).

The rising popularity of coproduction in public service provision is consistent with contemporary interpretations of professionalism. Service delivery inevitably requires knowledge inputs to define the services people want (Aligica & Tarko, 2013), but in contemporary society which is plagued by "wicked" problems (Rittel & Webber, 1973), no one has supreme knowledge over others; only limited and imperfect expertise

is available. A key premise of coproduction is that citizens' knowledge can contribute to making up for insufficient scientific expertise to improve the quality of public service delivery (Corburn, 2007; Jasanoff, 2005; Llano-Arias, 2015; Turnhout et al., 2020). Since citizens' knowledge, or so-called "local knowledge", is based on their practically and collectively accumulated understanding derived from lived experience that they share in a certain region (Antweiler, 1998; Corburn, 2003; Geertz, 2008; Yanow, 2004), they can provide practical solutions for delivering better public service tailored for the local context. Considering that coproduction emphasizes the mutual relationship between various stakeholders, it can provide citizens with a formal opportunity to act as major informants of informal knowledge about regional resources and contribute to improvements in public service delivery.

1.3. A challenge in coproduction: limited evidence on performance

Coproduction is believed to help yield publicly desired service outcomes, which makes the concept an international phenomenon among practitioners across the world who seek to improve public service delivery (Bovaird et al., 2019). Through coproduction practices, citizens—who are service users as well as community members—can contribute to public service delivery by providing their knowledge, resources, and creative ideas, thus increasing the legitimacy of the service provided and compliance with rules and regulations (Loeffler & Bovaird, 2016). Furthermore, greater citizen participation can help establish a trust-based, ethical relationship between citizens and government, which would advance the level of democracy and accountability in public service delivery (Verschuere et al., 2012).

Despite the growing attention to coproduction, its effects are less well known. Nonetheless, since coproduction itself can contribute to improvements in social value including improved accountability, democracy, and social justice by allowing greater public participation and empowerment in public service delivery, simply adopting coproduction is meaningful. Under this normative tendency towards optimism, the substantive effects of coproduction, such as speed of delivery and quality of service, often pale in comparison to the noble objectives of coproduction (Brandsen & Honingh, 2016; Steen et al., 2018; Voorberg et al., 2015).

2. Statement of the research problem: goal ambiguity in coproduction

This study raises concerns about a possible drawback of multiple actor settings central to the coproduction concept – goal ambiguity and its effect on the coproduction process. Frequently mentioned in the public management literature, goal ambiguity refers to the level of leeway in interpreting the goals of an organization (Chun & Rainey, 2005b). Goal ambiguity occurs when goals themselves inherently ambiguous, but another source is conflict over the goals generated by multiple parties. Particularly when political power is dispersed, an organization is likely to have more goal conflict, which leads to an elevated level of goal ambiguity (O'Toole & Meier, 2017).

Multiple participants with various backgrounds can provide rich, helpful information about public service provision, but broad participation also requires more leeway in interpreting the main goals of coproduction. Particularly, the existence of multiple, ambiguous goals in the coproduction process might affect which knowledge inputs are elicited and integrated into the coproduction process. The juxtaposition of

different objectives without any priority might provoke tension between participants, which could impede coproduction practice and eventually degrade the quality of coproduced public services.

The presumption, based upon past research, is that goal ambiguity will negatively influence public service performance (Chun & Rainey, 2005a, 2006; Jung, 2011). Vague, conflicting goals likely limit knowledge input and degrade public service delivery. If true, these suppositions present a significant challenge for advocates of coproduction.

3. Research questions

This study extends goal ambiguity theory from an organizational level to a more plural, network-like coproduction level. The study then documents the effect of ambiguous goals in the coproduction process on public service delivery.

Within this broad framework, two specific research questions are addressed.

- First, how does goal ambiguity affect local knowledge input in the coproduction process?
- Second, how does goal ambiguity affect public service delivery in coproduction settings?

4. Study design

The overall purpose of this study is to explore the possibility – even the likelihood or inevitability – that goal ambiguity will occur in coproduction. A mixed methods study is carried out to answer the questions posed above. This study develops a research framework to help us understand goal ambiguity in the coproduction context, and it

explores that framework through the case of regional water planning councils who develop regional water plans in the State of Georgia. These councils operate under the 2004 Georgia Comprehensive State-wide Water Management Program, which mandated the development of a state-wide water plan that supports a far-reaching vision for water resource management.

This study conducts two main analyses that explore two stages of the coproduction process: co-planning and co-delivery. These analyses attempt to answer the two research questions posed above. The first main analysis addresses the first research question, *how does goal ambiguity affect local knowledge input in the coproduction process.* Two theoretical frameworks help to structure this analysis: Locke's (1968) goal-setting theory and Jakobsen and Andersen's (2013) theory of knowledge inputs and coproduction. As the name suggests, the co-designing phase of coproduction encourages service users to offer their experience and knowledge (Nabatchi et al., 2017b), which is then incorporated in the design phase and referred to as coproducer inputs for designing public service provision plans. Individuals participating in the co-designing phase such as lay citizens, scientists, or public agency staff, have their own repertoires of knowledge that have been established through their lived experience or education. When asked to use their knowledge, they likely try to draw the most appropriate knowledge from their repertoires (Jakobsen & Andersen, 2013; Locke & Latham, 2002). When generating or transferring knowledge, individuals can be unclear about the form and focus of knowledge elicited (Cormican & Dooley, 2007). In other words, if goals are not clarified in the co-designing phase, individuals might not know which bits of knowledge to pull

out or incorporate. This analysis thus investigates the effect of goal ambiguity on the coproduced knowledge inputs in the co-designing phase.

The second analysis deals with the second research question, *how does goal ambiguity affect public service delivery in coproduction settings?* This phase of the analysis builds on and advances Chun and Rainey's (2005a) work on goal ambiguity and organizational performance. Ambiguous goals incorporated into public service provision plans might confuse individuals who actually implement the plans, which will eventually affect the speed and quality of public service delivery. The second analysis thus investigates the possible negative impact of goal ambiguity on the outcomes of co-delivering public services. Figure 1.1 illustrates the overall structure of this study and the coproduction phases that correspond to each research question.

5. Georgia's regional water plans

5.1. Case description

Water resource management in the State of Georgia, which is one of the water-rich regions in the United States, becomes challenging; the growing population and expanded economy have sharply increased water resource demands (Cowie et al., 2009). In 2004, the Comprehensive State-wide Water Management Planning Act was passed because of increased concerns of the public and experts over the consequences of poor water quality and long-term water scarcity across the state. Based on the act, a Comprehensive State-wide Water Management Plan was established in 2008 with extensive stakeholder involvement including technical and public input processes such as meetings of advisory committees, town hall meetings, and public meetings.

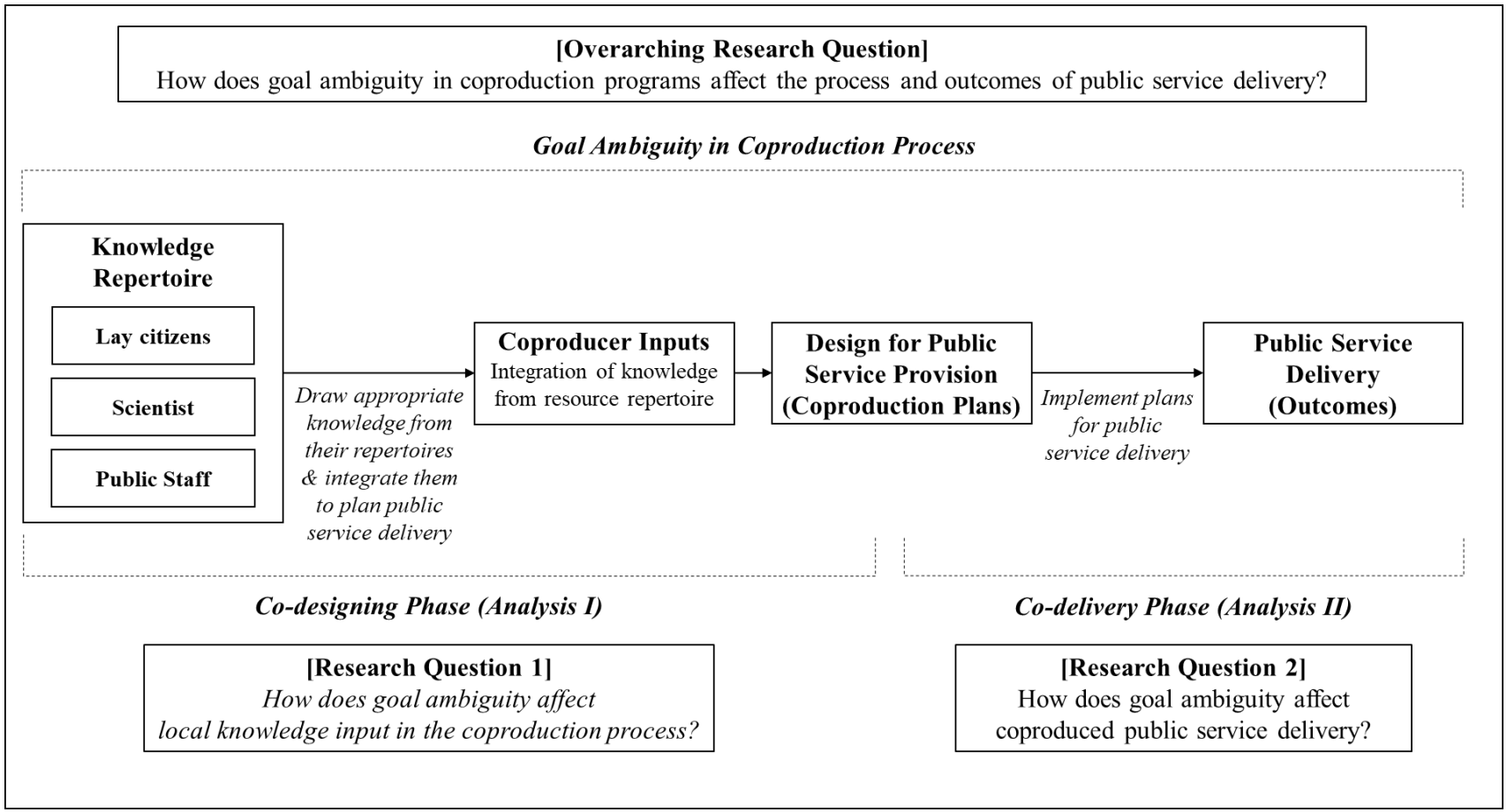

Figure 1.1 Research framework and questions

In 2009, ten Regional Water Planning Councils, which this study explores, were launched to guide the development of the Comprehensive State-wide Water Management plan. Each regional council took charge of one of the ten watershed regions in Georgia. Each council was composed of 25 regional stakeholders who reside or work in the area and represent diverse groups of Georgians related to agriculture, forestry, industry, commerce, water utilities, tourism, and environmental movements, etc. The top priority of the councils is to design detailed regional water plans for the protection, conservation, and use of regional water resources by customizing the Comprehensive State-wide Water Management plan in accordance with the distinctive characteristics of water resources in their region.

Through regional council meetings conducted by regional council members, state actors, water-related stakeholders, and citizens interested in the matter, regional water plans were established and updated on a more or less five-year basis to keep the plans current and up to date. Each of the councils has formulated two regional plans (in 2011 and 2017), and a third plan is currently being developed but it has been delayed and cannot be included in this study.

5.2. Georgia's regional water plans as a coproduction case

This study investigates the activities that occurred during the regional water planning processes as a case of coproduction for two reasons. First, Georgia's regional water plans were developed based on wide participation and active engagement of citizens and other stakeholders throughout the planning process. For successful coproduction activities, local knowledge from service users, who are "co-producers",

should be integrated into the policy design and implementation processes. In this case, regional water councils are responsible for extensively engaging with the actors and parties that might be affected by the regional water plans, including local governments, interested stakeholders, and the public. Water service users including council members and public participants are thus expected to actively lend their unique skills and local knowledge during the regional water plan design process (Georgia Water Council, 2008; Governor Perdue, Office of Communications, 2009).

When published, regional water plans are implemented by various actors involved in water supply and use, namely governmental agencies including the Georgia Environmental Protection Division (GA EPD), Georgia Department of Agriculture, Georgia Soil and Water Conservation Commission, as well as non-governmental actors such as Georgia Municipal Association, universities, water providers and users, riverkeepers, and environmental organizations (Altamaha Regional Water Planning Council, 2011). Considering that regional water plans seek to improve water service provision by including various actors, the case is considered to be public service coproduction.

Second, various Georgia regional water plans reflect different levels of goal ambiguity. Drawing from a broad set of goals offered by the state, the members of each regional council were required to develop their own regional vision and goals for regional water management in a site-specific fashion but still consistent with the State Water Plan. Regional visions and goals set by different actors that hold various values are thus likely to be diversified within the regional settings, which results in varying levels of goal ambiguity in each regional council. By comparing councils in similar settings but with

different levels of goal ambiguity, this study is able to explain how the degree of goal ambiguity in coproducing water service plans is influencing the outcomes of water services in Georgia.

5.3. Study scope

This study examines the effect of goal ambiguity on the process and outcomes of a coproduced water service, so it takes the form of retrospective studies based on the public reports and documents produced during the coproduction process. Among the three rounds of five-year regional water plans in Georgia, this study focuses mainly on the first round of Georgia regional water plans that were established over 2.5 years (February 2009-September 2011) and implemented for 5.5 years (October 2011-May 2017). Each round of regional water plans factors in the water supply and demand forecasts for 2050 estimated at the time of publication. The changes in water forecasts presumed to be generated as the outputs of the first-round regional water plans can only be captured by comparing the first and second-round regional plans. Since the results of second-round regional plans are not available before the third-round regional plans have been published, the planning processes during the second and third rounds are excluded from the study. Future studies can be conducted focusing on the rest of the plans when the third-round regional plans become available. Figure 1.2 below shows the timeline of regional water planning process that occurred during the research period.

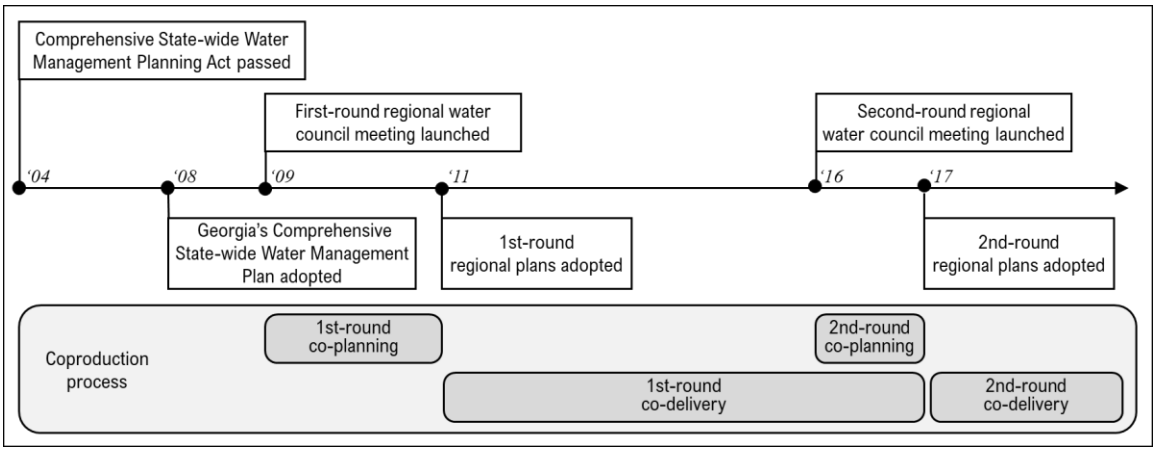

Figure 1.2 Timeline of Georgia regional water plans

6. Significance of the study

This dissertation has three theoretical ambitions. First, it extends the notion of goal ambiguity to social practices that accompany collaborative work. A high level of goal ambiguity is an almost inevitable corollary of coproduction, considering that multiple actors with various backgrounds are purposely selected and engaged in the process. However, most literature on goal ambiguity has focused on the organizational level; little research has sought to understand goal ambiguity in multiorganizational contexts or in multi-actor contexts where the actors have considerable autonomy and agency, such as coproduction. A handful of studies have suggested extending goal ambiguity to the program level or collaborative practices (e.g., Bryson et al., 2016; Jung, 2014; Rainey & Jung, 2010), but relatively little attention has been paid to how ambiguous goals in coproduction might influence performance. The empirical results from this study thus provide evidence that will likely support extending goal ambiguity concepts and theories to a broader range of collaborative social activities.

This leads to the second implication. This study aims to establish that goal ambiguity is an influential factor in coproduction. A comprehensive review of the literature on coproduction conducted by Voorberg and colleagues (Voorberg et al., 2015) states that finding influential factors of coproduction can provide new insights on the concept. Considering that a failure to achieve a shared vision and commitment to mutual goals among actors might lead to problem blaming rather than problem solving (Thomson & Perry, 2006), empirically examining the effect of goal ambiguity on collaborative practices could enhance our understanding of coproduction and provide new insights to managers of coproduction programs.

Lastly, this study conducts an empirical examination of two different phases in the coproduction process within the same context. As an umbrella-like concept, coproduction has been criticized because of its conceptual ambiguity (Brandsen & Honingh, 2016). A possible way to clarify the concept is to distinguish social innovation based on the types of citizen involvement in different stages or phases of the process, such as the co-design or co-implementation level (Voorberg et al., 2015). This case includes two different but closely related phases of coproduction, co-designing and co-delivering public services. According to an interview with a former Georgia Environmental Protection Division officer, citizen involvement was observed throughout the whole process of the case, but the types and levels of citizen involvement differed. For instance, co-designing regional water plans was led mainly by regional actors, but co-implementing the plans was conducted mainly by state actors with the help of local residents. By analyzing two different phases in the same case, this study could improve the conceptual clarity of coproduction.

7. Organization of the dissertation

This dissertation is composed of six chapters featuring a case study based on two empirical studies. The first three chapters explore the literature, provide theoretical insights related to the coproduction concept, and suggest research questions with theoretical underpinnings. Chapter one is a general introduction to the main concepts and ideas that run throughout the study, including an overview of the research questions and research design. Chapter two lays the groundwork for subsequent chapters by explaining the theoretical perspectives and trends in coproduction research. Chapter three draws on the organizational goal ambiguity discourse (Chun & Rainey, 2005b; Jung, 2012) and the literature on the characteristics of coproduction (Brandsen & Honingh, 2016; Nabatchi et al., 2017b) to investigate the dynamic, multi-phased aspects of goal ambiguity in the coproduction process. This study seeks to advance Chun and Rainey's (2005a) work on goal ambiguity and organizational performance, investigating the possible negative impact of goal ambiguity on the outcomes of coproduction. By evaluating the types and levels of goal ambiguity that arise in the coproduction process, this study extends the goal ambiguity concept into the coproduction process to provide context and direction for the subsequent analyses.

