Policy coherence between biodiversity conservation, climate change and poverty alleviation in Mexico

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Abstract

In the last decades, the impacts of climate change have affected people, societies, economic sectors and ecosystems in all the continents and oceans. Climate change will make poverty-alleviation harder by slowing down economic growth, eroding food security, and increasing and creating poverty traps. The poor, that are highly dependent on wildlife and natural resources for their persistence, will be affected the most. However, it seems that environmental priorities are not considered in the developmental agendas. If biodiversity and climate change are not included in policy domains other than the environmental, many negative effects will not be adequately mitigated or minimised. Addressing these multidimensional problems requires policy coherence for improving the outcomes of social and environmental policies, and for using more efficiently the limited resources that developing countries have. The overall aim of this study is to determine if there is coherence between the objectives of the National Development Plan and the sectoral programs of Mexico, with a special focus on climate change adaptation and mitigation, poverty-alleviation, and biodiversity conservation. Through a discourse network analysis, it was possible to determine the policy components within each program and to systematically identify the connections between them and investigate if there was policy coherence. Since the documents analysed belong to two different levels of the government, it was possible to analyse vertical and horizontal coherence. The analysis showed that there is vertical coherence between the NDP and the sectoral programs, low coherence between the sectoral programs, as well as low coherence between the four policy components of major interest. This analysis increases the very scarce literature on Mexico's policy coherence, providing empirical evidence that allows finding windows of opportunity for improving the coherence between sectoral programs in the future.

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Acronyms and abbreviations

GHG	Greenhouse gases
IPCC	Intergovernmental Panel on Climate Change
LGCC	General Law on Climate Change (in Spanish)
NDP	National Development Plan
SAGARPA	Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food
SALUD	Secretariat of Health
SCT	Secretariat of Communications and Transportation
SE	Secretariat of Economy
SECTUR	Secretariat of Tourism
SEDATU	Secretariat of Agrarian, Land and Urban Development
SEDENA	Secretariat of National Defence
SEDESOL	Secretariat of Social Development
SEGOB	Secretariat of the Interior
SEMAR	Secretariat of Navy
SEMARNAT	Secretariat of the Environment and Natural Resources
SENER	Secretariat of Energy
SEP	Secretariat of Public Education
SHCP	Secretariat of Finance and Public Credit
SRE	Secretariat of Foreign Affairs
STPS	Secretariat of Labour and Social Welfare

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Chapter 1: Introduction

1.1 Background

A public policy consists of a set of actions and decisions aimed to solve a public problem (Cejudo & Michel, 2016). Many governments, particularly the ones from developing countries, do not have sufficient resources to address all their public problems (Cloete & Meyer, 2006). Public policy coherence can improve the ways economies and societies use their resources, helping to transform systems that undermine well-being and perpetuate vulnerabilities (OECD, 2018). Therefore, public policy coherence is particularly important when it comes to social and environmental policies, which require an active role of the state to protect and to support the vulnerable humans and natural systems.

In the last decades, human and natural systems have been experiencing the impacts of the changes in the climate. This worldwide phenomenon exposes humanity and ecosystems to risk (International Panel on Climate Change [IPCC], 2014). The degree of vulnerability is affected by economic processes and development pathways (Latour, 2018; IPCC, 2014). Public policy can respond to climate change through mitigation and adaptation (Füssel, 2007). Mitigation means reducing the amount of greenhouse gas (GHG) emissions in the atmosphere, while adaptation refers to the actions taken to moderate the harm from climate change (McCarthy et al., 2001). Climate change has increased the complexity of prioritising public policy problems and poses a number of trade-offs between public policy objectives. One of the central trade-offs is the conflict between human economic activity and the use of natural resources (IPCC, 2014; 2018; Roe, 2013). Policies aimed to mitigate or adapt to climate change may reduce the risks, and present co-benefits in other areas of interest (IPCC, 2014). Cross-sectoral, multilevel mitigation and adaptation policies would result in reducing future climate-related risks (IPCC, 2018), having positive spill overs in biodiversity conservation and society's well-being.

Poverty is a complex socio-economic phenomenon and reducing it is one of the principal challenges of this century. Climate change will make this challenge harder to overcome since it will slow down economic growth, erode food security, and increase and create poverty traps (IPCC, 2014). Policy coherence implies a new approach to poverty and climate change,

where adaptation and mitigation should be integrated for optimising resources, and where development policies should include climate negotiations and financing, among others (Sumner, 2012; Wlokas et al., 2012).

At the same time, the rapid loss of biodiversity and the persistence of extreme poverty seem to be intimately related. In the four decades prior to 2010, wildlife populations declined by more than a third worldwide; in poorer, tropical regions, this number went up to 60% (WWF, 2010). Biodiversity hotspots and extreme poverty overlap geographically, particularly in rural areas, where people are highly dependent on wildlife and natural resources for their livelihoods (Barret, Travis & Dasgupta, 2011).

Biodiversity conservation and ecosystem services can improve climate change mitigation, and are the basis of many successful adaptation strategies, particularly for poor people (Reid & Swiderska; Roe, 2008), since they are the most reliant on natural resources for their subsistence and well-being (Reid, 2015). For example, communities around the world have used traditional knowledge and the genetic diversity of native species to adapt to the variability of climate throughout generations (Reid, 2015). At the same time, diverse and stable ecosystems can provide protection against storms, landslides, or erosion (Reid, 2015), while they work as carbon sinks, reducing GHGs (McCarthy et al., 2001). However, since the middle of the last century, biodiversity conservation has lost importance in the international agendas, that changed their priorities to poverty-alleviation, indigenous rights (Roe, 2008), and more recently to climate change (Roe, 2013).

Economic development in the current development paths, based on fossil fuels advances, means an increase in the GHG emissions intensity. Therefore, climate change mitigation represents a more significant challenge for developing nations, where reducing poverty and inequality is a priority (Wlokas et al., 2012; Grottera et al., 2012).

1.2 Research focus

As the globalisation impacts intensify, the arising policy problems cut across the traditional political boundaries (Savage & O'Connor, 2018), and developing countries do not have enough resources to address all these problems (Cloete & Meyer, 2006). Systems need to be

in place to ensure that scarce public funds are used efficiently (Cejudo & Michel, 2016); successful public policy coherence can improve the way governments use their resources (OECD, 2018). However, the majority of the empirical literature on policy coherence is based on developed countries (e.g. Selianko & Lenschow, 2015; Carbone, 2008; Careja, 2011; Skovgaard, 2018; Papadopoulou et al., 2020; May et al., 2005; Huttunen, Kivimaa, & Virkamäki, 2014; Nilsson et al., 2012; Kurze & Lenschow, 2018).

The major interest of this study is to analyse the coherence between climate change adaptation, climate change mitigation, poverty-alleviation, and biodiversity conservation in public policies. This study fills a gap in the research literature, with its explicit focus on coherence between these four policy components. Mexico serves as a single case study because it shows all the phenomena relevant to the study: it is a megadiverse, highly fossil-fuel dependent and high GHG emitter country with high levels of poverty (Hernandez-Trillo, 2016; Consejo Nacional de Evaluación de la Política de Desarrollo Social [CONEVAL], 2019; Organisation for Economic Co-operation and Development [OECD], 2013; Gobierno de México, 2018; Estrategia Nacional de Cambio Climático [ENCC], 2013; Climate Action Tracker [CAT], n.d.; Sarukhán et al., 2017). Studies on policy coherence in Latin America are scarce, and there is only a couple in Mexico (e.g. Cejudo & Michel, 2016; 2017).

Different authors (e.g. Nilsson et al., 2018; May, Sapotichne & Workman, 2006; Cejudo & Michel, 2016) have expressed the hardships of systematically identifying interaction between policies, and the need of developing theoretical and analytical tools for improving policy coherence. This study gives one step forward in that agenda, by using the method of discourse network analysis for analysing the coherence between the objectives of the sectoral programs and the National Development Plan (NDP) of Mexico.

The NDP is the main planning instrument of Mexico; it specifies the priorities, the national goals, and the greatest objectives of the country and is developed in the Presidential Office each presidential period. The sectoral programs are derived from the NDP, representing the second highest level of national planning, they are developed by each Secretariat of the State, and therefore, belong to different policy domains (Gobierno de la República, 2013; SHCP, 2013). Analysing all the policies from the two highest levels of the government, belonging

to different policy domains, is an approach rarely taken since most of the studies on policy coherence only include in their analysis the policies directly related to the topic they are focusing on (see section 2.5).

1.3 Aims and objectives

This research is a discourse network analysis of the National Development Plan (NDP) and the sectoral programs of Mexico. It looks for the answer to the research question: What lessons can be learned from analysing the coherence between the NDP and the sectoral programs of Mexico, with a special focus on: climate change, poverty-alleviation, and biodiversity conservation?

1.3.1 Aim

The overall aim of this study is to determine if there is coherence between the objectives of the NDP and the sectoral programs of Mexico with a special focus on climate change adaptation and mitigation, poverty-alleviation, and biodiversity conservation.

1.3.2 Objectives

a) In consistence with the aim, the objectives of this study are:
b) To determine the policy components contained in the objectives of the NDP and the sectoral programs.
c) To determine if the policy documents contemplate policy coherence.
d) To establish if there is vertical coherence between the objectives of the sectoral programs and the NDP.
e) To establish if there is horizontal coherence between objectives of the sectoral programs.
f) To identify if there is coherence between the policy components: climate change adaptation, mitigation, poverty-alleviation, and biodiversity conservation.

1.3.3 Thesis outline

This thesis is structured as follows:

Chapter one presents the background necessary for understanding the research focus of the study, which is later presented. The Research Focus introduces the relevance and scope of the study. It presents the research question, the aim, and the objectives that will help answer the research question. The second chapter is the literature review, that explores the theoretical literature in public policy, agenda-setting, and public policy coherence. It introduces the concepts of the four topics of interest: poverty-alleviation, biodiversity conservation, and climate change mitigation and adaptation, as well as how they interact with each other. It later presents the empirical relevance of analysing policy coherence in Mexico, presents the research gap, and the conceptual framework.

The third chapter presents the research design and method used to answer the research question. It presents the case study design, revisiting the reason for selecting Mexico as a single case study. It introduces the data that was used for the analysis, what it represents in the context of Mexico, and how it was selected. Later the chapter describes the approach for achieving each of the objectives of the study and ends with presenting the limitations of it.

The fourth chapter presents the results and discusses them revisiting the conceptual framework and the literature review of chapter two. Finally, the fifth chapter presents the summary of the findings in relation to the objectives presented in chapter one and its relevance in the empirical literature. It closes by disclosing the limitations and suggesting how this study can be used for further research and for improving policy coherence in Mexico.

Chapter 2: Literature review

2.1 Introduction

This literature review presents the theoretical literature in public policy, agenda-setting, and public policy coherence. The review introduces the existing research on the concepts of the policy components which are of primary interest for the study: climate change mitigation and adaptation, poverty-alleviation, and biodiversity conservation, as well as the relationships between them. Finally, the chapter presents the empirical literature related to the research problem. This literature review has the purpose to the identify the research gap and to introduce the basis for a conceptual framework.

2.2 Public Policy

A public policy consists of a set of actions and decisions aimed to solve a public problem (Cejudo & Michel, 2016). For a problem to be recognised as a public problem, it needs to be defined, and the necessity of state intervention needs to be expressed (Werner & Wegrich, 2007). However, most governments do not have sufficient resources to address all the public problems, and they must filter and prioritise which ones will be dealt with first (Cloete & Meyer, 2006). Therefore, before the policy formulation stage begins, the agenda-setting process takes place.

2.2.1 Agenda-Setting

An agenda is the collection of problems, solutions, and understanding of causes that come to the attention of the public and their governmental officials (Birkland, 2007). The governmental agenda is "a list of subjects to which officials are paying some serious attention at any given time" (Kingdon, 2014: 196).

Agenda-setting is the process by which problems and alternative solutions lose or gain attention (Birkland, 2007). It narrows the set of policy problems to a list on which officials will actually focus (Kingdon, 2014). In other words, the process of agenda-setting determines which public problems become policy issue areas that will be included in the governmental agenda.

The process of agenda-setting includes identifying, prioritising and defining a problem, mobilising support, and lobbying decision-makers to take appropriate actions (Cloete & Meyer, 2006). Policies that are supported by different groups, governmental agencies, and citizens, are more cohesive and stable than those with less support (May, 1991). Urgency, policy objectives, costs vs benefits, resources, feasibility and sustainability, are some of the factors considered when problem prioritisation takes place (Cloete & Meyer, 2006).

2.2.2 Public policy coherence

The ability of a public policy to solve a problem depends on the suitability of its design and its effective implementation (Cejudo & Michel, 2016). Changes in the globalisation of human activity and environmental challenges lead to an expansion of policy problems that cut across the traditional political boundaries (Savage & O'Connor, 2018), at the same time, complex problems need responses from numerous policies (Cejudo & Michel, 2017). Public policies not only coexist with each other, but they also interact and can enhance or hinder each other (Cejudo & Michel, 2016). Even policies that target a single sector tend to have cross-sectoral implications, which is not so apparent at first (Papadopoulou et al., 2020). The sum of a series of related and disjointed policies is not the solution for public problems (Cejudo & Michel, 2016), which is why policy coherence is essential.

Various scholars have given different but similar definitions of policy coherence. For example, May, Sapotichne & Workman (2006), define it as various policies that go together because they share a set of objectives or ideas. Careja (2011) considers that policies are coherent if the components of one policy generate positive spillovers in another policy or policies. For Cejudo & Michel (2016), coherence between policies refers to policies that within the same policy domain are harmonically related to achieving the overarching objectives of that space. For Papadopoulou et al. (2020), policy coherence focuses on the exploitation of synergies and on managing the trade-offs within and across policy domains and spatial scales. A policy domain (also known as policy area, policy field, and issue domain) is "a component of the political system that is organised around substantive issues" (Burstein, 1991: 328).

The definition of policy coherence used in this thesis is "various components of policies correspond because they share a set of ideas or objectives" (May et al., 2005:37). Policy components are policy issue areas, that can vary over time and across nations (May et al., 2005). The notion of the "extent to which a given policy component is concerned with the overarching policy of interest" is defined as policy centrality (May et al., 2005:48).

Different concepts have been used as synonyms of policy coherence (Danaeefard, Ahmadi, & Pourezzat, 2019). Some examples are *policy alignment* that refers to the process of driving collaboration for achieving policy consistency and coherence, with the end of making policy implementation more effective (Savage & O'Connor, 2018); *policy consistency*, defined as a lack of contradiction between policies; and *policy coordination*, described as a joint work of all the institutions that formulate a certain policy (OECD/DAC, 2001). In more detail, policy coordination is the process by which different organisations allocate responsibilities, define tasks, and share information with the end of being more efficient when implementing policies and programs. However, coordination by itself is not enough for achieving policy coherence (Cejudo & Michel, 2017). In the long run, broad policy problems can only be solved if there is coherence between at least a relatively limited number of policies, which is not generated automatically, but from deliberate interventions (Cejudo & Michel, 2016).

On the other hand, policies that lack coherence foster gaps or inconsistencies. These inconsistencies are caused by the lack of a 'policy glue' that provides a common bond for the broader policy domain (May et al., 2005). Policy incoherence refers to objectives of one policy in a particular field getting undermined or obstructed by actions of the government in other policy fields (Fukasaku et al., 2005). Different reasons can lead to policy incoherence. They can be administrative, political, institutional; lack of knowledge or conflicting interests from the policy-makers can also undermine policy coherence (Hoebnik, 2008; Siitonen, 2016; Ranabhat et al., 2018). Decentralisation, globalisation, and unclear goals and objectives also have negative effects on public policy coherence (Carbone, 2008).

The success of a policy usually involves a suitable alignment between the policy design and the policy objectives (Freitas & von Tunzelmann, 2008). Nonetheless, it can be a common mistake to assume that individual policies that are properly designed are inherently coherent

with the other policies (Cejudo & Michel, 2017). Many policies are effective and fulfil their objectives, but when looked at a bigger scale, they are redundant (Cejudo & Michel, 2016). Therefore, it is necessary to have a bird's eye view for exploring incoherence (Danaeefard, Ahmadi, & Pourezzat, 2019). It is also important to acknowledge that policy coherence does not talk about the appropriateness of a set of policies to solve a problem, both good and bad policies can have low or high degrees of coherence (Cejudo & Michel, 2017).

In many countries planning instruments produce general plans to project their development. From these large plans come more specific plans that usually are divided by policy domains, the sectoral programs (Martínez-Nogueira, 2010). According to Martínez-Nogueira (2010), strategic planning at the sectoral and organisational level is a way to strengthen the alignment of actions with the policy objectives, preserving coherence. Nevertheless, it is not rare to find a lack of coherence within and between the sectoral programs. It is a common mistake to assume that since each public policy is connected to an objective of the National Plan, they will be coherent (Cejudo & Michel, 2016; Comisión Económica para América Latina y el Caribe [CEPAL], 2003). Coherence can only be achieved if the features of each program involved in addressing the complex issue at hand are analysed in order to understand how they should be modified (Cejudo & Michel, 2017).

According to Cejudo & Michel (2016), public policy coherence can be analysed on three levels: internal coherence, coherence between policies, and coherence between policy domains. Internal coherence refers to the causal theory that structures a policy, while coherence between policies means that the policies coexisting in the same policy domain may contribute to, improve, or reinforce the chances of attaining the goals of that domain (Cejudo & Michel, 2016). Coherence between policy domains refers to correspondence between the objectives of two different policy domains, or, at least, the achievement of the objectives of the first policy domain does not affect the achievement of the objectives of the second one (ibid).

There are three ways in which a set of policies can be coherent: between policy instruments, between target populations, and between the objectives of different policies (Cejudo & Michel, 2016). Coherence between policy instruments means that the way they are designed

will allow them to solve the same public problem using different tools. Coherence between target populations exists when each of the policies potentially avoids gaps or duplications, and the sum of the people attended includes the entire target population (Cejudo & Michel, 2016; 2017). Coherence between objectives refers to objectives that even though they are meant to achieve different goals, they are harmoniously related between them in a way that they can serve to a greater goal (May, Sapotichne & Workman, 2006; Cejudo & Michel, 2016; 2017).

The analysis of policy coherence can also be vertical or horizontal. Vertical coherence means that there is coherence between different levels of the government (Geerlings & Stead, 2003). Horizontal coherence means that there is coherence between policy domains or areas at one level of the government (Nilsson et al., 2012).

According to Cejudo & Michel (2017), there are three levels of policy coherence. Low coherence refers to policies that by their design can simultaneously operate without obstructing each other, but do not complement each other for solving the same complex problem. Medium policy coherence refers to policies that by their design they complement each other but still leave gaps in addressing the complex problem. High policy coherence means absolute policy coherence, meaning that by their design, they can completely address the complex problem.

Absolute coherence between policy domains is impossible to achieve (Cejudo & Michel, 2016). Nonetheless, different policy domains are not necessarily incoherent; they could better cohere if they were linked by a common set of ideas or greater targeting (May, Sapotichne & Workman, 2006). When there is coherence between different policy domains, they correspond with each other, or at least the achievement of the goals of one policy domain will not negatively affect the achievement of the objectives of another one (Cejudo & Michel, 2016). Achieving coherence between policy domains is a very difficult task, however, studying how one policy domain is affected by the existence of other policy domains (horizontally and vertically) would be a step forward in achieving it (Nilsson et al., 2012).

Greater policy coherence can lead to better acceptance and implementation (May, Sapotichne & Workman, 2006). The results of policy coherence assessment can be used as a guide for

improving the design of policies in the future (Papadopoulou et al., 2020). Nevertheless, it remains a challenge to find an approach to systematically identify, characterise and address the interactions between policies (Nilsson et al., 2018). It is necessary to develop theoretical and analytical tools to conceptualise, evaluate, measure, and improve the coherence of public policies. The design of a methodology to assess the coherence between policies would be the first step to advance this agenda (Cejudo & Michel, 2016).

This study proposes a method for systematically analysing the coherence between policies. The policy documents included in the analysis are Mexico's NDP and sectoral programs (of the presidential period 2013-2018), which are developed by the Presidential Office and the Secretariats of the State, the two highest levels of government, which allowed to analyse both, horizontal, and vertical coherence. Since these policy documents are the highest level of national planning, they are not specific enough for addressing policy instruments or target populations (SHCP, 2013b), therefore, this study focused on the coherence between the objectives of the policies. According to Martínez-Nogueira (2010), the policy objectives constitute the critical parameters for the evaluation of the coherence of the policies; this way of achieving coherence requires that all the objectives within the policies are analysed (Cejudo & Michel, 2017).

2.3 Policy components

The policy issue areas or policy components that this work will focus on are climate change mitigation, climate change adaptation, poverty-alleviation, and biodiversity conservation.

2.3.1 Climate change, adaptation and mitigation

The Intergovernmental Panel on Climate Change (IPCC) refers to climate change as any change in the state of the climate that persists for an extended period, typically decades or longer, whether due to natural variability or as a result of human activity (UNFCCC, 2011). Anthropogenic climate change is becoming a risk for society and nature (Füssel, 2007). It will have effects such as heatwaves, water scarcity, coastal flooding, extreme precipitation, wildfires, landslides, and droughts (Keim, 2008; UNDESA, 2016). These effects will cause adverse health impacts, food insecurity, loss of life, damage to infrastructure and property,

to service provision, to livelihoods, and environmental resources (UNDESA, 2016). Poor people and communities are the most vulnerable to these effects, which will lead to an increase in poverty and inequalities (UNDESA, 2016). The ways society can respond to climate change is through adaptation and mitigation (Füssel, 2007).

Mitigation means limiting climate change by reducing greenhouse gas (GHG) emissions that contribute to climate change or by enhancing their sinks (McCarthy et al., 2001). According to the Paris Agreement (2015), keeping the increase of the global average temperature above pre-industrial levels below 2°C, and preferably under 1.5°C, would significantly reduce the impacts and risks of climate change (Bodle, Donat, & Duwe, 2016). Global warming already reached 1.0°C above pre-industrial levels, and in a business as usual scenario, it will likely increase to 1.5°C between 2030 and 2052. For limiting warming to below 2°C, CO_2 emissions should decline by 25% by 2030 and reach a net zero around 2070 (IPCC, 2018).

Adaptation refers to the actions in response to the climate stimuli, either present or expected, to moderate the harm from climate change or to exploit opportunities (McCarthy et al., 2001). Mitigation traditionally received much more attention than adaptation from the scientific and policy perspective; however, they are complementary and sometimes even mutually reinforcing (Füssel, 2007).

2.3.2 Poverty and poverty-alleviation

There are different terms to describe poverty. *Income poverty* means that a family's income is not enough to meet a federally established threshold, so it differs between countries. The *Global Multidimensional Poverty Index* looks beyond income, using three key dimensions: education, health, and standard of living (UNDP, 2018). There is also an international standard of *extreme poverty*. People are in extreme poverty if they live under the *international poverty line*. Today (2020), the *international poverty line* is s established at 1.9 US dollars a day, but it is redefined every couple of years using the purchasing power parity exchange rate (Correia, 2015). Nowadays, it is also recognised that poverty is not only economical; it is also social, political and cultural, and undermines human rights (UNESCO, 2018). In this study, *poverty-alleviation* refers to actions taken explicitly for reducing poverty.

2.3.3 Biodiversity conservation

Biodiversity refers to the variety of life on Earth (Convention on Biological Diversity [CBD], 2000). It comprises the ecosystems, the species that constitute them, and their genetic diversity. The ecosystems provide environmental services that are essential for human survival and wellbeing (Sarukhán et al., 2017).

In the last centuries, species extinction has increased as much as a thousand times over the rates presented throughout the Pleistocene (the last 1.8 million years) (Millenium Ecosystem Assessment, 2005). In this study, biodiversity conservation refers to the actions taken for conserving biodiversity. Biodiversity conservation can be achieved in different ways. *In-situ* conservation conserves genes, species and ecosystems through, for example, protected areas, ecosystem rehabilitation, or legislation for protecting endangered species. *Ex-situ* conservation conserves species or gene banks through zoos or botanical gardens (CBD, 2000). The sustainable use of biodiversity is another essential factor for its proper conservation (CBD, 2000).

2.3.4 Relationships between climate change, poverty-alleviation, and biodiversity conservation

Worldwide, the leading cause of biodiversity loss currently is land use change for agriculture (OECD, 2017). Nevertheless, according to the Millennium Ecosystem Assessment (2005), by the end of this century, climate change will be the most significant driver of biodiversity loss. In a study that included 105,000 species, it was projected that 18% of insects, 16% of plants, and 8% of vertebrates might lose more than half of their climatically determined geographic range under global warming of 2°C (IPCC, 2018). Another study predicted that without climate change mitigation up to 57% of plants and 34% of animals are likely to lose 50% or more of their present climatic range by the 2080s (Warren et al., 2013).

The present biodiversity coped with previous climate changes through evolutionary and behavioural changes. However, the current levels of fragmentation and habitat loss reduce the ability of species to reach new climatically suitable areas (Thomas et al., 2004). When species are confined to small areas, their genetic variability, and therefore their capacity to

adapt is reduced (CBD, n.d.). Biodiversity provides the goods and services that sustain humanity (CBD, 2000). Therefore, extinction events may induce ecosystem-level changes that can provoke severe effects on human well-being. For example, a forest die-off reduces carbon sequestration, timber supplies, water quality, and watershed volume (Scheffers et al., 2016). The loss of forests may also increase flood-related disasters that inflict trillions of dollars in damage in disadvantaged economies in the next decades (Bradshaw et al., 2007).

The persistence of extreme poverty and the rapid loss of biodiversity seem to be intimately related. Biodiversity hotspots and extreme poverty are geographically overlapped. This overlap is particularly persistent in rural areas, where people are highly dependent on wildlife and natural resources for their persistence (WWF, 2010; Barret, Travis & Dasgupta, 2011). Human survival, either rural or urban, depends on other life on Earth (Pecl et al., 2017), and eradicating poverty is harder when facing climate change and natural resource degradation and scarcity (OECD, 2017).

Efforts for eradicating poverty in the past have delivered important social and economic benefits, but many times at the expense of the environment. In many cases when the efforts have involved significant depletion of natural resources, they led to damage in well-being and human health, offsetting part of the benefits they were aimed to achieve (OECD, 2017).

