



Modelling Normative Coherence for Resilience: A Methodological Proposal for Addressing Socio-ecological Vulnerabilities

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Abstract

Policy research on resilience is both timely and necessary. The heightened attention to crises in global affairs, such as the Covid-19 pandemic and climate change, as well as their relationships to policy, have made resilience a popular concept for a diverse set of actors including policy-makers, economists, psychologists, educators and academics. Perceptions of vulnerability have provoked an emerging focus on resilience because it provides reassurance. At the same time, resilience remains opaque because it is presented by a variety of actors in different ways. This report examines how well sustainable development policies address vulnerabilities and promote resilience. It forwards a model for understanding the relationship between development policies and resilience based on the existing concept of normative coherence for sustainable development (NCSO). The question to which this article responds, asks: How normatively coherent are development policies with the concept of resilience? The report derives from the TRASSE (Trajectories of Social-Ecological Systems in Latin American Watersheds: Facing Complexity and Vulnerability in the context of Climate Change) research project which is a multinational effort funded by the Mexican National Council for Science and Technology (CONACyT-Mexico) and the French National Agency for Research (ANR-France). Empirical research has been conducted on the state development plan of Oaxaca, Mexico (2016-2022) in relation to resilience in the Copalita watershed.

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I. Introduction

Policy research on resilience is both timely and necessary. The heightened attention to crises in global affairs, such as the Covid-19 pandemic and climate change, as well as their relationships to policy, have made resilience a popular concept for a diverse set of actors including policy-makers, economists, psychologists, educators and academics. Perceptions of vulnerability have provoked an emerging focus on resilience because it provides reassurance (Lucero Álvarez et. al., 2021). At the same time, resilience remains opaque because it is presented by a variety of actors in different ways (Lerner, 2006; Ungar, 2021). It is seen as both a means to achieve sustainability and an end unto itself. (Ungar, 2019). It is recognized as a psychological resource (Fletcher & Sarkar, 2013), a teaching objective in education, a characteristic of territorial systems (Nienaber, 2012), and a policy goal (Coaffee et. al., 2018). The common thread amongst these approaches is the basic understanding that the term regards the ability of individuals, societies and systems to maintain their integrity when affected by external shocks (Ungar, 2018).

Consequently, the starting point for research on resilience must be an understanding of vulnerability. Since the start of the Covid-19 pandemic, the medical journal *The Lancet* has published numerous editorials related to the redefinition of vulnerability in response to the pandemic (*The Lancet*, 2020; Ahmad et. Al., 2020), contending that “more ground-work is needed to shift the landscape from an individual pathologizing of capacity, autonomy, and agency to the identification of divisions that define vulnerability within cultures, communities, and particular social groups” (Ahmad, et. al., 2020, p. 2). Not only does vulnerability result from individual response capacities but it arises from the interaction between individual coping

abilities and systemic characteristics that either reinforce or undermine the potential for agency amongst members of society (Ungar, 2021). Public policy is a key characteristic of such systems.

Consequently, this report examines how well sustainable development policies address vulnerabilities and resilience. Scholars, such as González-Quintero and Avila-Foucat observe that “attributes of the system primarily using indicators are preferred over analyzing causal relationships with models” (González-Quintero & Avila-Foucat, 2019, p. 1). Building on this reflection, this research forwards a model for understanding the relationship between development policies and resilience based on the existing concept of normative coherence for sustainable development (NCSD). The question to which this article responds, asks: How normatively coherent are development policies with the concept of resilience?

This report derives from the TRASSE (Trajectories of Social-Ecological Systems in Latin American Watersheds: Facing Complexity and Vulnerability in the context of Climate Change) research project which is a multinational effort funded by the Mexican National Council for Science and Technology (CONACyT-Mexico) and the French National Agency for Research (ANR-France). Its objective is to operationalize a theory of change for the sustainability of Social-Ecological Systems in rural-urban tropical watersheds and their vulnerability in the context of Climate Change.

The report is divided into six sections. Following this introduction, part two positions the research in the literatures on vulnerability and resilience. Part three introduces normative coherence for development as the conceptual approach through which resilience is examined. Part four presents the methodology utilized for this research and introduces the research case. This framework is implemented in empirical research in part five and part six presents the article’s conclusions.

II. Analytical foundations: The Social Construction of Vulnerabilities and Resilience

Vulnerability and resilience scholarship has evolved significantly, moving away from portrayals of these paradigms as static conditions towards understandings based on dynamic interactive processes. Contemporary research has its roots in the social risk literature and the recognition of “coupled systems” has emerged to address increased complexity in a globalized world.