Chapters four and five present empirical evidence about goal ambiguity in coproduction practices and its possible effect on coproduction outcomes. Chapter four provides the research design and methodology for two main empirical analyses. The first main analysis applies two theoretical frameworks to investigate the relationship between knowledge inputs and goal ambiguity in coproduction using a mixed-method approach. The second main analysis advances Chun and Rainey's (2005a) work on goal ambiguity

and organizational performance, investigating the possible negative impact of goal ambiguity on the outcomes of coproduction. Chapter five presents the analyses and results. The last chapter summarizes the overall findings and implications of the study, concluding by addressing its limitations and offering some recommendations for future research.

CHAPTER 2

THEORETICAL BACKGROUND

1. Coproduction of public services

1.1. Definition of coproduction

In recent decades, traditional, government-centered approaches to public service delivery have been challenged (Bovaird, 2007; Bryson et al., 2016; Pestoff, 2012). Public demand for greater engagement in the policy-making process has surged with the rise of populism and diminished trust in centralized government (Brandsen & Honingh, 2016; Fung, 2015). Given these challenges that governments face, the concept of coproduction in public services provides a new way forward in the provision of public services.

Over the years, the concept of coproduction has been refined, building upon the seminal contributions of Ostrom, Parks, and their collaborators at Indiana University (Ostrom, 1996; Ostrom et al., 1978; Parks et al., 1981; G. P. 1 Whitaker, 1980). Originally introduced in the 1970s and early 1980s, coproduction emphasizes the newfound role of citizens in the production of public services: Individual citizens, as recipients of public services, are now expected to help produce their own services in full or in part, alongside public service professionals. These arguments might seem similar to classic discourse on public participation in the policy process at first glance, since both recognize the lay public as important actors in public affairs. The distinction is that coproduction mainly covers issues related to the output side of public policy — that is,

the provision of public services, whereas the former literature emphasizes public participation in the earlier stages of the policy process (Brandsen et al., 2018).

The concept of coproduction was developed by several early pioneers, including Ostrom, Parks, and colleagues (Miller & Wyborn, 2020). According to Whitaker (1980), coproduction refers to a process in which citizens exert important influences on policy through their participation in the execution of public programs. In this process, the individual being served is a vital "coproducer" of any personal transformation that occurs. Rather than presenting a "finished product" to the citizen, agents and citizens work together to produce the desired transformation.

Parks and his colleagues defined coproduction as “a mixing of the productive efforts of regular and consumer producers” (Parks et al., 1981, p. 1002). The former refers to public service agents as professionals whereas the latter refers to their clients — the recipients of public service — who “may contribute to the production of some of the goods and services they consume” (Parks et al., 1981, p. 1002; see also Brandsen & Honingh, 2016; Pestoff, 2012; Pestoff, Osborne, & Brandsen, 2006). This mixing may occur directly, involving coordinated efforts in the production process, or indirectly through independent yet related efforts of regular producers and consumer producers (Parks et al., 1981). Ostrom (1996) further emphasized that coproduction involves individuals who are not in the same organization contributing their inputs to produce a good or service.

Brudney and England (1983) viewed coproduction as the degree of overlap between two sets of participants, regular producers (e.g., service agents, public administrators) and consumers (e.g., citizens, neighborhood associations). They defined

this overlap as a joint production of services by these two groups, or "coproduction." Coproduction thus essentially dissolves the traditional dichotomy between service providers and recipients. Ostrom posited that the perceived chasm between the market and the state, as well as between government and civil society, is an illusory dichotomy stemming from excessively inflexible disciplinary boundaries that constrain the examination of human institutions (1996, pp. 85–86). At its core, coproduction is founded on the principle of collaboration and shared responsibility between these two previously distinct roles. Through coproduction, service providers and users form a cooperative relationship in which the latter is empowered to actively participate in the design, delivery, and evaluation of services. By doing so, the boundary between the provider and consumer is effectively abolished, enabling a more equitable, democratic, and effective approach to service provision.

Since the 2000s, the growing recognition of coproduction's importance in public service provision has expanded the scope of the concept to encompass a wider range of actors and activities (Brandsen & Honingh, 2016; Nabatchi et al., 2017b). Some definitions highlight the role of various citizens as active participants in the production of services, either through their own efforts or through long-term relationships with service providers. For example, Pestoff et al. (2006b) defined coproduction as an arrangement where citizens produce their own services at least in part, while Bovaird (2007) defined it as the provision of services through regular, long-term relationships between service providers and service users or other members of the community. Similarly, Boyle and Harris (2009) described coproduction as delivering public services in an equal and

reciprocal relationship between professionals, people using services, their families, and their neighbors.

Other definitions focus on the relationship between individual citizens and public organizations that provide public services, such as Brandsen and Honingh's (2016) definition of coproduction as a direct and active contribution from citizens to the work of the organization, requiring a relationship between paid employees and groups of citizens, and Surva et al.'s (2016) definition of coproduction as a means of involving citizens as co-designers and co-implementers of services that public organizations typically deliver.

Osborne et al. (2016) offered a broader definition of coproduction as the voluntary or involuntary involvement of public service users in any of the design, management, delivery, and/or evaluation of public services. Nabatchi et al. (2017b) similarly described it as an umbrella concept that captures a wide variety of activities that can occur in any phase of the public service cycle and in which state actors and lay actors work together to produce benefits. Table 2.1 below summarizes these varying definitions of coproduction by leading scholars in the field.

Table 2.1 Definitions of coproduction

Year	Author(s)	Definition	Page(s)
1980	Whitaker	The individual served… is a vital "coproducer" of any personal transformation that occurs… Rather than an agent presenting a "finished product" to the citizen, agent and citizen together produce the desired transformation	240
1981	Parks et al.	Coproduction involves a mixing of the productive efforts of regular and consumer producers. This mixing may occur directly, involving coordinated efforts in the same production process, or indirectly through independent, yet related efforts of regular producers and consumer producers	1002

Table 2.1 continued

Year	Author(s)	Definition	Page(s)
1983	Brudney & England	The degree of overlap between two sets of participants-regular producers (e.g., service agents, public administrators) and consumers (e.g., citizens, neighborhood associations). The resultant overlap represents joint production of services by these two groups, or "coproduction"	63
1996	Ostrom	The process through which inputs used to produce a good or service are contributed by individuals who are not “in” the same organization	1073
2006	Pestoff et al.	An arrangement where citizens produce their own services at least in part. The latter could also refer to autonomous service delivery by citizens without direct state involvement, but with public financing and regulation	592-593
2007	Bovaird	The provision of services through regular, long-term relationships between professionalized service providers (in any sector) and service users or other members of the community, where all parties make substantial resource contributions	847
2009	Boyle & Harris	Delivering public services in an equal and reciprocal relationship between professionals, people using services, their families and their neighbours	11
2016	Brandsen & Honingh	A relationship between a paid employee of an organization and (groups of) individual citizens that requires a direct and active contribution from these citizens to the work of the organization	431
	Osborne et al.	The voluntary or involuntary involvement of public service users in any of the design, management, delivery and/or evaluation of public services	640
	Surva et al.	A way to involve citizens as co-designers and co-implementers of services that are usually delivered by public organizations	1031
2017	Nabatchi et al.	An umbrella concept that captures a wide variety of activities that can occur in any phase of the public service cycle and in which state actors and lay actors work together to produce benefits	769

1.2. Typologies of coproduction

Although scholars have proposed diverse definitions of coproduction, efforts have been made to enhance conceptual clarity and provide guidance for policymakers and practitioners by creating coproduction typologies that specify the various elements of coproduction. The first known typology was introduced by Brudney and England (1983) who suggested an actor-oriented typology using the categories of individual, group, and collective coproduction based on the degree of overlap achieved between regular producers and consumer spheres. This typology is explained below.

Individual coproduction refers to activities where the benefits are limited to a personal level with small overlap between the producer and consumer spheres. Individual coproduction can be classified into two distinct forms. First is "captured" coproduction, which involves citizens participating in soft service activities, such as education and welfare services. These services are attentive to the interests of service users, and their effectiveness is defined as productive interaction between citizens and public officials. However, citizens have little choice but to participate in these services since the service agenda is controlled by service agents. The second type of individual coproduction relates to intentional and voluntary actions taken by citizens for their personal use or benefit, such as turning in fire alarms and picking up litter. However, unless organized or coordinated, these individual actions will produce minimal benefits for society even when they are aggregated. They thus represent the bottom of the hierarchy of coproductive activity.

Group coproduction involves the voluntary and active participation of multiple citizens working in concert, which may require formal coordination between service

agents and citizens. Neighborhood associations are a good example of group coproduction, where individuals join forces to improve their neighborhood. These associations perform two primary functions: demand aggregation and articulation to transmit their preferences to public officials, and resource pooling to exert political pressure for alternative services. While potentially effective, group coproduction is limited in terms of the benefits it provides. Wealthier, better-educated, or non-minority citizens may be more willing and able to engage in coproduction activities, which may raise equity concerns. Structural and institutional barriers, such as resistance from city administrators and public employees who are unwilling to work with lay citizens is another potential obstacle of group coproduction.

The third type of coproduction is collective coproduction. This type provides goods and services that benefit the entire community, regardless of which citizens participate in service delivery. Collective coproduction is a response to fiscal challenges in local governments, rejecting the traditional government-centered view of service delivery and instead embracing alternative service delivery arrangements that involve direct citizen involvement. One example is when citizens donate to the city treasury or volunteer their labor for unspecified public work. Given that fiscal constraints drove this type of coproduction, active coordination between traditional service providers and consumers with the support of city officials and service agents is inherent. Thus, the degree of overlap between regular service providers and service users is extensive compared to other types of coproduction.

Brandsen and Honingh (2016) expanded upon this early, actor-based typology by proposing a two-dimensional typology that focuses on *when* coproductive activities occur

and *what* is coproduced. The first dimension is the extent of citizen involvement in providing a public service, categorized as either implementation only or design and implementation. The second dimension is the proximity of citizen-involved tasks to organizational core services, categorized as either complementary or non-complementary. These dimensions form a 2x2 matrix resulting in four types of coproduction: complementary coproduction in implementation, complementary coproduction in service design and implementation, coproduction in the implementation of core services, and coproduction in the design and implementation of core services.

Complementary coproduction in implementation refers to citizen participation in executing a complementary task, but not in its design. Citizens thus do not help design the service but assist in delivering it. Similarly, complementary coproduction in service design and implementation allows citizens to be involved in complementary activities but not core services. They can, however, help design such activities. On the other hand, coproduction in the implementation of core services refers to situations where citizens are actively involved in executing public services that are core to the organization, but not in their design. Coproduction in the design and implementation of core services refers to the scenario where citizens are directly engaged in both designing and implementing the core services rendered to them, guaranteeing the most extensive citizen involvement.

Nabatchi, Sancino, and Sicilia (2017b) also noticed the temporal nature of coproduction and merged it with the actor-based typology of Brudney and England (1983). They proposed a 3x4 matrix that combines three levels of participating actors (individual, group, collective) with four phases of the service cycle (co-commissioning,

co-design, co-delivery, and co-assessment), which yields 12 types of coproductive activities.

The variation in these types of coproduction depends on factors such as *who* is involved, *when* the activities are carried out, and *what* is being coproduced. The *who* factor is related to the former dimension, referring to the number and representation of participating actors. The latter is associated with the *when* and *what* factors: the *when* factor addresses the phases of the service cycle and their temporal orientation (e.g., prospective, concurrent, retrospective), while the *what* factor encompasses the nature and distribution of benefits and the resulting outputs of coproduction.

The most recent effort to categorize coproductive activity is by Steiner and colleagues (2022), who introduce the concept of 5*W*s. Drawing from literature reviews and empirical case studies, they propose additional *why* and *when* factors, in addition to the *who*, *when*, and *what* factors proposed by Nabatchi and her colleagues (2017b). Their study emphasizes the significance of the *why* factor, which concerns the underlying motivations behind coproductive activities. Steiner et al. argue that an investigation into the *why* factor of coproduction is essential, particularly since both cases analyzed in their research emerged from crises and evolved within specific political and community contexts. Four potential drivers of coproduction are identified as examples, including personal experiences or a desire to support vulnerable community members at an individual level, and replacement of services that have been withdrawn due to financial constraints or filling in gaps in the delivery of unpopular services at the societal or community level. The last factor is *where*, the contextual setting or space in which co-production takes place. Notably, the same factors involved in co-production may yield

different outcomes depending on the service setting, which can include education, environment, and health. Other examples that fall under the *where* factor include the socio-political context, the level and scale of the activity, or its geographical setting such as rural or urban areas. Table 2.2 below summarizes the varying typologies of coproduction with a description of the dimensions and components that each typology includes.

In summary, many definitions and typologies have been proposed for clarifying the concept of coproduction, but its essence lies in citizen engagement in the service delivery process, not only as consumers but also as "co-producers" of public services (Alford, 2014; Ostrom et al., 1978; G. P. 1 Whitaker, 1980). By changing the role of citizens from mere consumers to providers of public services, coproduction is said to enhance the responsiveness of governments, which can help increase democratic legitimacy of the public sector (Brandsen & Honingh, 2016; Meijer, 2016).

At the same time, engaging service consumers enables public managers to hear the voice of the marginalized, which strengthens the values of equity and social cohesion in the contemporary fragmented social context (Brandsen & Honingh, 2016). Further, the voluntary participation of citizens enlarges access to society's resources — citizen knowledge and expertise in the local context — that have not been fully utilized in traditional settings and thus helps to increase the effectiveness of public service delivery (Aschhoff & Vogel, 2018; Meijer, 2016).

Emphasizing the social robustness enhanced through citizens' inputs, this study adopts a comprehensive definition of coproduction that encompasses citizen engagement at any stage of the policy process, as outlined by Osborne et al. (2016) and Nabatchi et al.

(2017b). The provision of public services necessitates a holistic approach that recognizes the interconnectedness and interdependence of each stage, including planning, delivery, and evaluation, rather than treating them as isolated processes. Policy-related knowledge that is coproduced in decision-making can have a significant impact on the service delivery and outcomes of the public services delivered. For instance, the field of sustainability sciences highlights the importance of coproduction in the decision-making and evaluation processes using the term "knowledge coproduction", which refers to coproducing policy-related knowledge by stakeholders, citizens, and bureaucrats (Edelenbos et al., 2011). The integration of knowledge from diverse actors enables a more nuanced understanding of the complexities surrounding policy issues, ultimately contributing to the achievement of sustainable development goals (Miller & Wyborn, 2020).

Table 2.2 Coproduction typologies

Author(s)	Dimension(s)	Components
Brudney & England (1983)	• (Who) The degree of overlap found between the activities of regular producers and consumers (p. 63)	- Individual - Group - Collective
Brandsen & Honingh (2016)	• (When) The extent to which citizens are involved, not only in the implementation but also in the design of professionally produced services (p. 432)	- Implementation vs. Design & Implementation
	• (What) The proximity of the tasks that citizens perform to the core services of the organization (p. 432)	- Complementary vs. Noncomplementary

Table 2.2 continued

Author(s)	Dimension(s)	Components
Nabatchi et al. (2017b)	• (What and When) Phase of the service cycle (p. 773)	- Co-commissioning - Co-design - Co-delivery - Co-assessment
	• (Who) Level of coproduction (p. 773)	- Individual - Group - Collective
Steiner et al. (2022)	• (Who) Actors (p. 5)	- Citizens/clients/customers - Obligatees vs. Non-obligatees - Individual/Groups/Collectives - Professional vs. Lay involvement
	• (When) Stage/Time (p. 5)	- Design/Planning/Commissioning - Delivery/Implementation - Evaluation
	• (What) Outcomes (p. 5)	- Complementary vs. Non-complimentary - Voluntary vs. Non-voluntary - Individual values vs. Collective values - Tangible objects/ Information/Behavior
	• (Why) Reasons (p. 5)	- Personal experiences vs. Desire to support more vulnerable community members - Replacement of services withdrawn due to financial costs vs. Filling in gaps in delivery of 'unpopular' services
	• (Where) Context (p. 5)	- Socio-political - Level and scale - Geographical - Service settings

Accordingly, this study views coproduction as encompassing citizen involvement at any stage of the public service delivery process. Thus, this study applies the typology of Nabatchi et al. (2017b), which includes four categories based on service cycle phases: co-commissioning, co-design, co-delivery, and co-assessment. Since this study aims to provide a comprehensive analysis of a coproduction case from its beginning onwards, this approach offers a valuable framework to demarcate the policy process and understand the varying aspects of each phase. Particularly, this study focuses on the co-design and co-delivery categories, which are the most relevant to the targeted case.

2. Challenges in coproduction

2.1. The normative and optimistic tendency in coproduction studies

Under a parade of appreciation for the believed beneficial outcomes of coproduction, the majority of coproduction studies presume what *ought to be* the effects of coproduction, without careful concern for what they actually *are* (Steen et al., 2018; Verschuere et al., 2012; Voorberg et al., 2015). Accountability, democracy, and social justice — the intrinsic values that no one can neglect — are presented as the corollary of coproduction, for it allows greater public participation and empowerment in public service delivery and enhances those values.

This "normative tendency towards optimism", according to Steen, Brandsen, and Verschuere, (2018, p. 284), likely neglects the "substantive" aspect of coproduction, namely the inputs and outputs of coproduction, including how they are produced in the chain of coproduction and the challenges that coproduction practices might face. Verschuere, Brandsen, and Pestoff even assert that studies of coproduction's effects, such

as the quality of public services delivered, are the least developed but some of the most important aspects of coproduction research (Verschuere et al., 2012). Ryan (2012) also emphasizes the socio-political reasons for utilizing co-production, which goes beyond managerial concerns. His study of co-production cases in Australia and New Zealand suggests that officials considered political justifications, such as clients' rights, and in some cases, their legitimate right to be partners in the process, as a key precondition for successful co-production.

A hint for this optimistic approach toward coproduction can be found in a study by Voorberg, Bekkers, and Tummers (2015), which systematically reviewed the literature. The study identified 122 articles and books on coproduction from 1987 to 2013. The authors pointed out that more than half of the studies did not even mention the objective of coproduction, and sometimes coproduction itself became the primary objective (Voorberg et al., 2015). In other cases, one might observe that too many things, such as greater effectiveness, efficiency, legitimacy, or citizen satisfaction, are considered potential objectives of coproduction based on the belief that coproduction can resolve the limitations of traditional government-centered service delivery. This sanguine expectation might make coproduction seem like a “magic” concept or panacea, similar to the concepts of “governance” or “networks” that have received attention in the field of public management for decades (Bovaird, 2007; Pollitt & Hupe, 2011; Voorberg et al., 2015). Such over-aggrandizement may obscure what should be pursued in the coproduction process and the potential problems coproduction may have (Steen et al., 2018).