Climate change will make poverty-alleviation even harder by eroding food security, slowing down economic growth, and increasing and creating poverty traps, among other impacts (IPCC, 2014). Moreover, exposure and vulnerability to climate hazards are closely related to the existing underlying socio-economic inequalities (UNDESA, 2016); the poor will be affected the most since they have the lowest adaptive capacity (Wlokas et al., 2012). Therefore, poverty-alleviation and climate change adaptation and mitigation must coexist as a national response to inequality and poverty (Parnell, 2014). At the same time, the current economic development paths, and therefore the poverty-alleviation approaches, are based on fossil fuels that keep increasing the intensity of GHG emissions. Incorporating the concept of low carbon economy in the development process can lead to more sustainable poverty eradication. Mitigation of climate change could open a window to combat poverty, but this potential has not been really explored (Wlokas et al., 2012).

The adverse effects that climate change has over biodiversity will affect human well-being in many dimensions. For example, food security can be affected globally. The most important crops in the world (over three-quarters) depend on pollination. Climate change, along with other human-induced causes, may reduce the ranges of the pollinators or cause a timing mismatch between them and the crops (FAO-IPCC, 2017). Genetic diversity is an essential resource for humanity, and its loss can have many consequences for food security by reducing the capabilities of developing new crop varieties (Scheffers et al., 2016). The effects of climate change in agricultural productivity can increase the prices of beef, wheat, and maize up to 20%, 90%, and 50% respectively by 2050 (Nelson et al., 2013).

Marine fisheries provide around 17% of the worldwide protein for humanity (Food and Agriculture Organisation [FAO], 2014). For about one billion people in the world, most of them poor and food deficient, fish represents the primary source of animal protein (OECD, 2017). The effects of climate change on the sea and on marine fisheries will have major consequences for our society reducing ours sources of protein. Species that require cold water, and can move, can respond to the warming of water by moving poleward. However, fish and invertebrates that are not able to move to better environmental conditions are in danger of extinction (Nye et al., 2009). At the same time, ocean acidification will directly affect negatively fisheries that depend on coral reefs and shelled molluscs (Nye et al., 2009). For example, coral reefs are projected to decline by a 70-90% at a 1.5°C rise of global temperature, and up to 99% at 2°C (IPCC, 2018). The total marine productivity will also be affected because of morphological shifts, since as a morphological response to the increase in temperature, some species are reducing their sizes (Scheffers et al., 2016).

Climate change will increase the number of extreme weather events, that can have significant effects on public health (Keim, 2008). For example, changes in an ecosystem can increase the seasonality, range, and therefore, the infectivity of some vector-borne diseases (Thomson, 2019). Waterborne disease outbreaks are associated with heavy rainfalls and may raise the risk of foodborne illness (Maibach, Roser-Renouf, & Leiserowitz, 2008).

In another note, in developing countries, agriculture represents a major source of income and can lead to poverty-alleviation (OECD, 2003). Besides the effects that climate change will

have directly in the agricultural sector, it may also inhibit agricultural production through damaged infrastructure, for example, through damages in roads, bridges, storage sites, electricity distribution and irrigation. Preparing the agricultural infrastructure for climatic events is costly, but the cost of inaction would be higher (OECD, 2017). Infrastructure is a crucial component for achieving sustainable development, but not investing in the right type of infrastructure in the next 10-15 years will lock us in a GHG-intensive development path (OECD, 2017).

Carbon sequestration and minimising GHGs can reduce the catastrophic effects of climate change, and therefore decrease the extinction of terrestrial species substantially. The sooner we go back to near pre-industrial global temperatures, the more climate-related extinctions will be prevented (Thomas et al., 2004). To put it differently, biodiversity conservation and climate change mitigation and adaptation can reduce threats to human well-being and can also lead to poverty-alleviation.

2.4 Agenda setting and coherence between the public policy objectives: climate change adaptation, mitigation, poverty-alleviation and biodiversity conservation

In the last decades, many LICs have graduated into MICs, meaning they will gradually receive less international assistance; therefore, their need for policy coherence and for including climate negotiations and financing in their development policies will increase (Sumner, 2012). Poverty reduction requires better coherence in developmental policies (OECD/DAC, 2001). Simultaneously, policy coherence is also critical for balancing the potential trade-offs between poverty-alleviation and for achieving sustainability (OECD, 2017). So is the case in the majority of Latin American countries, which have made relatively little progress in the direction of establishing minimum standards of integration, coherence and coordination of policies in the fiscal and environmental areas (CEPAL, 2003), and the lack of coherence within and between the sectoral programs is a frequent phenomenon (Martínez-Nogueira, 2010).

Climate change is a complex cross-cutting problem, and the root causes of it are embedded across various sectors, such as energy, industry, transport and agriculture. Each of these sectors has different priorities established by distinct actors with different interests, making this a cross-sector problem (Adelle & Russel, 2013). Therefore, the success of climate change mitigation policies depends on how well they are integrated with other sectoral policies (Tosun & Lang, 2017); they are short-sighted if they only include measures from the climate policy field. For avoiding this, adjacent policy areas such as agriculture, energy, environment, economy, transport, trade, and development cooperation should be taken into account (Adelle & Russel, 2013; Tosun & Lang, 2017).

Climate change mitigation represents a big challenge for developing nations, where reducing poverty and inequality is a priority (Wlokas et al., 2012). If sectors other than the environmental do not accept climate change, it is not possible to understand inequalities (Latour, 2018). Economic development in the current development paths, based on fossil fuels advances, means an increase in the GHG emissions intensity (IPCC, 2018). This trade-off between climate change mitigation and economic development is a critical issue in international negotiations. In developing countries, that cannot afford to ignore possible synergies, the actions for climate change mitigation must be aligned with developmental goals and policies (Wlokas et al., 2012).

In most of the Latin American countries, the development of public policies on environmental matters entered late the governmental agenda. Consequently, in most of these countries, there is a lack of coherence between the objectives of the environmental policies and the objectives of the rest of the macro policies and sectoral programs (CEPAL, 2003). In developing countries, it is rare to find policy coherence studies regarding climate change adaptation (Nilsson et al., 2012; Gomar et al., 2014; Ranabhat et al., 2018). Policy coherence is crucial for dealing with the competition for resources such as land or water, among sectors, and for assessing if the overall demand for satisfying the sectoral objectives is sustainable (OECD, 2017). As Roe mentioned in 2008 (p.500), “after more than 50 years of debate, climate change may, therefore, be the glue that binds the conservation and development communities together and invigorates a time-pressured search for sustainable solutions”.

At the same time, adapting to climate change requires policies for better water management techniques, the introduction of new crop varieties, for infrastructure improvements, development policies focused on social inclusion, reducing inequalities, that are centred on ecosystem management (UNESA, 2016). Even more, if the responses of biodiversity to climate change are not included in decision-making and strategic frameworks, many adverse effects will not be adequately mitigated or minimised (Pecl et al., 2017). Measures for reducing vulnerability to climate change are more effective if they are part of long-term transformative strategies that embrace coherent policies across the social, environmental, and economic dimensions of sustainable development (UNESA, 2016).

2.5 Empirical relevance of policy coherence in Mexico

The term policy coherence was first introduced by the Organisation for Economic Co-operation and Development (OECD) and it revolved around the Sustainable Development Goals (Tosun & Lang, 2017). Therefore, the literature concerning to policy coherence is many times focused on the field of development cooperation (e.g. Fukasaku et al., 2005; Carbone, 2008; Siitonen, 2016; Nilsson, Griggs & Visbeck, 2016; Nilsson et al., 2018; Fourie, 2018; OECD/DAC, 2001; OECD, 2003; 2015; 2016; 2017; 2018).

Other studies that analyse policy coherence are usually focused on one topic, for example biogas (Huttunen, Kivimaa, & Virkamäki, 2014), the economic sector (Careja, 2011), the agricultural sector (Jardan & Halpin, 2006), fisheries subsidies (Mallory, 2016), land allocation (Harahap, Silveira, & Khatiwada, 2017) or arctic policy (May et al., 2005). Some others analyse one topic and its relation to other policy areas, for example, energy security in environmental policies (Selianko & Lenschow, 2015), energy efficiency and GHG reduction (Skovgaard, 2018), renewable energy and environmental policy areas such as biodiversity, habitats, resource efficiency and water (Nilsson et al., 2012), energy and environmental policies (Kurze & Lenschow, 2018), climate change adaptation and the forestry sector (Ranabhat et al., 2918). Some target more than one policy component, for example, Papadopoulou et al., (2020) see the relations between water, land, energy, food and climate and Di Gregorio et al. (2017) look at the linkages between climate change adaptation, mitigation, and development, in the land-use sector. Most of these studies are focused on the

European Union, and they only analyse documents and policy objectives directly related to that component. Up to the present time, no studies have analysed the coherence between the policy components climate change mitigation, climate change adaptation, poverty-alleviation, and biodiversity conservation.

Mexico covers all the areas of interest for the study of coherence between social and environmental policy in the policy components poverty-alleviation, climate change and biodiversity conservation. It is a middle-income country with high levels of poverty and inequality (Hernandez-Trillo, 2016; CONEVAL, 2019; Székely, 2011). It is also a megadiverse country, the high levels of endemism and species richness make it the fourth most biodiverse country in the world (Sarukhán et al., 2017). Natural resources played an important role in the development of Mexico (OECD, 2013). Mexico is a semi-industrialised, highly fossil-fuel dependent and high GHG emitter, at the same time, it has been recognised for being a leading developing country regarding climate change policies (Gobierno de México, 2018; ENCC, 2013; CAT, n.d.).

2.5.1 Policy coherence in Mexico

In Mexico, the practice of making long-term visions and formulating development and government plans persists at the federal and state levels. In recent years the importance of the coherence and complementarity between reforms and public policies has been recognised by the government (e.g. Presidencia de México, 2016). Mexico's legislation requires the elaboration of development plans at different levels of the government. The NDP, developed by the Presidential Office each presidential period is the main planning instrument of Mexico. The sectoral programs, developed by the Secretariats of the State, are the second highest level of national planning (Gobierno de la República, 2013; SHCP, 2013b).

According to Martínez-Nogueira (2010), Mexico has instruments in place that can help achieve coherence and coordination, such as long-term vision, planning, and institutionalised result-based management and evaluations. On the contrary, Cejudo & Michel (2016) say that even management mechanisms that look at more than one public policy (planning, coordination, evaluation) are not useful for improving coherence between policies, and that

Mexico has no instruments that can achieve or identify coherence between policies or between policy domains.

In the last presidential period (2013-2018) an administrative tool, strategic planning, was introduced for improving the general performance of the government organisations by ensuring that the members would share the same objectives. The *Technical Guide for the Elaboration of the Programs Derived from the NDP 2013-2018* pursues policy coherence by verifying that each objective of each program is properly aligned to the NDP and that no NDP objective is unattended by the strategies and lines of action (SHCP,2013b). The National Planning Law, last updated in 2018, has a similar approach, stating that the objectives of the programs derived from the NDP must be aligned with its NDP's strategies, but it does not mention the concept policy or program coherence.

2.5.2 Poverty in Mexico

Until 2002 there were no official poverty statistics available in Mexico. Perhaps because before then, the country had been governed by the same political party for over 60 years, and it made no sense for them to generate evidence of such unacceptable high poverty rates (Székely, 2011). Nowadays, the multidimensional definition of poverty is used for measuring it; it includes economic wellness and social rights; the social rights considered are education, social security, health, food security, and housing and services (CONEVAL, 2018).

It is estimated that since 1968 extreme poverty has declined. This decline was due mostly to a high rate of growth through industrialisation. The first official estimate of poverty in Mexico revealed that 53.8% of the population lived in poverty in the year 2000 (Székely, 2011). Before then, estimations suggest that the high rate of industrialisation between 1950-1970 created a good number of jobs, reducing the percentages of extreme poverty to approximately 20%, and of moderate poverty to 50% of the population (Hernandez-Trillo, 2016). Between 2008 and 2018, the percentage of people in poverty reduced from 44.4% to 41.9%; however, the number of people in poverty increased, from 49.5 to 52.4 million. People under extreme poverty reduced from 12.3 to 9.3 million in that same period, representing a decrease of 11% to 7.6% (CONEVAL, 2019). Since the early 2000s inequality

started to decline in most Latin-American countries, nevertheless, this has not been the case for Mexico (Székely & Mendoza, 2017).

As a strategy for combating poverty, many conditional cash transfer programs have been implemented. For example, in 1997, the antipoverty program *Progresa* focused on enhancing children's attendance in school and getting preventive health care. In 2000 its name changed to *Oportunidades,* and in 2012 it was renamed *Prospera* (Parker & Todd, 2017). In 1998 the Contributions Fund for Social Infrastructure (*FAIS*, in Spanish) started. It is a program for financing social infrastructure that directly benefits the population living in extreme poverty, and the locations with a high or very high level of social backwardness (Parker & Todd, 2017). Both programs belong to the Secretariat of Social Development. The program *Prospera* absorbs 55% of the budget allocated towards poverty-alleviation; *FAIS* absorbs 45% (Hernandez-Trillo, 2016).

However, poverty-alleviation is only a fragment of the wide-ranging social policy. Education and health are not strictly categorised as poverty relief programs, but they directly affect poverty levels and account for approximately 80% of the total federal government budget. Among the health-related programs, the most important is the *Seguro Popular* (People's Health Insurance), introduced in 2003, and covers the more than 60% non-insured population. The programs *FAIS*, *Progresa* and *Seguro Popular*, account for 95% of budgetary resources assigned to social programs (Hernandez-Trillo, 2016).

From 1992 to 2012 the public expenditure on social development augmented by almost 75%, and the number of social programs increased accordingly from 89 in 2004 to 273 in 2012 (Cejudo & Michel, 2017; Hernandez-Trillo, 2016). Despite these efforts, the percentage of people in poverty has remained almost the same (CONEVAL, 2015).

In the last two decades, social policy evolved in Mexico towards better-designed programs that are subject to strict evaluations (Pérez, Maldonado, & Hernández, 2015; CONEVAL, 2019). However, government agencies still work separately without sharing information, and programs are redundant, executing the same actions, having the same objectives, and targeting the same population (ASF, 2013; Cejudo & Michel, 2017).

2.5.3 Biodiversity in Mexico

Mexico is home to 10-12% of the biodiversity of the world, holding over 200 000 species (OECD, 2013), it is the fourth most diverse country in the world (Sarukhán et al., 2017). It ranks second place in mammal and reptile biodiversity, and fourth in amphibians and flora (Sarukhán et al., 2017; OECD, 2013). It is also the place of origin and diversification of many crops (OECD, 2013). The exploitation of natural resources has been crucial to Mexico's development. The importance of conserving the biodiversity of Mexico is also of global importance. However, socio-economic challenges such as population growth and rapid urbanisation are increasing the pressure on it. Loss and degradation of ecosystems is the primary threat to biodiversity, followed by overexploitation, and invasive species (OECD, 2013; SEMARNAT, 2013).

Mexico is part of international agreements, such as the Convention on Biological Diversity (CBD), and in an effort to fulfil its commitments, in 2000 published the first National Strategy on Biodiversity, that also contributes to the commitment with the Aichi Biodiversity Targets, and the Sustainable Development Goals. In 2016 the new National Strategy on Biodiversity of Mexico (ENBioMex) and the Plan of Action 2016-2030 were published (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad [CONABIO], 2016). At the institutional level, the most responsible entity for the environment, including biodiversity, is the Secretariat of the Environment and Natural Resources (SEMARNAT) (OECD, 2013).

Policy instruments in the environmental sector are not enough for achieving the conservation and sustainable use of biodiversity. It is essential to reform policies in the sectors that threaten biodiversity. Some of these sectors are tourism, energy, fisheries and agriculture (OECD, 2013).

A good example of incoherence between environmental and development programs in Mexico is in the agricultural sector, where the support given to farmers contributes to the intensification of agricultural production, and therefore to deforestation (OECD, 2013). Another example is the program *Progresa-Oportunidades* that has augmented deforestation

through increasing the consumption of resource-intensive products and lacks a welfare analysis that includes environmental impacts (Alix-Garcia et al., 2013).

2.5.4 Climate change in Mexico

In Mexico, climate change has been experienced with unprecedented and unexpected climatic phenomena. For example, 2009 saw the worst drought registered in the last 60 years, while 2010 was the wettest year in the record. In 2011 there were atypical and intense frosts. A global increase of 6% in the average temperature is expected in the country (SAGARPA, 2013). Mexico is highly susceptible to hydrometeorological events due to its geographic location (Monterroso & Conde, 2015).

Nonetheless, Mexico was the 12th highest CO_2 emitter in the world, reaching 477 $MtCO_2$ in 2018 (Global Carbon Atlas, n.d.). Energy generation is the primary emitter, followed by agriculture, and waste management in the third place (Climate Watch, n.d.). It is the highest emitter in Latin America, but also has been a leading country regarding climate change policies. In 2008 Mexico created the Climate Change National System, and in 2009 adopted its first Special Program on Climate Change. In 2012 the country developed a General Law on Climate Change (LGCC (in Spanish)), it was a remarkable achievement, being one of the first climate laws in the world, and the first developing country to enact it. In 2013 the National Strategy on Climate Change was published. In 2014 the country also imposed a carbon tax and defined the goal of obtaining 35% of its energy from renewable sources by 2024 (Ortega & Casamadrid, 2018). At the beginning of 2018, Mexico also established an Intersecretarial Climate Change Commission to coordinate actions between the Federal Public Administration Departments. Mexico also follows international agreements like the Mid-Century Strategy, the Paris Agreement, and the 2030 Agenda (Gobierno de México, 2018; ENCC, 2013; CAT, n.d.). The National Climate Change Strategy emphasises the inclusion of the poor and vulnerable when developing climate change mitigation policies. Climate change mitigation is also considered in Mexico's NDP, being mentioned in three out of five main objectives (ENCC, 2013; Mahachi, 2018), while climate change adaptation is mentioned in only one of the main objectives (Gobierno de la República, 2013).

2.6 Summary: The research gap

The literature review showed that complex problems, such as climate change, poverty, and biodiversity conservation, need responses from numerous policies. Even if the policies attending these problems belong to different policy domains, they interact and can hinder or enhance each other. Policy coherence can increase the probability of adequately addressing these complex problems. This study is the first one that addresses policy coherence between climate change, biodiversity conservation, and poverty-alleviation. The studies that address one or maybe two of these components, analyse documents from only one policy domain.

Despite the fact that achieving policy coherence could be more important for developing countries that lack of enough resources for addressing all their public problems, much of the empirical literature on policy coherence is focused on the European Union or European countries; there are only few studies focusing on the Global South (e.g. Selianko & Lenschow, 2015; Di Gregorio et al., 2017; Skovgaard, 2018; Papadopoulou et al., 2020; May et al., 2005; Huttunen, Kivimaa, & Virkamäki, 2014; Harahap, Silveira, & Khatiwada, 2017; Ranabhat et al., 2018; Siitonen, 2016; Fukasaku et al., 2005; Fourie, 2018; Nilsson et al., 2012, 2018) and with only a few exceptions (e.g. Cejudo & Michel, 2016;2017) there are almost no studies on policy coherence in Mexico.

The lack of an effective way to operationalize and measure coherence between policies and between policy domains has been recognised as a complication for analysing policy coherence (May, Sapotichne & Workman, 2006). Policy coherence has hardly gotten any attention in the discourse analysis research (with few exceptions such as Thede (2013), Selianko & Lenschow (2015), and Kurze & Lenschow (2018)), this study proposes using discourse network analysis for operationalising and measuring coherence.

This study, to the knowledge of the author, is the first one on policy coherence between climate change, biodiversity conservation and poverty-alleviation that includes all the policy domains in the governmental agenda of a country. The study performed a discourse network analysis examining the objectives of the NDP and all sectoral programs of Mexico and delivered results that can be used as a guide for improving the design of policies in the future.

2.7 Coherence, objectives and policy centrality: a conceptual framework

This section presents a conceptual framework for the analysis of the coherence between the objectives of the National Development Plan and the sectoral programs of Mexico with a particular focus on the policy components: *climate change adaptation* and *mitigation*, *poverty-alleviation*, and *biodiversity conservation*.

The framework builds on the chosen definition of policy coherence: "various components of policies correspond because they share a set of ideas or objectives" (May et al., 2005:37). This study focuses on the coherence between the objectives of the policy documents, that according to Martínez-Nogueira (2010), are the critical parameters for the evaluation of policy coherence. The analysis is based on the design of the policies, without including the implementation. Since the documents analysed come from two different levels of the government, it was possible to analyse vertical and horizontal coherence.

The first step was to determine what was on the governmental agenda, defined by Kingdon (2014:196), as "a list of subjects to which officials are paying some serious attention at any given time". This means determining which policy problems made it through the agenda-setting process, becoming policy components integrated into the governmental agenda at the two highest levels of national planning: The National Development Plan, and the sectoral programs.

Policy components are policy issue areas that can vary over time and across nations (May et al., 2005). For determining which policy components constitute the governmental agenda, a qualitative content analysis of the objectives of each policy document was carried out. The information was coded using the discourse network analysis method, allowing to find patterns between the extensive number of objectives in the documents (explained further in chapter 3). Policy components corresponding between different policies was interpreted as policy coherence (Figure 1).

For analysing how dominant each policy component was within each sectoral program and the NDP, the concept of policy centrality was used. It describes the extent to which a given policy component is represented in the overarching policy of interest (May et al., 2005). Their

scale of policy centrality was adapted as follows: Components that constitute 67 to 100% of the policy are referred to as *key features*; if they constitute 50 to 66% of the policy, *important features*; if they constitute 26 to 49% of the policy, *intermediate feature*, and *limited feature* if they constitute 1 to 25% of the policy.

Fig. 1. Conceptual Framework

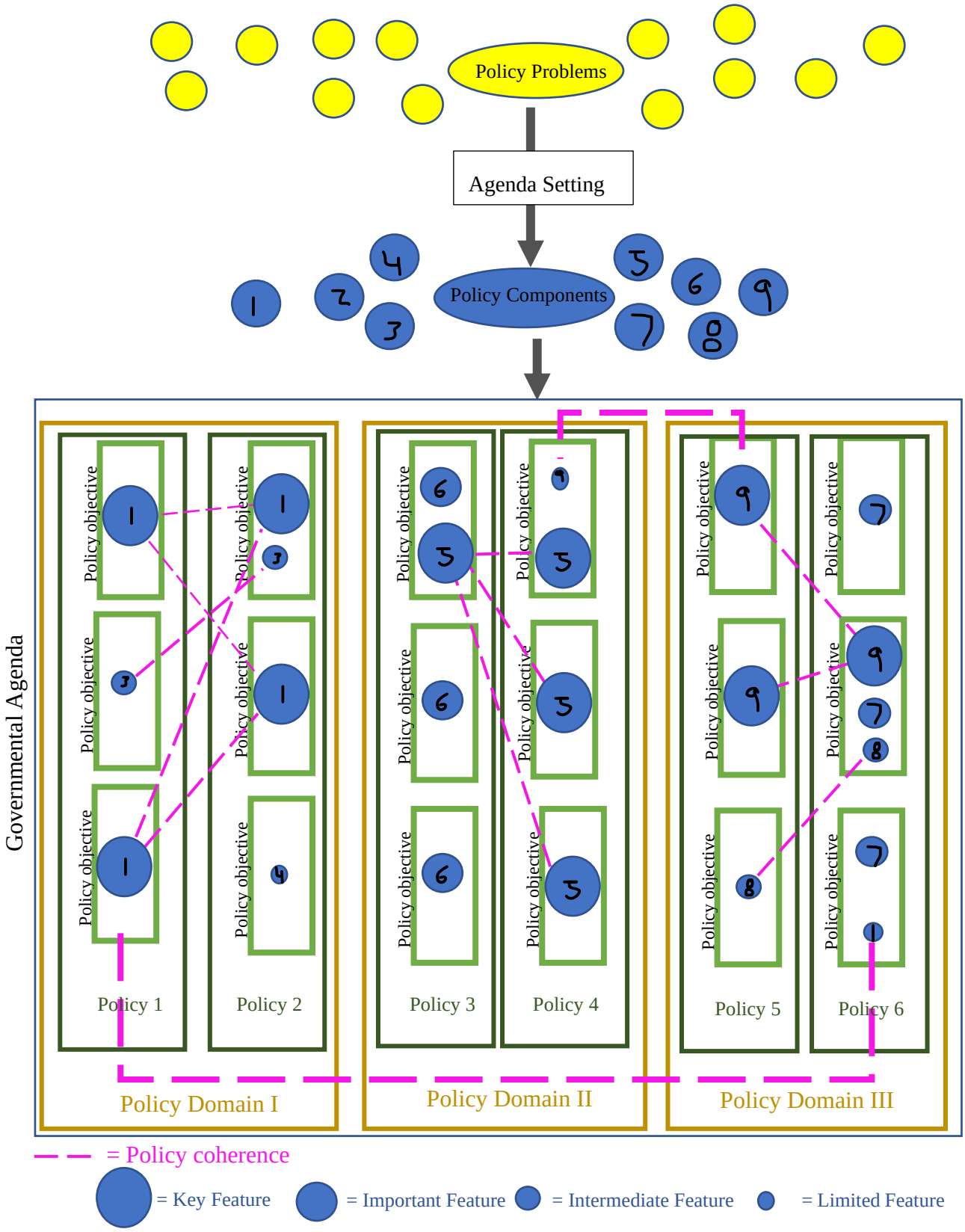


Figure 1 summarises the relationships between policy problems and agenda setting of policy components. Not all the public problems (yellow circles) can be attended, therefore, the agenda-setting process takes place to determine which public problems will become policy components (blue circles) and be considered in the governmental agenda (blue square). The governmental agenda contains different policies (black squares), that according to the topics they speak to, can be grouped in policy domains (orange squares). Policies express their intentions in their objectives (green squares), that express which policy component they are trying to attend. The more a policy component is represented within the objectives of a policy, the bigger its policy centrality, which is represented by the size of the blue circles, going from key features (or key elements) to limited features. Policy coherence (pink dotted line), represents policy components that correspond between different objectives of different policies or policy domains. Source: Author

Chapter 3: Research Design and Method

3.1 Introduction

This chapter presents the research design, presenting some concepts related to the discourse network analysis method. It presents a brief description of the country selected for the single case study, and how the data was selected and analysed. The chapter later describes the method used to address the objectives of this study and presents the limitations.