The Social Construction of Vulnerability

This project starts with the premise that vulnerability is socially constructed, embedding individuals in the systems in which they live. This approach derives from social theories of disasters. Social scientists (see García Acosta, 2018) have observed that “functionalist” approaches to disasters do not include attention to the vulnerability established by social systems characterized by inequality, marginalization, power differentials and inequitable access to resources. Addressing this oversight, Social Risk Construction Theory identifies specific types of risk as joint products of knowledge and acceptance according to social perceptions (Gran Castro & Ramos de Robles, 2021). Recent works focused on the social production of inequality as the basis of risk construction (García Acosta, 2018; Aguilar León, 2018). Many works in disaster studies specifically examine the impact of social marginalization on risk which is defined as exposure to the impacts of external shocks (Wilches-Chaux, 2017).

According to García Acosta (2018), vulnerability is a variable closely related to existing internal contradictions, the hierarchy of functions in any society, and the social complexity that underlies each disaster. Gustavo Wilches-Chaux (1993) proposes a classification of 10 types of vulnerability that lead to differentiated effects of the impact of a physical event on a particular social matrix. Some typologies that are relevant for this article include: physical (or localized)

vulnerability which is related to the location of large population groups in areas of high physical risk, under conditions of poverty and lacking alternative relocation options; economic vulnerability which is linked to poverty, the scarcity of economic resources including economic dependency at the community level; social vulnerability which refers to the low degree of organization and internal cohesion of communities at risk; political vulnerability which refers to the centralization of decision-making as a factor that weakens the levels of local autonomy to decide the most appropriate action strategies and ecological vulnerability referring to development models that dominate and destroy environmental reserves, leading to vulnerable ecosystems incapable of self-adjustment.

These elements have been reorganized into social-ecological vulnerability, where vulnerability depends on the exposure, and the sensitivity of the community or households. The sensitivity depends on the access to assets divided into human, social, physical, financial and natural ones. In addition, the internal (from the household) and external (planning policies) response capacities are also elements of vulnerability. During the period of damage, exposure will depend on the magnitude of the shock and on the immediate capacity to respond. Since vulnerability is viewed as the propensity for damage, a household or a community can be made more vulnerable after an event if he is not resilient.

The vulnerabilities presented by Wilches-Chaux provide an interesting lens through which to analyze the interaction between public policies and vulnerabilities in local communities. First, this approach indicates that vulnerability is not a monolithic concept, but it is differentiated. Second, building resilience to address a specific vulnerability may neglect or even undermine others. For this reason, policy-focused research must examine the causes of vulnerabilities and address them simultaneously. Moldes, Koff, Da Porto & Lipovina (2021)

illustrate how policy objectives directly contribute to or address vulnerabilities through policy coherence for development analysis that links policies to exposure, lagging institutional coping capacity and inequalities as the sources of health and economic vulnerabilities during the Covid-19 pandemic.

Resilience: From Ecology to Analysis of Socio-ecological systems

Like vulnerability, the concept of resilience has also responded to social science perspectives. Early studies (see Holling, 1973) focused on the time it took for systems to return to their original state as a measure of resilience (Bollettino, Alcayna, Dy, and Vinck, 2017). Wilson defines resilience as ‘the ability of a system to absorb impacts/disturbance and to re-organize into a fully functioning system, as well as post-event adaptive processes’ (Wilson, 2010, p. 367). Cutter, Barnes, Berry, Burton, Evans, Tate, & Webb (2008) add that these adaptations and reactions can also take place during the event causing a shock. There can be different systems to which such a shock pertains. It can be a region as Segert & Zierke (2005) state since particular types of risks are increasingly regionalized. The events are mainly exogenous events, e.g. natural hazards, climate change, or events that have their origin in globalization. Endogenous events, however, can also lead to changes that show the resilience of a region (Sturn 2011). These events have different time horizons: ‘First, small events are the outcomes of structured, but not fully determined, situations, because they are the results of choices and strategies undertaken within structured circumstances. Second, sequences of these small events produce large processes, and large (or, in common parlance, “global”) outcomes of small events may not be fully predictable from the events themselves. Third, the large processes thus generated may be responsible for reproduction or change in big structures. Time, in the

sense of short-term actions which affect longer-term paths of large social processes and thus structures, become specifically important' (Storper 1988).