2.2. The ambiguous and broad concept

Co-production of public services has gained recognition as a flexible and adaptable approach to public service delivery that is compatible with various perspectives. In recent decades, the term has been spread across diverse disciplines ranging from public administration to economics, science and technology studies (STS), and sustainability studies (Brandsen & Honingh, 2016; Miller & Wyborn, 2018; Van Eijk & Steen, 2016) with its simple but far-reaching idea of providing service together (Aschhoff & Vogel, 2018; Nabatchi et al., 2017b; Osborne et al., 2016). However, as the concept matures, coproduction is increasingly seen as a broad term encompassing the participation of citizens and public sector professionals in the provision of public services (Brandsen et al., 2018; Durose et al., 2017; Nabatchi et al., 2017b). Pestoff (2012) considers coproduction as an umbrella term for "a partnership between citizens and public service providers" (p. 1105). This broad definition of coproduction increases its variety of dimensions and applications (Nabatchi et al., 2017b), which extends its domain to all collective efforts made in any process for public service provision, ranging from the design to the management, delivery, and evaluation of public service (Bovaird, 2007; Bovaird & Loeffler, 2012; Osborne et al., 2016). For example, the concept has been broken down into various components, such as co-creation, co-design, co-planning, co-management, and co-assessment, while highlighting the different stages of involvement (Durose et al., 2017).

Thus, coproduction remains an elusive, wooly concept in the realm of public management and policy despite the continuous efforts refine the concept (Osborne et al., 2016, p. 640); (Aschhoff & Vogel, 2018). Pestoff (2012) notes coproduction's wide range

of meanings and describes two possible kinds of definitions: “direct citizen participation in the delivery of a public financed service at the site of service delivery”, and “group provision of such services” (Pestoff, 2012, p. 1107). The initial discourse on coproduction is close to the former definition. The latter, however, puts more emphasis on the diverse mix of service providers in terms of greater engagement of citizens in managing public service (Pestoff, 2012).

Even the definitions of consumer producers, or “co-producers”, vary to some extent, depending on the author’s point of view. Ostrom, who apparently coined the coproduction concept, emphasized the direct involvement of citizens, or “outsiders” of the existing organization, for public service provision (Pestoff, 2012; Rosenbloom & Gong, 2013). Stemming from this initial idea of coproduction, some scholars such as Brandsen and Honingh (2016) limit co-producers to the direct end-users of a certain public service. Other scholars, however, insist that not only direct service users but other members of society, such as volunteers and community groups, can be regarded as possible co-producers of public services (Bovaird, 2007; Rosenbloom & Gong, 2013).

This expansive, multivalent concept of coproduction may contribute, in part, to its flexible application to various phenomena. The practical attractiveness of such terms may lie in their vagueness, which includes an inherent positivity that makes it difficult to argue against them, as well as making them flexible enough to be applied to different phenomena (Brandsen et al., 2018). However, it should be noted that different definitions of a concept inevitably include different cultural backgrounds, focuses, or levels of analysis. If coproduction remains vague and elusive, this will hinder systemic research on the concept.

Among the potential problems that can be veiled by optimism and ambiguous definitions of coproduction, this study highlights a specific challenge to coproduction, namely the concept of goal ambiguity. The next chapter will introduce this concept and provide a deeper discussion of its potential hindrances to coproduction. By examining the issue of goal ambiguity in the context of coproduction, this study provides a deeper understanding of this relationship and therefore makes a significant contribution to the literature.

CHAPTER 3

RESEARCH QUESTIONS AND DEVELOPMENT OF HYPOTHESES

1. Goal ambiguity and coproduction

1.1. Goal ambiguity in public management

The literature on public organizations has emphasized the importance of organizational goals in performance management based upon Locke and Latham's theory of goal setting, which posits that individuals with clearer goals in an organization will tend to outperform those with less clear goals (J. W. Lee et al., 2010). Public organizations, however, often have relatively vague and conflicting goals compared to private firms and businesses (Boyne, 2002; Lan & Rainey, 1992; Perry & Rainey, 1988; Rainey et al., 1976)(Rainey, 2016). Earlier research on goal ambiguity in public management is based upon this presumed difference in the goals of public and private organizations. Multiple and diverse objectives, values, and criteria characterize public organizations (Bozeman & Kingsley, 1998; Rainey, 1983; Rainey et al., 1976), which has led researchers to devote significant attention to understanding the concept of goal ambiguity and how it shapes various facets of public organizations, ranging from organizational control to motivation, job satisfaction, and performance (Jung, 2012; Pandey & Wright, 2006; Rainey & Jung, 2010; R. M. Walker et al., 2010).

Chun and Rainey's (2005b) research marked the first systematic attempt to define and measure goal ambiguity. They defined the concept as "the extent to which an organizational goal or set of goals allows leeway for interpretation, when the

organizational goal represents the desired future state of the organization" (p. 2). Prior to their study, goal clarity had been measured in relation to similar concepts, such as role ambiguity, or through perceptual measures based on surveys of organizational members (Bozeman & Kingsley, 1998; Rainey, 1983; Rainey et al., 1995). Focusing on the varying leeway that organizational goals can provide, Chun and Rainey (2005b) suggested a conceptual framework that measures goal ambiguity in four dimensions: *mission comprehension, directive, evaluative, and priority goal ambiguity*. Mission comprehension goal ambiguity refers to the ambiguity present when individuals understand the mission of their organization, while directive goal ambiguity represents the leeway in conveying organizational missions through detailed rules or guidelines. Evaluative goal ambiguity refers to the level of leeway allowed for individuals to subjectively evaluate goal achievement, and priority goal ambiguity represents the extent of interpretive leeway in deciding priority among multiple goals. Through this framework, Chun and Rainey's study opened new avenues of research on the importance of goal ambiguity in public organizations. Subsequent empirical investigations have further expanded on this work (e.g., Jung, 2011, 2012, 2014; Lee et al., 2009, 2010; Moynihan, 2015).

1.2. Goal ambiguity as a potential challenge of coproduction

Since ambiguity refers to knowing differently rather than knowing incompletely (R. E. van den Hoek et al., 2014), goal ambiguity occurs when a goal is interpreted differently and then accepted by individuals. Goal ambiguity is also likely to increase when multiple goals that allow broad interpretation or leeway exist. The problem is that

coproduction involves extensive stakeholder engagement. The multiplicity of stakeholders characterizes the coproduction domain, but at the same time, it also introduces a plurality of goals, each of which invites multiple interpretations. Coproducers from diverse backgrounds project their own values onto the meaning of coproduction goals, such as legality, equity, dialogue, and user orientation (Jørgensen & Bozeman, 2007; Koontz & Johnson, 2004). This broad interpretation of goals among multiple stakeholders poses a significant challenge for public managers trying to create shared visions of coproduction practices. If these diverse values are accepted, coproduction practices would allow leeway in interpreting and prioritizing goals and might eventually create value conflict among the participants resulting in public service disparities (Andersen et al., 2021; Aschhoff & Vogel, 2018; Jørgensen & Bozeman, 2007). Hence, this study uses goal ambiguity as a theoretical concept to investigate the phenomenon of multiple participants and goals in coproduction practices. This study poses the following overarching research question:

> *How does goal ambiguity in coproduction affect the processes and outcomes of public service delivery?*

As a preliminary step toward answering this overarching research question, this study illuminates the patterns of goal ambiguity occurring in coproduction. Particularly, this study identifies two coproduction stages and describes their varying characteristics. Coproduction includes a wide variety of activities, ranging from simply delivering public services with lay actors – a classic approach to coproduction – to processes that involve

public interaction, including co-commissioning, co-designing, and co-assessing public services (Nabatchi et al., 2017b). Even though these variations can become muddled up under the general concept of "coproduction", their temporal natures, goals, and intended outcomes vary (Jo & Nabatchi, 2016). Therefore, an empirical analysis of goal ambiguity should begin with a clear distinction between the two primary coproduction phases: co-designing and co-delivering public services.

This study thus suggests a theoretical framework to examine goal ambiguity in two distinctive phases of coproduction: the co-designing and co-delivery phases. The co-designing phase can be defined as "activities that incorporate the experience of users and their communities into the creation, planning, or arrangements of public services" (Nabatchi et al., 2017b, p. 772). The knowledge and experience from non-state actors, or "outsiders" to the traditional decision-making process, can provide state actors a better understanding of how public services can be designed in a way that produces the greatest utilization and benefit for the individuals and communities involved (Nabatchi et al., 2017b). Under this situation, where innovative and multiple viewpoints are needed, abstract but positive objectives are strategically fostered (Eisenberg, 1984; Ravishankar, 2013). On the other hand, in the co-delivery phase, which is the traditional view of coproduction that refers to "joint activities between state and lay actors that are used to directly provide public services and/or to improve the provision of public service" (Nabatchi et al., 2017b, p. 772), clear objectives can be positively related to organizational performance. At least, this is a widely held assumption in the field of public management (Chun & Rainey, 2005a; Jung, 2014b; Locke & Latham, 2002). Considering that each phase of the service delivery cycle may require different types of

desirable outputs (Jo & Nabatchi, 2016), the role of goal ambiguity might differ in each stage. By studying both phases, this study investigates two more specific research questions:

How does goal ambiguity affect local knowledge input in the coproduction process?

How does goal ambiguity affect coproduced public service delivery?

This study names two types of goal ambiguity related to the above-mentioned coproduction phases: Planning goal ambiguity and Implementation goal ambiguity. Planning goal ambiguity is associated with the interpretive leeway in goals and targets in the co-designing phase: coproducers might be confused when determining what knowledge to apply to the program to attain their common goals by designing optimal public services. Implementation goal ambiguity is another type of goal ambiguity that might occur in the co-delivery phase of coproduction: coproducers might have different perceptions of their common goals when implementing coproduction plans and delivering public services.

The four dimensions—mission comprehension, directive, evaluative, and priority—can be used to gauge the diverse attributes associated with each type of goal ambiguity. However, this study does not employ directive goal ambiguity considering the characteristics of the targeted case. This dimension is generally evaluated through the ratio of rules to laws, which considers the degree of autonomy granted to federal agencies

by Congress. Given that the current study focuses on variations among different coproduction groups within the same program, directive goal ambiguity is deemed unsuitable for this particular case. Similarly, evaluative goal ambiguity is not used in measuring planning goal ambiguity, as the data associated with evaluating the planning process is not available. Despite these gaps in measurement, the case study featured in this dissertation provides keen insights on how goal ambiguity typically affects coproduction of public services.

Figure 3.1 presents the theoretical model that will be used to investigate the phenomenon of goal ambiguity in the coproduction process. More detailed discussion of each research question will follow in next section (see figures 3.3 and 3.4).

2. Knowledge creation in designing coproduction practices

The rising popularity of coproduction in public service provision goes along with contemporary interpretations of professionalism. Service delivery inevitably requires knowledge inputs to define the services people want (Aligica & Tarko, 2013), but in modern society which is plagued by "wicked" problems (Rittel & Webber, 1973), no one has supreme knowledge over others. Only limited and imperfect expertise is available.

Originally coined by Rittel and Webber (1973), the term wicked problems refers to policy issues that have no clear definitions or solutions. Their ambiguous characteristics often require multiple actors to work together, which makes them more complicated (Head & Alford, 2015; Rittel & Webber, 1973). Wicked problems are difficult to solve and tend to persist regardless of the action taken. Furthermore, when greater complexity and ambiguity exist and the local context is considered an important

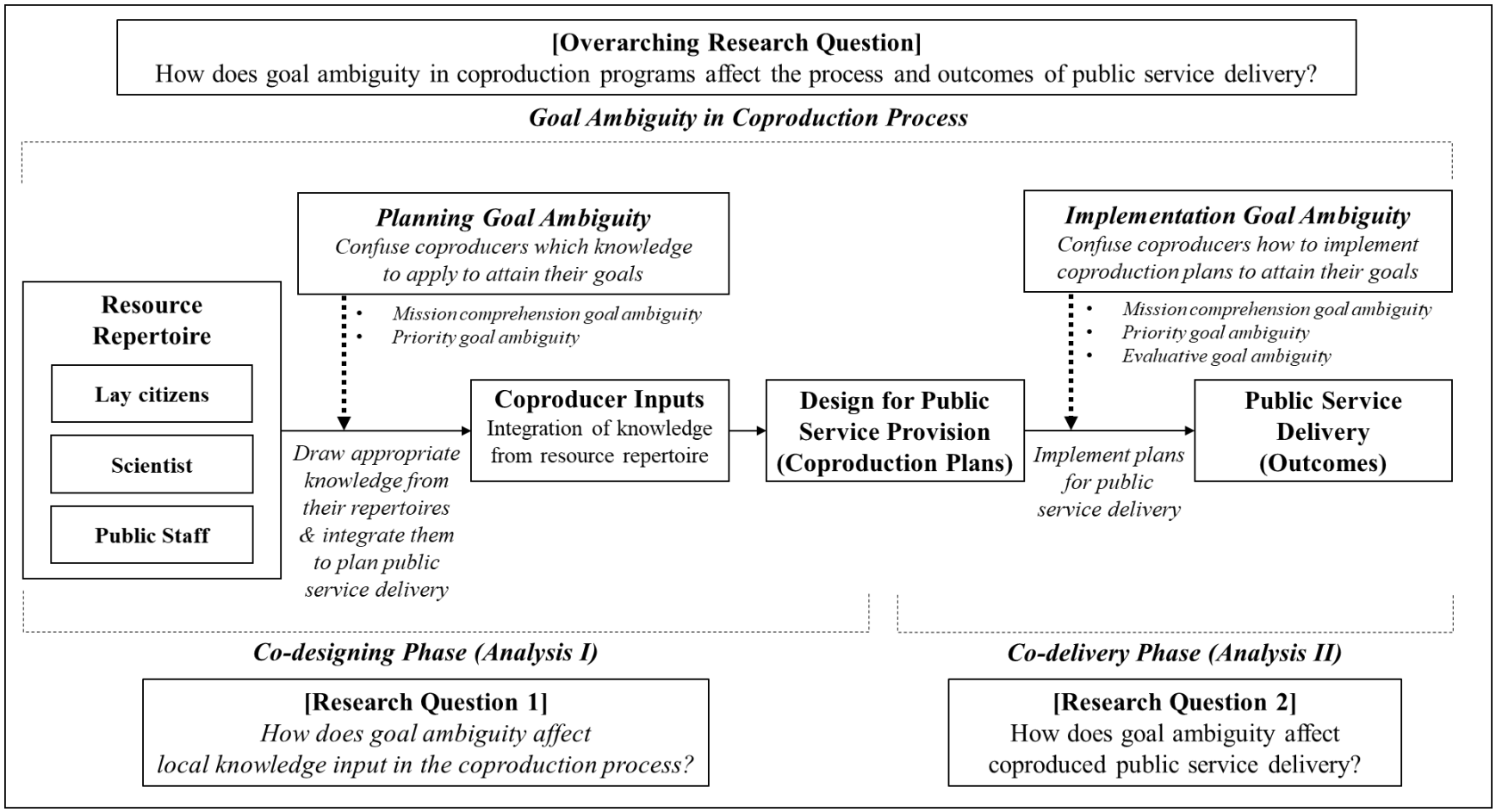

Figure 3.1 Theoretical model and research questions of the study

element in problem-solving, the importance of integrating various sources of knowledge increases (Olsson & Folke, 2001).

The expert-oriented approach of normal science is seen as incapable of dealing with complicated problems such as environmental management and local development that involve various stakeholder groups with different interests (Ludwig et al., 2001; Nowotny et al., 2001; Raymond et al., 2010). In current society, therefore, professionals that traditionally held the predominant positions in developing solutions may be less effective.

In this situation, the interactive process of coproduction is supposed to yield improved and effective service provision by enabling knowledge creation within professional-citizen relationships. Generalized ideas and insights that professionals provide may not resolve individual, context-specific issues in public service provision. Users, on the other hand, are the ones that know best their situations and needs for public services, but they do not have the relevant technical knowledge about policy design or service delivery to yield effective outcomes. In coproduction practices, all participants, including service professionals and ordinary citizens, bring forth knowledge that might enhance service delivery (Brandsen & Honingh, 2016; Jakobsen & Andersen, 2013; Miller & Wyborn, 2018; Ostrom et al., 1978). By collectively creating knowledge inputs closely related to actual service needs, coproduction practices can enhance effectiveness compared to the traditional, government-centered approach to service provision.

Considering that public service delivery inevitably requires knowledge information to define the services people want, eliciting and integrating various types of knowledge within multi-actor settings is thus one of the core aspects of coproduction in

its quest to deliver better public services to citizens. Along with "joint fact-finding" processes (Innes & Booher, 2010) that employ all possible knowledge bases, the true nature of a social problem can be fully understood and collectively acceptable solutions can be yielded (Rogers, 2006; Roux et al., 2006), thus meeting the definition of "socially robust" (Nowotny, 2003).

Local and indigenous knowledge that laypeople hold is an example of relevant information that coproduction can elicit and utilize (Brandsen & Honingh, 2016; Edelenbos et al., 2011; Klenk et al., 2017). Despite a general perception that knowledge is the product of education or training accumulated by scientific practices, it is commonly accepted among scholars that there is a different type of knowledge that is not derived from scholarly or scientific expertise. This unprofessional or even mundane knowledge base is called "local knowledge" owing to its contextual characteristics that are not very generalizable. Local knowledge tends to be informal and indigenous, and rooted in specific settings, rather than being formal or academic. In other words, local knowledge refers to the practically and collectively accumulated understanding from lived experience, which makes it inherently a "social product" within regional boundaries (Antweiler, 1998; Corburn, 2003; Geertz, 2008; Yanow, 2004).

In coproduction practices, local knowledge is expected to provide practical insights for public policies based upon accumulated experience (Failing et al., 2007; Fischer, 2000; Jasanoff, 1997, 2004). For instance, in one study, Jakobsen and Andersen (2013) suggested a coproduction process model and the effect of how different producer inputs affect service outcomes in coproduction practices. As shown in Figure 3.2, they considered the resources of service users as the starting point for citizen inputs into

coproduction, which would eventually affect the quality of service outcomes. From the knowledge bases they have, citizens as public service users name inputs relevant to the problems they experience in public service provision, which leads to the best possible outcomes that coproduction can yield. If some service users, particularly those who are marginalized, are constrained and cannot deliver sufficient inputs to coproduction, only limited outcomes are available. In other words, there is no substitute for robust local knowledge, which suggests that consultative and participative processes are very important.