3.2 Research design

This research relied on a single case study using discourse network analysis techniques for extracting the qualitative content of Mexico's NDP and sectoral programs for mapping the connections between the secretariats and between the policy components. A case study allows to investigate and understand the depth of the research problem, in this case, to understand the bigger picture, that is necessary for adequately analysing policy coherence (Danaeefard, Ahmadi, & Pourezzat, 2019). The scope of the study is purely normative, based on the design of the policies, without considering their implementation.

Discourse network analysis uses a combination of qualitative, category-based content analysis and network analysis. It allows to systematically measure actors' discourses using text sources (Leifeld, 2020). It is a versatile methodological approach that can help describe the topography or structures of political discourses (Leifeld, 2017). Discursive structure refers to a written or spoken discourse that is ideologically lade (Unvar & Rahimi, 2013).

In the first step, the qualitative content analysis, the statements found in the selected documents are annotated, and a code is assigned to similar thought units in the text (Leifeld, 2017; Muller, 2015). This coding process can be deductive, when the codes are established prior to coding deduced from a theoretical framework, or inductive, when the codes emerge from the text being analysed (Muller, 2015). In this study, the qualitative content analysis was inductive, allowing to define the policy components and determine what was on the governmental agenda. According to Leifeld (2017), statements can be coded into four different types of codes. The first one is *actors*, referring to the person or organization who

makes the statement. The second one is *concepts,* which represent an abstract of the contents in the statements. The third one is the *agreement relation*, which can be "positive" if the actor states the concept in an affirmatory way or "negative" if the actor uses a negative connotation of the concept or rejects it. The fourth one is the *time* at which the statement was made.

In the second step the coded information is analysed using network analysis methods. In this thesis the data will be transformed into four types of networks: *affiliation networks*, *actor congruence networks*, *actor conflict networks*, and *concept networks*, as described by Leifeld (2010; 2017), Mueller (2015), and Leifeld & Haunss (2010). Figure 2 shows a simplified illustration of these types of networks.

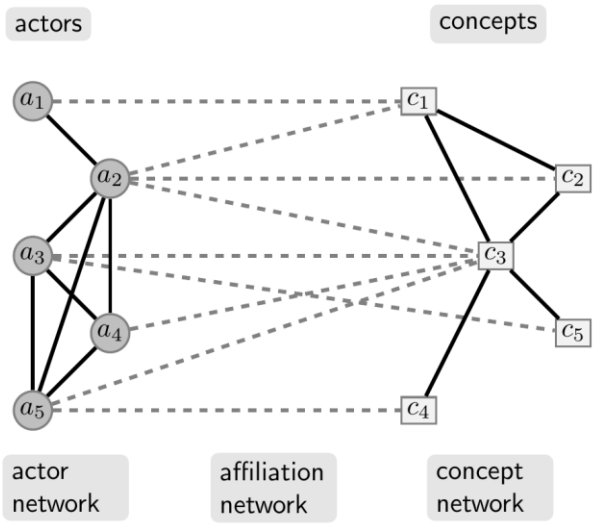
For building the discourse network structure, first an *affiliation matrix* is created. In this matrix the rows represent the actors and the columns represent the concepts extracted through the qualitative content analysis. When an actor agrees to a certain concept, the corresponding cell in the matrix is assigned a value of 1. If an actor explicitly disagrees with a certain concept, a value of -1 is registered in the corresponding cell (Mueller, 2015). From the *affiliation matrix* an *affiliation network* can be built, which allows to identify discursive relationships between actors that emerge when they use the same arguments or topics in their statements (Rennkamp, 2017).

The *affiliation network* can be transformed into an *actor congruence network* using the number of common statements or concepts between two actors as a measure of their discursive similarity (Leifeld & Haunss, 2012). A link is created if two actors share a concept in a positive way, or if they both share a concept in a negative way (Leifeld / Haunss, 2010). The number of common statements is obtained through an actor co-occurrence matrix, where both, rows and columns, are the actors, and the values in the cells correspond to the number of shared concepts between each pair of actors (Muller, 2015). The link between the actors becomes stronger when the number of shared concepts increases (Leifeld & Haunss, 2010). Actors sharing large quantities of concepts arguably identify more with each other than actors sharing fewer concepts (Muller, 2015). The actors that share large quantities of concepts are recognised as *discourse coalitions*, defined as groups of actors that share a common discourse (Hajer, 1993). In the same way an *actor conflict networks* represents the antagonistic relations

between actors; links between actors are created based on disagreement between actors (Leifeld, 2010). In this thesis the actor conflict network was interpreted as policy incoherence.

In the *concept network* a pair of concepts are connected by links when they are used by the same actor. The edge weight between two concepts represents the number of actors referring to both concepts (Leifeld & Haunss, 2010). For creating this network, a concept co-occurrence matrix is used, where both the rows and the columns represent the concepts, and the corresponding cell is given a value of 1 when a pair of concepts are attributed to an actor (Muller, 2015).

Fig. 2. Discourse network model



Source: Leifeld & Haunss, 2010; Leifeld, 2017.

While classical qualitative text analytical methods are appropriate for analysing small numbers of actors and statements, discourse network analysis can capture complex patterns of discursive interactions and provides the appropriate relational analytical tools for a large number of statements made by many actors (Rennkamp et al., 2017), as is the case in this thesis. Some disadvantages are that this method requires a lot of manual coding before an empirical case can be analysed and it does not analyse the causality of the discourse (Leifeld, 2010). However, it is a tool that permits to reduce that political discourse complexity to a degree that is interpretable by the researcher (Leifeld, 2010). It allows to see the overall topography of the discourse on the concept level, the actor level, and on a combined display

(Leifeld & Haunss, 2010). It visually reveals how single actors or concepts are embedded in the political discourse (Leifeld, 2010) and is more formal than most other approaches that deal with policy discourse (Leifeld & Haunss, 2012).

The qualitative content analysis also included a search for concepts related to policy coherence, annotated the intention of each policy program to be related to another program, either in their objectives or in the introduction of each program, and annotated statements related to climate change adaptation, climate change mitigation, biodiversity conservation, and poverty-alleviation.

3.2.1 Case study: Mexico

Mexico was selected as a single case study because it shows all the phenomena relevant to the study, as it has already been discussed in section 2.5. It is the fourth most biodiverse country in the world (Sarukhán et al., 2017), highly fossil-fuel dependent and GHG emitter (12^{th} highest GHG emitter, CAT, n.d.) country with high levels of poverty (Székely, 2011; Hernandez-Trillo, 2016). It has also been internationally recognised for being a leader regarding climate change policies among the developing countries (Gobierno de México, 2018; ENCC, 2013).

Mexico follows the practice of developing long-term visions, and its legislation requires the elaboration of development and government plans (Martínez-Nogueira, 2010). In the last presidential period, the government introduced the administrative tool ‘strategic planning’ for improving the performance of the government organisations, for ensuring that all the members of the government would share the same objectives. The *Technical Guide for the Elaboration of the Programs Derived from the NDP 2013-2018* explicitly pursues policy coherence and states the way to achieve it (SHCP, 2013b).

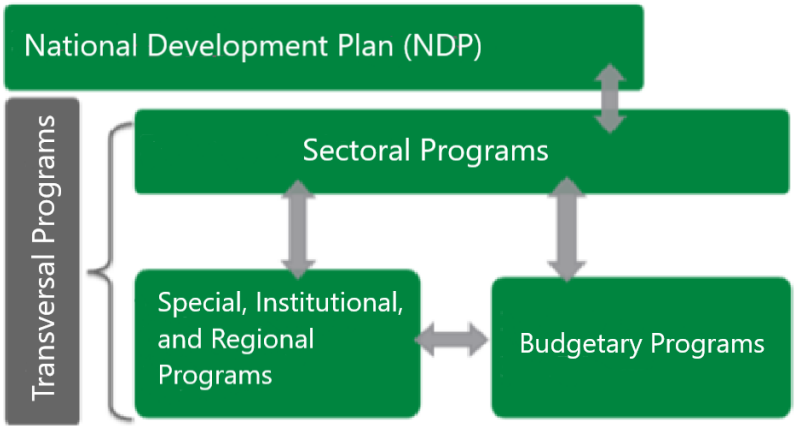
3.2.2 Data sources and selection

Mexico has different levels of national planning, which are central for defining from the broadest national goals, up to the most detailed level of implementation. The documents analysed in this study are the two highest levels of national planning, the NDP, and the sectoral programs derived from it. The NDP is the main planning instrument of the country.

It specifies the national goals to be achieved by means of government actions and governs the actions of all the agencies and entities of the Federal Public Administration (SHCP, 2013b). The NDP outlines the main objectives of the country's public policies, establishes specific actions to achieve them, and describes indicators for measuring the progress made (Gobierno de la República, 2013).

The sectoral programs, the second-highest level of national planning, are derived from the NDP (Figure 3). Each sectoral program corresponds to a Secretariat of the State. By the end of the last presidential period in Mexico (2013-2018), when this study started, there were 18 Secretariats of the State, but two of them did not have a sectoral program. The Secretariat of Culture was formerly known as the National Council for Culture and Arts and was elevated to a secretariat by the end of 2015. The Secretariat of the Civil Service (SFP) stayed inactive in the first years of the 2013-2018 presidential period because the government failed to allocate a secretary. The sectoral programs are developed in the first two years of each presidential period, and these two secretariats were activated after that, which explains why they did not have a sectoral program. Table 1 presents the 18 Secretariats of the State, their acronyms in Spanish, and their corresponding sectoral program. All of these programs are of public access and can be easily found on the web.

Fig. 3. Relation of the programs derived from the NDP 2013-2018



Source: SHCP 2013b

Table 1. Secretariats of the State of Mexico and their sectoral programs

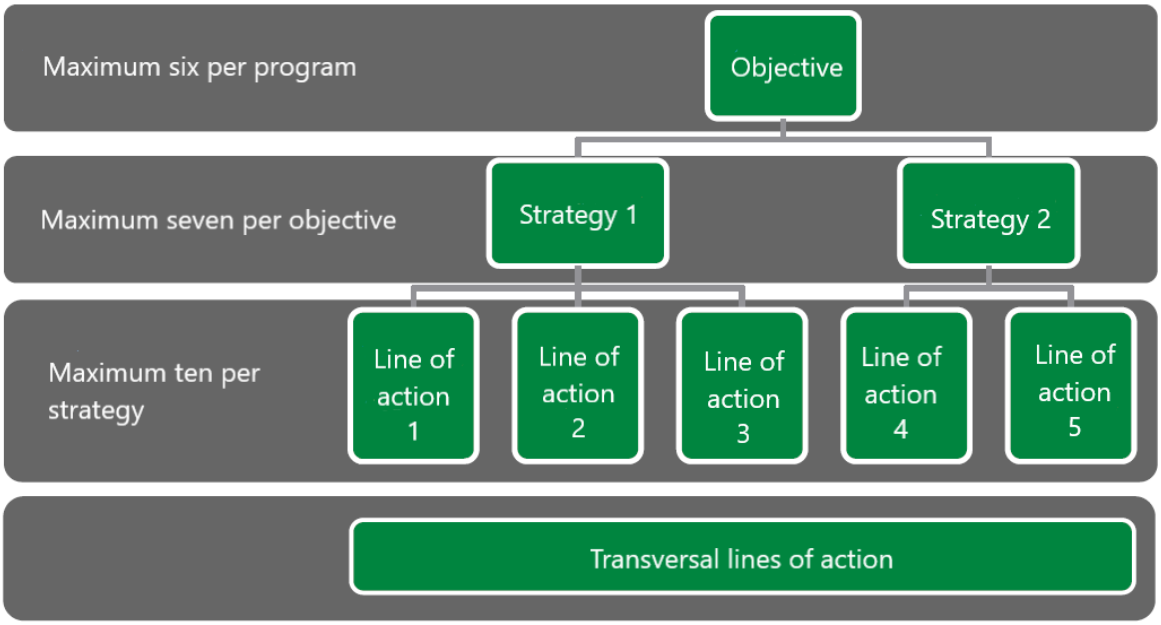
Secretariat of the State	Acronym	Sectoral program
Secretariat of Economy	SE	Innovative Development Program
Secretariat of Finance and Public Credit	SHCP	Development Financing National Program
Secretariat of National Defence	SEDENA	National Defence Sector Program
Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food	SAGARPA	Agricultural, Fishing and Food Development Sector Program
Secretariat of Energy	SENER	Energy Sector Program
Secretariat of Navy	SEMAR	Navi Sector Program
Secretariat of Foreign Affairs	SRE	Foreign Affairs Sector Program
Secretariat of Health	SALUD	Health Sector Program
Secretariat of Communications and Transportation	SCT	Communications and Transportation Sector Program
Secretariat of Agrarian, Land and Urban Development	SEDATU	Agrarian, Land and Urban Development Sector Program
Secretariat of Social Development	SEDESOL	Social Development Sector Program
Secretariat of the Interior	SEGOB	Governance Sector Program
Secretariat of the Environment and Natural Resources	SEMARNAT	Environment and Natural Resources Sector Program
Secretariat of Public Education	SEP	Education Sector Program
Secretariat of Labour and Social Welfare	STPS	Labour and Social Welfare Sector Program
Secretariat of Tourism	SECTUR	Tourism Sector Program
Secretariat of the Civil Service	SFP	
Secretariat of Culture	CULTURA	

Source: Adapted from the National Development Plan (2013-2018)

The government actions in the NDP and the Sectoral programs are defined in objectives, strategies and lines of action (Figure 4). The objectives describe the fundamental reasons for government action without specifying the particular mechanisms to achieve them and are divided into strategies. The strategies refer to a set of actions to achieve a specific objective. Finally, strategies are divided into lines of action, which are the most concrete expression of how the Government of the Republic intends to achieve the proposed goals (Gobierno de la República, 2013). The data used in this study consisted of the objectives of the NDP and the Sectoral programs, that according to Martínez-Nogueira (2010) are critical parameters for the evaluation of policy coherence. The policy components found in the strategies and lines

of action were coded under their corresponding objective to avoid biases related to the different number of lines of action between the sectoral programs.

Fig. 4. General structure of the programs derived from the NDP



Source: SHCP (2013b)

The NDP also presents three transversal strategies that are meant to be considered in all the sectoral, institutional, regional, and special programs (see Figure 3 and Figure 4). Three transversal programs were published:

- Program for Democratizing Productivity (PDP).
- National Transversal Program for Equal Opportunities and Non-Discrimination against Women (PROIGUALDAD).
- Program for a Near and Modern Government (PGCM).

All the sectoral, institutional, regional, and special programs have a section of "transversal strategies". However, these transversal strategies are only focused on achieving the goals of the three transversal programs, do not reflect joint action towards other goals, and are redundant with the objectives of the main part of each sectoral program. For these reasons, it was decided that the section of "transversal strategies" of each policy document was not included in this study.

3.3 Data analysis

For using the discourse network analysis to analyse coherence between the objectives of the NDP and the sectoral programs of Mexico the following assumptions took place. Each sectoral program corresponds to a secretariat; therefore, the programs can be interpreted as the discourse, while the secretariats are the actors; so is the case of the NDP, that corresponds to the Presidential Office. The 31 objectives, 118 strategies, and 819 lines of action of the NDP and the 85 objectives, 430 strategies, and 2585 lines of action of the sectoral programs are the statements that were coded using inductive coding.

The strategies and lines of action were coded under their corresponding objective. This was decided because the different policy documents have different numbers of objectives, strategies, and lines of action, which would affect the weight of a concept in the program; as it was explained in section 3.2, the number of times a code is logged is very important for structuring a discourse network. The coding and analysis were undertaken using the Atlas.ti, a software specialized on the qualitative analysis of large bodies of graphical, textual, video, or audio data.

3.3.1 What is on the governmental agenda?

A qualitative content analysis of the116 objectives, 548 strategies, and 3401 lines of action of the NDP and the 16 sectoral programs was conducted to define the policy components comprised in the governmental agenda.

The components of interest to this study were *climate change mitigation*, *climate change adaptation*, *poverty-alleviation*, and *biodiversity conservation*, so more detail was allowed for the components related to those concepts compared to the others. For example, agricultural biodiversity is considered a different component than biodiversity conservation, and renewable energy, energy efficiency, and hydrocarbons were coded separately from the component energy. However, all the policy components found in the data were coded and considered in the analysis. In relation to the conceptual framework (section 2.7), this part of the analysis allowed to determine which policy components are in the governmental agenda,

which implies that they were policy problems that received attention enough to make it through the agenda-setting process and become policy components.

For facilitating the discussion of frequency of the components in each policy document, the notion and scale of *policy centrality* by May et al. (2005), was used. Policy centrality was used to assess the importance of each policy component within the sectoral programs. The scale is based on the percentage of objectives within each program that address each component. Since the number of objectives in the sectoral programs can be as low as four, the scale was adapted as follows:

- *Key Feature*: 67 to 100% of the objectives of the program address the component
- *Important Feature*: 50 to 66% of the objectives of the program address the component
- *Intermediate Feature*: 26 to 49% of the objectives of the program address the component
- *Limited Feature*: 1 to 25% of the objectives of the program address the component

Conceptual clarity is essential for assuring that the concepts reflect their intended meaning (Cejudo & Michel, 2017). For this reason, the NDP and sectoral programs were assessed to determine if any definition or notion of coherence is presented. The qualitative assessment also registered to which objectives of the NDP the sectoral programs intended to be aligned and looked for any discussion about climate change, poverty-alleviation, or biodiversity conservation.

3.3.2 Notion of coherence within the NDP and the sectoral programs

The qualitative content analysis included a search for concepts related to policy coherence in the NDP and the sectoral programs. Even though it is beyond the scope of this study to analyse the effects of conceptual clarity regarding policy coherence, it was considered that determining if and where such conceptual clarity exists (or does not exist) would be a step forward in improving the efforts towards achieving policy coherence.

3.3.3 Vertical coherence

As mentioned in section 2.2.2., vertical coherence means that there is coherence between different levels of the government (Geerlings & Stead, 2003). The NDP represents the discourse of the Presidential Office, while the sectoral programs represent the discourse of the Secretariats of the State; they belong to different levels of the government, therefore, it was possible to analyse vertical coherence.

The method for evaluating vertical coherence was based on the approach stated in the *Technical guide for the elaboration of the programs derived from the NDP 2013-2018.* This guide states that coherence can be achieved by verifying that each objective of each program is adequately linked to the NDP, and that no objective of the NDP is unattended by the sum of objectives of the other programs (SHCP, 2013b).

The introduction of each sectoral program indicates to which of the objectives and national goals of the NDP the program will be aligned; as previously mentioned, this was annotated during the qualitative content analysis.

Using the coded information, an affiliation matrix was created to determine the discursive structure of the actors. When an objective of a sectoral program worked towards a policy component, a value of 1 was assigned in the corresponding cell. If the achievement of an objective would work against a policy component, a value of -1 was registered in the corresponding cell. According to Fukasaku et al. (2005) policy coherence refers to objectives of one policy getting undermined or obstructed by actions of the government in other policies. Therefore, any negative value found in the affiliation matrix would be interpreted as policy incoherence. The affiliation matrix and the affiliation network created from it were used to verify if the policy components of the sectoral programs corresponded to the components of the NDP and if any policy component of the NDP was left unattended by the sectoral programs.

3.3.4 Horizontal coherence

Horizontal coherence was analysed in different ways. With the qualitative content analysis, a record was taken of the sectoral programs that mention the collaboration with other

secretariats. The affiliation matrix was used to determine if the intention of collaboration was corresponded by the other secretariats. An affiliation network was created to show the relations between the secretariats and the policy components.

For determining coherence, an actor co-occurrence matrix and an actor congruence network were created. The more two secretariats co-supported the same policy component, the larger the link between them. The highest values of co-occurrence between actors are recognised as discourse coalitions and interpreted as a high level of policy coherence. For discussing the level of coherence between the secretariats (and between the policy components) the three levels of policy coherence presented by Cejudo & Michel (2017) are used. Low policy coherence refers to policies that can act simultaneously without obstructing each other, but do not complement each other for solving the same policy problem. Medium policy coherence makes reference to policies that by their design they complement each other but still leave gaps in addressing the policy problem. High policy coherence refers to policies that by their design, they can completely address the policy problem.

3.3.5 Coherence between the policy components: climate change adaptation, climate change mitigation, poverty-alleviation, and biodiversity conservation

Coherence between the policy components *climate change adaptation*, *climate change mitigation*, *poverty-alleviation*, and *biodiversity conservation* was analysed in different ways. First, with an affiliation network that included only these four components and allowed to determine which secretariats consider them in their discourse. From this affiliation network, an actor congruence network was created to look for discourse coalitions around the four components of interest.

The coded information also allowed to look at the coherence between the main policy components at a deeper level analysing the concept co-occurrence and building a concept network. A second affiliation network regarding only the four components was created, it included the information of the objectives where the components co-occur, which allowed to

see when one objective of a program contains more than one of the policy components of interest.

3.4 Limitations of the research

The selection of the four policy components of interest for this study (*climate change adaptation*, *climate change mitigation*, *poverty-alleviation*, and *biodiversity conservation*) was predefined by the author. There is likely to be coherence or conflict between other policy components, (e.g. infrastructure, health, economy, education etc.), however, not all the policy components were analysed with detail (e.g. through a concept congruence network) because of the limitations of scope. The output of the discourse analysis could be used to analyse coherence between other policy components in the future.

This analysis is a static recording of the state of the policy documents in the presidential period 2013-2018. It could not reflect the dynamics in the policy process over time, which again can be another entry for further research.

Chapter 4: Results and Discussion

4.1 Introduction

This chapter presents the analysis of agenda setting and policy coherence between Mexico's NDP and sectoral programs. The first part presents the discursive structure of the NDP and the programs. The next section explores the notion of policy coherence on each program. The third part presents the results of the analysis for vertical and for horizontal coherence, applying the conceptual framework introduced in section 2.7. By the end, the results of the coherence between the policy components *climate change adaptation, climate change mitigation, biodiversity conservation,* and *poverty-alleviation* are presented and discussed separately, presenting windows of opportunity for increasing coherence between them. The final section presents a summary of the chapter.

4.2 Agenda-setting, policy components and structure of Mexico's NDP (2013-2018)

As presented in the conceptual framework of section 2.7, the agenda-setting process determines which public problems will become policy components in the governmental agenda. The inductive qualitative content analysis of the objectives of the NDP and the sectoral programs allowed to determine which public problems were prioritised in the policy agenda-setting process and became policy components represented in the governmental agenda. A total of 34 policy components were identified (see Figure 5).

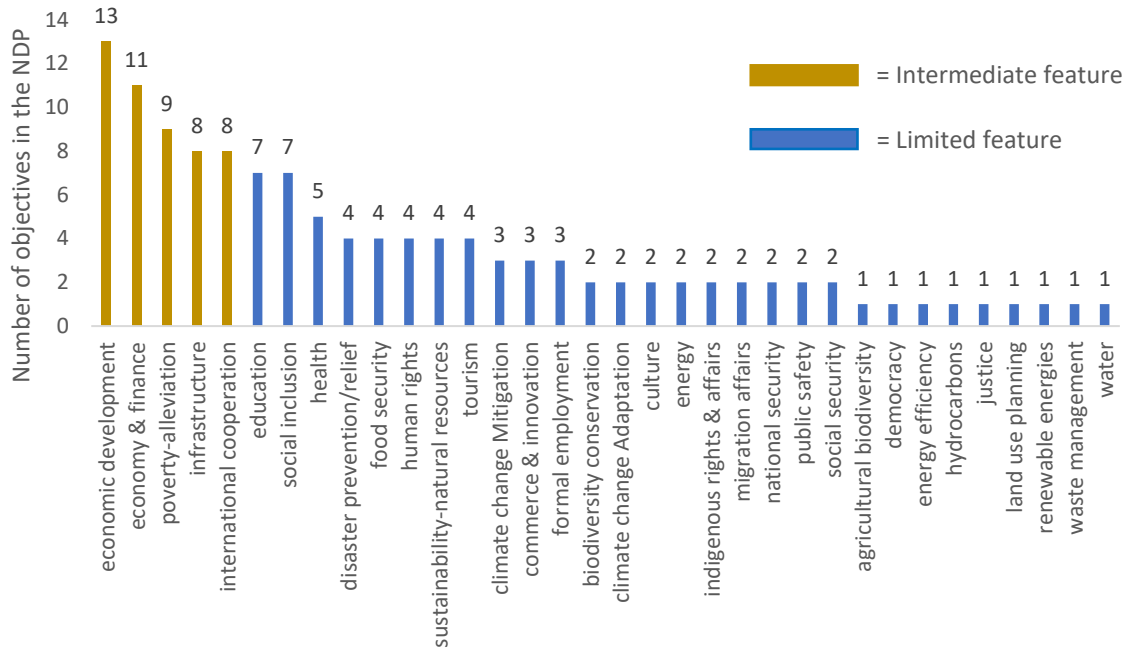
The general structure of the NDP is as follows. The general objective is to bring "*Mexico to its full potential"* (Gobierno del la República, 2013:21). It consists of five national goals: "*Mexico in peace"*, "*Inclusive Mexico"*, "*Mexico with high-quality education"*, "*Prosperous Mexico*, and "*Mexico with global responsibility"* (ibid). It has a total of 31 objectives, 118 strategies, and 819 lines of action. The goal *Mexico with global responsibility* has only four objectives, while the goal *Prosperous Mexico* has 11.

The policy components were coded 124 times in the 31 objectives of the NDP (Figure 5). The fourth national goal, *Prosperous Mexico,* is the one with the highest number of objectives

(n=11). Among those objectives, objective 4.4, that seeks to propel a green growth in the country, is the one that addresses the highest number of policy components (n=14). However, as mentioned in section 3.3.1 this could be explained because the content analysis allowed more detail for the components related to the four components of interest, three of which, climate change mitigation, climate change adaptation, and biodiversity conservation, are directly related to "green growth".

Figure 5 shows that the most common component in the discourse of the NDP is *economic development* (n=13). Even though it was the most common component in the NDP's discourse, it represents and intermediate feature according to the policy centrality scale, explained by the big number of objectives of the NDP. A policy component is considered an intermediate feature (presented in yellow in Figures 5 and 6) if it is mentioned in 26-49% of the objectives of the policy document, a limited feature (presented in blue in Figures 5 and 6) is a policy component mentioned in 1-25% of the policy documents. The second policy component with more mentions in the NDP was *economy & finance* (n=11), followed by *poverty-alleviation* (n=9), *infrastructure* (n=8), and *international cooperation* (n=8). The other three policy components of major interest for the study, *climate change mitigation* (n=3), *climate change adaptation* (n=2), and *biodiversity conservation* (n=2) were limited features, represented by a meagre number of objectives.