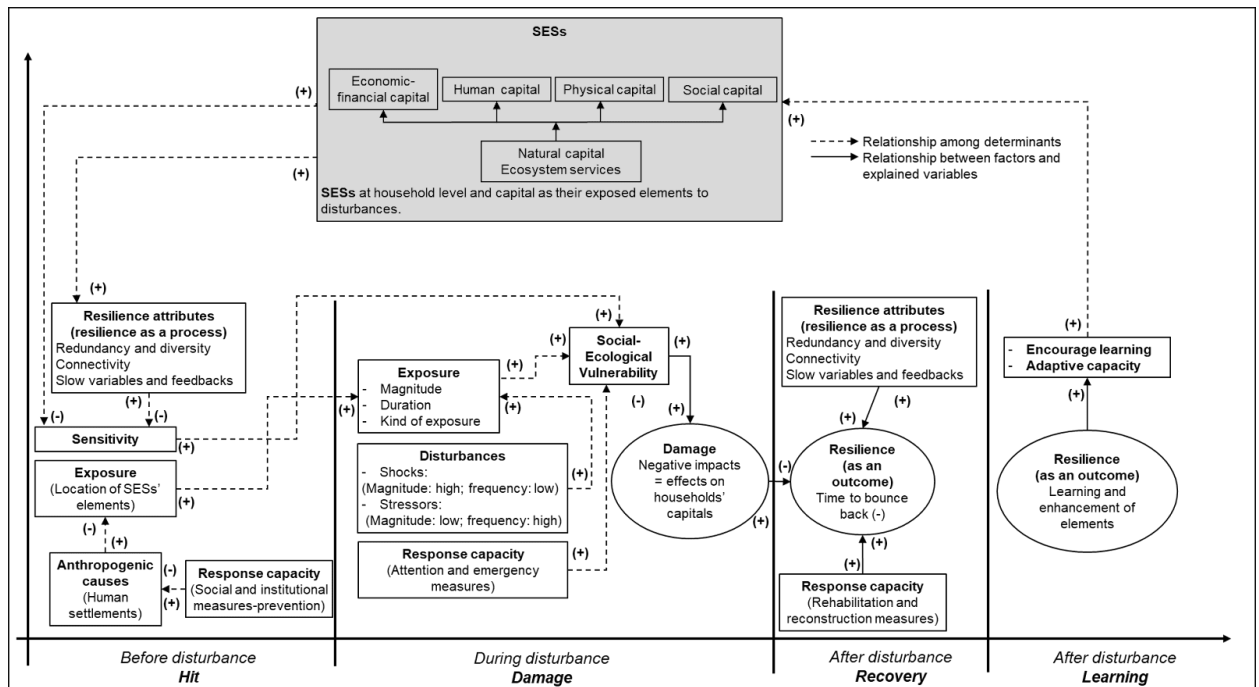
Resilience has conceptually evolved in two ways. First, the field integrated social science perspectives in order to provide a “conceptual umbrella under which different disciplines can come together to tackle complex problems with more holistic interventions” (Levine, 2014). By offering a way to understand how human and natural systems cope with shocks, resilience studies promoted wider definitions that addressed the interaction between individuals, social and natural systems. Folke (2006) indicates how the resilience perspective began to influence fields outside ecology like anthropology (Vayda & McCay, 1975), ecological economics (Costanza, Norton & Haskell, 1992), environmental psychology (Lamson, 1986), cultural theory (McCubbin, McCubbin, Thompson, Han & Allen, 1997), public policy analysis (Koff & Maganda, 2019), human geography (Nienaber, 2012), social learning (Hartwig, Clarke, Johnson, & Willis, 2020), etc.

Second, resilience research has integrated ‘agency’ into systems-dominated scholarship. This change is compatible with the social constructivist turn applying it to the building of risk theories. One key aspect in these theories is adaptability which is the capacity of actors in a system to manage resilience. While complex adaptive systems are generally characterized by self-organization without system-level intent or centralized control, social constructivist theories ascertain that human actions dominate social-ecological systems, and that the adaptability of systems is mainly a function of individuals and the groups managing systemic structures. This leads to transformability which is the capacity of humans to create a fundamentally new system when the existing system has become untenable (Walker, Holling, Carpenter & Kinzig, 2004). Such a human controlled transformation of a social-ecological system can happen in response to

past policies and actions recognized as having failed, or they can be triggered by a shock, or driven by shifts in social values (Gunderson, 2010). Such transformation can actually be beneficial, as Equihua, Espinosa, Gershenson, López-Corona, Munguía, Pérez-Maqueo, & Ramírez-Carrillo, (2019) pinpoint by proposing ‘anti-fragility’ as a concept in which systems not only withstand shocks but actually benefit from them as a defining characteristic.