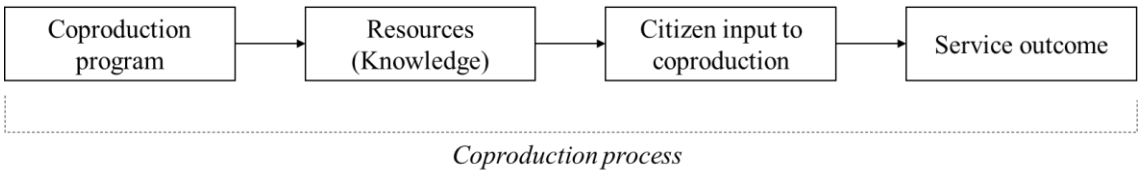

Figure 3.2 Citizen input in coproduction
Source: Adapted from Jakobsen and Andersen (2013), p. 706

Here, the first research question is, *how does goal ambiguity affect local knowledge input in the coproduction process?* As shown in Figure 3.3, goal-setting theory states that individuals have their resource repertoire or knowledge bases, and when working as a team, they can elicit the most task-relevant knowledge from this reservoir of knowledge and experience in order to deal with the present situation and achieve their common goals (Locke & Latham, 2002; Wood & Locke, 1990). The establishment of clear goals thus offers the form and focus for which knowledge should be generated and transferred in a certain situation (Cormican & Dooley, 2007). For instance, McGreevy (2012) studied the case of rejuvenating local society of Japan and found that the ideas of

"legitimate knowledge" vary depending on group identity, suggesting that participants' identification of each other as stakeholders with a common future determines the level of knowledge to be shared.

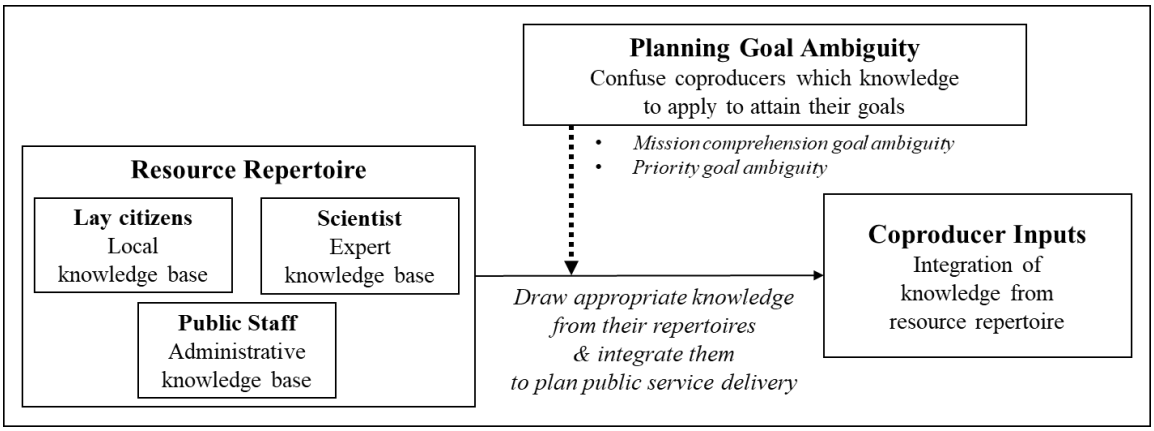

Figure 3.3 Effect of planning goal ambiguity on knowledge elicitation

In other words, unclear purpose or lack of common vision might be a barrier to effective knowledge sharing in coproduction. The participants of coproduction, the coproducers, also work as a team to provide quality public services, which is the end goal of coproduction. Particularly in the co-designing phase of the coproduction process, multiple stakeholders with various backgrounds (e.g., lay citizens, scientists, and public officials) bring their own knowledge bases (e.g., local, expert, and administrative knowledge bases) into the coproduction domain and draw their experience and knowledge from these bases. Coproducer inputs, which are the basis for designing public service provision, are composed by selecting and integrating the most appropriate knowledge for their common goals (Jakobsen & Andersen, 2013). With a higher level of goal ambiguity in the co-designing process of coproduction, referred to as planning goal

ambiguity in this study, program managers might be confused about which coproducers to listen to, and which knowledge to draw from or apply to the project to attain their common goals. Coproducer inputs will therefore likely be comprised of a suboptimal, limited mix of knowledge. Therefore, a situation where multiple or difficult-to-understand goals exist is likely to generate fewer local knowledge inputs. Hence, this study predicts a negative relationship between goal ambiguity and knowledge inputs made in coproduction practices as follows:

Hypothesis 1. As goal ambiguity increases, the amount of knowledge inputs made in coproduction practices decreases.

Hypothesis 1a. As mission comprehension goal ambiguity increases, the amount of knowledge inputs made in coproduction practices decreases.

Hypothesis 1b. As priority goal ambiguity increases, the amount of knowledge inputs made in coproduction practices decreases.

3. The effect of goal ambiguity on coproducing service delivery

Despite the possibility of a negative relationship between goal ambiguity and coproduction success, relatively few attempts have been made to observe goal ambiguity in the context of collaborative settings such as coproduction. Rather, most studies have examined goal ambiguity at the organization and program levels. One reason for this apparent neglect might come from the ambiguous and complex nature of the concept of

coproduction. According to Nabatchi and colleagues (2017b, p. 766), the scholarly enthusiasm toward coproduction made the term apply to an extensive range of activities which led to conceptual confusion (Brandsen & Honingh, 2016; Nabatchi et al., 2017b). For instance, Pestoff (2012) points out this wide range of meanings by presenting two possible kinds of definitions in coproduction discourses: “direct citizen participation in the delivery of a public financed service at the site of service delivery”, and “group provision of such services” (p. 1107).

The early discussion on coproduction was close to the former definition. The latter, however, puts more emphasis on the diverse mix of service providers in terms of greater engagement of citizens in managing public services (Pestoff, 2012). Different definitions of a concept inevitably reflect different cultural backgrounds, focuses, or levels of analysis. What should be referred to as coproduction outcomes or public service performance thus can be differentiated in accordance with varying understandings of what coproduction really is. Voorberg and colleagues (2015) point out this varying definition and relatively scarce attention toward the outcomes of coproduction, which limits our understanding of the relationship between the inputs and outcomes of coproduction.

Here, the second research question is posed: *How does goal ambiguity affect coproduced public service delivery?* By extending the relationship between goal ambiguity and outcomes, this study intends to enhance our understanding of coproduction outcomes. In the discourse on goal ambiguity, goal-setting theory provides a frequently cited rationale that underpins its impact on individual behaviors and the subsequent outcomes in public organizations (Latham & Locke, 2007; Locke & Latham, 2002, 2002;

Maltarich et al., 2016; Wood & Locke, 1990). While initially focusing on how goals affect individual behavior (Latham et al., 2008), goal-setting theorists have more recently begun to study how goals affect organizations and their performance.

The discourse on goal ambiguity in public organizations and its impact on organizational performance has attracted scholarly interest. An almost universal consensus has emerged suggesting that obscurely defined goals, which allow "leeway for interpretation" (Chun & Rainey, 2005b) and can cause conflicts among actors with different interpretations, negatively impact the performance of public organizations, including actual goal attainment rates, perceived effectiveness, work quality, and productivity (Calciolari et al., 2011; Chun & Rainey, 2005a; Jung, 2011, 2014b).

Empirical evidence confirming these relationships is growing. Botti and Monda (2019) conducted a meta-analysis of 75 studies on goal ambiguity and its synonyms (e.g., goal clarity, goal specificity, inconsistent goals, mission valence). According to their findings, predominant studies that have dealt with the consequences of goal ambiguity showed a negative relationship between goal ambiguity and performance. This negative tendency between them is not limited to the results from organization itself, but also extends to employees' perceptions and decisions, such as job motivation, job satisfaction, and organizational commitment (Jung & Rainey, 2011; Wright & Pandey, 2011). For instance, Peng et al. (2015) found the negative impact of goal ambiguity on individuals' value congruence, which refers to the degree that individuals match their values with organizational values. A recent work by Andrew and Mostafa (2019) also provided evidence for the negative relationship between organizational goal ambiguity and the engagement of senior managers in 10 European countries.

Coproduction sits on the boundary between the private and public sectors, but its end objective is firmly situated in the public domain: to produce "collective goods whose benefits may be enjoyed by the entire community" (Brudney & England, 1983, p. 64). As Figure 3.4 illustrates, coproducers contribute their inputs to help design plans, assuming these plans will result in the provision of public services that they will collectively enjoy. To improve the delivery of public services, coproducers participate in the implementation of these plans and monitor their progress. However, with greater levels of implementation goal ambiguity, coproducers might confuse how to implement coproduction plans to attain their common goals.

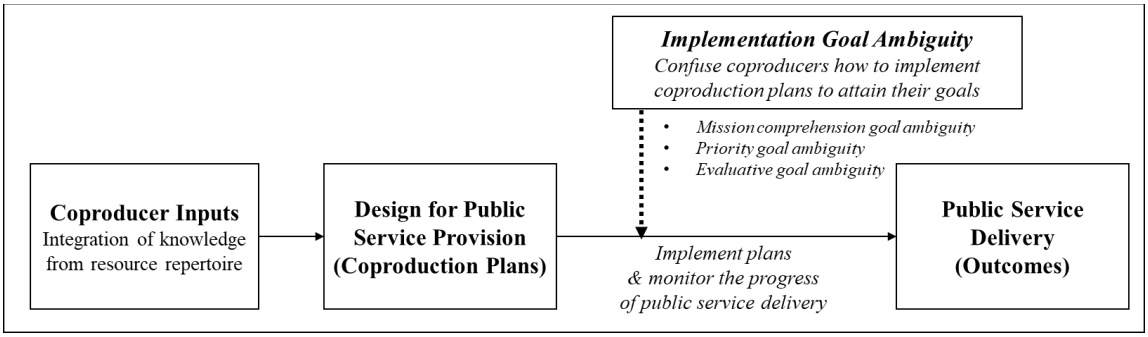

Figure 3.4 Effect of implementation goal ambiguity on public service delivery

Building on numerous studies showing a negative relationship between goal ambiguity and program performance (Jung, 2014b; Matland, 1995; Rainey & Jung, 2010), it can be assumed that public outcomes, or outcomes pursued for the sake of the public, might be affected by vague, conflicting, or loosely set goals. Drawing on the foregoing discussion, this study proposes the following hypotheses:

Hypothesis 2. Goal ambiguity in implementing coproduction plans will negatively affect public service outcomes.

Hypothesis 2a. Mission comprehension goal ambiguity in implementing coproduction plans will negatively affect public service outcomes.

Hypothesis 2b. Priority goal ambiguity in implementing coproduction plans will negatively affect public service outcomes.

Hypothesis 2c. Evaluative goal ambiguity in implementing coproduction plans will negatively affect public service outcomes.

Studying the forgoing hypotheses will shine a light on goal ambiguity's effect on coproduction processes. Based on careful reviews of the literature, we find that this particular relationship has not been studied carefully. It is, therefore, an original contribution that could be highly useful to coproduction researchers and practitioners, including citizens who consume coproduced public services.

CHAPTER 4

DATA AND METHODS

This study analyzes the case of Georgia Regional Water Councils to ascertain the level of goal ambiguity in coproduction practices and its effect on the outputs of coproduction. Case studies are often presented in the literature on coproduction as an ideal approach to illustrate the detailed context in a particular locale, such as the patterns of social decisions or knowledge coproduced by multiple stakeholders (Pestoff et al., 2013). According to Yin (2017), a case study enables researchers to examine the contemporary phenomenon within specific contextual conditions. With attention to the local situation, a case study enables a better, in-depth understanding of coproduction practices (Taylor & de Loë, 2012). In the following section, this paper describes the case to be studied; then, the analytical methods are explained in subsequent sections.

1. Case selection

This study focuses on the case of Georgia Regional Water Councils for three reasons. First, the coproduction approach is gaining increasing advocates from the field of water management and governance. Water management is complex in its nature because individual stakeholders rarely have sufficient knowledge or experience to solve the problem (Leimona et al., 2015). Water management thus requires co-creation of practical solutions based on knowledge from multiple stakeholders (Popovici et al., 2020). The movement to involve citizens in water management projects has increased

across the world, raising questions regarding how local and expert knowledge is shared and how it competes to achieve a common goal (Edelenbos et al., 2011). Hence, this study can enhance understanding of how water management solutions are co-produced.

Furthermore, the case studied here includes many complex characteristics of coproduction, particularly because it involves multiple actors with diverse backgrounds who collaborate to design and deliver public services. The Georgia Governor, Lieutenant Governor, and Speaker of the House appointed 25 members in each regional water planning council, which included diverse groups of Georgians representing agriculture, forestry, industry, commerce, local governments, water utilities, regional development centers, tourism, recreation, and environmental groups. The representatives were expected to act consistent with their backgrounds and the state's economic needs when resolving water resource issues, particularly by using their unique skills and local knowledge bases (Georgia Water Council, 2008; Governor Perdue, Office of Communications, 2009). The council members were the primary actors who designed their regional water plans, and the whole process of water management policy was supervised by GA EPD to support local efforts to develop these region-specific plans. Citizens and local governments were also encouraged to participate.

Lastly, this case presents an opportunity to examine different types of coproduction practices within the same context. As an umbrella-like concept, coproduction has been criticized due to its conceptual ambiguity (Brandsen & Honingh, 2016). A possible way to increase its clarity is distinguishing social innovation based on the types of citizen involvement, such as co-designing or co-implementing policy (Voorberg et al., 2015). This case includes two different but consecutive phases of the

coproduction process, co-designing and co-delivering public services. One former Georgia Environmental Protection Division officer interviewed in this study observed that citizen involvement occurs throughout this case, but the types and levels of citizen involvement differ (G. Cowie, personal communication, August 15, 2022). Co-designing regional water plans was led mainly by regional actors, but co-implementing the plans was mainly run by state actors with the help of local residents. By analyzing two different phases of coproduction in the same case, this study clarifies how those phases may differ.

2. Case description

The case of Georgia State Water Management is analyzed in this study. In the State of Georgia, two different but related plans govern water management based on the 2004 Comprehensive State-wide Water Management Planning Act (Official Code of Georgia Annotated [O.C.G.A.] §12-5-520): the Comprehensive State-wide Water Management Plan (i.e., the state water plan) and the Regional Water Development and Conservation Plans (i.e., the regional water plans). The primary objective of the state and regional water plans is to manage water resources in Georgia through 2050. As the names suggest, this water management planning effort is twofold. First, the state water plan developed by the Georgia Environmental Protection Division (GA EPD) provides basic directions for managing water resources statewide. Following this guidance, the regional water plans are then customized in accordance with the distinctive characteristics of water resources and contextual factors in each region. Ten water planning regions were identified based on watershed drainage areas adjusted to conform to existing political

boundaries such as county lines (See Figure 4.1)[1] (Georgia Environmental Protection Division, 2009).

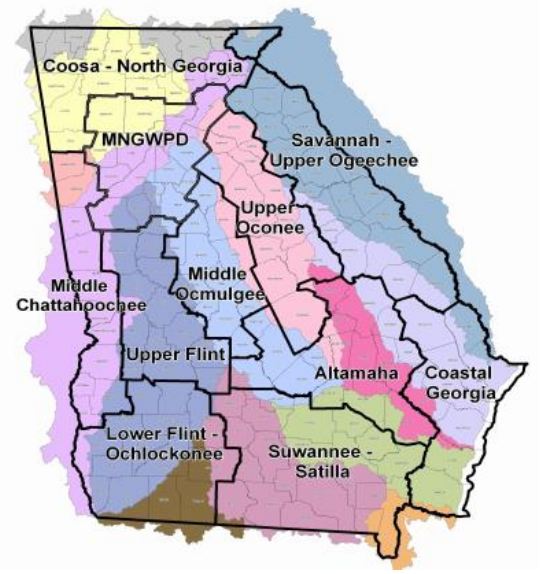

Figure 4.1 Water planning regions in Georgia

Source: Georgia Environmental Protection Division (2009, p.15)

From March 2009, when the 10 regional committees were launched, 10 to 11 meetings were held by each council, and six joint meetings were also conducted to exchange information and experience among the councils. The regional water councils submitted their recommended regional water plans on June 30, 2011. These plans were adopted by GA EPD on November 15, 2011.

[1] The Metropolitan North Georgia Water Planning District (MNGWPD) is not included in this policy since it developed separate water management plans as an independent water district created by the Georgia General Assembly in 2001 based on O.C.G.A. 12-5-570 (GA EPD, 2009). Therefore, this area is excluded from the analysis.

2.1. The purpose and focus of the regional water planning councils

The purpose of the regional water planning councils is to develop recommended regional water plans for the protection, conservation, and use of regional water resources. To fulfill this role, each council was given three objectives: first, sustainable development of the state's economy based on regional water resources; second, the protection of public health and the ecological systems of the region; and third, improved quality of life for all individuals in the region (Georgia Environmental Protection Division, 2009). To this end, council members are expected to develop regional visions and goals for water management, in a region-specific fashion but still consistent with the State Water Plan. Regional councils also conduct "gap analyses", which compare the baseline capacity of water resources with forecasts of water demands. The councils assess the adequacy of water resources based upon inputs from local governments and four major water use sectors (municipal, industrial, agricultural, and energy) as well as supplemental information and expert knowledge provided by the GA EPD. The councils then develop regional water management plans specifying detailed management practices to reduce future water demand and/or increase water supply. During this process, the council members try to eliminate the gap between expected demand and supply.

Along with these purposes and objectives, the regional water planning councils are responsible for extensively engaging the actors and parties that may be affected by the regional water plans such as local governments, interested stakeholders, and the public. These efforts include the provision of open meetings and regional forums to collect public comments on regional water planning and the adoption of a public involvement

plan that seeks input from the public, local governmental officials, water providers, and other stakeholders (Georgia Environmental Protection Division, 2009).[2]

A study by Bell and Scott (2020) analyzed the 106 meeting reports of Georgia regional water councils and uncovered three discernible topics that appear in the planning process. First is *regional planning protocols*, which encompass standard and procedural terms relevant to water planning. Second is *water quality and quantity*, which includes the status of water bodies such as nutrient, assimilative capacity, or volume of groundwater resources. Third is *water quantity and regional planning*, which includes elements related to goals and decisions of regional water councils as well as issues related to water quantity.

2.2. Types of goals

Five discernible sets of goals are established in the process of coproducing Georgia Regional Water Plans: regional visions, regional goals, management practices, meeting goals, and meeting agendas. Regional visions are comprehensive and symbolic statements that illustrate the fundamental purpose of regional water councils. In the early stage of co-designing regional water management plans, each council established its own vision statement that functions as basic guidelines for the sustainable future of water in their regions through 2050. These broad visions are specified by regional goals, which focus on general issues that affect the design and implementation of region-specific water

[2] Detailed responsibilities and requirements for the regional water planning councils can be found in the Memorandum of Agreement (MOA) between Georgia Environmental Protection Division (GA EPD), Georgia Department of Community Affairs (GA DCA), and each regional water planning council.

management plans. For instance, the Upper Oconee regional council reified its vision in seven goals associated with various facets of water management, such as technology, sustainability, information accessibility, and education (Upper Oconee Water Planning Council, 2011). Regional visions and goals are thus set to frame the coproduction of water services in Georgia as a whole, from the design to the implementation and assessment of these regional plans.