Fig. 5. Number of objectives of the NDP covering each policy component

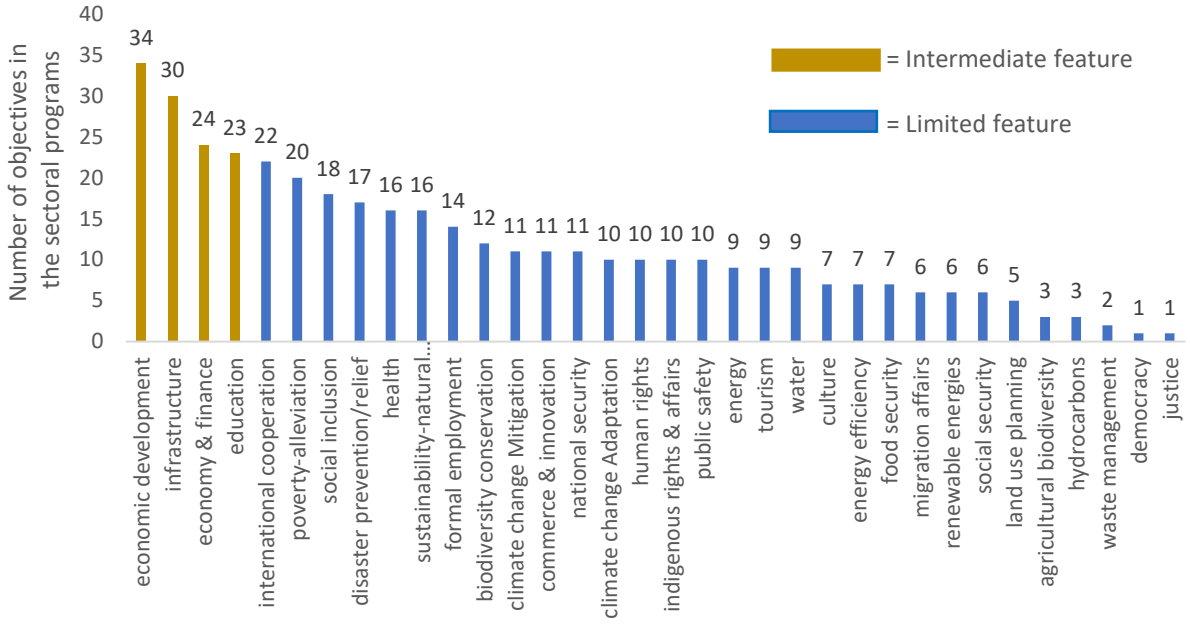


Source: Author

4.3 Agenda-setting, policy components and structure of Mexico's sectoral programs (2013-2018)

The qualitative content analysis allowed to see that the overall discourse of the sectoral programs presented similar patterns than the NDP. As reflected in figure 6, *economic development* (n=34) was the most represented in the discourse of the sectoral programs. It was followed by *infrastructure* (n=30) and *economy & finance* (n=24). However, once again related to the big number of objectives, they were intermediate features according to the policy centrality scale. *Poverty-alleviation* (n=20), *biodiversity conservation* (n=12), *climate change mitigation* (n=11), and *climate change adaptation* (n=10) were limited features in the discourse regarding all sectoral programs. Across the 85 objectives, 430 strategies, and 2585 lines of action of the sectoral programs, the 34 policy components were coded 400 times.

Fig. 6. Number of objectives of the sectoral programs covering each policy component



Source: Author

Table 2 provides an overview of the structure of each sectoral program. The second column presents the number of objectives, strategies, and lines of action on each sectoral program, as well as the number of policy components it comprises.

As mentioned in section 3.3, the qualitative content analysis was used also for annotating the intention of each policy document to be related to another program. Each sectoral program has a section in the introduction that presents to which objectives and national goals of the NDP it claims to be aligned to; this is captured in the third column of Table 2, and will be used for analysing coherence in the next sections. The fourth and fifth column present the results for policy centrality of the programs, they present as *key features* the policy components that were represented in more than 67% of the objectives of the program, and as *important features* the policy components that were covered in 50-66% of the objectives of the program. The last column shows which of the components *climate change mitigation* (CCM), *climate change adaptation* (CCA), *biodiversity conservation* (BC), and *poverty-alleviation* (PA) form part of the discourse of each sectoral program.

Table 2. Structure of the sectoral programs

Sector Program & Secretariat	Structure	Objectives and goals of the NDP	Key features: in 67-100% of the objectives	Important features: in 50-66% of the objectives	Policy components: CCM, CCA, BC, PA
Environment and Natural Resources (SEMARNAT)	Objectives: 6 Strategies:35 Lines of Action: 248 Components:22	4.4 of *Prosperous Mexico*	Biodiversity conservation, water, international cooperation, sustainability-natural resources,	Climate change mitigation	Covers all
Agricultural, Fishing and Food Development (SAGARPA)	Objectives: 5 Strategies:17 Lines of Action:150 Components:19	4.10 of Prosperous Mexico 2.1 of Inclusive Mexico	Economic development, economy & finance	Poverty-alleviation, sustainability-natural resources	Covers all
Foreign Affairs (SRE)	Objectives:5 Strategies:23 Lines of Action:159 Components:20	5.1, 5.2, 5.4 of Mexico with global responsibility	-	Economic development, international cooperation, education, culture, migration affairs	Covers all
Innovative Development Program (SE)	Objectives:5 Strategies: 30 Lines of Action:194 Components:6	4.7, 4.8 of Prosperous Mexico 5.3 of Mexico with global responsibility	Commerce & innovation	Economic development	None
Development Financing National Program (SHCP)	Objectives:6 Strategies:35 Lines of Action:144 Components:10	4.1, 4.2 of Prosperous Mexico	Economy & finance	Economic development	None
Governance (SEGOB)	Objectives:5 Strategies:31 Lines of Action:137 Components15	1.1, 1.2, 1.5, 1.6 of Mexico in Peace 2.1 of Inclusive Mexico 5.4 of Mexico with global responsibility	-	Public safety, human rights, indigenous rights & affairs	None
Labour and Social Welfare (STPS)	Objectives:4 Strategies:21 Lines of Action:85 Components:8	1.5 of Mexico in peace 2.2, 2.3, 2.4 Prosperous Mexico 5.4 of Mexico with global responsibility	Formal employment	Social inclusion	Only includes PA
Agrarian, Land and Urban Development (SEDATU)	Objectives:5 Strategies:27 Lines of Action:177 Components:10	2.5 of Inclusive Mexico	Economic development, land use planning	Poverty-alleviation, sustainability-natural resources, social inclusion	Only includes PA
Education (SEP)	Objectives:5 Strategies:35 Lines of Action:265 Components:10	All the objectives of Mexico with high-quality education	Infrastructure, education	Economic development, formal employment, health, culture	Only includes PA
Social Development (SEDESOL)	Objectives:6 Strategies:20 Lines of Action:77 Components:11	2.1, 2.2, 2.4, 2.5 of Prosperous Mexico	Poverty-alleviation	-	Only includes PA
Health (SALUD)	Objectives:5 Strategies:33 Lines of Action:228 Components:12	2.1, 2.3 of Inclusive Mexico 4.1 of Prosperous Mexico	Health	Poverty-alleviation, international cooperation, infrastructure	Only includes PA
Tourism (SECTUR)	Objectives:5 Strategies:22 Lines of Action:112 Components:17	4.11 of Prosperous Mexico	Tourism, international cooperation	-	Includes CCA, CCM, and PA
Energy (SENER)	Objectives:6 Strategies:27 Lines of Action:120 Components:14	4.6 of Prosperous Mexico	Economic development, energy, infrastructure	Energy efficiency, renewable energies	Includes CCA, CCM, and PA
Navy (SEMAR)	Objectives:6 Strategies:27 Lines of Action:104 Components:11	1.2 of Mexico in peace	Infrastructure, disaster prevention/relief, national security	Biodiversity conservation, education	Includes CCA, CCM, and BC
Communications and Transportation (SCT)	Objectives:6 Strategies:26 Lines of Action:161 Components:10	3.5 of Mexico with high-quality education 4.5, 4.8, 4.9 of Prosperous Mexico	Economic development, infrastructure	Economy & finance, public safety	Only includes CCA
National Defence (SEDENA)	Objectives:5 Strategies:21 Lines of Action:121 Components:12	1.2, 1.6 of Mexico in peace	National security	-	Only includes BC

Source: Author

Regarding the four policy components of major interest for this study, the three secretariats that cover all of them (SAGARPA, SEMARNAT and SRE) are also the ones with more components. *Climate change adaptation* is not a key or important feature in any of the sectoral programs. While the four components of interest are included in the Environment and Natural Resources Sector Program (SEMARNAT), only *biodiversity conservation* and *climate change mitigation* are key and important features. *Biodiversity conservation* was an important feature in the Navy (SEMAR) and Environment and Natural Resources (SEMARNAT) sectoral programs. *Poverty-alleviation* is an important feature in 3 programs, and a key feature in the Social Development Sectoral Program (SEDESOL).

Table 2 shows that the component with the highest policy centrality is *economic development*; it is a key or important feature in 8 secretariats. However, if the components directly associated with the other dimensions of poverty in the multidimensional approach (economic wellness, health, and education) (CONEVAL, 2018) are grouped with *poverty-alleviation*, then in would dominate the discourse in the sectoral programs and in the NDP.

To summarise, the discursive affinity of the programs showed that 34 public problems made it through the agenda-setting process and became policy components represented in the NDP and the sectoral programs. *Economic development* was the most dominant component in both cases, mentioned in 42% of the objectives of the NDP, and in 40% of the objectives of the sectoral programs. The next five places of importance in the discourse were taken by *economy & finance*, *infrastructure*, *poverty-alleviation*, *education*, and *international cooperation*.

In the NDP the percentage of the objectives covering the four policy components of interest for this study was: poverty-alleviation 29%, climate change mitigation 10%, climate change adaptation and biodiversity conservation in 6%. And for the sectoral programs the percentage was: poverty-alleviation 24%, biodiversity conservation in 14%, climate change mitigation 13%, and climate change adaptation 12%. The only secretariats that covered all the four policy components on their objectives were: Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), Secretariat of Foreign Affairs (SRE), and Environment and Natural Resources (SEMARNAT). The secretariats that mention none of

them are: Secretariat of Economy (SE), Secretariat of Finance and Public Credit (SHCP), and the Secretariat of the Interior (SEGOB).

The generalisability of the results of the discursive affinity is limited because policy components can vary over time and across nations (May et al., 2005). However, even though it is very time consuming, the discourse analysis technique allowed to transform the raw data of the discourse in the policy documents into patterns, that can be used as a baseline for analysing changes in the future, comparing them to other levels of the government, or for comparing governmental agendas between countries. In reference to the conceptual framework of section 2.7, the analysis of the discursive structure allowed to populate the policies by identifying the policy components contained in their objectives and allowed to determine the policy centrality of each component.

4.4 Notion of coherence within the NDP and the sectoral programs

Knowing that many other concepts have been used as synonyms (Danaeefard, Ahmadi, & Pourezzat, 2019; Savage & O'Connor, 2018; OECD/DAC, 2001), the qualitative analyses looked for any statement that could refer to policy coherence. The results showed that there is almost no mention of the concept 'policy coherence' in the NDP or in the sectoral programs. The only program that actually mentioned coherence was the Development Financing National Program (SHCP) in one line of action that seeks to "promote coherence of the policies of the three levels of government aimed at raising and democratising productivity".

The NDP talks about *coordinated and concurrent public policies*, but mostly focused on the coordination between the three levels of government (federal, state, and municipal). The introduction of the Social Development Sector Program (SEDESOL) recognises that for advancing in poverty eradication, it is necessary to improve the institutional coordination to avoid the duplication of programs and resources, to improve the social impact and to increase the concurrence of the different levels of the government. The Innovative Development Program (SE) looks for 'aligning the programs and instruments of the Secretariat and other

agencies to the requirements of the sector'. The Environment and Natural Resources Sector Program (SEMARNAT) also mentions aligning and coordinating federal programs.

The introduction of the Agricultural, Fishing and Food Development Sector Program (SAGARPA) mentions that the application of public policies in the agri-food sector has been ineffective, characterized by disjointed programs and inadequate coordination, and expresses the intention of improving the organisational structure through evaluations and revisions of the programs. However, there is no mention of policy coherence or alignment in the objectives of the program, and when concurrence is mentioned, it does not refer to the sectoral level. The introduction of the Health Sector Program (SALUD) talks about the lack of articulation of policies and asks for the presence of health components in different policy domains. However, the objectives only talk about coordination and do not refer to policy coherence at all.

The Agrarian, Land and Urban Development (SEDATU), the Governance (SEGOB), the Communications and Transportation (SCT), Education (SEP), Labour and Social Welfare (STPS), and the Navy (SEMAR) sectoral programs many times mention interinstitutional and vertical coordination but do not present any concept similar to policy coherence. The National Defence (SEDENA), the Energy (SENER), the Foreign Affairs (SRE) sectoral programs do not talk about coordination or policy coherence at all.

The Tourism Sector Program (SECTUR), even though it does not mention the word policy coherence, clearly talks about it. The introduction repeatedly mentions the need for effective intergovernmental collaboration and coordination for aligning programs, projects, actions, and public budgets. It says, "there is no comprehensive vision that encourages the articulation of agencies and entities, which integrates program objectives and seeks to achieve common and shared results". It recognizes that the type of programs, their diverse objectives and operation rules limit their concurrence and therefore, the complementarity of the government actions for improving their capacities. And these statements are recognised as statements of policy coherence according to the definition of May et al (2005:37), "various components of polices correspond because they share a set of ideas or objectives".

In summary, the content analysis showed that the term ‘coherence’ is rarely mentioned in the sectoral programs; only the Development Financing National Program of Finance and Public Credit mentions it as such. Even when Tourism and the Social Development sector programs describe the problem of lack of coherence, they do not use that term. In general, the terms used are alignment, concurrence, integration, and articulation, and the programs mostly talk about coordination, however, no definition is given for any of those terms.

It is beyond the scope of this study to analyse if the lack of conceptual clarity has effects on the results of policy coherence. Nonetheless, in line with the idea that conceptual clarity is essential for assuring that the concepts reflect their intended meaning (Cejudo & Michel, 2017), these results could be considered for improving clarity in policy documents in the future.

4.5 Vertical coherence between the NDP and the sectoral programs

With the program Atlas.ti an affiliation matrix was created (see Table 3) using the information coded in the qualitative content analysis. The content analysis registered the agreement relation between the objectives and the policy components. When an objective attended to a certain policy component, it was considered a positive relation and a value of 1 was assigned in the corresponding cell. If by its design, an achievement of an objective would have undermined or worked against a policy component, a negative agreement relation, with a value of -1 would have been assigned, and interpreted as policy incoherence, that according to Fukasaku et al. (2005) happens when the objectives of a policy get undermined or obstructed by the actions of the government in other policies. The affiliation matrix has no cells assigned to negative values because no negative relations were identified between any of the policy objectives, therefore it can be determined that there is no policy incoherence between the sectoral programs and the NDP. Since they belong to two different levels of the government, according to the definition of vertical coherence by Geerlings & Stead (2003), these results can be interpreted as lack of vertical incoherence.

Table 3. Affiliation matrix: policy components in the objectives of the NDP and the sectoral programs

	NDP	SE	SHCP	SEDENA	SAGARPA	SENER	SEMAR	SER	SALUD	SCT	SEDATU	SEDESOL	SEGOB	SEMARNAT	SEP	STPS	SECTUR
agricultural biodiversity	1				1									2			
biodiversity conservation	2			1	1		3	2						5			
climate change Adaptation	2				2	2	1	1						2			2
climate change Mitigation	3				1	1	1	1		2				3			2
commerce & innovation	3	4	1		1	1		2							1	1	
culture	2							3					1		2		1
democracy	1												1				
disaster prevention / relief	4		2	1	1		4	2	1	1	1	1	1	2			
economic development	13	3	3		5	4		3		4	4	1		2	2	1	2
economy & finance	11	2	6		4	1		1		3	2	1		2			2
education	7	1		1		1	3	3	1	2		1	2	1	5		2
energy	2		1		1	5								2			
energy efficiency	1				1	3					1			1			1
food security	4				2			2	1			1		1			
formal employment	3				1	1	1						1	2	2	4	2
health	5			1	1			2	6			2		1	2	1	
human rights	4						1	2	2				3	1		1	
hydrocarbons	1					2								1			
indigenous rights & affairs	2				1			1	1				3	2	1		1
infrastructure	8			1	2	4	5		3	6	2	1			5		1
international cooperation	8	1	2	1			2	3	3				2	4			4
justice	1												1				
land use planning	1										4		1				
migration affairs	2							3	1			1	1				
national security	2		1	3			5	1					1				
Poverty-alleviation	9				3	1		1	3		3	4		2	1	1	1
public safety	2			1				1		3	1		3				1
renewable energies	1			1	1	3											1
social inclusion	7	1	2			2			2	1	3	2	1		1	2	1
social security	2		1	1				1				2				1	
Sustainability-natural resources	4			1	3		1			1	3			5			2
tourism	4							2		1				1			5
waste management	1					1								1			
water	1		1	1	2				1					4			

Source: Author

The values of the affiliation matrix allowed to create the affiliation network between the NDP and the sectoral programs (Figure 7). This network shows that the policy components contained in each sectoral program correspond with the components of the objectives of the NDP the program intends to be aligned to (see Table 2). The network also shows that all the policy components found in the NDP are attended by the sum of the policy components found in the sectoral programs. These results show that the criteria for achieving coherence stated in the *Technical guide for the elaboration of the programs derived from the NDP 2013-2018* are fulfilled.

Going back to the definition of policy coherence, "various components of policies correspond because they share a set of ideas or objectives" (May et al., 2005:37), and the explanation of vertical coherence by Geerlings & Stead (2003), that implies coherence between different levels of the government, it can be concluded that there is vertical policy coherence between the sectoral programs and the NDP.

Fig. 7. Vertical coherence: Affiliation network between the NDP and the secretariats

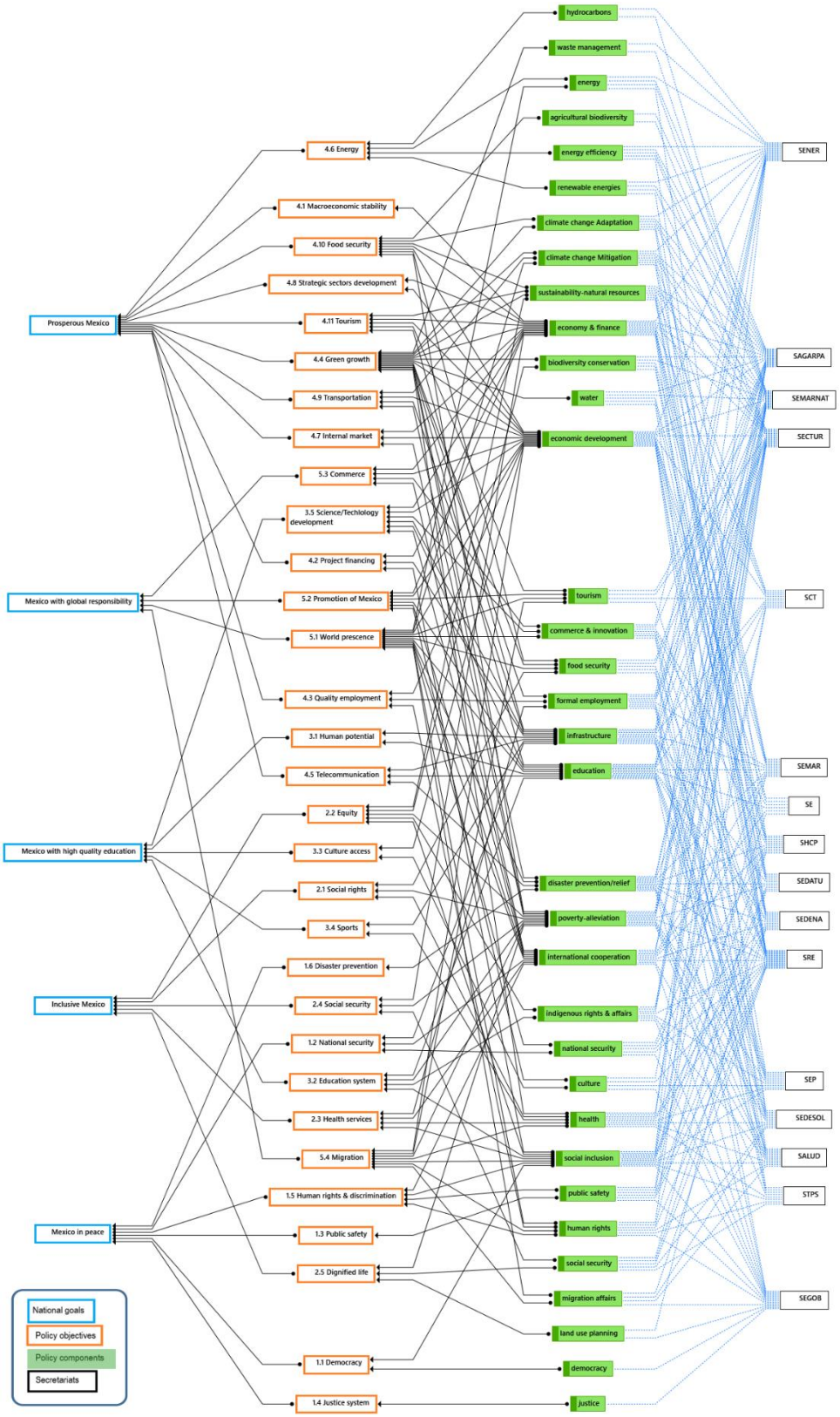


Fig. 7. Blue squares represent the National Goals; the orange squares represent the objectives of the NDP; the green squares represent the policy components, and the black squares the secretariats. The black arrows indicate a direct link between the national goals and de objectives, or between the objectives and the policy components. The dotted blue lines indicate an indirect connection between the secretariats and the policy components made through their objectives. Source: Author.

4.6 Horizontal coherence between the sectoral programs

The affiliation matrix (Table 2) shows that no policy incoherence was detected between the sectoral programs of the secretariats. As discussed in the previous section, no objective of the sectoral programs was designed in a way that its achievement would undermine or work against another objective or policy component.

The conceptual framework of section 2.7 presents the approach to determining horizontal policy coherence by finding shared policy components in the objectives of different sectoral program policies. The affiliation network of Figure 8 shows which policy components are shared between the secretariats. The dotted blue lines indicate an indirect connection between the secretariats and the policy components made through the objectives of their sectoral programs. For more detail on each secretariat, see Annexe 1, where the discursive structure of each sectoral program is presented.

Based on the affiliation network of the secretariats, an actor co-occurrence matrix (Table 4) was created. The numbers in the cells represent the number of connections between the secretariats created through their shared policy components. According to Hajer (1993), discourse coalitions are groups of actors that share a common discourse. Discourse coalitions can be identified in an actor co-occurrence network because they are more connected to each other than to other actors (Muller, 2015). The presence of discourse coalitions is recognised as a high level of policy coherence. The highest level of coherence was found between SEMARNAT and SAGARPA, sharing 16 policy components. The second highest was between SEMARNAT and SRE, that shared 14 policy components. The third highest was between SEMARNAT and SECTUR, sharing 12 policy components. SENER shared 11 components with SEMARNAT, SECTUR, and SAGARPA and 7 with SRE. Many policy components are in their discourses, which is why they are considered to be part of the same

discourse coalition, which represents a high level of policy coherence. However, no other discourse coalition was identified.

The lowest level of coherence was found between the Secretariat of Economy (SE) and the Secretariat of Navy (SEMAR), SE and Secretariat of National Defence (SEDENA), STPS and SEDENA, STPS and SEMAR, and between STPS and Secretariat of Tourism (SECTUR), the connection between each pair was through sharing only 2 policy components. The results show that even though all the secretariats are connected to each other, the connection between them can be very weak, showing low levels of policy coherence.