Resilience before a shock can be conceptualized as the attributes a system has to confront it, and after a shock the capacity to respond to it. The capacity to respond depends also on the changes in the recovery of the assets, on the absorptive capacity (resilience attributes) but also on the actions that reflect a learning and reorganization process (see Figure one: Vázquez-González, Ávila-Foucat, Ortiz-Lozano, Moreno-Casasola, & Granados-Barba, 2021)

Figure 1: A System Analysis of Resilience



Source: Vázquez-González, et al., 2021.

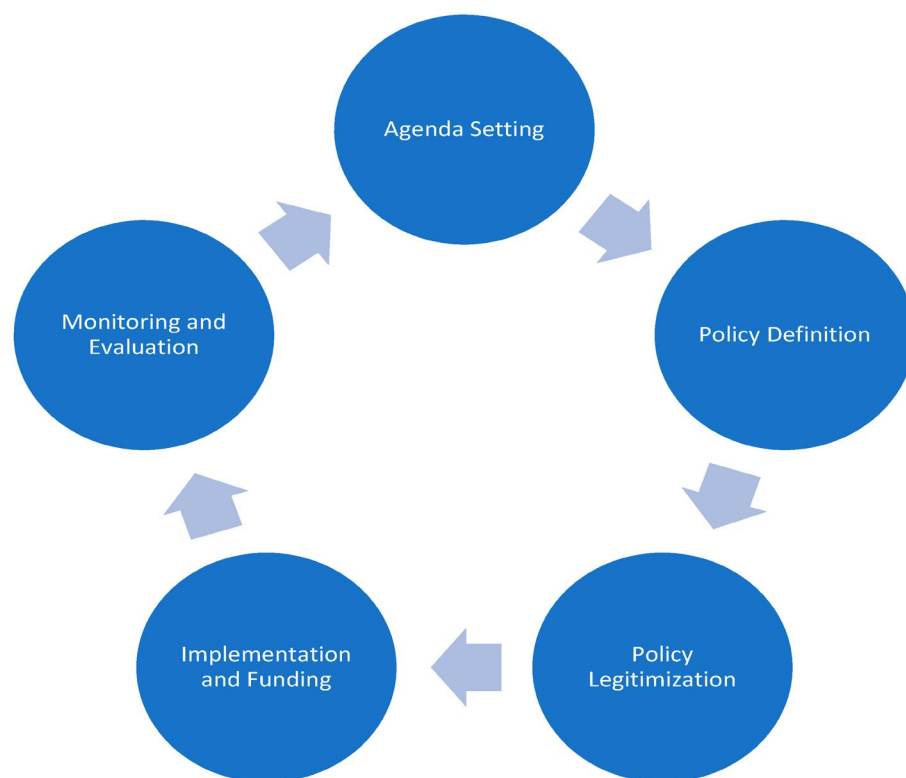
III. Normative Coherence for Resilience

In order to properly examine the relationship between governance and resilience, three elements must be addressed: 1) the coherence of policies for shock prevention, 2) the adaptability of government during shocks and 3) the ability of actors to learn and reform in response to shocks. These characteristics can be studied through policy coherence for development (PCD) analysis. PCD was first proposed by the European Union (EU) and the OECD in the 1990s. Since then, it has been promoted by international organizations and their member states as a means to promote sustainable development. It is included in Target 17.14 of the 2030 Agenda, focusing on sustainability partnerships for achievement of the SDGs (Graham & Graham, 2019; Traoré, 2020). In global discussions, the concept has been re-proposed as policy coherence for sustainable development (PCSD) in order to highlight the importance of “whole of government approaches” to sustainability (Larsson, 2018; Koff et. al., 2022). This approach addresses each stage of the policy cycle, including: agenda setting, policy definition, policy legitimization, policy implementation (including both data and funding), and policy monitoring and evaluation (see figure two).

In general, scholars such as Koff, Challenger & Portillo (2020) have identified eight typologies of PCD (see table one) which determine how policies either contribute to or undermine sustainable development. Among these typologies, normative coherence for sustainable development (NCSD) directly examines the coherence between policy definition and sustainability. Because examination of governance responses to shocks and learning following shock periods entail integration of institutional dynamics and actors/networks into a more comprehensive analysis which will be conducted in future research, this report adopts the NCSD

approach as a basis for reflection on how coherent development objectives and strategies are with resilience as a policy goal.