Management Plans (MPs), which aim to fulfill regional visions and goals, are tactical goals of each regional council and indicate ways to operationalize actions for regional water management. Based on MPs, initial, short-term, and long-term action plans are developed and implemented to provide quality water service in the regions. Further, MPs function as evaluation benchmarks to measure the performance of regional water management; regional water plans are updated based on the level of achievement in MPs. Management plans are thus closely related to the co-delivery phase of Georgia regional water management.

Meeting goals and agendas address relatively short-term issues raised in regional council meetings. The goals are broadly stated guidance for each regional council meeting on the design of water management plans; the agendas are the most detailed plans for action to be conducted in each council meeting. Considering that regional councils' decisions made in the meetings were based upon both goals and agendas, it can be said that these elements are associated with the results of the co-designing phase of regional water management plans.

2.3. Key organizations and actors in the regional water planning councils

Each regional water management planning council consists of 25 members who coproduce the regional water management plan. These diverse groups of Georgians represent agriculture, forestry, industry, commerce, local governments, water utilities, regional development centers, tourism, recreation, and environmental groups. The members are expected to represent the interests of their demographic or industrial cohorts, and they are encouraged to apply their unique skill sets and local knowledge bases to coproduce regional water plans (Georgia Water Council, 2008; Governor Perdue, Office of Communications, 2009). Three alternates and ex-officio members from the House and Senate also serve on each regional council (GA EPD, 2009).

Together, the council members design their regional water plans, and the whole process of water management policy is supervised by GA EPD, which supports local efforts to develop region-specific plans. Other stakeholders are also encouraged to participate in the process and provide their own knowledge regarding the local context.

3. Data collection and management

The main sources of data are procedural documents of regional water council meetings and the resultant reports from the council activities. The documents include regional water plans adopted by GA EPD in 2011 and 2017, state-wide H_2O forecasts, meeting records, agendas, public announcements, and pre-meeting materials for meetings conducted from 2009 to 2011 by the 10 regional councils. They were obtained from the Georgia Environmental Protection Division (GA EPD) through freedom of information disclosure. Additionally, the contents of the documents were double-checked by a former

Georgia Environmental Protection Division officer who verified their accuracy (G. Cowie, personal communication, August 15, 2022).

The data related to water quality in Georgia are collected from the public database portal provided by the Georgia Environmental Monitoring and Assessment System (GOMAS), an online database that contains physical, chemical, and biological data gathered by the Watershed Protection Branch of GA EPD and external entities that have a contract or agreement with GA EPD or are required to submit data as part of their permit agreement (Georgia Environmental Protection Division, 2019).

This study includes two control variables: gross domestic product (GDP) and population estimates by county. The GDP data by county were obtained from the U.S. Bureau of Economic Analysis. The population estimates were collected from the U.S. Census Bureau, which annually announces population estimates by county reflecting population change such as births, deaths, and migration based on decennial census (United States Census Bureau, 2021).

4. Analytic strategies

Two main analyses will test hypotheses in each coproduction phase as follows. First, a mixed-method approach, a quantitative analysis of qualitative data, is employed to test the first hypothesis: As goal ambiguity increases, the amount of knowledge inputs in coproduction decreases. This step analyzes the effect of goal ambiguity on the co-designing phase of the coproduction process. Ordinary least squares regression analysis and multilevel analysis are applied to test the second hypothesis: Goal ambiguity in implementing coproduction plans negatively affects public service outcomes. This step

examines the effect of goal ambiguity on the outputs of the implementation phase of the coproduction process. These steps are described in more detail below.

4.1. Analysis 1: planning goal ambiguity and local knowledge inputs

A mixed-method approach with an embedded design is adopted to examine the level of goal ambiguity's effect on actual knowledge production to answer the first research question: *how does goal ambiguity affect local knowledge input in the coproduction process?* The variables used in the model and a detailed explanation of the model are presented in the following sections.

Variables

Independent variables

This study uses *planning goal ambiguity* as an independent variable. Planning goal ambiguity is measured in two dimensions: mission comprehensive and priority goal ambiguity based on the work of Chun and Rainey (2005a). The authors propose a way to systemically measure the level of goal ambiguity in the public sector context. This method has been mainly in research on public organizations, but this study extends it to coproduction practices based on previous contributions such as Jung's study on goal ambiguity in public programs (Jung, 2014a) and Bryson and his colleagues' work that apply the concept of goal ambiguity to collaboration (Bryson et al., 2016). This study measures the degree of interpretive leeway that exists when co-designing regional water plans. Considering data availability and characteristic of the co-designing phase, two out

of four dimensions that Chun and Rainey (2005a) suggest, comprehensive and priority goal ambiguity, are used to measure planning goal ambiguity.

Mission comprehensive goal ambiguity in planning meetings is measured as the first dimension of planning goal ambiguity, which refers to the difficulty in interpreting goals presented in regional council planning meetings. Gunning-Fog Index (GFI), the formula that computes the readability of a given passage based on its length and syllable counts, is employed to measure mission comprehensive goal ambiguity in the regional water planning meetings. The precedent for this measure is Chun and Rainey (2005), who suggested that more difficult words in the goal sentence indicate lower understanding of the goals.

Priority goal ambiguity is another dimension for planning goal ambiguity, which refers to the amount of interpretive leeway that coproducers might have in establishing an order of precedence among various goals proposed in regional water planning meetings. When other things are equal, the number of goals named in a council meeting is positively related to difficulty in setting goal priority. The two main indicators of priority goal ambiguity are the number of goals and agendas presented in each regional water planning meeting.

Dependent variable

In this study, *local knowledge input* is the dependent variable. Local knowledge input is defined as the contributions made by residents in Georgia regional water councils as coproducers of the water service. Local knowledge input is measured by counting the

frequency of coded utterances that are spoken by local participants in each council meeting.

These coded utterances fall into three knowledge-related subcategories—knowledge statement, knowledge agreement, and knowledge disagreement. Together, they represent local knowledge input. A detailed methodology for coding utterances and categorizing them into their respective subcategories is provided in the following section.

Control variable

In this study, the frequency of utterances recorded in a meeting is included as a control variable. The dependent variable is based on the frequency of utterances related to local knowledge in each meeting. The length of meetings may have a significant impact on the number of utterances made by participants in the regional water council meetings. Thus, a positive association is expected between the total frequency of utterances and local knowledge input in each meeting. Table 4.1 below presents summarizes the variables and their measures for Analysis 1.

Model specification for Analysis 1

The mixed method approach has gained popularity since the early 1980s because it eases the tension between the qualitative and quantitative methodologies (Cameron, 2009). Some social phenomena cannot be fully explained with a single method due to their complex nature or limitations in the methodology. Sometimes qualitatively driven research needs more generalizable results, while quantitative research needs more in-depth description to adequately explain results. The simultaneous use of both approaches

in a single study can produce superior answers to research questions and strengthen the analytic power of the research compared to what can be achieved with either method alone (Cameron, 2009; Malina et al., 2011; Morse, 2016).

Table 4.1 Variables for Analysis 1

Variable	Measurement*	Data source
Independent variables		
Mission comprehensive goal ambiguity	Gunning-Fog Index (GFI)** of goal statements mentioned in regional water planning meetings	- Regional water planning meeting goals
Priority goal ambiguity	Average Z-scores of two indicators - the number of meeting goals - the number of meeting agendas	- Regional water planning meeting goals - Regional water planning meeting agendas
Dependent variable		
Local knowledge input	The frequency of coded utterances spoken by *local* participants and fall into three knowledge-related subcategories – *knowledge statement, knowledge agreement, and knowledge disagreement*	- Regional water planning minutes
Control variable		
Frequency of utterance	The frequency of utterance included in a meeting	- Regional water planning minutes

*Adapted from Chun and Rainey (2005b, p. 5).

**GFI is calculated as $0.4 \times \left(\frac{N\ of\ words}{N\ of\ sentences} + 100\left(\frac{N\ of\ complex\ words}{N\ of\ words}\right)\right)$, where complex words refer to words with three or more syllables.

In the context of mixed methods, an embedded design refers to a model in which one dataset is nested within a traditional quantitative or qualitative design (Caracelli &

Greene, 1997; Creswell & Plano Clark, 2011; Palinkas et al., 2011). An embedded design is useful when a single data set is not sufficient to conduct an independent study design and a different type of data is needed (Creswell & Plano Clark, 2011). For instance, researchers collect and analyze qualitative data grounded in the specific context of a phenomenon, quantify the findings, and use them to make quantitative inferences.

In this research, the level of local knowledge, which is the main dependent variable, is difficult to quantify. This study thus embeds the output of qualitative content analysis within predominantly quantitative data to examine the relationship between goal ambiguity and local knowledge inputs.

A three-staged embedded design for the first analysis is employed for a quantitative examination of qualitative findings. The first stage is a qualitative analysis using the content analysis approach. Content analysis is a promising and useful approach that can provide a deep understanding of the case. The use of written materials, whose content cannot be changed over time, reduces the problems of other qualitative approaches such as interviews and participatory observations that often entail self-reports (Gil-Garcia, 2012). Particularly when analyzing a certain organization or program, a content analysis may help to track its development by providing clues to its context, culture, or beliefs of actors implied in the written materials (Simons, 2009). Since this study tracks knowledge flow when co-designing regional water plans rather than subjective feelings or thoughts regarding the coproduction process, content analysis provides rich and relatively objective information regarding how knowledge from different actors was gathered and integrated under conditions of goal ambiguity.

The second stage involves quantifying the qualitative data (Sandelowski, 2000). A common approach is to count the frequencies of a qualitative code (Bazeley, 2004; Driscoll et al., 2007; Srnka & Koeszegi, 2007). Through this process, qualitative data can become the dependent variable for a quantitative analysis, bridging the two methods.

In the last stage, a panel regression model estimates the impact of goal ambiguity on the amount of local knowledge input produced across the councils in the co-designing phase of the coproduction process. Using a dependent variable derived from a qualitative content analysis, this study incorporates the rich context of narrative data while increasing the generalizability of the results through quantitative analysis. The detailed methodology for each stage is described below.

Stage 1: Qualitative content analysis

A content analysis is conducted based on the hands-on guide provided by Erlingsson and Brysiewicz (2017). Starting with a thorough understanding of the narrative data based on reading and re-reading the relevant materials, a reduction process then breaks down the text into meaningful units, which are referred to as utterances (i.e., single sentences). This phase also includes a data cleaning process to detect and remove errors in the primary data. The meaningful units are then labeled with codes and grouped into subcategories. The subcategories are regrouped into categories and themes to form a hierarchical scheme, which enables a concise, structured understanding of the study material (Srnka & Koeszegi, 2007).

Figure 4.2 below illustrates the coding process in this study with an example. The first step involves identifying an utterance (e.g., “There is no way we used that much

water") as a meaningful unit from the transcript of Middle Chattahoochee Water Planning Council Meeting 1 (Middle Chattahoochee Regional Water Planning Council, 2009, p. 8). Next, the utterance is labeled with the code ("denying knowledge"), indicating the speaker's intention to refute the knowledge presented earlier. The code is then classified into a subcategory ("knowledge disagreement"), which includes codes that indicate disputes or conflicts in accepting specific knowledge. This subcategory is grouped into a broader category ("knowledge input validation") that contains other subcategories related to validating knowledge inputs (e.g., "knowledge agreement", "knowledge confirmation", etc.). Lastly, a theme ("knowledge communication") is created, which encompasses knowledge-related categories (e.g., "knowledge input validation", "knowledge input identification", "goal identification", etc.). More detailed findings from the coding process are presented in Chapter 5.

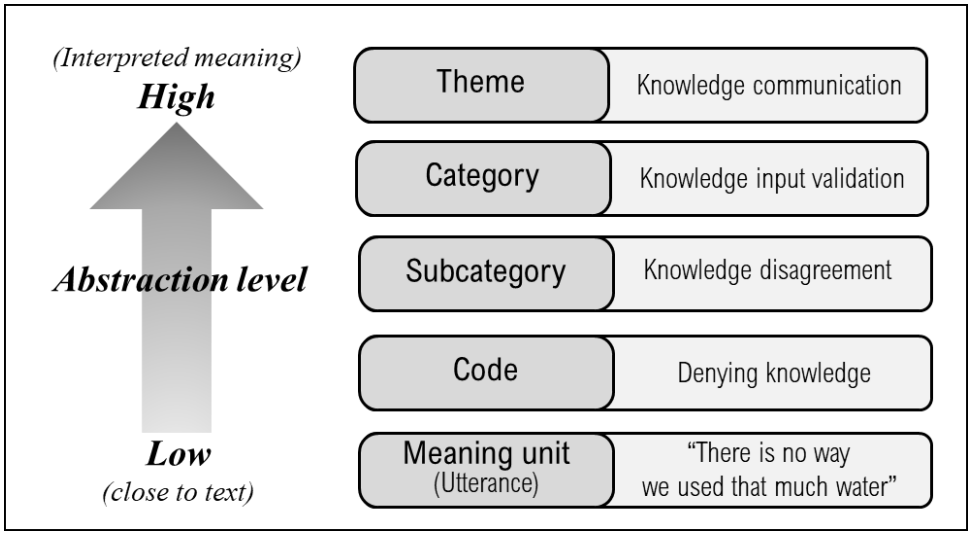

Figure 4.2 Coding process

Source: Adapted from Erlingsson & Brysiewicz (2017)

Stage 2: Quantifying qualitative data

The starting point of the quantification process is counting the frequency of utterances that can be regarded as local knowledge input. When quantifying qualitative data that is based on natural language, such as interviews or documents, one common method is to count the frequency of words or utterances in a corpus. In basic content analysis, this approach allows researchers to examine the appearance of specific terms and determine their significance in the text (Bryman, 2003; Egerer & Hellman, 2020; Vaismoradi et al., 2013). This method has also allowed researchers to quantify and explore various aspects of knowledge and content within a given corpus. For instance, Praharaj et al.(2023) quantified the quality of collaboration using the concept of knowledge co-construction, which was defined as the frequency of context-related words. Similarly, Lee et al.(2021) employed the concept of utterance frequency to measure knowledge gaps during problem-solving, which were measured by categories of idea units coded by researchers.

Adapted from studies of local knowledge conducted by Edelenbos et al. (2011) and Yanow (2004), this study recognizes three types of knowledge inputs: local knowledge, expert knowledge, and administrative knowledge. These terms are defined in Table 4.2 below. In this study, local knowledge comprises two dimensions, the spatial ("local") and substantive ("knowledge") components. Debates have persisted regarding how to define local knowledge, but the most distinctive aspect comes from its holders – non-scientists, laypeople, local experts, local stakeholders, or those situated opposite to professionals (See Ballard et al., 2008; Bryant & Wilson, 1998; Petts & Brooks, 2006; Taylor & de Loë, 2012).

Table 4.2 Types and definitions of coproducer inputs

Type	Main holder	Definition
Local knowledge	Council members General public	Site-oriented knowledge concerning the attributes of the local community or environment based on daily experience
Expert knowledge	Scientists Environmental specialists	Objective and testable knowledge based on systemic observations
Administrative knowledge	Staff Program contractor	Knowledge concerning bureaucratic standards and rules for regional water planning

Local knowledge should be site-oriented; that is, strongly rooted in a particular community that shares culture, norms, or even interests (Corburn, 2003; Edelenbos et al., 2011; Geertz, 2008). The main holders of local knowledge are thus members of the geographically located community, or so-called 'neighborhoods' that can share some specific values and identity among them (Corburn, 2003; Fernandez-Gimenez et al., 2006; Taylor & de Loë, 2012). Coded utterances that contained knowledge related to water management and were spoken by local actors were counted as local knowledge inputs. The detailed standards used to categorize local knowledge from the coded utterances are presented in Chapter 5, along with the results obtained from Stage 1.

Stage 3: Quantitative panel regression analysis

In the last stage, a panel regression model estimates the impact of goal ambiguity on the amount of local knowledge input produced across the councils in the co-designing phase of the coproduction process. The focus of this study is on council meetings

occurring repeatedly across the study period. The data are thus cross-sectional time-series data, which are vulnerable to individual heterogeneity between entities and multicollinearity. By analyzing longitudinal data in a panel, researchers can efficiently control these effects and evade biased results (Baltagi, 2008).

Quantified qualitative data and other quantitative data are merged for the final analysis. On the quantitative side, mission comprehensive goal ambiguity and priority goal ambiguity of each council meeting are included as independent variables. On the qualitative side, local knowledge inputs derived from the qualitative content analysis are included as a dependent variable. The frequency of utterances included in a meeting is included as a control variable because the frequency of coded data can be affected by the overall length of sourced documents (Bazeley, 2004). The merged data are arranged in a panel format based on two dimensions: the council names (cross-section) and sequence of meetings (time-series). Nine to eleven meetings are observed for each regional council, which establishes unbalanced panel data. A random effect panel regression analysis is employed as the final step of this mixed method approach, which is described below.

$$Y_{it} = \beta_0 + \beta_1(MCGA)_{it} + \beta_2(PGA)_{it} + \beta_3(UTT)_{it} + \varepsilon_{it}$$

where *i* is regional water council ID; *t* is regional water planning meeting number;

Y_{it} is local knowledge input of council *i* in meeting *t*;

$(MCGA)_{it}$ is the mission comprehensive goal ambiguity of council *i* in meeting *t*;

$(PGA)_{it}$ is the priority goal ambiguity of council *i* in meeting *t*;

$(UTT)_{it}$ is the frequency of utterance included in a meeting t of council *i*;

and ε_{it} is an error term.

Identification strategy

To specify a better-fitting model, this study employs a Hausman test. The null hypothesis of a Hausman test is that a random effect model is preferred, while the alternative is a fixed effect model. The result indicates that the null hypothesis cannot be rejected, with a p-value of 0.237. A random-effect panel regression model is thus efficient for this study.

Assumption tests were conducted on the cross-sectional dependence, serial correlation, and heteroskedasticity issues. A Breusch-Pagan LM test was carried out for cross-sectional dependence. The result shows the null hypothesis cannot be rejected ($\chi 2$ = 43.2, p-value = 0.55), which indicates the proposed model does not have cross-sectional dependence. No serial correlation was found in the proposed model, according to the Wooldridge test results ($\chi 2$ = 9.3554, p-value = 0.4987). Lastly, the Breusch-Pagan test was performed for heteroskedasticity, the result of which indicated that heteroskedasticity is not present in the model with the p-value of 0.41.

4.2. Analysis 2: implementation goal ambiguity and coproduction outcomes

This study employs two models to test the second hypothesis, *Goal ambiguity in implementing coproduction plans will negatively affect public service outcomes*. Analysis models are specified according to different proxies for dependent variable, *implementation goal ambiguity.* Model 1 conducts an ordinary least squares regression analysis with a dependent variable consisting of water availability changes, while Model

2 tests a multilevel analysis using water quality as a proxy for *implementation goal ambiguity*. The variables used in the model, as well as a detailed explanation of the analysis models, are presented in the following sections.