Fig. 8. Affiliation network of the secretariats

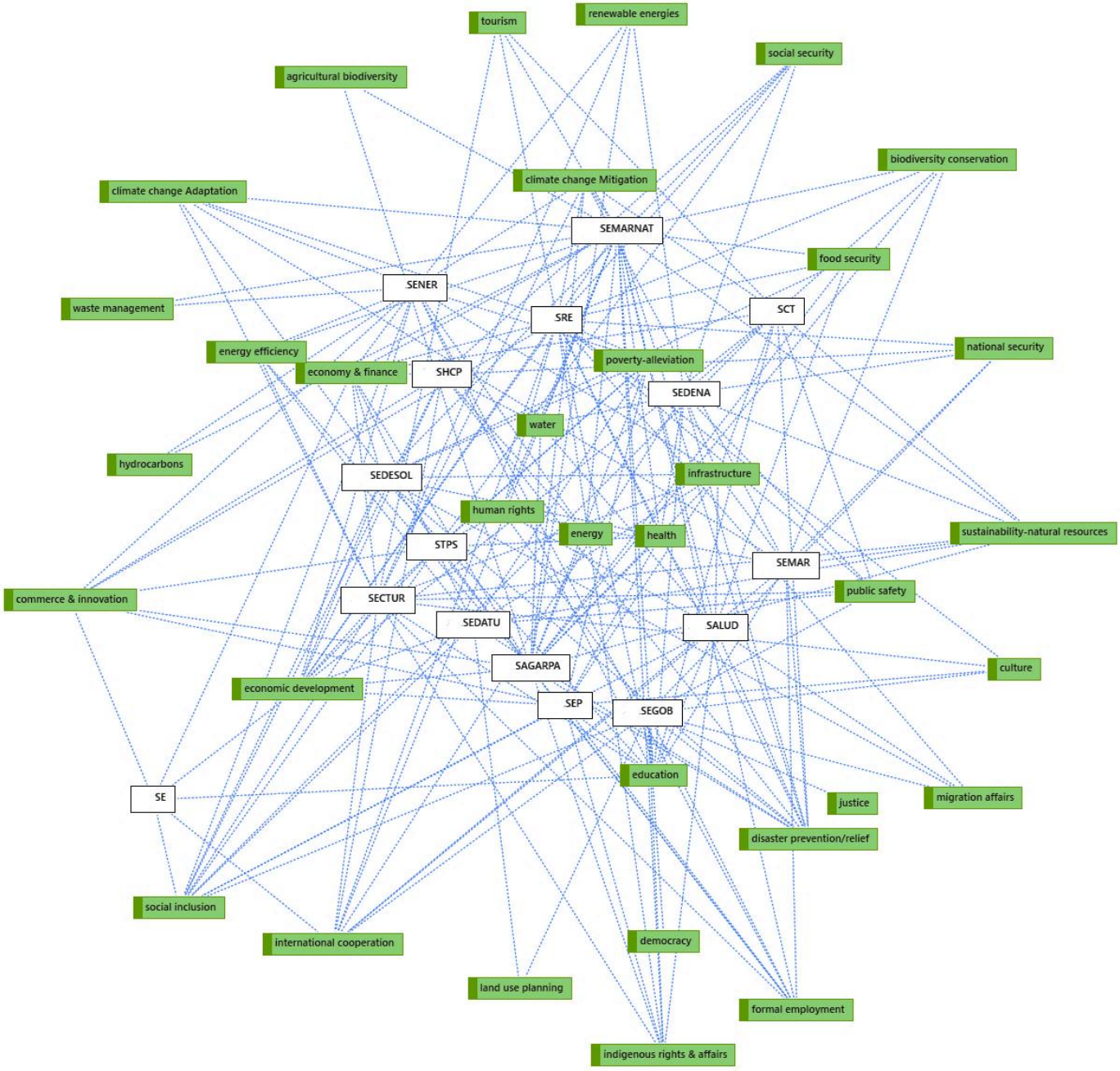


Figure 8 shows which policy components (green squares) are shared between the 16 secretariats (black squares). The links between them (dotted blue lines) indicate an indirect connection between the secretariats and the policy components made through the objectives of their sectoral programs. Source: Author

Table 4. Actor co-occurrence matrix: the secretariats

	SE	SHCP	SEDENA	SAGARPA	SENER	SEMAR	SRE	SALUD	SCT	SEDATU	SEDESOL	SEGOB	SEMARNAT	SEP	STPS	SECTUR
SE		5	2	3	5	2	5	3	4	3	4	3	4	4	3	5
SHCP	5		5	6	5	3	7	4	4	4	5	4	6	3	4	4
SEDENA	2	5		7	3	7	8	6	5	4	5	5	7	3	2	6
SAGARPA	3	6	7		11	7	11	7	6	7	7	3	16	7	5	11
SENER	5	5	3	11		5	7	4	6	6	6	3	11	7	5	11
SEMAR	2	3	7	7	5		8	5	5	3	3	6	9	3	2	7
SRE	5	7	8	11	7	8		9	7	5	9	9	14	7	6	11
SALUD	3	4	6	7	4	5	9		4	4	8	7	9	6	4	6
SCT	4	4	5	6	6	5	7	4		7	6	4	7	4	2	9
SEDATU	3	4	4	7	6	3	5	4	7		6	4	6	4	3	8
SEDESOL	4	5	5	7	6	3	9	8	6	6		4	7	6	5	6
SEGOB	3	4	5	3	3	6	9	7	4	4	4		6	5	3	7
SEMARNAT	4	6	7	16	11	9	14	9	7	6	7	6		6	5	12
SEP	4	3	3	7	7	3	7	6	4	4	6	5	6		6	8
STPS	3	4	2	5	5	2	6	4	2	3	5	3	5	6		4
SECTUR	5	4	6	11	11	7	11	6	9	8	6	7	12	8	4	
Total	**55**	**69**	**75**	**114**	**95**	**75**	**123**	**86**	**80**	**74**	**87**	**73**	**125**	**79**	**59**	**115**

Source: Author

Figure 9, the actor congruence network, was created based on the actor co-occurrence matrix. It visually represents the discourse coalition identified in the matrix, formed by SAGARPA, SEMARNAT, SRE, SENER, and SECTUR.

Fig. 9. Actor congruence network: the secretariats

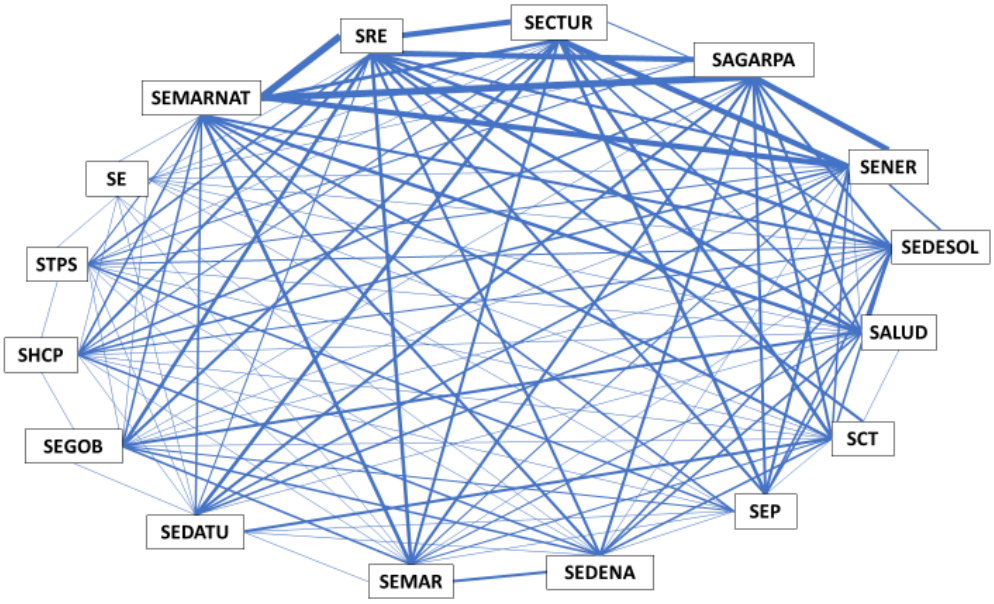


Figure 9 presents the actor congruence network between the secretariats. The blue lines represent the number of policy components shared by each pair of secretariats; the lowest value is 2 and the highest is 16. Source: Author

In line with the concept of policy incoherence by Fukasaku et al. (2005), presented in section 2.2.2, it was not possible to find an objective of one sectoral program getting undermined or

obstructed by other programs. Therefore, this study did not identify policy incoherence between the policy documents. This could be explained by the fact that the documents analysed belong to the two highest levels of national planning, therefore, their objectives are not detailed enough to identify undermining from one to another.

If the scale of levels of Cejudo & Michel (2017) is applied to these results of horizontal coherence, it would be applied as follows. There is a low level of coherence between most of the sectoral programs, that by their design, do not hinder or obstruct each other, therefore they can operate simultaneously, but the lack of commonalities between their objectives does not allow them to solve the same complex problem. There is a medium level of policy coherence between the sectoral programs that form the only discourse coalition identified, conformed by SAGARPA, SEMARNAT, SRE, SENER, and SECTUR; this means that by their design they complement each other, but still leave gaps in addressing the complex problem.

However, a low level of coherence was identified in terms of programs not fully corresponding to each other. With the information extracted with the content analysis, the following cases show sectoral programs that mention in their objectives the involvement of other sectors which did not correspond those claims in their sectoral programs.

The Agricultural, Fishing and Food Development Sector Program (SAGARPA) mentions many times the importance of innovation in the agricultural sector, however, as it is shown in the affiliation matrix (see Table 3), there is no mention of agriculture in the Innovative Development Program (SE). The Tourism Sector Program (SECTUR) mentions that tourism can be used for poverty eradication and to improve community development, however, there is no mention of tourism in the Social Development Sector Plan (SEDESOL), nor in the Labour and Social Welfare Sector Program (STPS) (see Table 3).

The results of this section are interpreted as horizontal coherence, since they are at the same level of the government. While the results show that there is no incoherence between the sectoral programs, the data contributes to a clearer understanding of the level of coherence between policies, allowing to identify windows of opportunity for improving policy coherence.

The results of this study show that discourse network analysis can be a good way for systematically identifying the degree of commonality and interactions between policies and between policy domains, which are required for properly analysing coherence between policy objectives, a task that different authors have identified as very difficult to achieve (e.g. Nilsson et al., 2018; May, Sapotichne & Workman, 2006; Cejudo & Michel, 2016).

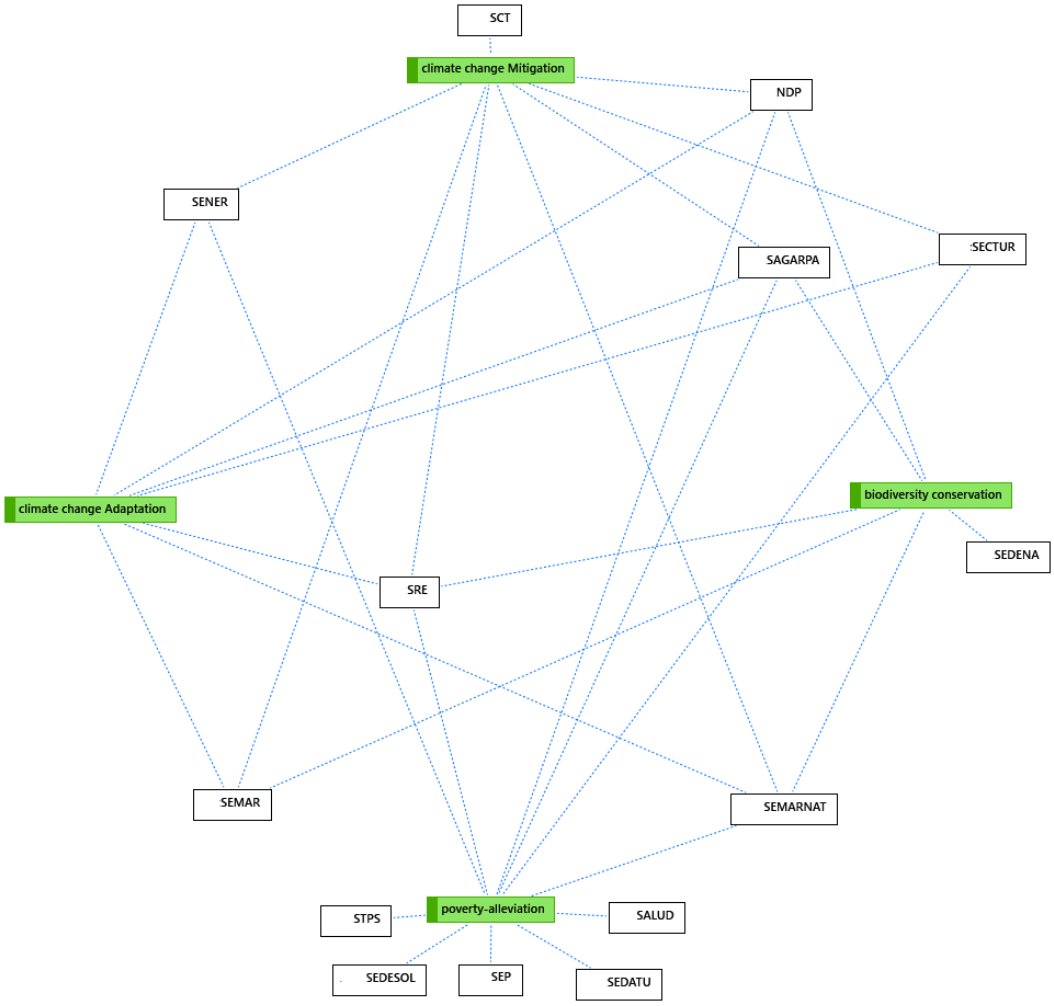
4.7 Coherence between the objectives for climate change, biodiversity conservation and poverty-alleviation

Figure 10 shows the affiliation network of the secretariats regarding only the four policy components of interest to this thesis: *climate change adaptation*, *climate change mitigation*, *poverty-alleviation*, and *biodiversity conservation*. Out of the 16 secretariats, 13 consider at least one of them. The secretariats that do not form part of this affiliation network are Secretariat of Economy (SE), Secretariat of the Interior (SEGOB), and the Secretariat of Finance and Public Credit (SHCP). The most popular component was *poverty-alleviation*, that is covered by 10 secretariats. The topic with least interest was *biodiversity conservation*, with only 5 secretariats including it. *Climate change mitigation* receives slightly more attention than *climate change adaptation*, with 7 and 6 secretariats respectively, since the Secretariat of Communications and Transportation (SCT) only covers *climate change mitigation*, without considering *adaptation*.

Given the popularity of the component *poverty-alleviation* in the affiliation network, it was considered important to analyse the changes in the actor congruence network if *poverty-alleviation* was not included. Figure 11 presents both *actor congruence networks*. The one on the left includes the four policy components, therefore, the highest value of the link, can only be four. The green lines represent the connections that included only the environmental components (*climate change adaptation, climate change mitigation, and biodiversity conservation*), while the blue lines represent the links where one of the connections is created due to the presence of the component *poverty-alleviation*. The actor congruence network on the right shows how much the actor network changes if *poverty-alleviation* is not included.

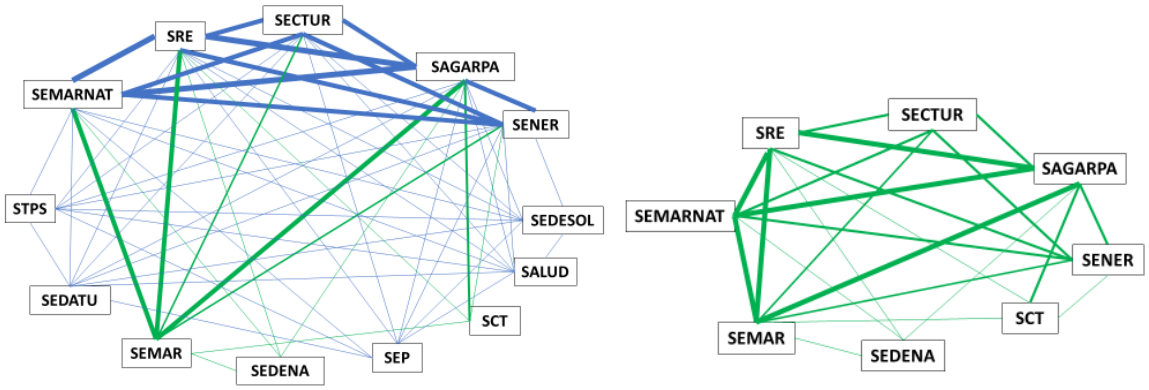
These two networks allow to visualise how much the coherence reduces when *poverty-alleviation* is taken out of the equation. The congruence network on the left includes 13 secretariats, while the one in the right only includes 8. This finding goes in line with CEPAL (2003), that mentions that in Latin America there is a lack of coherence between the environmental policies and the rest of the macro policies or sectoral programs. It is also to be noted that when only considering these four policy components, SEMAR joins the discourse coalition previously detected, conformed by SAGARPA, SEMARNAT, SRE, SENER, and SECTUR.

Fig. 10. Affiliation network: sectoral programs regarding climate change, biodiversity conservation, and poverty-alleviation



The green squares represent the policy components, the black squares the secretariats, and the blue dotted line represents the connection between them created through their statements in the objectives of the sectoral programs. Source: Author

Fig. 11. Actor congruence networks regarding the policy components climate change mitigation, climate change adaptation, biodiversity conservation and poverty-alleviation.



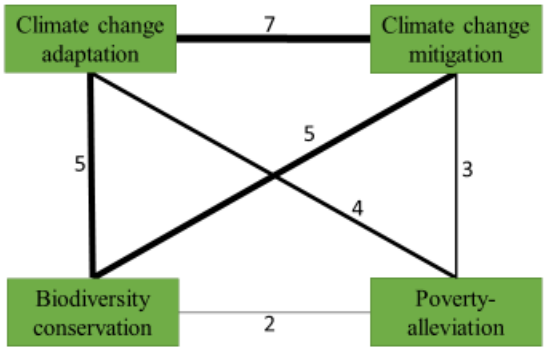
The figure on the left presents the actor congruence network based on the four policy components of major interest for this study. The links between them represent the number of shared policy components between each pair; the blue lines show the links that include *poverty-alleviation*, the green lines are links created without including *poverty-alleviation*. The figure on the right presents the actor congruence network that only includes the components *climate change mitigation*, *climate change adaptation* and *biodiversity conservation.* Source: Author.

Figure 12 shows the concept congruence network of the four components of major interest for this study. The links between the policy components shows the number of actors (in this case the secretariats and the NDP) that include that pair of components in their discourse.

The strongest link was between *climate change mitigation* and *climate change adaptation* (n=7) they were components shared by the NDP, SAGARPA, SENER, SEMAR, SRE, SEMARNAT and SECTUR. The weakest links were between *poverty-alleviation* and *biodiversity conservation* (n=2) shared by the NDP and SEMARNAT, the link between *poverty-alleviation* and *climate change mitigation* (n=3), shared only by the NDP, SECTUR, and SEMARNAT. The link between *poverty-alleviation* and *climate change adaptation* (n=4), was created by the NDP, SAGARPA, SEMARNAT, and SECTUR.

The links between *climate change adaptation-biodiversity conservation* and *climate change mitigation-biodiversity conservation* were the same (n=5), covered by the same five actors, NDP, SAGARPA, SEMAR, SRE, and SEMARNAT.

Fig. 12. Concept congruence network: climate change mitigation, climate change adaptation, biodiversity conservation and poverty-alleviation.



This figure shows the concept congruence network of the four components of most interest for this study: climate change adaptation, climate change mitigation, biodiversity conservation and poverty-alleviation. The links between each pair of components (black lines) show the number of government dependencies (secretariats or NPD) that mention them both in their programs. Source: Author.

The concept congruence network clearly represents the low level of coherence between some of the components. In general, these results are in line with the literature review presented in this study. In the NDP and in the sectoral programs climate change mitigation received more attention than climate change adaptation (see figures 5 and 6), which is not rare (Füssel, 2007). However, the concept network shows that climate change adaptation is more connected to the other components than climate change mitigation. It clearly presents the low level of of coherence between poverty-alleviation and biodiversity conservation, which are not only intimately related (WWF, 2010), but also geographically overlapping (Barret, Travis & Dasgupta, 2011).

Creating this network also allowed to see that only the NDP and SEMARNAT consider the four policy components, and therefore concluding that there is a low level of coherence between *climate change adaptation, climate change mitigation, poverty-alleviation* and *biodiversity conservation*.

The discourse network analysis allowed to analyse coherence between the four main components at a deeper level. Figure 13 shows an affiliation network that shows which of these four components co-occurred in the same objective, revealing how tightly connected the they are. This kind of network shows the objectives of the programs that covered at least

two of the main policy components. Out of the 31 objectives of the NDP, only one covers all the four main topics. Out of the 85 objectives of the 16 secretariats, also only one was found to cover the four main components. The Environment and Natural Resources Sector Program (SEMARNAT) presented more coherence between the main topics. The four main topics were mentioned in the objective *Inclusive sustainable growth*. The objective *Climate change* covered 3 topics, only leaving behind *poverty-alleviation*. The objective *Risk management* mentioned *poverty-alleviation* and *climate change mitigation*, while the objective *Landscape use & recovery* only mentioned *biodiversity conservation* and *poverty-alleviation*.

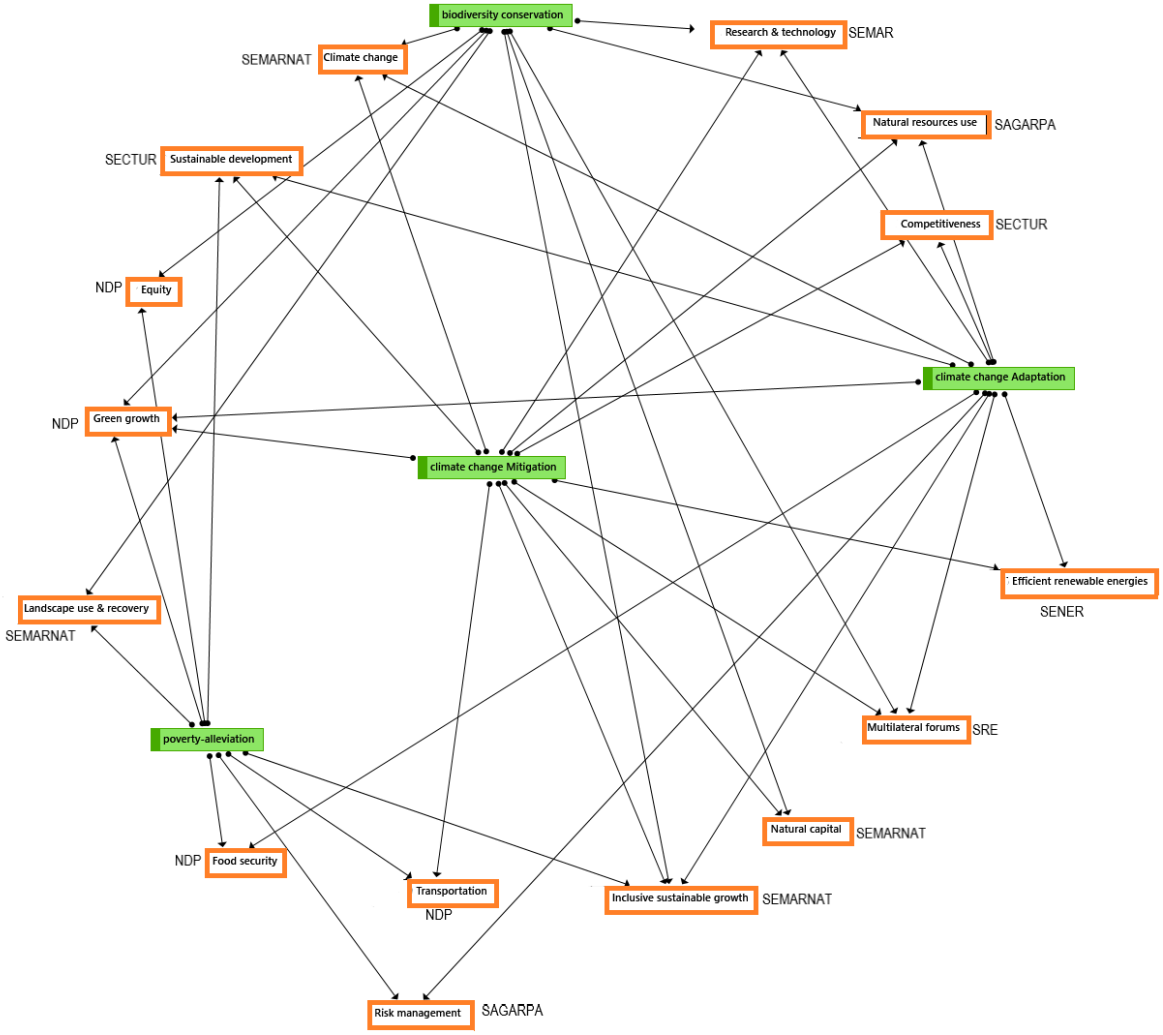
The objective *Multilateral forums* of the Foreign Affairs Sector Program (SRE) includes the topics *climate change mitigation*, *climate change adaptation*, and *biodiversity conservation*. The Navy Sector Program (SEMAR) also presented co-occurrence of the same 3 topics under the objective *Research & technology*.

SAGARPA also covered all the main topics: the objective *Natural resources* use covers *climate change adaptation, climate change mitigation*, and *biodiversity conservation*, while the objective *Risk management* covers *poverty-alleviation* and *climate change adaptation*.

The Tourism Sector Program (SECTUR) covered 3 policy components in one objective, and 2 in another. It does not consider *biodiversity conservation* in any of its objectives. The National Defence Sector Program (SEDENA) only covers *biodiversity conservation* under the objective *Operational response*.

Even though the previous results showed some level of coherence between the four components, this analysis shows that when analysed at the concept level, there is low coherence among the objectives of the NDP and the sectoral programs regarding *climate change adaptation, climate change mitigation, poverty-alleviation,* and *biodiversity conservation*

Fig. 13. Affiliation network: Co-occurrence of the components climate change mitigation, climate change adaptation, poverty-alleviation, and biodiversity conservation within the same objectives



Source: Author

Given the cross-cutting nature of the four components of interest for this study, many other policy components are related to them. The following subsections present the importance of having policy coherence between *biodiversity conservation*, *climate change adaptation*, *climate change mitigation*, and *poverty-alleviation*, and the other policy components. The subsections present the relations between the components that is missing in the governmental agenda, what it represents for Mexico, and proposes ways for improving their coherence.

4.7.1 Coherence and biodiversity conservation

According to CEPAL (2003), in most of the countries in Latin America, there is a lack of coherence between the objectives of the environmental policies and the objectives of the sectoral programs. This is in line with the results of this study, that show that only SAGARPA, SEMARNAT, SEDENA, SEMAR, and SRE consider *biodiversity conservation* on their sectoral programs. Many times, the approach these five secretariats present for achieving biodiversity conservation is through job creation, however, the Labour and Social Welfare Sector Program (STPS) does not consider *biodiversity conservation* (see Table 2).

The fragmentation of the environment has detrimental effects on biodiversity (Thomas et al., 2004; CBD, n.d.) and globally, the main cause of biodiversity loss is land use change (OECD, 2017). SEDATU is the secretariat responsible for the land use planning policies and even though the introduction of its sectoral program says that policies must be implemented for achieving biological biodiversity and environment conservation in the agricultural areas, it is not represented in the objectives of the program. Building roads and highways can also increase habitat fragmentation; however, *biodiversity conservation* is also not considered in the Communications and Transportation Sector Program (see Table 2 or Annexe I).

Biodiversity conservation could be integrated in the sectoral programs in many ways. For example, it is important to include it in the Social Development Sector Program (SEDESOL), considering that people in extreme poverty many times depend on wildlife and natural resources for their survival (Barret, Travis & Dasgupta). Many times, the programs designed for eradicating poverty result in the depletion of natural resources, leading to damage in well-being and human health, offsetting part of the benefits they meant to achieve (OECD, 2017). For example, it has been proved that the most important program of SEDESOL, Progresa-Oportunidades, has increased deforestation (Alix-Garcia et al., 2013), which could lead to an increase in flood-related disasters, damaging disadvantaged economies (Bradshaw et al., 2007). However, neither SEDESOL nor the Secretariat of Health (SALUD) consider any of the environment-related policy components in their sectoral programs.