Figure 2: Stages of the Policy Cycle.



Source: Koff & Maganda, 2019.

Table 1: Typologies of Policy (In)Coherence for (Sustainable) Development

| Typology of (In)coherence | Definition |
|------------------------------------|--|
| Horizontal (in)coherence | (In)coherence between development and non-development policies |
| Vertical (in)coherence | (In)coherence between policies of regional organizations, member states, municipalities |
| Inter-donor (in)coherence | (In)coherence between development policies/projects of different donors |
| Internal (in)coherence | (In)consistencies between the objectives and means of a given policy (i.e., measurement techniques, monitoring) |
| Inter-organizational (in)coherence | (In)coherence between the development policies of a country's government and civil society organizations |
| Multilateral (in)coherence | (In)compatibility between the development goals and procedural norms of international organizations such as the EU, OECD, the UN, and the international financial institutions |
| Financial (in)coherence | (In)coherence between the structure of development funding and policy objectives |

| Typology of (In)coherence | Definition |
|---------------------------|--|
| Normative (in)coherence | (In)coherence between policy strategies in development and non-development policy arenas and core values of liberal democratic societies |

Source: Koff, Challenger & Portillo, 2020.

Normative Coherence for Resilience

The emerging literature on NCS D does not only examine the coherence of policies for development, it explicitly prioritizes development goals and analyzes how coherent policy definitions are with these normative priorities (Koff & Häbel, 2022). For example, Koff (2017 and 2020) has illustrated how the securitization of migration policies undermines regional sustainable development strategies, despite the inclusion of sustainability language in regional agendas in Africa, Europe and the Americas. Koff & Maganda (2016) showed how European Union investments in water development cooperation projects were weakened because the EU did not incorporate Human Right to Water and Sanitation (HRWS) perspectives which undermined stakeholder buy-in and damaged the long-term sustainability of these projects, most of which ended in less than five years following the EU investment. Häbel’s research (2020) indicates how different policy communities defined key norms such as democracy, human rights and sustainability according to their own incentive structures, thus diluting their normative value as development program goals. More recent scholarship has operationalized this relational quality more clearly by documenting policy alignment in specific ways. Kauffer & Maganda (2022) have studied the integration of the HRWS and Integrated Water Resources Management (IWRM) language in Central American regional water policies and the regulatory framework for water in six Central American states (water laws, policies and programs)-. This study showed how regional water frameworks adopted these norms but national regulatory frameworks did not align due to stakeholder resistance. Similarly, Häbel, Koff & Adam (2022) examined the development policy frameworks of the Association of Southeast Asian Nation (ASEAN) and

found that gender and migration were only addressed in the language of the ASEAN’s Cultural Community (they are not present in the Political or Economic Communities’ governing documents), thus undermining important ASEAN legislation on the protection of women and migrants. The present report adopts this conceptual approach in its analysis of resilience, introducing the concept of normative coherence for resilience (NCR). In doing so, it prioritizes resilience as a policy objective and applies normative coherence as an analytical tool toward understanding policy alignment with this objective.

Specifically, this research models normative coherence for resilience through three steps aimed at conceptually and methodologically addressing socio-ecological vulnerabilities, the first two of which are presented in this section. Step three is included in part four, on methodology.

The first step toward analyzing NCR is the establishment of defining characteristics of vulnerability which can be used as benchmarks for research. This step highlights the problems to which NCR responds. This task includes establishment of a matrix which examines the interaction between “dimensions of vulnerability” and “causes of vulnerability” (see table two).

Table 2: Analysis of Socio-ecological Vulnerability by Dimension and Cause

| Dimension | Exposure to Shocks | Informality | Inequity |
|------------------|--|--|--|
| Economic | Economic exposure to price fluctuations | Informal economic markets | Class cleavages |
| Social | Social exposure to threats to well-being (such as Covid-19 pandemic) | Informal territorial development (such as housing) | Social hierarchies/racism/discrimination |
| Governance | Political exposure to corruption/lack of transparency | Informal/lacking provision of services and utilities | Unequal access to decision-making |
| Environmental | Environmental exposure to ecological threats (such as plagues) | Informal/lacking governance of natural resources | Unequal access to strategic resources and ecosystem services |

| | | | |
|----------|--|---|--|
| Security | Security exposure to cross-border violence and disasters | Informal provision of security/missing rights framework | Unequal levels of protection and unequal participation in security decisions |
|----------|--|---|--|

Source: Table established by authors.