Variables

Independent and control variables

Implementation goal ambiguity is a dependent variable in this study. Similar to council-level goal ambiguity, the operationalization and measurement of goal ambiguity are based upon Chun and Rainey (2005b). Considering data availability and the characteristics of the co-delivery phase of coproduction, three out of four dimensions of goal ambiguity – mission comprehensive goal ambiguity, evaluative goal ambiguity, and priority goal ambiguity – are employed to measure implementation goal ambiguity. (These four dimensions are independent variables in the second analysis.)

Mission comprehension ambiguity in the co-delivery phase refers to difficulty in interpreting goals of regional plan implementation. Similar to previous steps, GFI is employed by computing the length and syllable counts of regional goal and vision statements presented in each regional plan.

Evaluative goal ambiguity in the co-delivery phase is defined as the level of leeway in interpreting council goals when assessing their achievements for regional water plan implementation. It is measured as a percentage of the subjective benchmarks for water management plans in each council. Each council suggests benchmarks as standards to evaluate the effectiveness of their regional plans and collect information for better progress to meet the regional visions. Among them, the ones that need subjective

assessments are counted as subjective benchmarks that elevate evaluative ambiguity in each council. Some examples of subjective benchmarks include "improved education at state and local government conferences and workshops" or "enhanced awareness in Comprehensive Planning by local governments across region" (Altamaha Regional Water Planning Council, 2011, p. 8–5), which do not include a numeric or objective sense of regional plan assessment.

Priority goal ambiguity in implementation is defined in this study as the level of interpretive leeway that coproducers might have in establishing an order of precedence among objectives of regional plan implementation. The number of council goals and management practices, which are the long-term goals and performance targets in regional water councils, respectively, is used as the main indicator of priority goal ambiguity. As with planning goal ambiguity, the concept is operationalized as average z-scores of these two indicators.

Lastly, the analysis incorporates gross domestic product (GDP) and population estimate for each council in 2017 as control variables for differences in counties. The literature on water management acknowledges the importance of socio-economic factors, such as population growth, incomes, and regional outputs, as key non-climatic variables for predicting water demand in a given region (Brown et al., 2013; Cosgrove & Loucks, 2015; Sanchez et al., 2020; Worland et al., 2018). Aiming to control for the potential influence of socio-economic conditions in each county, this study includes GDP and population estimates at the county level[3]. It should be noted that population estimate is

[3] This study initially included two additional control variables related to regional and geographical characteristics of counties: water consumption by category (agriculture, energy, industry, municipal) and geographic location (North and South Georgia, defined as regions situated above and below the "fall line"

not included in Model 1, as the forecasted water demand already considers expected population change.

Dependent variables

This analysis measures coproduction outcomes – the outcomes of coproducing regional water management, as the dependent variables. As GA EPD mentioned in their Regional Water Planning Guidance, the end goal is to "manage water resources in a sustainable manner through 2050" (Georgia Environmental Protection Division, 2009, p. 5). To this end, regional water councils were required to employ detailed policy tools called "management practices" to ensure having enough water and maintaining its assimilative capacity. The former deals with water quantity, focusing on reducing the gaps between water supply and demand; the latter refers to the capability of water to absorb pollutants without degradation, which is more related to water quality issues (Georgia Environmental Protection Division, 2009). This study thus includes two aspects of water resources in Georgia – water quantity and water quality – as the criteria to assess the outcomes of coproducing regional water management.

Water quantity

To achieve sustainability of water resources, regional councils forecasted the future supply and demand of water in their region and devised methods to reduce the gap

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that separates the northern mountain and piedmont regions of the state from the southern coastal plan). However, these variables were excluded from the final analytic models due to multicollinearity issues. The presence of high variance inflation factors (VIF) exceeding 10 indicated a strong correlation among the variables, which can lead to distorted and insignificant results.

between them. Based on the knowledge coproduced in regional meetings, the 2011 regional water plans reported the potential gaps and water quality issues in the regions and proposed plans to sustainably supply water services in their regions until 2050. The 2017 regional water plans follow-up the initial plans. After 5 years of implementation, regional water councils revised their forecasts to reflect the progress made by the initial plans. It is thus reasonable to assume that changes in 2050 potential water availability in each county are affected by the implementation of coproduction plans proposed by each regional council. This analysis uses the changes in the potential water availability as a proxy for the quantitative aspects of coproduction outcomes.

Water availability is measured using two sources provided by the Georgia Environmental Protection Division (GA EPD): (1) Regional Water Plans from each regional water council published in 2011 and their updated version in 2017; and (2) State-wide H_2O Forecasts. Counted first is the potential water availability in each county in 2050 as reported in the 2011 Regional Water Plans. The calculation of water availability in 2011 involves subtracting the forecasted 2050 municipal water demand from the permitted municipal water withdrawal limits within a county measured in 2011.

Second, the potential water availability in 2050 as updated in the 2017 Regional Water Plans is counted. The second Regional Water Plans published in 2017 reflect the effects of councils' management practices to reduce gaps between water demand and supply. The dataset is cross-checked with the State-wide H_2O Forecasts, the internal reports of GA EPD that provided the baseline dataset for the Regional Water Plans. To calculate the water availability in 2017, the permitted municipal water withdrawal limits within a county that were measured in 2017 were deducted from the forecasted 2050

municipal water demand. The changes in water availability in each county were determined by computing the difference between the water availability in 2017 and 2011.

Three of the ten councils (Lower Flint-Ochlockonee, Middle Chattahoochee, Upper Flint) refused to provide the potential water gaps because they disagreed with the idea of calculating "gaps". For example, the Lower Flint-Ochlockonee Regional Water Plan (2011) states:

> "...council questions whether the criteria used to determine “gaps” for surface water flows are appropriate metrics by which to evaluate the impacts of consumptive water use on the state’s water resources. The “gaps” do not provide for reasonable use by lawfully permitted users. Moreover, the “gaps” are not defined in terms of any demonstrable environmental harm" (Lower Flint-Ochlockonee Regional Water Planning Council, 2011, p. ES-3).

Three councils thus did not publish their gap analyses in their regional water plans in either 2011 or 2017. They are thus excluded from Model 1, which uses water quantity-related measures as dependent variables. The analysis includes 106 observations from each county within the remaining seven councils: Altamaha, Coastal Georgia, Coosa-North Georgia, Middle Ocmulgee, Savannah-Upper Ogeechee, Suwannee Satilla, and Upper Oconee.

Water quality

This study uses dissolved oxygen (DO) as a proxy for the qualitative aspect of coproduction outcomes. DO refers to the amount of oxygen incorporated in the water body. DO is one of the most important indicators of the water quality because it is essential for the aquatic ecosystem. Aquatic lives, including fish and other organisms, use oxygen to breathe, and a sufficient level of concentration is required for an efficient transfer of oxygen to their blood (Michaud, 1991; United States Environmental Protection Agency, 2013). Therefore, DO is frequently used as a simple parameter to assess the quality of water, particularly when comparing water resources from different reservoirs or streams (Kannel et al., 2007; Sánchez et al., 2007). Georgia also uses DO as one of the main criteria to monitor the quality of water in the state (Georgia Water Council, 2008). This study therefore operationalizes water quality as the average level of DO aggregated from the monitoring locations in each county in 2017, when the first round of regional water plans was completed. Table 4.3 presents the variables for Analysis 2 and their measurements.

Model specification for Analysis 2

Ordinary least squares regression is commonly used to explore the relationship between goal ambiguity and organizational performance (Chun & Rainey, 2005a; J. W. Lee et al., 2009). However, this study considers the hierarchical structure of the data. Each council includes multiple counties within its boundary. In other words, counties are nested in regional councils making the dataset multi-level: Implementation goal ambiguity,

Table 4.3 Variables for Analysis 2

Variable	Measurement*	Data source
Independent variables		
Mission comprehensive goal ambiguity	Gunning-fox index (GFI)** of vision and goal statements mentioned in 2011 regional water plans	- Regional council visions - Regional council goals
Evaluative goal ambiguity	Percentage of subjective or workload-oriented benchmarks out of total benchmarks for water management plans in each council	- Benchmarks of regional water management plans
Priority goal ambiguity	Average Z-scores of two indicators - the number of council goals - the number of Management Practices	- Regional council goals - Management Practices
Dependent variables		
Water availability change	[(Permitted Municipal Water Withdrawal Limits within a county in 2017) – (2050 Forecasted Municipal Water Demand within a county measured in 2017)] – [(Permitted Municipal Water Withdrawal Limits within a county in 2011) – (2050 Forecasted Municipal Water Demand within a county measured in 2011)]	- Regional Water Plans 2011 & 2017 - State-wide H_2O Forecasts
Water quality	Average level of dissolved oxygen aggregated from the monitoring locations in each county in 2017	- Georgia Environmental Monitoring and Assessment System (GOMAS)
Control variables		
GDP by county	Gross domestic product by each county in 2017	- U.S. Bureau of Economic Analysis
Population estimate	Annual estimates of the resident population for counties in 2017	- U.S. Census Bureau, Population Division

*Adapted from Chun and Rainey (2005b, p. 5).

**GFI is calculated as $0.4 \times \left(\frac{N\ of\ words}{N\ of\ sentences} + 100 \left(\frac{N\ of\ complex\ words}{N\ of\ words} \right) \right)$, where complex words refer to words with three or more syllables.

the independent variable of this analysis, is measured at a council level; while measures of council outcomes are taken from county-level observations. Failing to reflect this nested structure of the regional water councils and counties might result in severe biases such as an inflated type-I error rate in the significance tests of regression coefficients (Leeuw & Meijer, 2008; McNeish & Stapleton, 2016). Previous studies by Jung (2014c, 2014b) on goal ambiguity have also used a hierarchical generalized linear model to capture the nested data structure when including individual and organizational-level variables in the analysis models. By employing multilevel models, this study integrates higher-level and lower-level (in this case, council-level and county-level) information into a single model.

Identification strategy

The Breusch-Pagan Lagrange Multiplier test was run to find out whether the groups within the nested data structure affect the analysis results, indicating that a multilevel analysis that considers group effect is appropriate. The test statistics for Model 1 (water availability change) was $\chi^2(1) = 3.0149$ with a p-value of 0.082, indicating that there is no statistically significant difference across councils. Thus, this study analyzed Model 1 uses ordinary least squares (OLS) regression to regress the dependent variable of water availability change on the independent variables of mission comprehensive, priority, evaluative goal ambiguity, and GDP by county as shown below.

$$Y_i = \beta_0 + \beta_1(MCGA)_i + \beta_2(PGA)_i + \beta_3(EGA)_i + \beta_4(GDP)_i + \varepsilon_i$$

where *i* is regional water council ID;

Y_i is change in 2050 municipal water availability forecasts from 2011 to 2017 in council *i*;

$(MCGA)_i$ is the mission comprehensive goal ambiguity of council *i*;

$(PGA)_i$ is the priority goal ambiguity of council *i*;

$(EGA)_i$ is the evaluative goal ambiguity of council *i*;

$(GDP)_i$ is gross domestic product by council *i*;

and ε_i is an error term.

On the other hand, the test statistic for Model 2 (water quality) was $\chi^2(1) = 45.96$ with a *p*-value less than 0.001, indicating statistically significant evidence of group effect. Thus, Model 2 employs multilevel analysis to capture the group effect as shown below.

Level 1 (location): $Y_{ijk} = \pi_{0jk} + e_{ijk}$, and

Level 2 (county): $\pi_{0jk} = \beta_{00k} + \beta_{01k}(Population)_{jk} + \beta_{02k}(GDP)_{jk} + r_{0jk}$

Level 3 (council): $\beta_{00k} = \gamma_{000} + \gamma_{001}(MCGA)_k + \gamma_{002}(PGA)_k + \gamma_{003}(EGA)_k + u_{00k}$

$$\beta_{01k} = \gamma_{010} + u_{01k}$$

$$\beta_{02k} = \gamma_{020} + u_{02k}$$

Combined: $Y_{ijk} = \gamma_{000} + \gamma_{001}(MCGA)_k + \gamma_{002}(PGA)_k + \gamma_{003}(EGA)_k$

$$+ \gamma_{010}(Population)_{jk} + u_{01k}(Population)_{jk}$$

$$+\gamma_{020}(GDP)_{jk} + u_{02k}(\mathrm{GDP})_{jk} + r_{0jk} + u_{00k} + e_{ijk}$$

where *i* is monitoring location ID; *j* is county ID; *k* is regional water planning council ID;

Y_{ijk} is the average level of dissolved oxygen in 2017 at location *i* in county *j* in regional water council *k*;

$(Population)_{jk}$ is population estimate in 2017 for county *j* in council *k;*

$(GDP)_{jk}$ is gross domestic product in 2017 for county *j* in council *k;*

$(MCGA)_k$ is the mission comprehensive goal ambiguity of council k;

$(PGA)_k$ is the priority goal ambiguity of council k;

$(EGA)_k$ is the evaluative goal ambiguity of council k;

and r_{0jk}, u_{00k}, and e_{ijk} are error terms in each level.

CHAPTER 5

RESULTS

1. Analysis 1: Goal ambiguity and knowledge creation in the co-design phase

The first analysis of the relationship between goal ambiguity and citizen's knowledge inputs in the co-designing phase was conducted in three stages: qualitative content analysis, quantification of qualitative data, and quantitative panel regression analysis. The subsequent sections present the results of each stage of the analysis.

1.1. Stage 1: Qualitative content analysis

This study has taken meeting data from ten regional water councils in Georgia for the period of 2009 to 2011. The narrative material is collected from 109 meeting records of the water councils and broken down into 25,377 utterances. Through content analysis, three themes were derived, namely: knowledge communication, administrative communication, and off-task communication. These themes were further categorized into seven categories (goal identification, knowledge input identification, knowledge input validation, water planning procedure, council meeting management, affective behavior, and other statement) based on 20 subcategories. Table 5.1 below provides a detailed description of the themes, categories, and subcategories, along with sample quotes to illustrate them.

Table 5.1 Themes, categories, and subcategories of the content analysis

Theme and Category	Subcategory	Sample quote
Knowledge communication		
Goal identification	Goal setting *Utterance designed to introduce the objectives of the meeting*	The PC then outlined the following objectives for Council Meeting 9: Selection of Final Management Practices for Regional Water Resources (Coastal Georgia Council Meeting 9, 2010)
	Goal clarification *Utterance that intends to confirm or refresh the objective of the meeting*	Again, it is not the intent of the water planning process to rewrite existing laws. (Suwannee-Satilla Council Meeting 1, 2009)
Knowledge input identification	Knowledge presentation *Utterance designed to introduce expertise related to water planning*	The Planning Contractor provided a Power Point presentation which covered population and employment projects and methods for water and wastewater forecasts (Altamaha Council Meeting 3, 2009).
	Knowledge statement *Utterance that comprises knowledge inputs elicited from the speakers at the meeting scene*	Another council member noted that in the 1954 drought, streams ceased to flow and there was no ground water pumping for irrigation at that time (Lower Flint Council Meeting 5, 2010).
	Knowledge request *Utterance that intends to call for certain knowledge related to the planning*	Jim Quinn asked if a reservoir could be built to address the gap (Lower Flint Council Meeting 5, 2010).

Table 5.1 continued

Theme and Category	Subcategory	Example quote
Knowledge communication		
Knowledge input validation	Knowledge agreement *Utterance that supports the validity of knowledge presented by other speakers*	Yes, you are correct that the hydrology has changed (Suwannee-Satilla Council Meeting 8, 2010).
	Knowledge disagreement *Utterance that denies the validity of knowledge presented by other speakers*	There is no way we used that much water (Middle Chattahoochee Water Planning Council Meeting 1, 2009).
	Knowledge confirmation *Utterance that reiterates previously mentioned knowledge to facilitate the knowledge process*	Jim reminded the members about the discussion of Trends, Forces, and Factors at CM1 (Middle Chattahoochee Council Meeting 2, 2009).
	Knowledge absence *Utterance that confirms no available knowledge exists*	Tim Cash said he was not aware of any (Middle Chattahoochee Water Planning Council Meeting 8, 2010).

Table 5.1 continued

Theme and Category	Subcategory	Example quote
Administrative communication		
Water planning procedure	Procedure explanation *Utterance that provides the demonstration of water planning procedure*	Public involvement will be provided for at each of the Council's meetings (minimum quarterly) through comment periods for local government officials and the public at each meeting (Upper Flint Council Meeting 2, 2009).
	Procedure request *Utterance that calls for a certain activity or behavior related to planning procedure*	The PC asked for volunteers to attend inter-Council meetings (Suwannee-Satilla Council Meeting 7, 2010).
	Procedure agreement *Utterance that supports a certain activity or behavior related to planning procedure*	The group agreed that they were okay with the Chair and planning contractors starting discussions with the RCs on how the groups can work together (Upper Oconee Council Meeting 10, 2011).
	Procedure disagreement *Utterance that rejects a certain activity or behavior related to planning procedure*	A couple of members were concerned that voting by simple majority did not promote consensus (Upper Flint Council Meeting 2, 2009).

Table 5.1 continued

Theme and Category	Subcategory	Example quote
Administrative communication		
Council meeting management	Introduction *Utterance designed to opens the meeting or introduce meeting participants*	Chairman John Bennett welcomed the group to the meeting and asked for introductions (Coosa-North Georgia Council Meeting 6, 2010).
	Material distribution *Utterance that intends to hand out materials related to the due process*	The PC handed out the memo from Linda MacGregor (Suwannee-Satilla Council Meeting 8, 2010).
	Schedule arrangement *Utterance that organizes the schedules for meetings and related activities*	Council members set dates for the next two meetings: Wednesday, June 16 and Wednesday, September 8 (Upper Oconee Council Meeting 5, 2010).
	Wrap up *Utterance designed to adjourn the meeting*	This marked the end of Council Meeting 1 (Suwannee-Satilla Council Meeting 1, 2009).

Table 5.1 continued

Theme and Category	Subcategory	Example quote
Off-task communication		
Affective behavior	Positive statement *Utterance that expresses positive feelings about the situation*	Matt Windom thanked Randall for speaking with the Council (Middle Chattahoochee Council Meeting 3, 2009)
	Negative statement *Utterance that expresses negative feelings about the situation*	As a resident of Savannah, I am concerned about the health of our coast (Coastal Georgia Council Meeting 4, 2009).
Other statement	Other statement *Utterance that does not fall into the subcategories above*	I have other comments, but I want to keep in brief (Coastal Georgia Council Meeting 8, 2010).