In Mexico the exploitation of natural resources has been crucial for development purposes (OECD, 2013), therefore, *biodiversity conservation* could also be considered by the Innovative Development Program (SE).

Biodiversity conservation is not achievable if it is not included in the sectors that threaten it, such as tourism and energy (OECD, 2013). But neither the Energy Sector Program (SENER) nor the Tourism Sector Program (SECTUR) consider that policy component. The Tourism Sector Program (SECTUR) recognises in its introduction the threat that tourists and developers represent to species, however, the policy component *biodiversity conservation* is not covered in the objectives of the program.

Even though *biodiversity conservation* is considered in the Agricultural, Fishing and Food Development Sector Program (SAGARPA), the approach mostly focused on genetic biodiversity and the conservation of Natural Protected Areas. Agriculture represents one of the major threats to biodiversity (OECD, 2017); the support given to farmers contributes to the intensification of agricultural production, and therefore to deforestation (OECD, 2013). For this reason, it is important that SAGARPA focuses more on biodiversity conservation.

If the responses of biodiversity to climate change are not considered, many adverse effects will not be properly mitigated or minimised (Pecl et al., 2017). Therefore, it is important that the Secretariats of Tourism (SECTUR), Energy (SENER), and Communications and Transportation (SCT), that are responsible for big scale infrastructure projects, include *biodiversity conservation* when approaching *climate change mitigation* and *adaptation*. Healthy and stable ecosystems provide protection against storms, landslides, and erosion (Reid, 2015), therefore, the presence of *biodiversity conservation* could be increased in the sectoral programs by linking it to *disaster prevention/relief* and *climate change adaptation*.

4.7.2 Coherence and climate change adaptation

Climate change adaptation is more effective if it is embraced by coherent policies across the social, economic, and environmental dimensions of sustainable development (UNESA, 2016). However, *climate change adaptation* as a policy component, was only considered in the Agricultural, Fishing and Food Development (SAGARPA), Energy (SENER), Navy

(SEMAR), Foreign Affairs (SRE), Environment and Natural Resources (SEMARNAT), and Tourism (SECTUR) sector programs.

Climate change adaptation could be considered in many other sectors. For example, the Health Sector Program (SALUD) should consider it, since the extreme weather effects, (that will increase due to climate change) can be detrimental for public health (Keim, 2008). They can increase waterborne disease outbreaks and increase the infectivity of some vector-borne diseases (Maibach, Roser-Renouf, & Leiserowitz, 2008).

The Social Development Sector Program (SEDESOL) mentions that one of the primary functions of the government is to protect the population from events that can deteriorate their well-being either due to situations that diminish their socioeconomic stability or that increase their living costs. It mentions that 71.8% of the population does not have access to social security, which puts them at a higher risk of falling into poverty in the face of certain catastrophic events. Climate change will make poverty-alleviation even harder by slowing down economic growth, increasing and creating poverty traps, eroding food security (IPCC, 2014), and increasing the prices of food (Nelson et al., 2013), and the poor will be affected the most (Wlokas et al., 2012). Therefore, it is of great importance to include climate change adaptation in the Social Development Sector Program (SEDESOL).

The adverse effects of climate change will affect food security by affecting crop pollinators (FAO-IPCC, 2017), reducing the genetic diversity of crops (Scheffers et al., 2016), reducing the productivity of marine fisheries (Nye et al., 2009; Scheffers et al., 2016), and reducing the infrastructure required for the supply chain (OECD, 2017). The Agricultural, Fishing and Food Development Sector Program (SAGARPA) does consider *climate change adaptation* in the objectives *Natural resources use* and *Risk management*, but the component could also be included in the objectives that talk about Rural food shortage, and Agri-food sector improvement.

Given that the effects of climate change can damage infrastructure, such as roads, bridges, or buildings (OECD, 2017), *climate change adaptation* should be included in the Communications and Transportation Sector Program (SCT).

Furthermore, Mexico elaborates Risk Atlases, documents that diagnose, weigh and detect the dangers, vulnerabilities and risks in the geographical space, and integrate information on areas susceptible to be impacted by natural phenomena. The government agency that develops the Atlases is part of the Secretariat of the Interior (SEGOB), which also receives help from the Secretariat of Agrarian, Land and Urban Development (SEDATU). The Governance Sector Program (SEGOB) recognises that the magnitude and frequency of the natural disasters generate costs that can exceed the capacity of the government. It mentions that in the period 2004-2013 the fund for attending natural disasters was 59 times higher than the fund for preventing them. Even then, none of these sectoral programs consider *climate change adaptation*, that is closely related to disaster risk reduction.

In general, there is a low level of coherence between *disaster prevention/relief*, and *climate change adaptation* (see Annexe I). Even in the NDP, adaptation is not mentioned on the objective Disaster prevention. Linking the two policy components would increase the presence of *climate change adaptation* in 6 sectoral programs (SCT, SEDESOL, SHCP, SEDENA, SEGOB, SALUD, and SEDATU), increasing its presence in the governmental agenda, and the coherence between the secretariats.

4.7.3 Coherence and climate change mitigation

Climate change mitigation traditionally has received much more attention than adaptation (Füssel, 2007). This bias is reflected in the sectoral programs in Mexico, where the component *climate change mitigation* in considered in the Agricultural, Fishing and Food Development (SAGARPA), Energy (SENER), Navy (SEMAR), Foreign Affairs (SRE), Communications and Transportation (SCT), Environment and Natural Resources (SEMARNAT), and Tourism (SECTUR) sector programs, while *climate change adaptation* was considered only by 6 because SCT did not consider it on its sectoral program (see Figure 10). Given that Mexico is the 12th highest CO_2 emitter in the world (Global Carbon Atlas, n.d.), that the success of climate change mitigation policies depends on how well they are integrated with other sectoral policies (Tosun & Lang, 2017), and that mitigation can present co-benefits in other areas of interest (IPCC, 2014), *climate change mitigation* should be included in more sectors.

Climate change will increase the difficulty of reducing poverty (IPCC, 2014), therefore, the Secretariat for Social Development (SEDESOL) should consider it on its sectoral program. According to Wlokas et al. (2012), climate change mitigation could help combat poverty, and it should be aligned with developmental goals and policies. At the same time, the current development paths are based on fossil fuels (Wlokas et al., 2012), and for example not investing in the right type of development will lock us in a fossil fuel-dependent path (OECD, 2017), which would increase the adverse effects of climate change. Therefore, the Development Financing National Program (SHCP) should also consider the component *climate change mitigation.*

Including climate change mitigation (and adaptation) in the agendas of the sectoral programs would allow to increase access to international funds (Sumner, 2012; Wlokas et al., 2012). The Energy Sector Program (SENER) was the only one that mentions using climate change mitigation for financing programs. Given that Mexico does not have enough funds for addressing all the public problems (Cloete & Meyer, 2006), climate negotiations and financing could be considered by more sectors.

4.7.4 Coherence and poverty-alleviation

Among the four policy components of major interest for this study, *poverty-alleviation* is the one with the most coherence among the programs, since it is included in 10 out of 16 sectoral programs, the Agricultural, Fishing and Food Development (SAGARPA), Energy (SENER), Foreign Affairs (SRE), Health (SALUD), Agrarian, Land and Urban Development (SEDATU), Social Development (SEDESOL), Environment and Natural Resources (SEMARNAT), Education (SEP), Labour and Social Welfare Sector Program (STPS), and the Tourism (SECTUR) sector programs.

While the Secretariat for Social Development (SEDESOL) is the secretariat directly responsible for the poverty-alleviation programs, the secretariats of Labour and Social Welfare (STPS), Education (SEP), and Health (SALUD), are responsible for three other dimensions of poverty (economic wellness, education, and health, respectively) considered in the multidimensional definition of poverty used in Mexico (CONEVAL, 2018). None of these secretariats considered climate change or biodiversity in their sectoral programs. To

date, the increase in the budget and number of social programs has not been enough for substantially reducing poverty in Mexico. As mentioned in the literature review, climate change, biodiversity, and poverty are closely related, therefore, including *climate change adaptation*, *climate change mitigation*, and *biodiversity conservation* in the discourse of the four secretariats mentioned in this paragraph, could potentially increase their effectiveness when addressing poverty.

In the last two decades in Mexico, social policy has evolved towards better-designed programs that are periodically evaluated (Pérez, Maldonado, & Hernández, 2015; CONEVAL, 2019). But the problem of agencies working separately without sharing information, and programs being redundant, executing the same actions, having the same objectives, and targeting the same population still persists (ASF, 2013; Cejudo & Michel, 2017). Poverty reduction requires better coherence in developmental policies (OECD/DAC, 2001).Despite the increase in the number of social programs and the almost 75% increase in expenditure on social development (Cejudo & Michel, 2017; Hernandez-Trillo, 2016), poverty has remained almost the same (CONEVAL, 2015). Since the sum of disjointed policies is not the solution for public problems (Cejudo & Michel, 2016), increasing the coherence between *climate change adaptation* and *mitigation*, *biodiversity conservation*, and *poverty-alleviation*, has potential for improving the results of the current social development policies in Mexico.

There are many ways of improving policy coherence between the four policy components of interest. As it was presented in Chapter 2, they are closely related to each other. For these reasons it would be easy to insert them in different objectives of the NDP and the sectoral programs, which would increase the coherence between them.

Chapter 5: Conclusions

5.1. Introduction

This chapter presents a summary of the main findings. The findings are divided in relation to the objectives used for answering the research question: What lessons can be learned from analysing the coherence between the National Development Plan and the sectoral programs of Mexico, with a special focus on: climate change adaptation, climate change mitigation, poverty-alleviation, and biodiversity conservation? It later presents the conclusions, limitations and some recommendations for further studies.

5.2 Summary of findings in relation to the objectives of the study

This research aimed to determine if there is coherence between the objectives of the NDP and the sectoral programs of Mexico with a special focus on climate change adaptation, climate change mitigation, poverty-alleviation, and biodiversity conservation. The policy documents analysed were from the presidential period 2013-2018. They were analysed using the discourse network analysis method.

5.2.1 Discursive structure: policy components

The qualitative content analysis of the policy documents allowed to determine a list of 34 policy components. The policy components that dominate the discourse of the NDP were *economic development*, *economy & finance*, and *poverty-alleviation*. The discourse of the sectoral programs was dominated by the same components, but also included *infrastructure*. However, if education, social security, health, and food security, that are the components considered in the multidimensional definition of poverty in Mexico are included in the network, then *poverty-alleviation* becomes the most dominant component in both the NDP and in the sectoral programs. The components that received the least attention in the sectoral programs and on the NDP were *justice* and *democracy*.

5.2.2 Conceptual clarity: policy coherence

There is no conceptual clarity for the concept of policy coherence. Not even the *Technical Guide for the Elaboration of the Programs Derived from the NDP 2013-2018* that presents the strategy for achieving coherence, offers a definition for it. The term is also not included in the *National Planning Law*. Only the Development Financing National Program (SHCP) mentions coherence as such. The other sectoral programs and the NDP use other terms related to coherence, such as concurrence, alignment, articulation, but they do not present a definition for them.

5.2.3 Vertical coherence

The content analysis did not identify any negative relation agreement between the objectives (results depicted in Table 3). No objective was designed in a way that its achievement would undermine the achievement of another objective. Therefore, and according to the definition of policy incoherence by Fukasaku et al. (2005), it is concluded that there is no vertical policy incoherence.

The results of the content analysis in combination with the affiliation matrix allowed to determine that according to the approach for achieving coherence stated in the *Technical Guide for the Elaboration of the Programs Derived from the NDP 2013-2018*, there is vertical coherence between the NDP and the sectoral programs.

5.2.4 Horizontal coherence

No objective of the sectoral programs was getting undermined or obstructed by another objective, therefore, it is concluded that there is no horizontal incoherence between the sectoral programs.

At the sectoral level, the actor congruence matrix and network allowed to determine that there is coherence between all the sectoral programs, however, sometimes, at a very low level, with programs sharing only 2 policy components. A medium level of coherence was found between the discourse coalition formed by SAGARPA, SEMARNAT, SRE, SENER, and SECTUR; this implies that their sectoral programs complement each other, but still leave

gaps in addressing public problems. Since each sectoral program belongs to a different policy domain, the results of this can also be used to discuss coherence between policy domains.

5.2.4 Coherence between climate change mitigation, climate change adaptation, biodiversity conservation, and poverty-alleviation

The discourse network analysis provides different tools that allowed to analyse coherence between the four policy components from different perspectives. The affiliation network between the four components showed that there was low coherence; only 13 secretariats formed part of the network. Using the actor congruence network including only the four components allowed to see that most of the links between the secretariats were formed through the component *poverty-alleviation*. When excluding *poverty-alleviation* from the analysis, only 8 secretariats formed part of the network.

A concept congruence network allowed to identify that the lowest degree of coherence was between *poverty-alleviation* and *biodiversity conservation*. With an affiliation network of the four components, including co-occurrence within the objectives, it was possible to have a more detailed insight. It showed that only 2 objectives out of the 116 included in the NDP and the sectoral programs covered the four main topics at the same time. Therefore, it was concluded that there is low coherence between *climate change mitigation*, *climate change adaptation*, *biodiversity conservation*, and *poverty-alleviation*

5.3 Conclusions

This thesis presented a novel policy-analytical approach for assessing policy coherence. It proposes that discourse network analysis is an appropriate method for determining the policy components in the governmental agenda and to determine if there is vertical and horizontal coherence between the objectives of different policies and policy domains.

The lessons learned by analysing the coherence between the NDP and the sectoral programs were that there is no conceptual clarity around the concept of policy coherence in the programs. The guidelines presented by the government for achieving policy coherence are only effective for vertical coherence between the NDP and the sectoral programs. The

coherence between the sectoral programs is low, and half of the sectoral programs do not consider environmental components in their discourse. And finally, that there level of coherence between *climate change mitigation*, *climate change adaptation*, *biodiversity conservation*, and *poverty-alleviation* is very low.

The analysis allowed to corroborate that the guidelines established for achieving policy coherence by the Mexican government in the *Technical Guide for the Elaboration of the Programs Derived from the NDP 2013-2018* are enough for achieving vertical policy coherence, but not for achieving horizontal policy coherence at the sectoral level. The results agree with previous studies that consider a mistake to assume policy coherence can be achieved if each public policy is connected to an objective of the National Plan (Cejudo & Michel, 2016; CEPAL, 2003).

For the analysis of the coherence between *climate change mitigation*, *climate change adaptation*, *biodiversity conservation*, and *poverty-alleviation,* the discourse network analysis showed that there was some coherence between some secretariats. However, the same coded information allowed to have a deeper insight into the interactions using actor congruence networks, a concept congruence network, and an affiliation network that analysed if the four policy components co-occurred in the same objective. Only 2 out of the total of 116 objectives analysed in the programs included the four policy components. Therefore, it is concluded that there is lack coherence between *climate change mitigation*, *climate change adaptation*, *biodiversity conservation*, and *poverty-alleviation.*

While scholars have not been able to find a way to effectively operationalise the degree of commonality between policies and between policy domains (May, Sapotichne & Workman, 2006; Nilsson et al., 2018), the results of this study suggest that discourse network analysis is a good method for achieving it. It is also good for identifying windows of opportunity for increasing the coherence between policies.

This analysis is the first one that focuses in coherence between these four policy components. It will increase the very scarce literature on Mexico's policy coherence, providing empirical evidence that allows to find windows of opportunity for improving the coherence between sectoral programs in the future.

5.4 Limitations and recommendations

Because of the scope of the study, it was not possible to analyse in depth the interaction and coherence between all the policy components. However, the outputs of this discourse analysis could be used for those purposes in the future.

In line with the idea that conceptual clarity is essential for assuring that the concepts reflect their intended meaning (Cejudo & Michel, 2017), it is recommended that a definition of policy coherence is included in the NDP, in the *Technical Guide for the Elaboration of the Programs Derived from the NDP 2013-2018* and in the *National Planning Law*.

While the results are a static recording of the policy documents in the presidential period 2013-2018, and they cannot reflect the dynamics in the policy process over time, they can be used for analysing changes in time. Repeating this analysis at other levels of national planning would increase the understanding of policy coherence.

The results of this study can be used by policy-makers for identifying where they can focus for improving policy coherence at the sectoral level.

Even though the generalisability of the results is limited due to the changing nature over time and across nations of policy components, they can be used as a baseline for analysing changes in time, for comparing them to other levels of national planning, or for comparing governmental agendas between countries.

6. References

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SEDESOL: Secretaría de Desarrollo Social. 2013. *Programa Sectorial de Desarrollo Social 2013-2018*. México.

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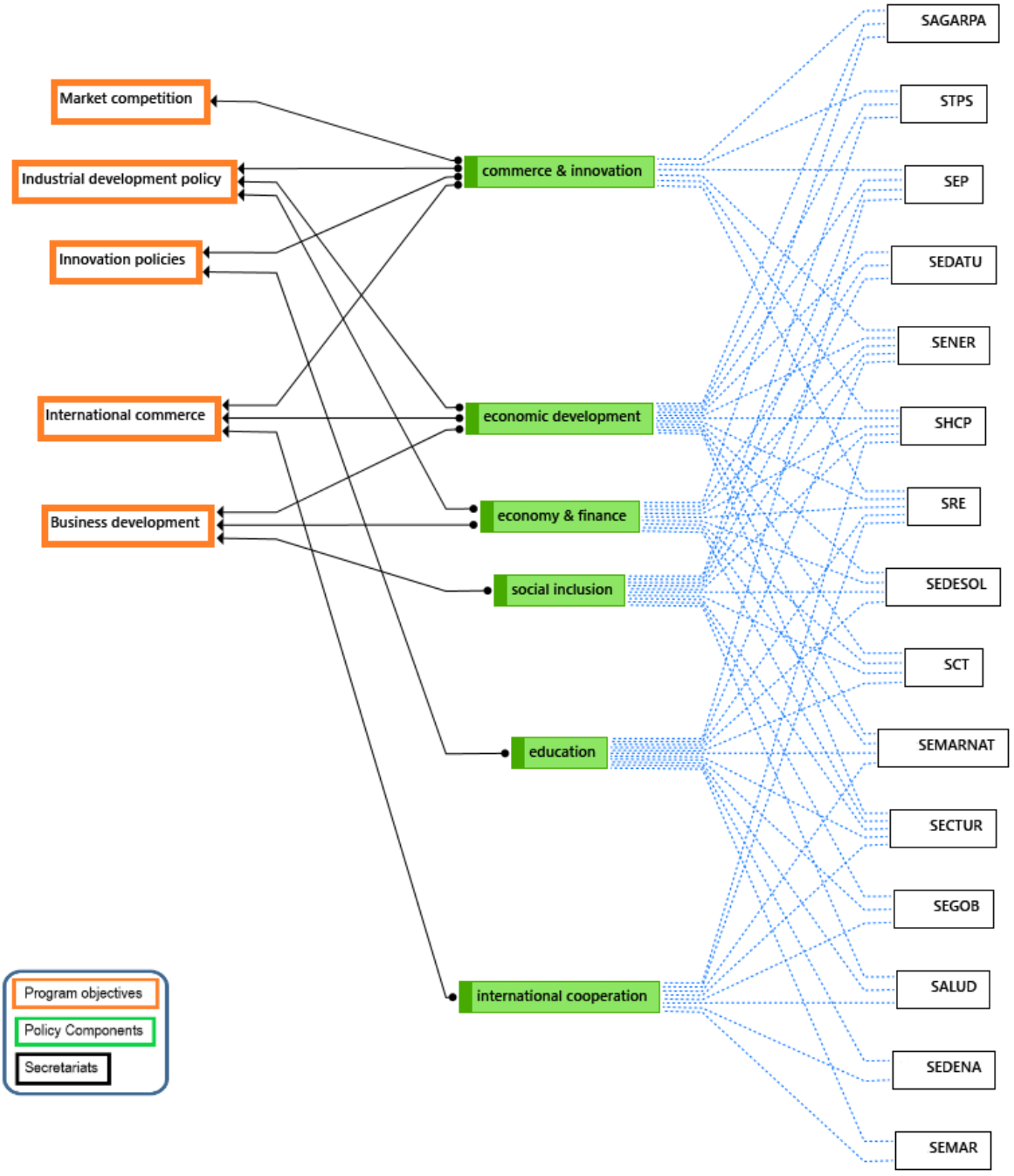
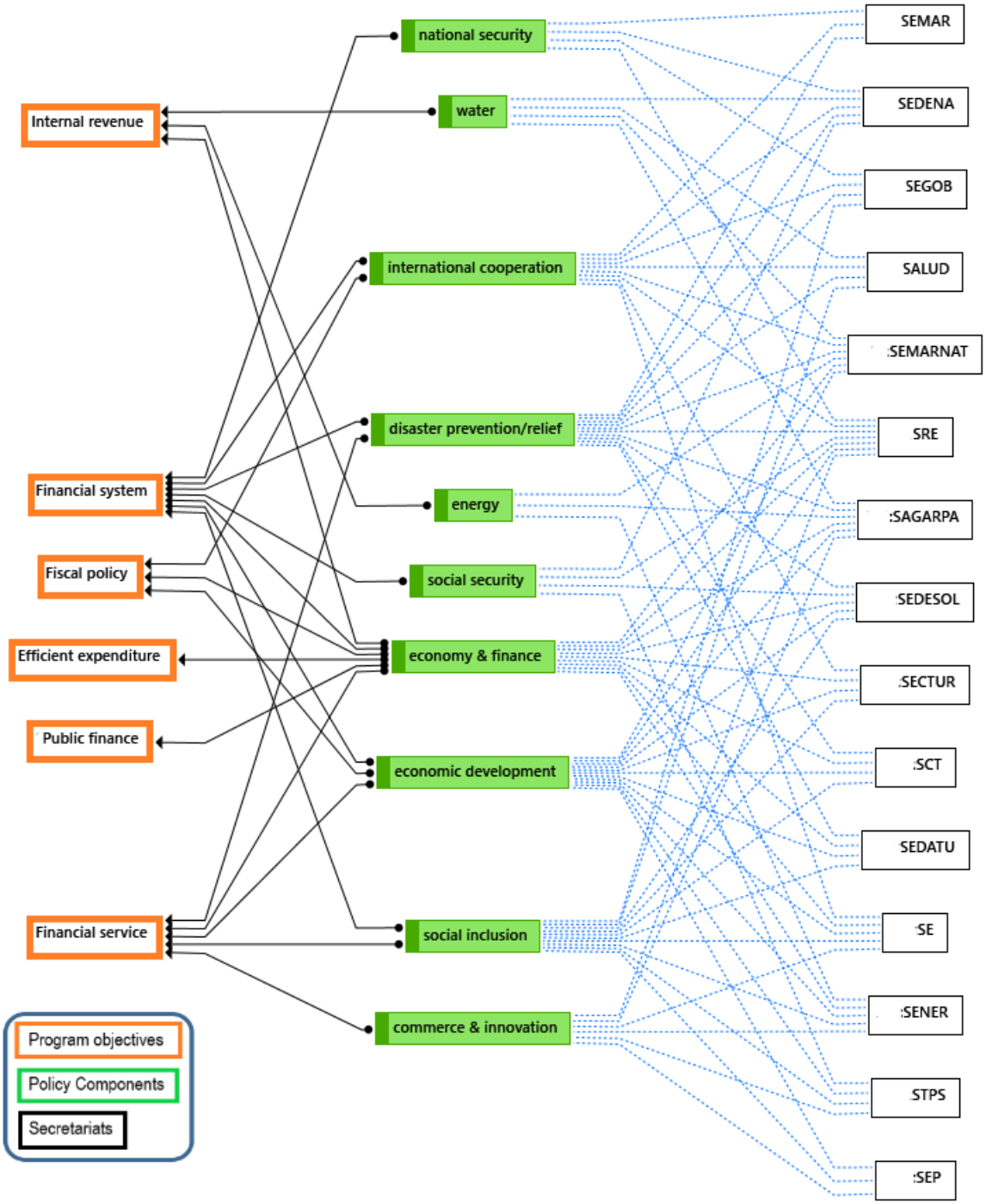
Annexe I

Fig. I.1 Discursive structure and affiliation network of the Secretariat of Economy (SE) according to its sectoral program



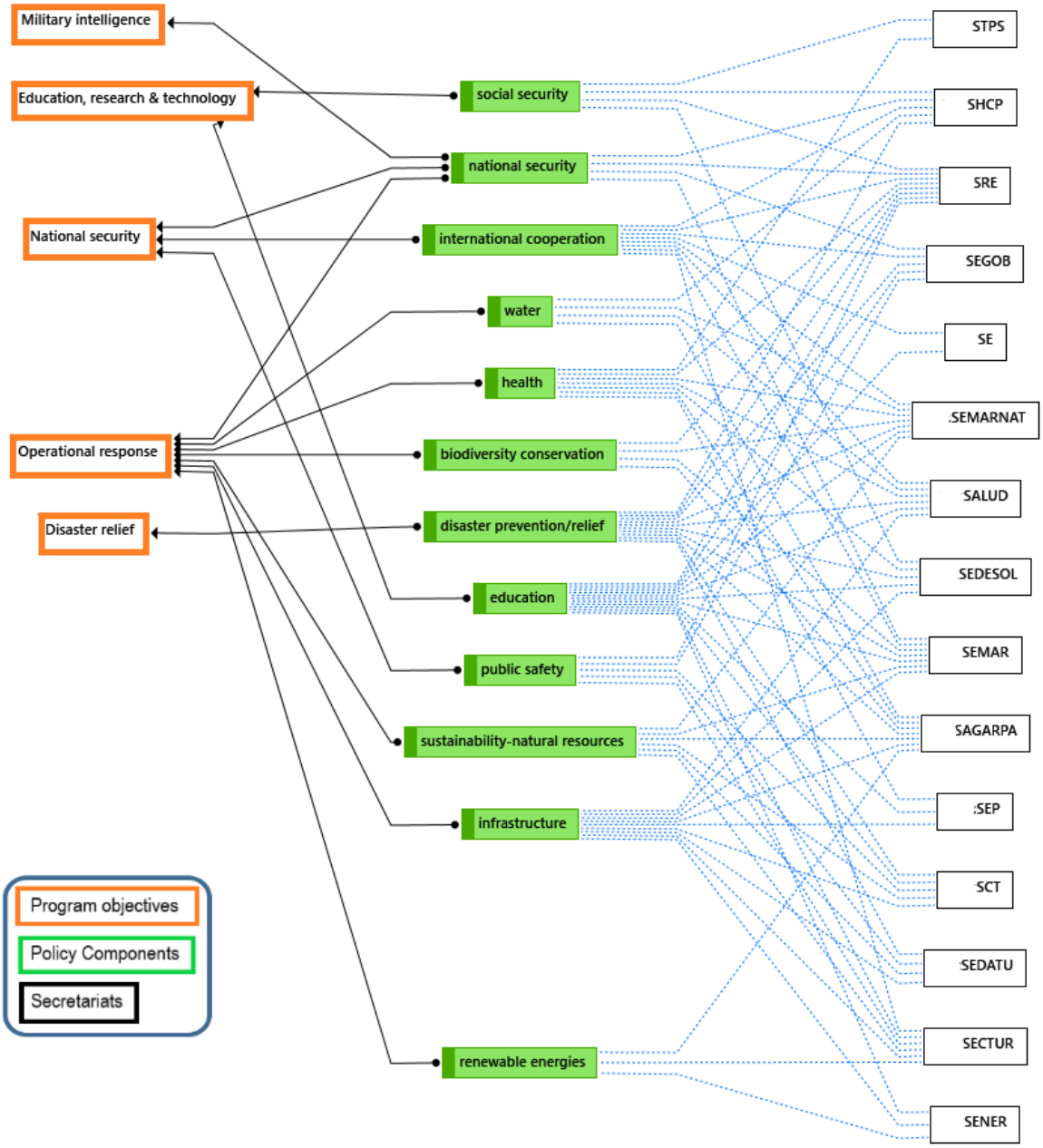
Source: Author

Fig. I.2 Discursive structure and affiliation network of the Secretariat of Finance and Public Credit (SHCP) according to its sectoral program