The dimensions refer to selected types of vulnerability recognized by Wilches-Chaux (1993): economic vulnerability, social vulnerability, political vulnerability, environmental vulnerability and security vulnerability. These dimensions were chosen because they correspond to the central features of sustainable development. This is important because this analysis studies the coherence of development objectives and strategies for resilience.

The causes of vulnerability derive from previous modelling of this concept. This approach builds on the article by Moldes-Anaya, et al. (2022) which modeled vulnerability to the Covid-19 pandemic as the interaction between exposure to external shocks, weak institutional capacity to respond to shocks and the presence of social fractures which result from inequalities. This work questioned whether specific policy sectors contributed to or mitigated these characteristics.

Because the present research examines socio-ecological resilience, three causes of vulnerability are identified: 1) exposure to external shocks, 2) informality, defined as a lack government regulation in sectors where regulation is necessary (Koff, 2015) and 3) social fractures resulting from to inequitable power relationships. Exposure addresses autonomy and control. How well can communities insulate themselves from external shocks in different dimensions? Do policies expose communities to external shocks in order to pursue other policy objectives, such as economic growth and global market integration? Informality is defined as sectors lacking state regulation and protection. (Kauffer, 2016) This is generally viewed as a source of vulnerability due to the absence of social protections and formal rules (Khuat, 2016).

Finally, inequity refers to internal cleavages that make communities susceptible to risk and conflict. Conflict weakens collective capacities to answer shocks with unified responses.

The second step in this model is the definition of socio-ecological resilience as a response to the identified causes of vulnerability in each dimension. This is conceptualized in the matrix presented in table three. In general, normative coherence for resilience is defined here as the alignment of development objectives and strategies with the identified characteristics that contribute to a community’s ability to withstand external shocks. This research identifies protection, which includes policies that insulate a community from shocks, formality, which establishes/reinforces state response capacities and provides rights-based services and equity which reinforces social cohesion, thus improving the capacity for mobilization.

Table 3: Analysis of Socio-ecological Vulnerability by Dimension and Cause

| Dimension | Protection from Shocks | Formality | Equity |
|------------------|--|---|---|
| Economic | Economic protections aimed at stabilizing standard of living | Transparent regulation of economic markets/ taxation | Economic integration programs, job training, unemployment insurance, etc. |
| Social | Universal social welfare programs | Transparent urban planning/ infrastructure (roads) | Social integration programs, Anti-discrimination measures, Respect for indigenous communities |
| Governance | Responsive governance policies/ transparency | Universal service provision (utilities) | Establishment of citizen decision-making systems |
| Environmental | Sustainable environmental conservation | Transparent regulation of strategic natural resources | Equal access to strategic natural resources/ ecosystem services |
| Security | Security exposure to cross-border violence and disasters | Rights-based security policy framework | Citizen security for all |

Source: Table established by authors.

IV. NCR Methods and Research Design

Following the conceptualization of “vulnerability” and “resilience,” the third step proposed in this model for NCR analysis is the establishment of indicators which can measure the relationships between policies and these concepts, especially their components. protection, formality, and equity in the case of resilience.

Table four introduces a scale for the measurement of NCR. The scale examines whether the normative bases of specific policies mutually reinforce or clash with specific causes of resilience. It is based on the work proposed by Nilsson, Chisholm, Griggs, Howden-Chapman, McCollum, Messerli, Neumann, Stevance, Visbeck, & Stafford-Smith, (2018) which maps the interactions between the SDGs. In order to adapt this scale to norms, policies are analyzed in terms of their coherence or incoherence with causes of resilience (determining a positive or negative number), their indirect or direct relationship to a cause of resilience (-1/+1 or -2/+2) and their incomplete or complete relevance for a cause of resilience (-2/+2 or -3/+3) In cases where policies directly and completely reinforce causes of resilience, +3 is assigned. When policies directly and completely undermine resilience then -3 is assigned. The values in between represent mixed relationships as explained in the table.