After the analysis, an intercoder reliability test was conducted to ensure the validity of the coded results. A sample of 213 utterances was coded a second time based on the categories and subcategories named above by another Ph.D. researcher in the environmental management and policy field. The results were compared with the original analysis using Krippendorff's alpha, a widely used measure for the quality of content analysis which shows the reliability of the coding scheme, which in turn contributes to the validity of interpreted results (Neuendorf, 2017). By employing Krippendorff's alpha, this study sought to ensure that the coding scheme used in the analysis yielded consistent and reliable results, enhancing the overall validity of the findings. In this case, Krippendorf's alpha = 0.89 exceeds the normal threshold of 0.8 or above. This result establishes that the two coders were relatively consistent (Gaur & Kumar, 2018; Neuendorf, 2017).

1.2. Stage 2: Quantifying qualitative data

In Stage 2, the frequencies of coded utterances derived from the content analysis were counted. Table 5.2 below presents the 25,377 utterances sorted and counted on two dimensions: thematic categories and speaker types.

Table 5.2 Characteristics of utterance (N = 25377)

Category	Speaker type			
	Local	Expert	Staff	Other
Goal identification				
Goal setting	261	68	372	67
Goal clarification	17	1	38	8
Knowledge input identification				
Knowledge presentation	635	1134	2836	7
Knowledge statement	4840	2276	2419	59
Knowledge request	2231	150	365	12
Knowledge input validation				
Knowledge agreement	536	38	56	4
Knowledge disagreement	409	21	14	0
Knowledge confirmation	110	14	117	2
Knowledge absence	130	82	74	29
Water planning procedure				
Procedure explanation	740	452	1774	532
Procedure request	338	41	197	30
Procedure agreement	170	2	3	9
Procedure disagreement	16	1	1	0
Council meeting management				
Introduction	232	75	62	11
Material distribution	55	51	246	69
Schedule arrangement	103	5	65	57
Wrap up	11	0	10	56
Affective behavior				
Positive statement	250	71	33	6
Negative statement	41	4	3	0
Other				
Other statement	5	0	0	118
Total	11130	4486	8685	1076

Figures Figure 5.1 and Figure 5.2 present detailed characteristics of coded utterances in waffle charts. Figure 5.1 illustrates the distribution of utterances by thematic category. Each square on the chart represents 100 utterances, yielding a total of 25,377 utterances. *Knowledge input identification* is the largest portion, accounting for 66.8% of total coded utterances. *Water planning procedure* is the next largest category, making up 17% of the total coded utterances. *Knowledge input validation* comprises 6.4% of the coded utterances, while *council meeting management* and *goal identification* accounts for 4.4% and 3.3%, respectively. Excluding the *other statement* category, *affective behavior* was the smallest category, comprising only 1.5% of the coded utterances.

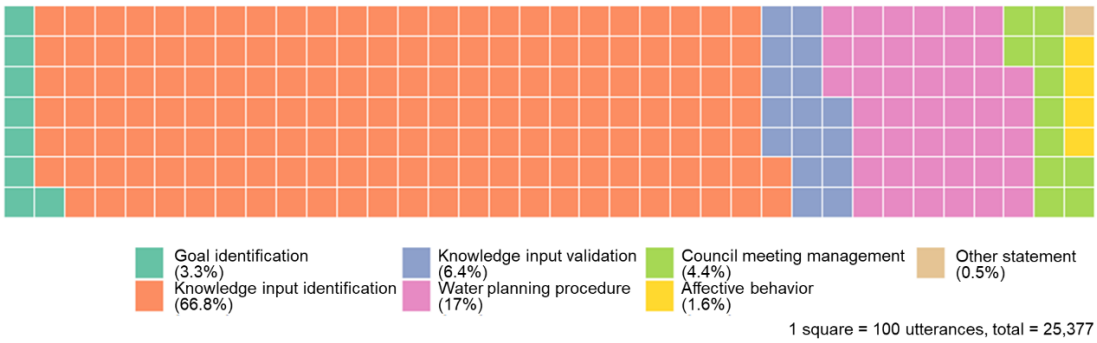

Figure 5.1 Distribution of utterances by thematic categories

Figure 5.2 displays the distribution of utterances by type of speaker. Each square on the chart represents 10 utterances. *Local* speakers are the most frequent, accounting for 43.8% of the total utterances. *Staff* speakers are the next largest group, representing 34.2% of the total utterances. *Expert* speakers made the fewest utterances, with 17.7% of the total utterances, excluding *other* speakers.

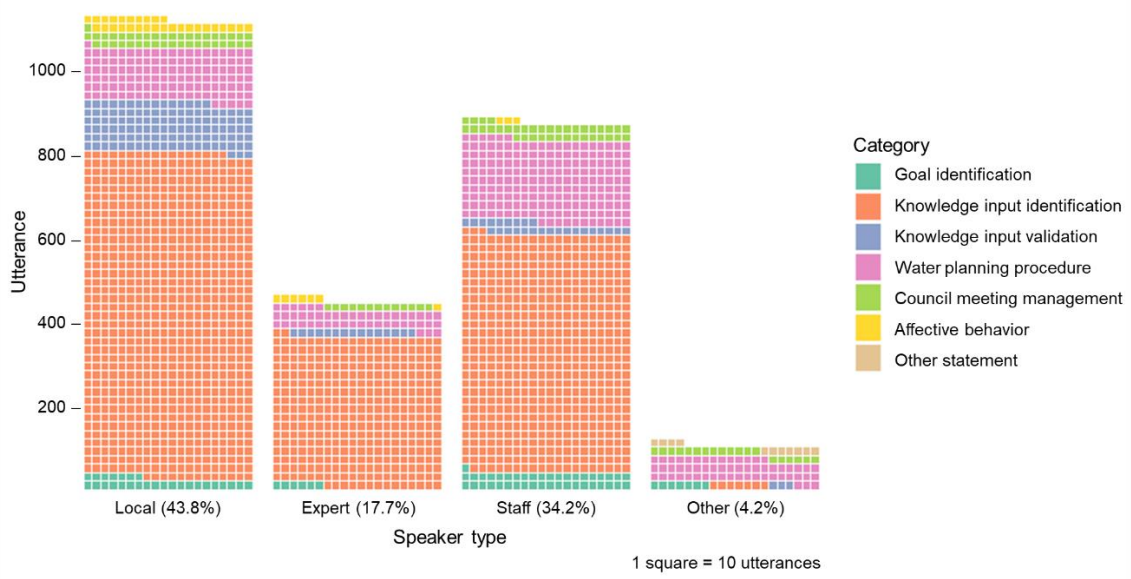

Figure 5.2 Distribution of utterances by speaker type

Among coded utterances, the ones that are spoken by local participants and fall into three knowledge-related subcategories – *knowledge statement, knowledge agreement, and knowledge disagreement* – are counted as local knowledge inputs. Among the two knowledge-related categories, five subcategories were excluded considering the context of regional water council meetings. *Knowledge presentation* was excluded since it was defined as an utterance meant to introduce scientific expertise rather than practical experience in the local context. *Knowledge request* and *knowledge absence* were excluded because they were intended to check the status of knowledge rather than to express the substantive information that speakers held. *Knowledge confirmation* was also excluded since it was intended to double check the knowledge voiced by others and did not include any new information. A total of 5,785 utterances are classified as local knowledge inputs from the total of 25,377 utterances.

These local knowledge inputs were used as the dependent variable in the quantitative analysis that follows.

1.3. Stage 3: Quantitative panel regression analysis

Stage 3 conducts a random-effect panel regression analysis. *Local knowledge* derived from Stage 2 is used as the dependent variable in the equations, which is predicted by the independent variables of *mission comprehensive goal ambiguity* and *priority goal ambiguity* and a control variable named *frequency of utterance.* Table 5.3 below presents the descriptive statistics for all variables.

Table 5.3 Descriptive statistics for Analysis 1

Variables	Mean	S.D.	Min	Max
Dependent variable				
Local knowledge	55.61	31.34	12	218
Independent variable				
Mission comprehensive goal ambiguity	15.33	4.31	2	25.07
Priority goal ambiguity	0	1.76	-3.82	3.46
Control variable				
Frequency of utterance	247.18	101.13	77	748

Table 5.4 presents the result of random-effect panel regression explaining the amount of local knowledge input in coproduction practices. The result indicates that the relationship between local knowledge input and mission comprehensive goal ambiguity is negative and significant, β = -1.31, p = 0.011. This finding supports

Hypothesis 1a: *As mission comprehension goal ambiguity increases, the amount of knowledge inputs made in coproduction practices decreases*. The effect of priority goal ambiguity on local knowledge input is also negative and significant, β = -3.84, p = 0.004. This finding supports Hypothesis 1b: *As priority goal ambiguity increases, the amount of knowledge inputs made in coproduction practices decreases.* The R^2 value in this analysis is moderate with an R^2 of 0.53 and an adjusted R^2 of 0.47, which indicates that approximately half of the variation in the amount of knowledge inputs can be explained by two variables: planning goal ambiguity and frequency of utterance.

Table 5.4 Random-effect panel regression for goal ambiguity's effect on local knowledge input

Variables	Coefficients	Standard Errors
Planning goal ambiguity		
Mission comprehensive goal ambiguity	-1.31*	0.52
Priority goal ambiguity	-3.84**	1.35
Meeting characteristic		
Frequency of utterance	0.25***	0.02
Constant	12.68	9.32
R^2 = 0.53		
Adjusted R^2 = 0.47		
*χ^2 = 114.22****		
Observations = 109		

*Note: *p < 0.05, **p < 0.01, ***p < 0.001*

Together, these results fully support Hypothesis 1: *As goal ambiguity increases, the amount of knowledge inputs made in coproduction practices decreases*, which

postulates that planning goal ambiguity has a negative impact on the amount of knowledge inputs made in coproduction practices.

2. Analysis 2: Goal ambiguity and coproducing public service in the co-delivery phase

Analysis 2 investigates the relationship between goal ambiguity and public service outcomes in the co-delivery phase of coproduction. It is comprised of two models with two different dependent variables, *water availability change* and *dissolved oxygen.* As explained previously, these variables represent water supply and water quality – the two most important indicators of adequate or sufficient water capacity. Table 5.5 presents the descriptive statistics for Model 1 of Analysis 2. To better approximate normality, *water availability change* was adjusted to positive values only and log transformed.

Table 5.6 presents the OLS regression results for Model 1, where *water availability change* is the dependent variable. The results indicate a significant negative correlation between all three dimensions of goal ambiguity and changes in water availability in counties. Specifically, the findings support Hypothesis 2a: *Mission comprehension goal ambiguity in implementing coproduction plans will negatively affect public service outcomes,* since a significant negative correlation is observed between mission comprehensive goal ambiguity and water availability change, β = -0.042, p = 0.041. This result indicates that a one level increase in mission comprehensive goal ambiguity corresponds to a 4.14% decrease in water availability change. Similarly, Hypothesis 2b: *Priority goal ambiguity in implementing coproduction plans will negatively affect public service outcomes* is also supported with β = -0.047, p = 0.084 in

Table 5.5 Descriptive statistics for Model 1, Analysis 2

Variables	Mean	S.D.	Min	Max
Dependent variable				
Log of water availability change	1.24	0.18	0	1.83
Independent variables				
Mission comprehensive goal ambiguity	19.0	1.79	16.6	23.2
Priority goal ambiguity	-0.67	1.35	-1.53	2.95
Evaluative goal ambiguity (%)	0.76	0.14	0.56	0.91
Control variable				
GDP by county (Billions of chained 2012 dollars)[4]	1.30	2.25	0.028	16.4

priority goal ambiguity, indicating that a one unit increase in priority goal ambiguity induces a 4.59% decrease in water availability change. Lastly, evaluative goal ambiguity shows a significant negative association with water availability change, β = -0.318, p = 0.009. This result supports Hypothesis 2c: *Evaluative goal ambiguity in implementing coproduction plans will negatively affect public service outcomes*. A 1% increase in evaluative goal ambiguity leads to a decrease of 27.21% in water availability change.

The R^2 value in this analysis is relatively weak, with an R^2 of 0.138 and an adjusted R^2 of 0.104. This suggests that approximately 10% of the variation in water availability change can be explained by the factors of implementation goal ambiguity and GDP by county. In social science research, low multiple coefficients of determination can result from poor model specification or weak relationship. In this case, it is possible to

[4] Chained dollars are adjusted for inflation over time to allow comparison of figures from different years.

obtain a low R^2 value because certain important covariates, such as geographical characteristics of each council, cannot be included due to statistical issues, as mentioned earlier.

Table 5.6 OLS regression for goal ambiguity's effect on water availability change

Independent variables	Estimate	Std. Error
Goal ambiguity		
Mission comprehensive goal ambiguity	-0.043**	0.020
Priority goal ambiguity	-0.047*	0.027
Evaluative goal ambiguity	-0.316***	0.120
Regional characteristic		
GDP by county	-0.004	0.007
Constant	1.241****	0.016
Sample size = 106		
R^2 = 0.138		
Adjusted R^2 = 0.104		
F statistics = 4.035***		

Note: **** p<0.001, ***p<0.01, ** p<0.05, * p<0.1

However, it should be noted that an R^2 value ranging from 0.1 to 0.5 can be considered acceptable if the majority of explanatory variables demonstrate statistical significance (Ozili, 2023). In this case, since most of the explanatory variables, including the three dimensions of implementation goal ambiguity, show statistical significance, the R^2 value is considered acceptable. Thus, we can conclude that implementation goal ambiguity has a negative impact on the changes in water availability in counties.

Table 5.7 displays the descriptive statistics for Model 2 of Analysis 2. To better approximate normality, *dissolved oxygen* and *population estimate* were log transformed. facilitate the interpretation, especially considering the log-transformed dependent variable. These transformations help to meet the assumptions of normality and enhance the interpretability of the relationship between the variables.

Table 5.7 Descriptive statistics for Model 2, Analysis 2

Variables	Mean	S.D.	Min	Max
Dependent variable				
Log of dissolved oxygen (mg/L)	1.55	0.607	-1.05	2.58
Independent variables				
Mission comprehensive goal ambiguity	18.9	2.33	14.04	23.2
Priority goal ambiguity	-0.007	1.44	-2.29	2.95
Evaluative goal ambiguity (%)	0.78	0.14	0.56	0.92
Control variable				
GDP by county (Billions of chained 2012 dollars)	2.35	3.56	0.03	16.4
Log of population estimate	4.57	0.42	3.37	5.46

Unlike the previous model that deals with the quantitative outcomes of co-delivery, no significant correlation was observed between implementation goal ambiguity and water quality. As Table 5.8 shows, the log-transformed population estimate was the only significant predictor of dissolved oxygen, $\beta = 0.208$, $p = 0.014$. This result does not support Hypothesis 2: *Goal ambiguity in implementing coproduction plans will negatively affect public service outcomes.*

Table 5.8 Multilevel analysis of goal ambiguity's effect on water quality

Variables	Estimate	Std. Error
Fixed effects, council-level		
Mission comprehensive goal ambiguity	-0.011	0.035
Priority goal ambiguity	-0.044	0.054
Evaluative goal ambiguity	-0.172	0.637
GDP by council	0.004	0.012
Log of population estimate	0.208**	0.084
Constant	-0.024	0.075
Random effects		
County-level variance	0.081	0.284
Council-level variance	0.042	0.205
County-level intra-class correlation = 0.202		
Council-level intra-class correlation = 0.105		
Sample size = 792		
Number of groups = 132 counties; 10 councils		

Note: **** $p<0.001$, ***$p<0.01$, ** $p<0.05$, * $p<0.1$

3. Discussion

This study investigates the impact of goal ambiguity on the co-production of public services through a case study of Georgia Regional Water Councils. Two empirical analyses have been conducted for each major phase of coproduction, co-designing and co-delivering water service.

In Analysis 1, the study examines how goal ambiguity influences local knowledge inputs, which is considered an input of co-designing water services. The findings reveal that a higher level of goal ambiguity is associated with a reduced likelihood of generating

local knowledge inputs, which empirically supports the previous discussion on goal ambiguity's likely effect on local knowledge production. The elicitation of local knowledge can be maximized with the active engagement of local people (Klenk et al., 2017). Therefore, it is essential to establish a conducive environment that encourages their participation and enhances the production of local knowledge (Mbah, 2019; Mirijamdotter et al., 2018). Particularly, identifying the purpose or reasons for engagement can ensure high-quality public participation (Russo et al., 2020). Considering previous research demonstrating that ambiguous goals demotivate individuals to engage with their work and organizations (Andrews & Mostafa, 2019), the presence of goal ambiguity may discourage local co-producers from actively engaging in the co-design of water services, resulting in less local knowledge in the coproduction process.

Analysis 2, which explores the influence of goal ambiguity on the outcomes of the co-delivery stage, yields mixed results. Model 1, which focuses on the quantitative aspect of water service delivery, aligns with previous studies highlighting the negative impact of loosely set goals on the performance of public organizations (Chun & Rainey, 2005a; Selden & Brewer, 2000; M. van der Hoek et al., 2018). Specifically, Chun and Rainey's (2005a) study on US public organizations revealed that mission comprehension, priority, and evaluative goal ambiguity were negatively associated with organizational performance indicators such as productivity and managerial effectiveness. By demonstrating the negative relationship between these three dimensions of goal ambiguity and the outcomes of co-delivering public services, this result further contributes to the generalizability of goal ambiguity theory in the context of collaborations between the public sector and third parties.

On the other hand, Model 2, which examined the relationship between goal ambiguity and the qualitative aspect of water service delivery, produces insignificant findings. Perhaps the water planning process placed more emphasis on water quantity than water quality. Plus, increased water supply might not correspond with increased quality of water. For example, increased demand for agricultural water supplies and increased urban density often result in polluted stormwater runoff which is one of the greatest threats to clean water in the US (United States Environmental Protection Agency, 2015).

This ambivalent result can also be explained by the context. Over the decades, pollution patterns in the state have shifted from point-source pollution to non-point source pollution. While sewage discharges from business firms and other point sources have decreased, population growth in the state has led to elevated levels of non-point source pollution, characterized by excessive nutrients and harmful algae blooms (Georgia Environmental Protection Division, 2022). Controlling non-point source pollution, however, is more challenging at the local level compared to its counterpart. Non-point pollution is typically brought into the local jurisdiction from elsewhere, and its sources are too various and pervasive to track and mitigate. Therefore, a comprehensive and coordinated strategy across multiple management levels is required to effectively control non-point source pollution (Mandelker, 1989; Patterson et al., 2013; M. A. Walker & Andres, 2018). In addition, the cross-jurisdictional nature of the problem presents unique challenges of coordination and control for the respective governments in a federalist system. Considering this, it may be plausible that the level of goal ambiguity at the regional level might not significantly impact the actual implementation efforts aimed at

enhancing water quality. Due to the complex nature of non-point source pollution and the need for comprehensive strategies, the influence of goal ambiguity at the regional level may be diminished.