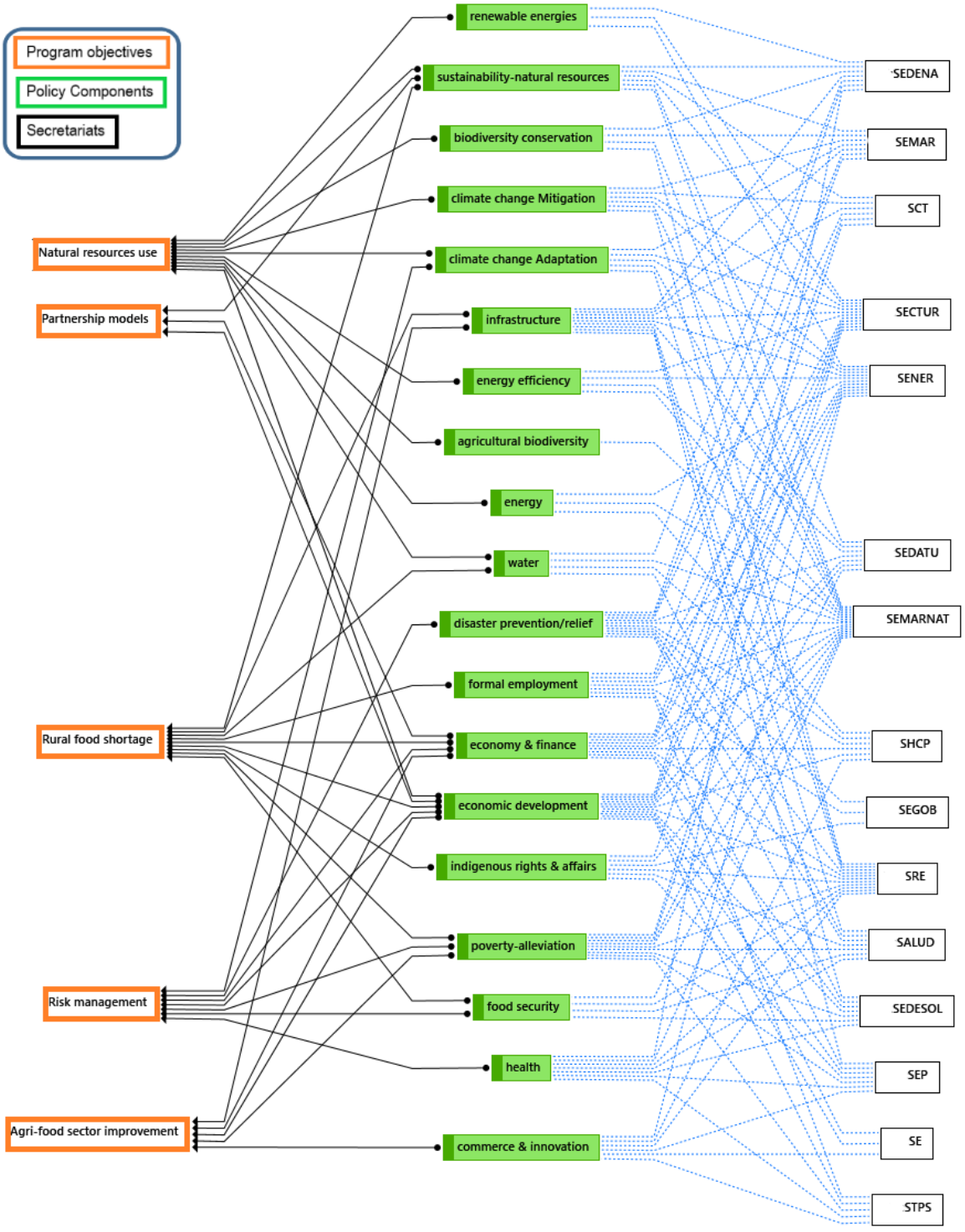
Source: Author

Fig. I.3 Discursive structure and affiliation network of the Secretariat of National Defence (SEDENA) according to its sectoral program



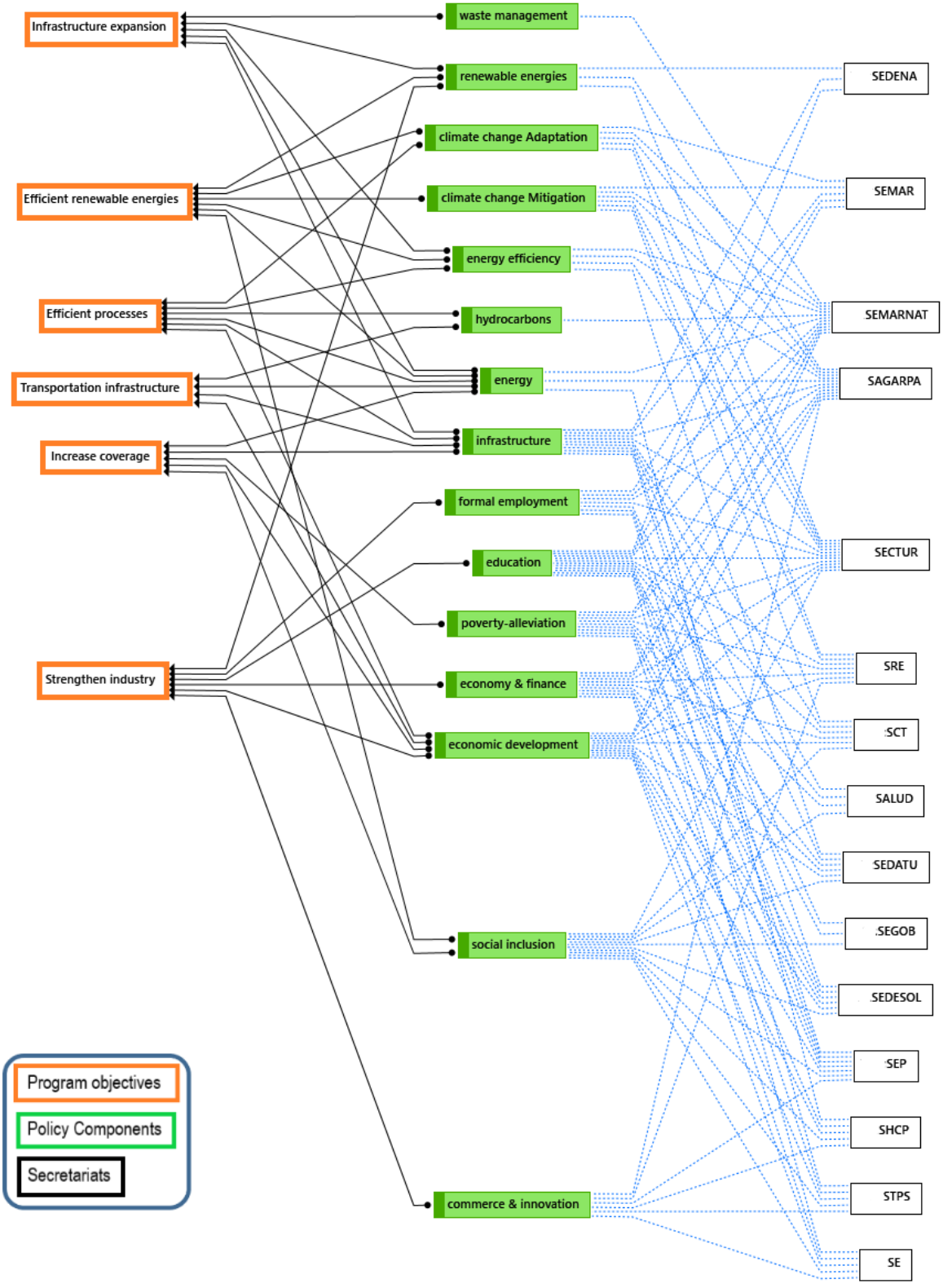
Source: Author

Fig. I.4 Discursive structure and affiliation network of the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) according to its sectoral program



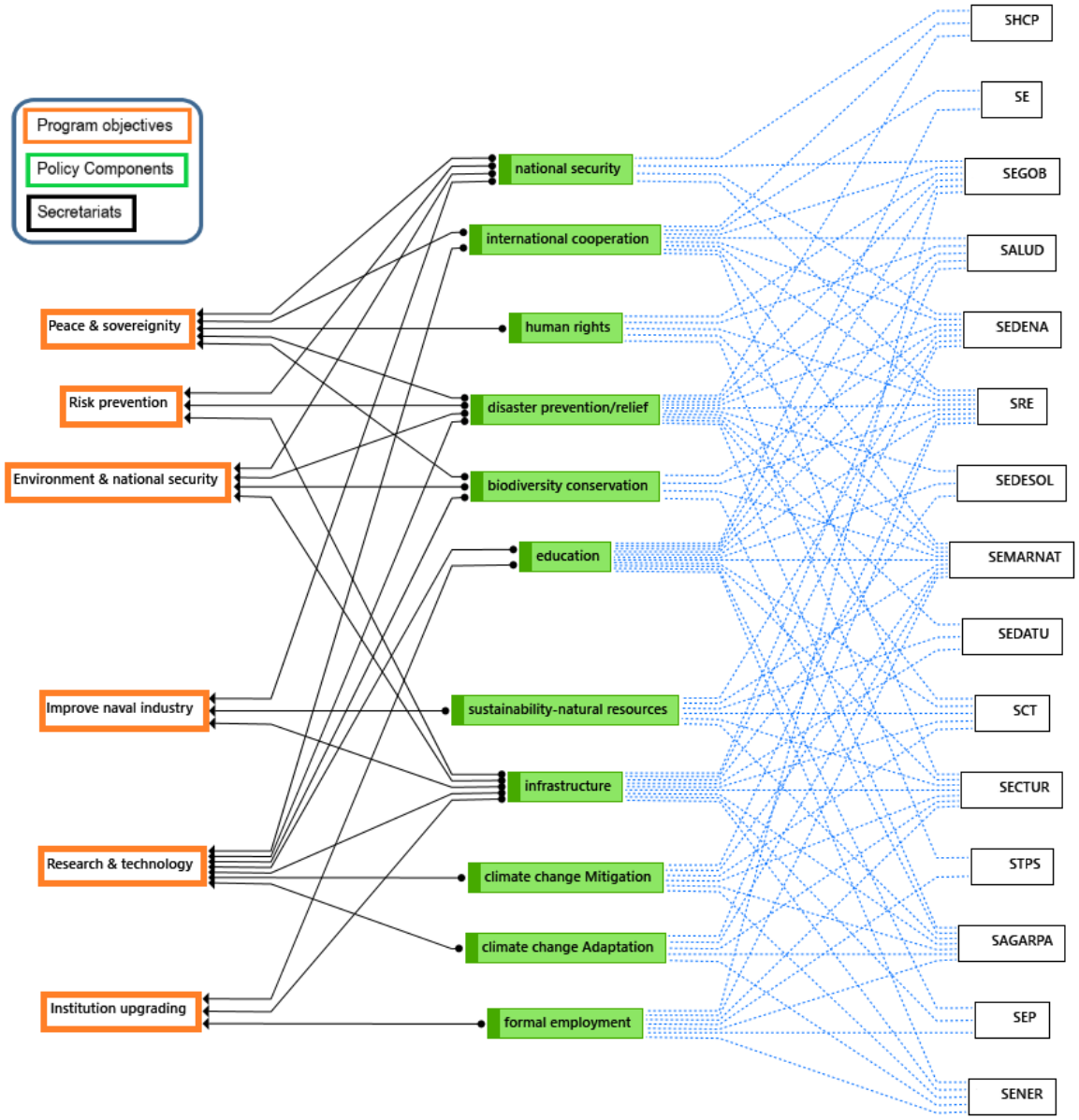
Source: Author

Fig. I.5 Discursive structure and affiliation network of the Secretariat of Energy (SENER) according to its sectoral program



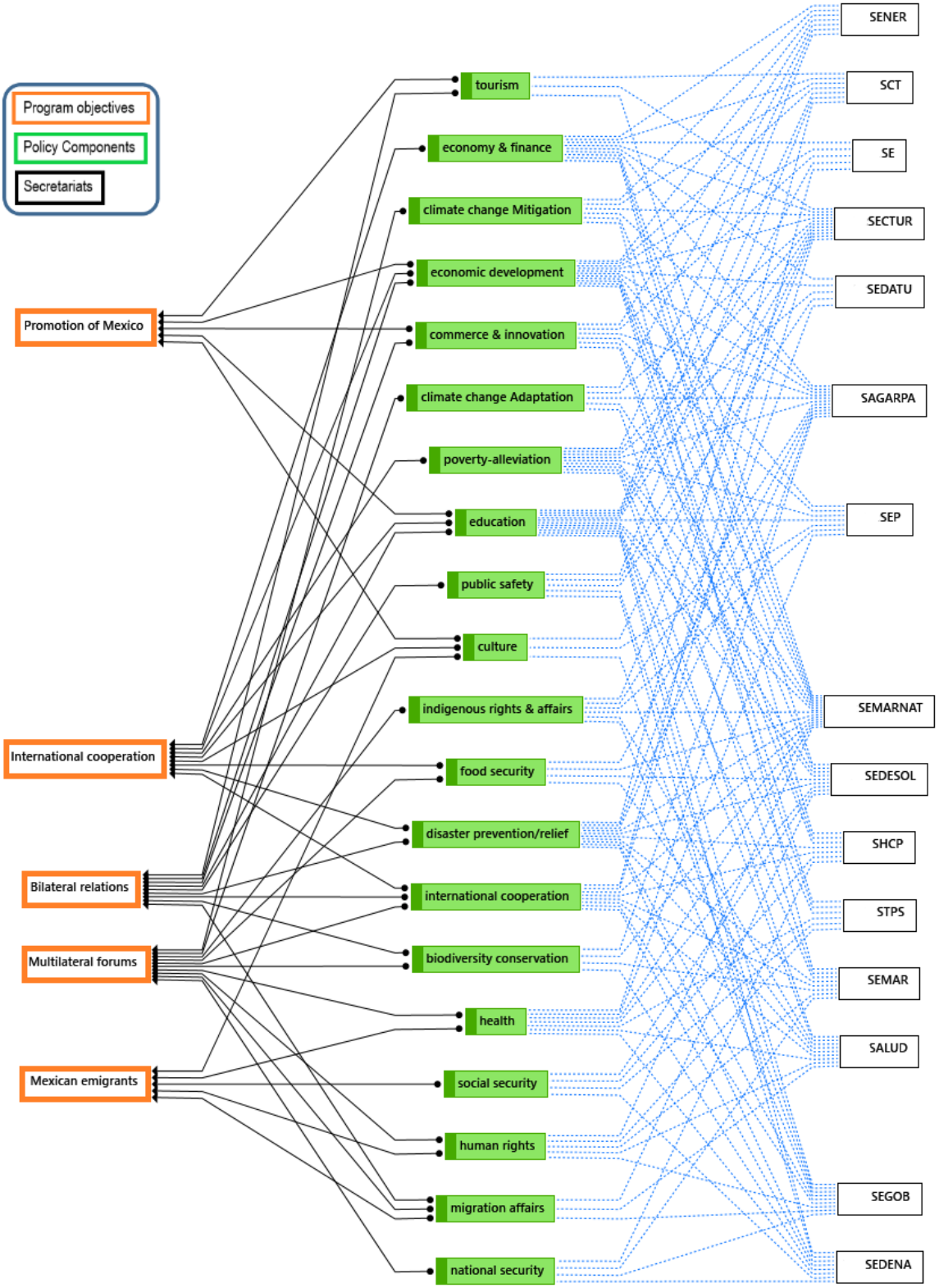
Source: Author

Fig. I.6 Discursive structure and affiliation network of the Secretariat of Navy (SEMAR) according to its sectoral program



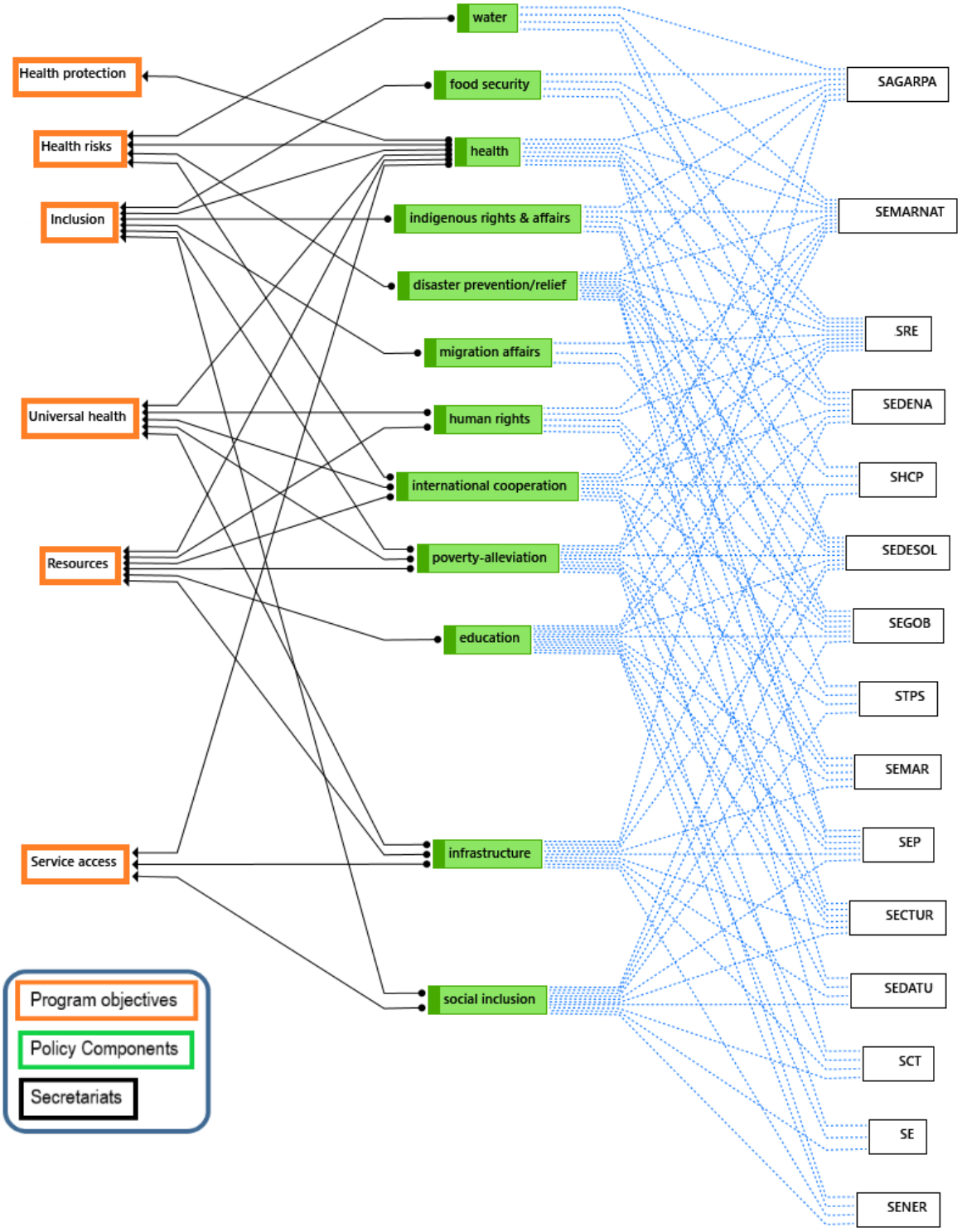
Source: Author

Fig. I.7 Discursive structure and affiliation network of the Secretariat of Foreign Affairs (SRE) according to its sectoral program



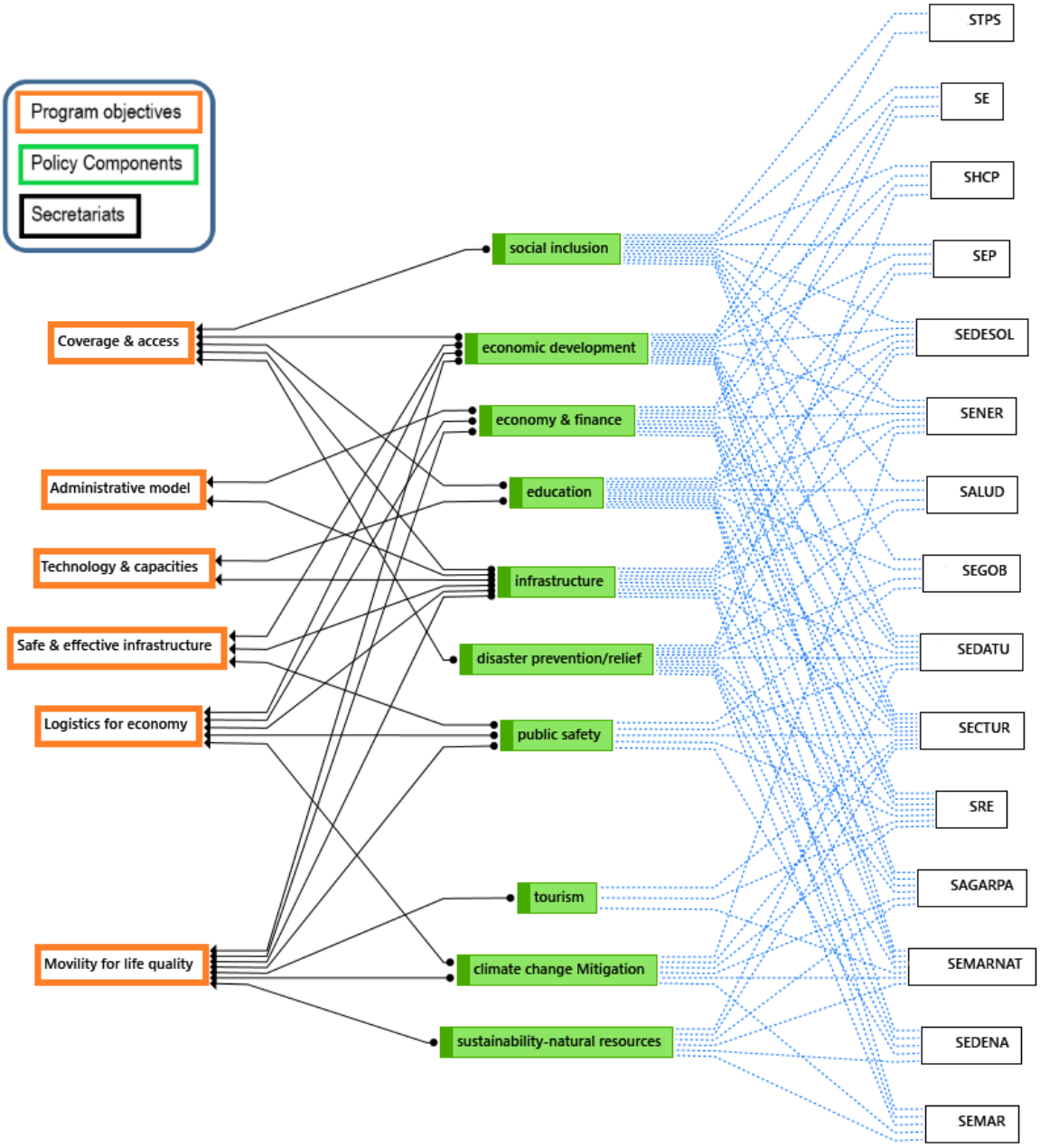
Source: Author

Fig. I.8 Discursive structure and affiliation network of the Secretariat of Health (SALUD) according to its sectoral program