Table 4: Scale for measurement of normative coherence for resilience

| Interaction | Name | Explanation | Example |
|-------------|-------------|---|--|
| +3 | Indivisible | Directly and completely mutually reinforcing norms | Formal and substantive normative commitments to resilience in relation to a specific cause |
| +2 | Reinforcing | Directly and incompletely mutually reinforcing resilience norms | Formal normative commitments to resilience in relation to specific cause |

| | | | |
|----|---------------|--|--|
| +1 | Enabling | Creates conditions that further resilience (indirect) | General normative discourse in favor of resilience without direct reference to specific cause |
| 0 | Consistent | No significant positive or negative interactions. | Absence of normative elements in policy debates |
| -1 | Constraining | Creates conditions that indirectly undermine resilience | General normative discourse undermining resilience without direct reference to specific cause |
| -2 | Counteracting | Directly but incompletely clashing with resilience norms | Formal normative commitments that directly reference and undermine specific cause of resilience |
| -3 | Cancelling | Directly and completely clashing with resilience norms | Formal and substantive normative commitments that directly and completely undermine specific cause of resilience |

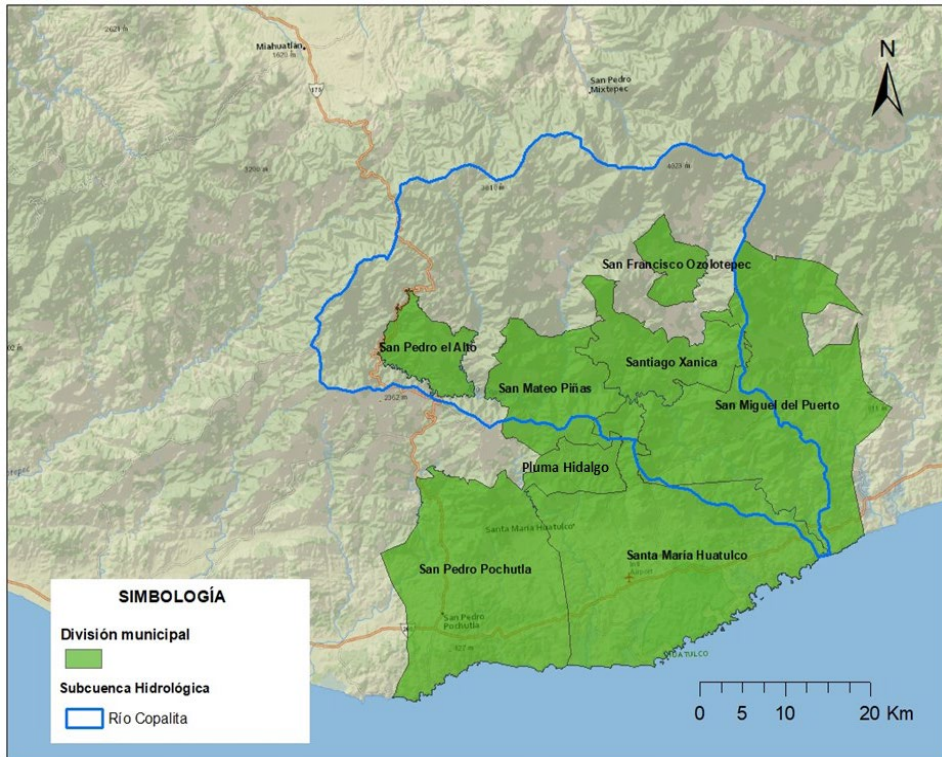
Source: Table established by authors based on Koff, et al. (2020)

Study Area

As stated above, this research is part of the TRASSE research project which examined various watershed in France, Mexico and Colombia. This research is part of the project's focus on the Copalita watershed in Oaxaca, Mexico.

The Copalita watershed (CW) is located along the Pacific coast of Mexico in the state of Oaxaca. It covers approximately 183,165 hectares (SAGARPA & SEDAPA, 2015; INAFED, 2020) (Map 1). In the upper part, which ranges from 1,501 to 2,900 meters above sea level (masl) pine and pine-oak forests are prevalent; the middle part between 501 to 1,500 masl contains sub-evergreen and mesophyll forests; and the lower part between 0 to 500 masl is characterized by deciduous forest (Ramos Olivera, 2015). The CW is the home of 12 municipalities with 40,455 inhabitants (own calculations with data of INEGI, 2020). According to official data in 2015, 58% of the CW's population was characterized by a high degree of social marginalization and 41% lived in very high degrees of marginalization (CONEVAL,

2020). Economically, here are different production systems in the CW, including forestry in the upper part, coffee production in the middle part, fishing and livestock in the middle and lower parts and crops for self-consumption throughout the watershed (SAGARPA & SEDAPA, 2015). Also, the lower part includes the tourist center of Huatulco, which has fostered economic diversification in the basin.