CHAPTER 6

CONCLUSION

This dissertation started with speculation on the possibility of goal ambiguity in the coproduction process. Goal ambiguity likely arises from the inherent nature of coproduction, which involves multiple actors with diverse opinions and often vague objectives. This study therefore aimed to challenge the prevailing optimistic set of assumptions surrounding coproduction, which stems from the idea that diverse participants can forge unitary policy solutions that are sounder and more effective than those developed by policy elites. Another optimistic assumption is that a diverse set of actors can forge policy solutions that better serve the longer-term objectives of accountability and democracy than can policy elites. Put simply, if more stakeholders are involved in the policy process, their views will eventually converge and culminate in more effective policy solutions. Coproduction increases the number of participants by including consumers of public services in the policy process, but this alone does not guarantee success.

The shortcomings of the traditional policy process are thus seen as a failure in the process itself, which involves too few stakeholders and too little information. Elite actors are prone to develop incomplete or ineffective policy solutions. A more diverse set of stakeholders who are actively engaged in the policy process will do better.

This optimistic set of assumptions inadvertently hinders a comprehensive understanding of the intricate dynamics and influencing factors that shape the

coproduction process and obscure the need to further investigate its actual costs and benefits (Bovaird, 2007; Gheduzzi et al., 2021; Steen et al., 2018; Verschuere et al., 2012b; Voorberg et al., 2015). This study has looked beneath that optimistic veneer and found one major impediment to effective coproduction – goal ambiguity which unfortunately stems from the defining characteristics of the process itself, i.e., including diverse stakeholders and encouraging active participation.

By shedding light on goal setting in multiple actor settings and the resulting plurality of values, this study highlighted goal ambiguity as a possible factor that can hinder coproduction processes and outcomes. A case study of Georgia Regional Water Councils provided answers to two main research questions, each of which relates to the impact of goal ambiguity on two main stages of the coproduction process, namely co-designing and co-delivering water services in the State of Georgia. By analyzing the experiences and outcomes of the Georgia Regional Water Councils who coproduced water policy in their respective jurisdiction, this study identifies goal ambiguity as a key factor affecting the success of the coproduction process.

The following sections describe the key findings of this dissertation, as well as the theoretical, methodological, and practical implications that arise from these findings. Additionally, the methodological limitations of this study are provided, along with future research needs regarding the relationship between goal ambiguity and coproduction.

1. Findings and implications

1.1.Overall findings

This study presents an approach that exposes the role of goal ambiguity within the context of coproduction. As mentioned above, this process entails the inclusion of numerous, diverse participants with multiple values who are encouraged to participate actively. This study assumes that goal ambiguity can have detrimental effects on coproduction outcomes. To evaluate this assumption, two empirical analyses were undertaken in two distinct stages of the policy process: co-designing (policy formulation) and co-delivery (policy implementation). In this study, these stages occurred during the first and second rounds of Georgia Regional Water Councils' water planning process, which took place from 2009 to 2017.

The first empirical analysis explored how goal ambiguity in the co-designing process affects the amount of local knowledge inputs incorporated into coproduced regional water management plans. This analysis was based on a mixed method approach that detected two types of goal ambiguity, mission comprehensive and priority goal ambiguity. These forms of goal ambiguity were found to be negatively associated with the amount of local knowledge inputs generated during regional water planning meetings, while the frequency of utterances in a meeting were a positive predictor of local knowledge inputs. It can thus be concluded that local water service users, or co-producers, are less likely to present knowledge when goals are difficult to understand or multiple goals exist simultaneously, even though meetings comprised of a larger number of utterances might have given them more opportunities to contribute. This result fully

supports the first hypothesis that anticipated a negative relationship between goal ambiguity and local knowledge inputs in the co-designing process.

The second analysis focused on the co-delivery process, examining the relationship between implementation goal ambiguity and the outputs of co-delivery. Three dimensions of goal ambiguity—mission comprehensive, priority, and evaluative goal ambiguity—were identified as weak predictors of coproduction outcomes based upon the mixed results obtained. Specifically, the findings showed that projected water availability in 2050 was likely to decrease when goals were difficult to understand, multiple goals existed, or subjective rather than objective benchmarks were provided for the assessment of coproduction activities. However, no evidence was found to suggest that any forms of goal ambiguity affected water quality in the regions. Thus, the findings partially support the second hypothesis, which predicted a negative relationship between goal ambiguity and co-delivery outcomes.

In summary, the results of this dissertation confirm that vague, loosely articulated, or multiple conflicting goals can have a detrimental effect on coproduction activities and outputs. However, it is important to note variation in the impact of goal ambiguity across different stages of coproduction, namely co-designing and co-delivering the policy (that is, the policy formulation and policy implementation stages), and on different forms of goal ambiguity (i.e., mission comprehensive, priority, and evaluative goal ambiguity).

1.2. Implications

Theoretical implications

Further exploration of the process and outcomes of coproduction

Although coproduction has gained popularity as a promising approach to public service delivery in recent decades, its actual effectiveness has been subject to ongoing scrutiny. A possible reason for this scrutiny might come from the complex process and ambiguous outcomes of coproduction, which are not as simplistic and straightforward as conventional wisdom might suggest. Scholarly enthusiasm toward coproduction has caused the term to be applied to an extensive range of activities causing conceptual confusion (Brandsen & Honingh, 2016; Nabatchi et al., 2017b). The multiple and diversified meanings associated with coproduction may lead to diverse interpretations of what should constitute coproduction outcomes, thereby creating confusion in its conceptualization and results. Furthermore, the prevailing optimistic view of coproduction is partly based on its presumed effect of enhanced democratization, improved effectiveness, and higher quality of public services. This assumption hinders investigations into coproduction's real effects by specifying these aspirational values as its due outcomes (Steen et al., 2018; Verschuere et al., 2012b; Voorberg et al., 2015). In addition, Voorberg et al. (2015) point out the relatively scarce attention toward the outcomes of coproduction, which limits our understanding of the relationship between the inputs and outcomes of coproduction.

This study has addressed this gap by analyzing several different types of coproduction outcomes in its procedural stages. The study focused on two distinct but interconnected stages of the coproduction process: co-designing and co-delivering. By

examining these two stages separately, the study has uncovered variations in how goal ambiguity affects different types of coproduction practices. Furthermore, the study sought to provide empirical evidence regarding goal ambiguity's effects on the potential outcomes of coproduction practices.

Local knowledge as a key outcome of coproduction

Criticism of traditional top-down, unilateral decision-making has evoked increased calls for collaborative practices that involve the participation of lay individuals in the governance process (Ansell & Gash, 2008). However, the discussions surrounding active engagement and its measurement need further development. The lack of a clear and universally agreed upon definition hampers the establishment of common methods for assessing the extent and effectiveness of public engagement, as it encompasses a wide range of activities (Hamlyn et al., 2015). More often, related concepts such as commitment and satisfaction are frequently used interchangeably or as substitutes for engagement (Kang, 2014; Macey & Schneider, 2008). Therefore, researchers need to develop better approaches for evaluating public engagement, particularly by focusing on individuals' utilization of their knowledge and skills within the engagement process (Becker-Klein et al., 2016).

This study identified local knowledge inputs as the outcome of the co-designing stage, highlighting the significance of civic engagement in formulating policy in a coproduction setting. Local knowledge, which can only be obtained within the local context and from local participants, justifies active civic engagement in public service provision. However, its importance in coproduction has not received sufficient emphasis

in the field of public administration[5]. Rather, the importance of local knowledge in resolving social problems has been emphasized in the fields of science and technology (STS) studies and sustainability science, which is grounded in social constructivism and emphasizes the collaborative production of policy-relevant knowledge for sustainable development by engaging diverse communities, referred to as "knowledge coproduction" (Edelenbos et al., 2011; Miller & Wyborn, 2018; van der Molen et al., 2015). By applying the concept of knowledge coproduction to the field of public administration, this study has sought to highlight one potential outcomes of coproduction processes and underscore the importance of local knowledge in co-designing policy solutions.

Applying goal ambiguity theory to coproduction studies

This study contributes to the literature on coproduction by identifying goal ambiguity as a possible deterrent of effective coproduction of public services. When multiple stakeholders are involved in the decision-making processes, we must acknowledge the existence of numerous valid perspectives on understanding the problem and identifying solutions (Brugnach et al., 2011; Brugnach & Ingram, 2012). The inclusion of diverse viewpoints allows for problem formulation from various angles, factoring in different preferences, knowledge types, and potential solutions, but it is noteworthy that this diversity of perspectives can also result in multiple interpretations of the given problem when the shared goals are not clear enough or when participants have

[5] Previous scholars have emphasized participation in the political, policy, and administrative processes (e.g., Dryzek, 1994; Godenhjelm & Johanson, 2018; Yang & Callahan, 2007), but less attention has been devoted to identifying ways to increase and sustain optimal participation in the coproduction process, even though participation is one of its core conditions.

different worldviews. When multiple stakeholders are involved in policy-making and implementation processes, it is inevitable that conflicts will arise due to differing perspectives on understanding the problems at hand and identifying suitable solutions (Clarke & Peterson, 2015). This can be attributed to the diverse backgrounds, experiences, societal positions, values, and beliefs held by the stakeholders involved (Aschhoff & Vogel, 2018). Recognizing the inherent multi-actor nature of coproduction, this widely held assertion thus justifies the need to address goal ambiguity in coproduction research.

This study also contributes to the study of goal ambiguity in the field of public management by extending its applicability from the individual and organizational levels to collaborative groups. Previous scholarly attempts to generalize the assumption that goal ambiguity negatively affects the performance of public entities has been made at the program level (Jung, 2012, 2014; Rainey, 2008; Rainey & Jung, 2010), but not beyond. This study therefore helps to broaden and extend the application of goal ambiguity theory to a wider range of public affairs that involves the participation of numerous non-state actors.

This extension of goal ambiguity is particularly significant in addressing complex social challenges. Policy-makers increasingly rely on coproduction and collaborative governance in the realm of public policy (Ansell & Gash, 2008; Bovaird, 2007; Fung, 2006). These approaches have gained prominence as effective solutions for addressing complex societal issues such as environmental management, climate change, or international development, which are commonly referred to as wicked problems (Rittel & Webber, 1973). These complex problems that arise in postmodern society often seem

intractable; despite the belief that they are the province of experts, these issues continue to pose significant challenges that cannot easily be addressed using existing knowledge and expertise. A strategic means to tackling these challenges thus requires the engagement of many organizations and individual stakeholders to elicit new sources of knowledge and reach positive desired outcomes (Guston, 2001; Leith et al., 2016).

By extending the study of goal ambiguity to coproduction, this study offered valuable insights into understanding and explaining of a wider array of collaborative efforts aimed at addressing complex issues. Considering that goal ambiguity is likely to increase when tasks are complex and non-routinized (J. W. Lee et al., 2010), the recognition of goal ambiguity in the context of coproduction sheds light on the dynamics and challenges involved in these collaborative endeavors, suggesting a possible negative factor for solving complex problems through increased collaboration and collective action.

By investigating local water management efforts, this study suggests that goal ambiguity is a possible hinderance to collaborative management of public services. By investigating this problem directly, this study found that ambiguous goals are a significant obstacle to inclusive practices and outcomes. Recognizing and effectively managing conflicting input and divergent viewpoints is crucial for fostering successful inclusive practices and ensuring that the interests and needs of all stakeholders are adequately represented and addressed in public policy processes.

Methodological and practical implications

Objective operationalization of local knowledge inputs

This study introduces a new methodological approach for coproduction studies to examine and quantify local knowledge inputs, thereby enhancing the generalizability of the results derived from qualitative data obtained from meeting minutes. Local knowledge is frequently understood as a "social product" shaped by culture and context (Antweiler, 1998), leading to its characterization as a perceptual concept. Consequently, studies on local knowledge have predominantly focused on recognizing and incorporating that knowledge alongside established scientific expertise (Klenk et al., 2017) rather than assessing its tangible outcomes. When measurement has been attempted, it has typically relied upon individual perceptions through surveys or peer evaluations (Reyes-García et al., 2016) or by simply counting the number of individuals within a specific region who were believed to possess local knowledge. To overcome these limitations, this study employed a content analysis method to measure knowledge. By counting the frequency of coded meaning units, content analysis provides researchers with an objective and systematic way to quantify qualitative materials and identify patterns of information within them (Mayring, 2015; Vaismoradi et al., 2013). Similar to previous studies that have measured knowledge (J. Lee et al., 2021; Praharaj et al., 2023), this study began by counting the frequency of utterances related to knowledge. However, it took a step further by analyzing the characteristics and content of each knowledge input taken from written meeting transcripts. This involved separating and categorizing utterances based on their attributes such as the type of speaker and the purpose of the utterance. This analytical approach allowed for the exploration of spatial characteristics inherent in local knowledge, which offers a means to gauge local knowledge inputs addressing public issues.

Guidance for managing citizen engagement in coproduction

This research not only enriches the existing knowledge base on coproduction but also provides practical insights for policymakers and stakeholders involved in environmental governance and risk mitigation. When striving for consensus in the problem-solving process, a group may encounter two possibilities: groupthink and collective intelligence. Despite both being triggered by the group's inclination towards consensus, they lead to contrasting outcomes (Cha et al., 2020). Groupthink, which refers to a phenomenon where group members avoid raising disagreements and ultimately neglect exploring alternative perspectives (Janis, 1982), can result in poor group performance due to biased information sharing and self-censorship (Kamau & Harorimana, 2008).

Conversely, when group members actively interact and share their knowledge, it can foster the development of collective intelligence—a cohesive reservoir of knowledge that empowers the group's practical capabilities (Lévy, 1997). In essence, having multiple policymaking groups and implementing checks and balances between them can counteract the monopolization of ideas in the problem-solving process (Hart, 1998).

In coproduction practices, engaging diverse individuals and groups effectively prevents groupthink by stimulating the reevaluation of existing ideas and facilitating the generation of alternatives through knowledge sharing among participants. However, this conflict inevitably introduces additional challenges in terms of internal communication and coordination and necessitates agreement on the problem definition, which may lengthen the decision-making process (Hart, 1998).

By shedding light on goal ambiguity as a barrier to effective coproduction, this study suggests potential pitfalls to avoid when managing the inclusion and participation of diverse groups including indigenous and local communities in decision-making processes. Recognizing that goal ambiguity can impede agreement on the problem definition by allowing for different interpretations, controlling the level of goal ambiguity can alleviate the communication burden associated with preventing goal ambiguity.

The study indicates that having a small number of clear goals expressed in straightforward language, along with developing objective measures of those goals, can improve the effectiveness of both interim and final outcomes in the coproduction process. This practical knowledge underscores the importance of establishing clear and understandable goals in order to encourage the active engagement of citizens who, alone, can contribute local knowledge which helps to improve coproduction efforts as well as prevent groupthink in the problem-solving process.

Furthermore, this study focuses on coproduction within the realm of natural resource policy, where strong collaborations among stakeholders are essential for achieving sustainable resource management (Margerum & Robinson, 2015; Youm & Terman, 2020). It emphasizes the significance of effective partnerships and cooperative efforts to ensure the optimal utilization and preservation of natural resources. By examining these coproduction processes, the study provides some insights into the dynamics, challenges, and potential strategies for fostering successful collaboration in the context of natural resource management.

2. Methodological issues and directions for future study

One methodological limitation of this study comes from the manner of operationalizing and measuring local knowledge for the analysis. Local knowledge was defined based on the holders of that knowledge and the number of times they uttered suggestions in formal meetings, but another aspect of knowledge content—the quality of knowledge, should also be considered. This might be difficult to assess from a measurement validity standpoint. Local knowledge is shaped from the local wisdom, practices, and experience of laypeople in their daily lives. Both who holds the knowledge and how that knowledge is accumulated is of great importance. The duration of individuals' relationships or residency in the region might be a possible proxy for assessing the qualitative aspects of local knowledge (Taylor & de Loë, 2012).

The quality of knowledge is nonetheless difficult or impossible for researchers to gauge fully, particularly when the study retrospectively examines coproduction processes. In this case, the coproduction meetings were held from 2009 to 2011; hence, we cannot go back to those meetings and gather additional information on the quality of local knowledge input that existed. This suggests that a more intensive, qualitative exploration of coproduction cases might be possible when studying contemporaneous cases with augmented techniques such as in-depth interviews and participant observations. A word-based content analysis can be also considered to explore the intricacies of the case, specifically by placing emphasis on particular words that signify the ordinary and experience-based nature of local knowledge. By employing these techniques in conjunction, a more comprehensive understanding of coproduction processes and the significance of local knowledge can be attained.

Another important consideration is that this study conducted two separate analyses focusing on major phases of coproduction, namely co-planning (policy formulation) and co-delivery (policy implementation) of water services. The interaction between these two phases was not estimated in this study. Certainly knowledge inputs might influence implementation outcomes in regional water planning policy, but this study was not able to estimate that relationship quantitatively because of too few cases and too many levels of analysis resulting from the utilization of multiple data sources. The combined dataset had a nested structure necessitating multilevel analysis. A proxy for co-delivery outcomes, water quality, was estimated at the monitoring location nested within the county, which is further nested within the water district. Similarly, knowledge input was calculated at the meeting level, which is also nested within the water council district. Including knowledge input in the multi-level model as an independent or control variable would complicate the model because it would introduce a double nested structure with too many levels of analysis. Such an analysis was deemed unworkable in the present study because of limitations in the number of cases and time periods that were studied. Future studies should undertake a more thorough and comprehensive analysis by considering the interplay between the co-planning and co-delivery phases of coproduction.

It is also important to acknowledge the limitations concerning data availability in this study. The analysis focused on the case of Georgia Regional Water Councils. However, as mentioned above, it should be noted three out of ten councils refused to complete a water availability gap analysis because they objected to the variable itself. As a result, this study only had access to limited and partial observations from 106 counties

across the remaining seven regional councils. This restricted dataset may have caused reduced variance among the observations and could have increased bias in the estimates.

Furthermore, it is important to acknowledge that the analysis undertaken in this study is primarily focused on the first round of the regional water planning process which was established in 2011 and partially on the second round completed in 2017. Therefore, the most recent outcomes and developments in the case were not included in this study. As a result, the findings may not reflect the full extent of the current state of coproduction within the Georgia Regional Water Councils.

Indeed, a subsequent study can address the dataset limitations by providing a more comprehensive and up-to-date analysis. Since regional water plans undergo review by regional water councils every five years, this presents an opportunity to collect more longitudinal data that could be used to estimate the long-term effects of goal ambiguity on coproduction within the evolving context.

The Georgia Environmental Protection Division announced its intention to develop a draft of the third-round regional water plans on March 31, 2023, and began soliciting public review and comments by May 15, 2023 (Georgia Environmental Protection Division, 2023). This process will yield new information on water availability gaps and enable a more detailed assessment of the implementation phase of the second-round regional water plans. By conducting subsequent analyses at regular intervals, studies can expand the scope of this research and provide more generalized insights about the coproduction process and the impact of goal ambiguity on it.

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