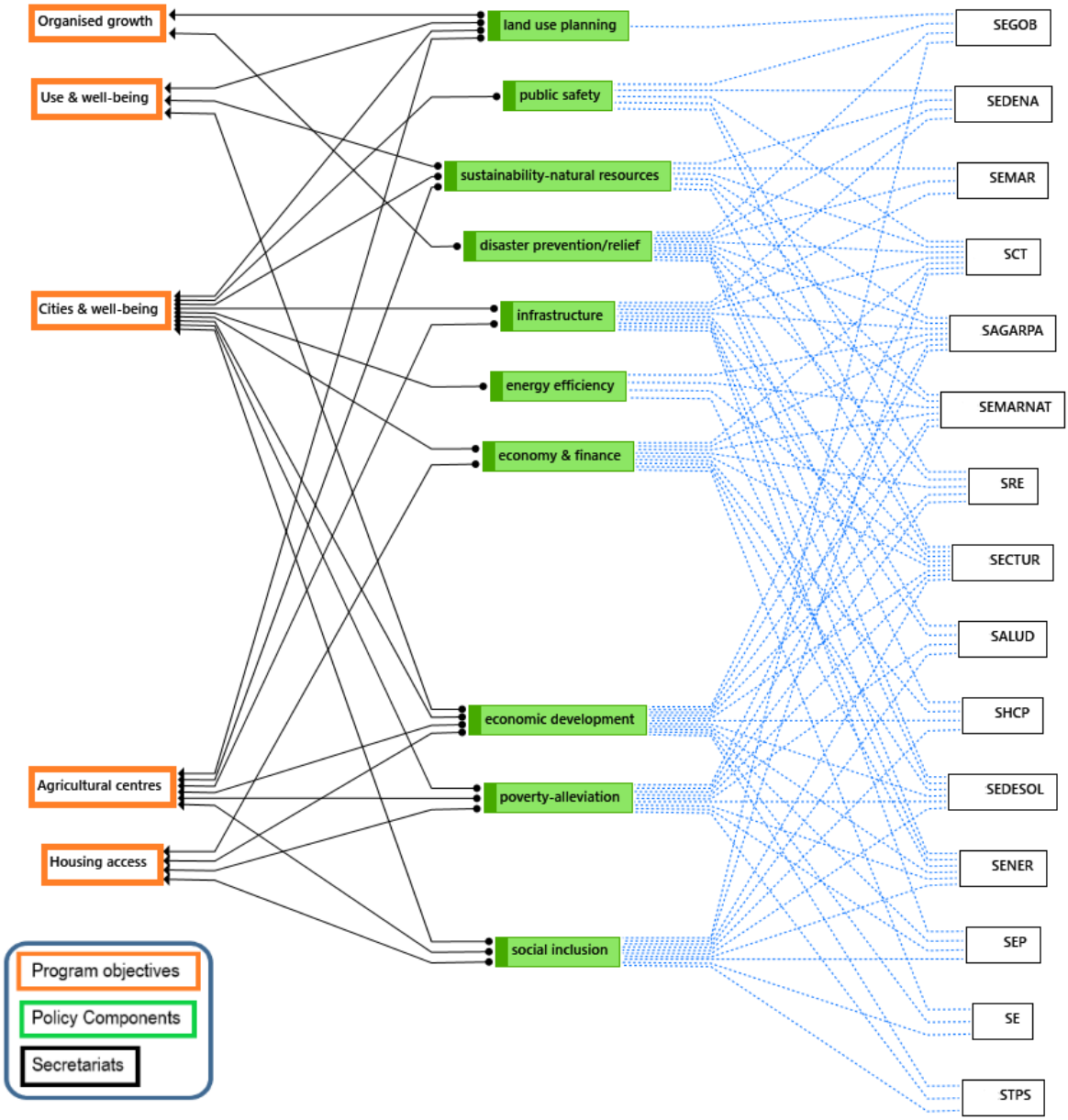
Source: Author

Fig. I.9 Discursive structure and affiliation network of the Secretariat of Communications and Transportation (SCT) according to its sectoral program



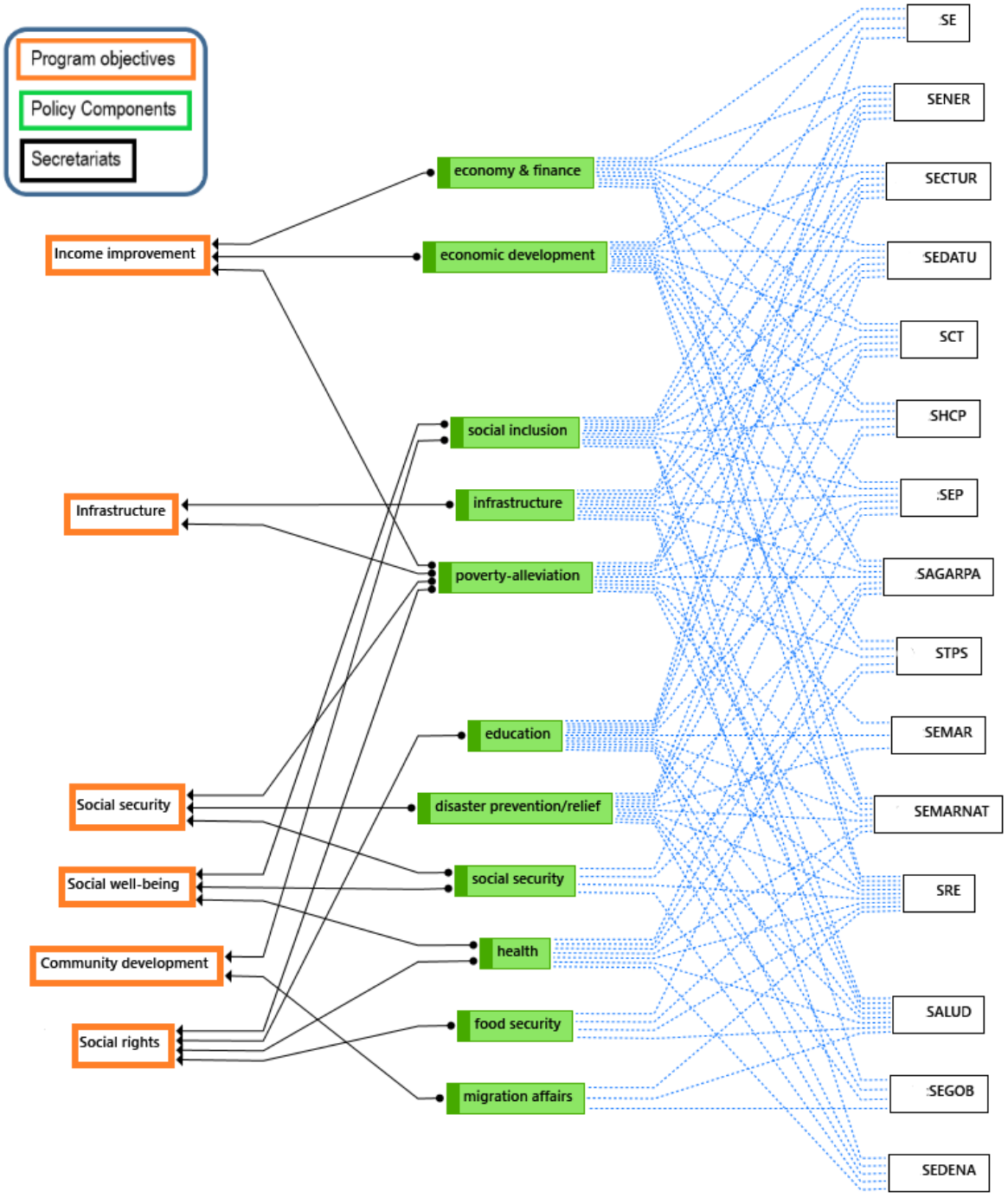
Source: Author

Fig. I.10 Discursive structure and affiliation network of the Secretariat of Agrarian, Land and Urban Development (SEDATU) according to its sectoral program



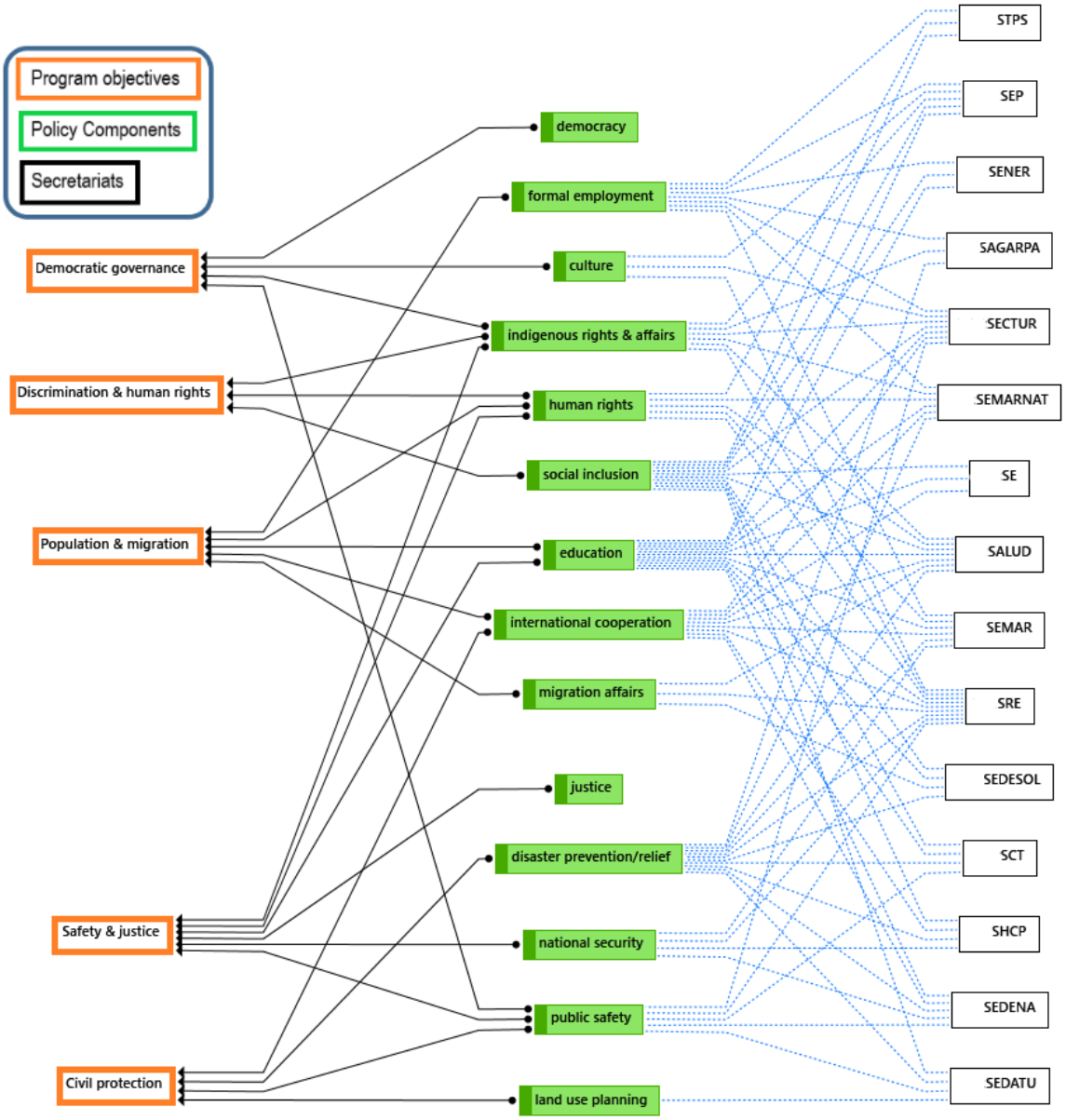
Source: Author

Fig. I.11 Discursive structure and affiliation network of the Secretariat of Social Development (SEDESOL) according to its sectoral program



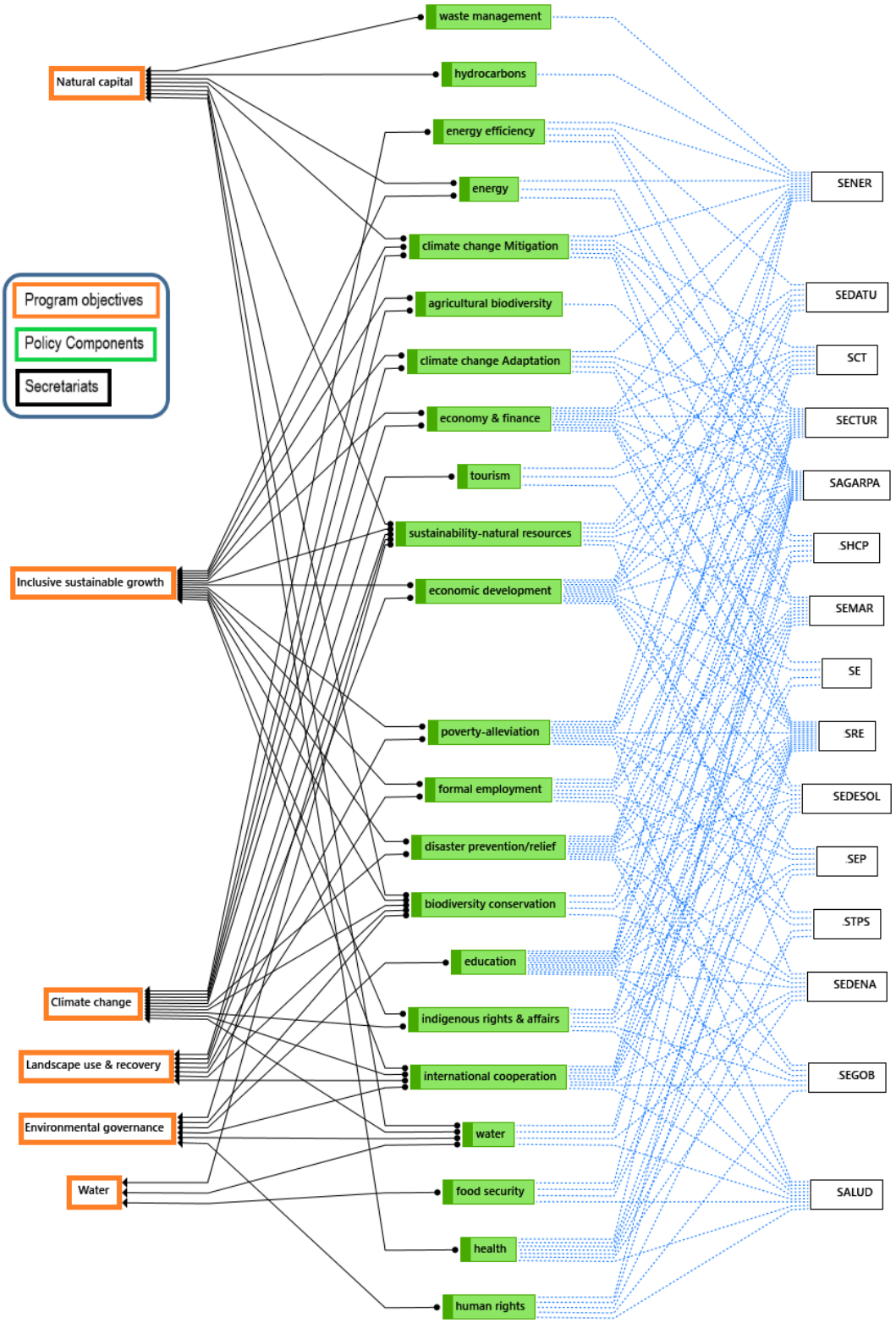
Source: Author

Fig. I.12 Discursive structure and affiliation network of the Secretariat of the Interior (SEGOB) according to its sectoral program



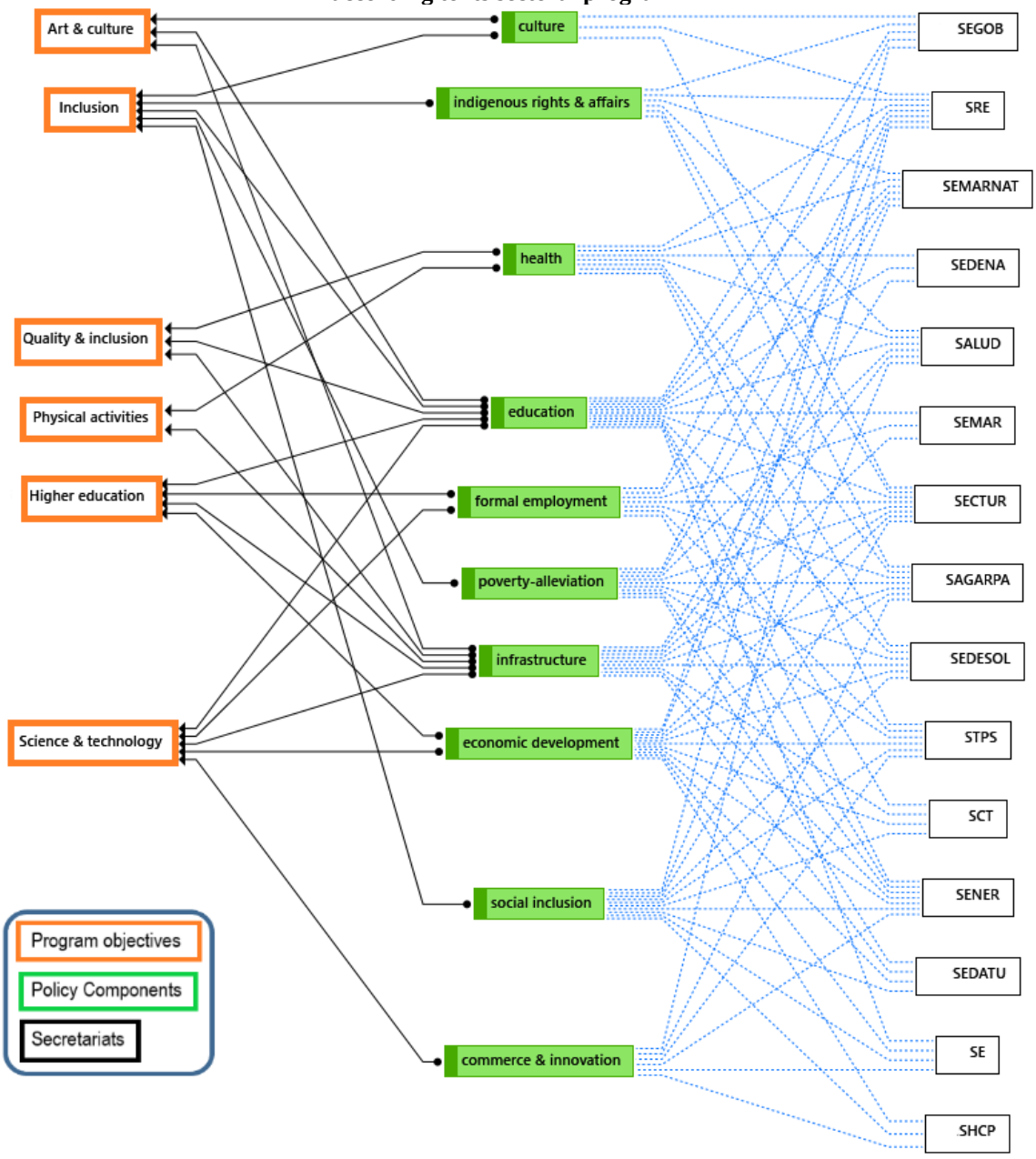
Source: Author

Fig. I.13 Discursive structure and affiliation network of the Secretariat of Environment and Natural Resources (SEMARNAT) according to its sectoral program



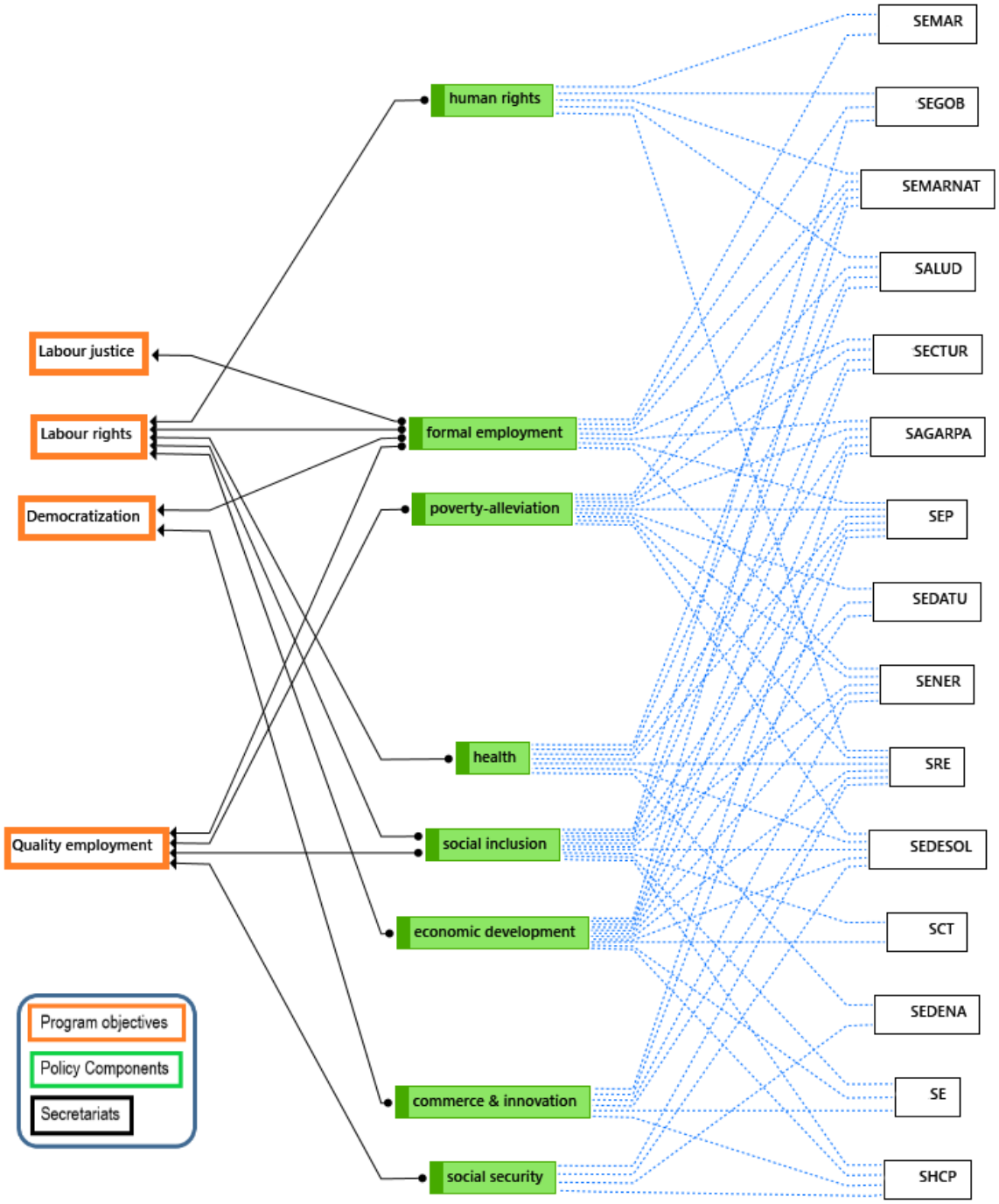
Source: Author

Fig. I.14 Discursive structure and affiliation network of the Secretariat of Public Education (SEP) according to its sectoral program



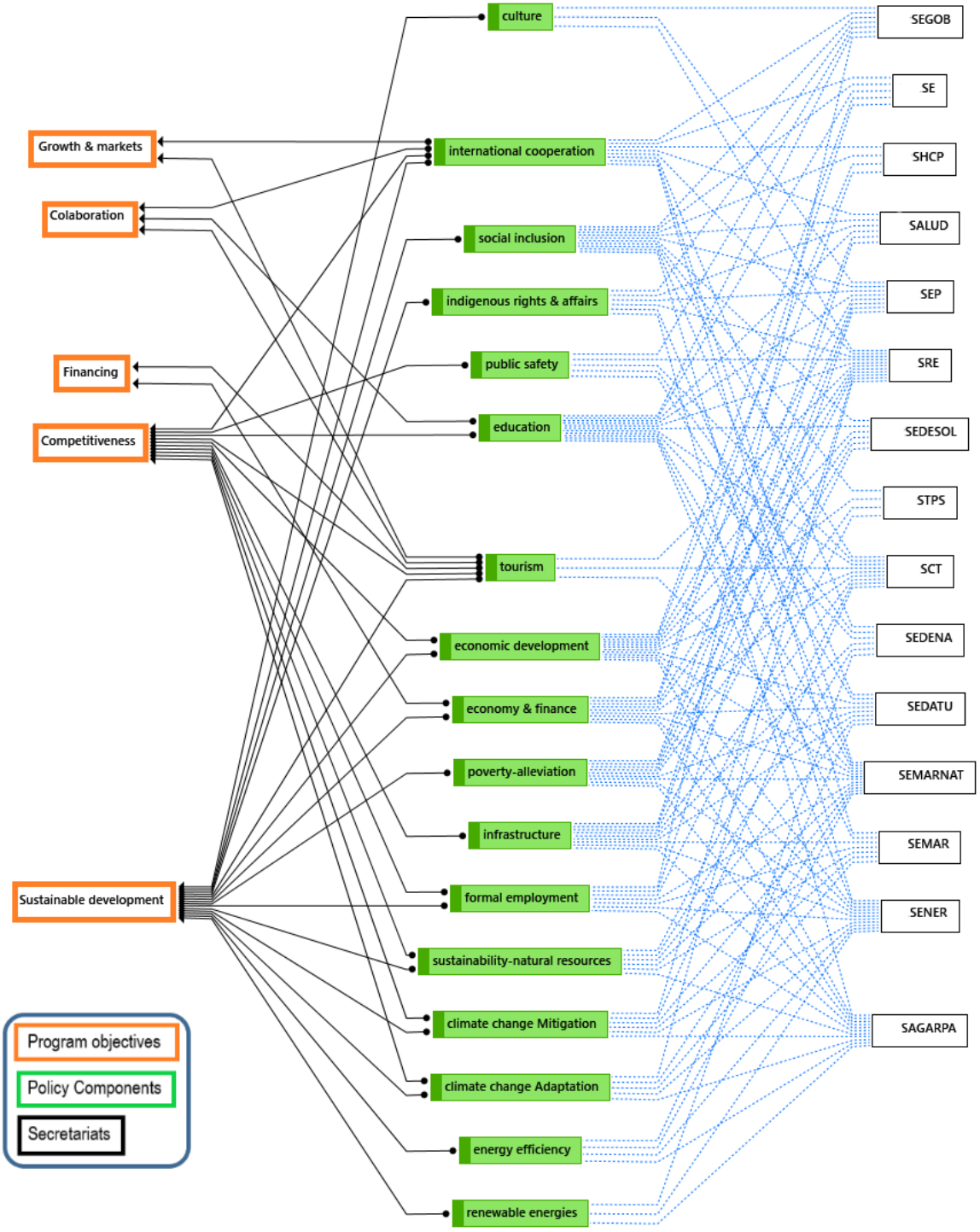
Source: Author

Fig. I.15 Discursive structure and affiliation network of the Secretariat of Labour and Social Welfare (STPS) according to its sectoral program



Source: Author

Fig. I.16 Discursive structure and affiliation network of the Secretariat of Tourism (SECTUR) according to its sectoral program



Source: Author