Map 1. Copalita Watershed. Source. Ramirez-Leon, A. Article in elaboration

Data Collection

This report presents preliminary results of research on normative coherence for resilience. Sustainable development and resilience are often presented as synonyms or overlapping concepts in public debates (Marchese, Reynolds, Bates, Morgan, Spierre & Linkov, 2018). While these paradigms are related, they actually differ in their normative objectives. “Sustainable Development” is broadly defined as “meeting the needs of the present without compromising the

ability of future generations to meet their own needs” (Brundtland Commission, 1987). Even more recent iterations of sustainability focus on community needs. For example, Kate Raworth’s *Doughnut Economics* (2017) addresses sustainability through the establishment of a safe and just space which provides for social needs while respecting environmental boundaries. Resilience, instead, is a complex paradigm that addresses the relationship between communities and external factors, represented by shocks. It recognizes that communities do not develop in vacuums introducing complexity to development relationships.

In order to highlight these differences between sustainable development and resilience, this research applied the NCR analytical framework to the *Plan Estatal de Desarrollo 2016-2022* for Oaxaca (Oaxaca State Development Plan, 2016-2022). This plan was chosen because it is the basis for sustainable development policies in the state. Also, the plan is organized around the five dimensions of resilience which facilitated research. These are: 1) Inclusive Oaxaca with Social Development (Social), 2) Modern and Transparent Oaxaca (Political), 3) Safe Oaxaca (Security), 4) Productive and Innovative Oaxaca (Economic) and 5) Sustainable Oaxaca (Environmental) (Estado de Oaxaca, 2016). There are also some transversal policies but these were not included because they do not represent independent dimensions.

The research team examined all objectives and strategies within these sustainable development sectors. This included 187 objectives and 467 strategies. An objective is the declaration of a specific policy goal within a sector. A strategy defines means of implementation for the associated objective. The research team analyzed each objective and strategy in relation to a specific cause of resilience. When the objective or strategy undermined a cause for resilience, a negative value was assigned based on the criteria presented in table four. When the

objective or strategy reinforced a cause of resilience, a positive value was assigned according to this same corresponding criteria.

Limitations of Research

This is preliminary research meant to introduce a new methodology for examining normative coherence for resilience. A number of limitations exist but they represent opportunities for innovative future research. First, the State Development Plan integrates a deeper level of specificity which is not included in this analysis. Lines of Action identify specific projects to be developed in order to activate corresponding strategies (and their associated objectives). Due to time limitations, these lines of action were not analyzed for this report as they number in the thousands. They will be integrated in the analysis in the near future.

Second, this study tests NCR analysis with the state development plan. Other key documents exist through which the state government promotes development, such as sectoral plans. Moreover, this analysis does not include different levels of government, especially the federal and municipal. The analysis will broaden in the future based on feedback received on this study. Analysis will incorporate sectoral plans as well as federal and local policies.

Third, this report only focuses on NCR because the Covid-19 pandemic prevented the research team from conducting interviews and organizing policy forums. Therefore, other PCD analyses based on institutional relationships and actors could not be integrated at this time. NCR is only one typology of PCD analysis and this will be expanded in the future.

Finally, a methodological limitation of this study regards levels of analysis. The state development plan was selected because it directly affects development in the Copalita watershed. Watershed-level research is complicated in policy terms because it does not represent a level of government with corresponding policies. The watershed covers various municipalities so the

state level is the most appropriate for policy analysis. However, this approach is incomplete as the watershed is also affected by federal policies and their vertical coherence for resilience with state and municipal governments. This needs to be addressed in future research if scholarship aims to illustrate direct impacts of development policies on watershed resilience. This is not the case here.

V. Results

The empirical analysis conducted through the NCR analysis presents very interesting trends. While the word “sustainable” is not included in the state development plan’s title (it is prominent in other state plans, such as that for Veracruz state), but the concept is prominent in the plan and it permeates almost all of the sectors. For this reason, normative coherence for resilience is evident in the state plan’s objectives (see table five) and strategies (see table six) for all dimensions except for economic resilience. This dimension is markedly incoherent for resilience both in terms of objectives and strategies. This trend is caused by a focus on economic growth, competitiveness, and export driven integration into economic markets. The language utilized in economic objectives and strategies foregoes the explicit reference to sustainability that is present in the plan’s treatment of the other dimensions. For example, the security dimension decidedly adopts rights-based citizen security language that makes references to social peace and conflict resolution. Economically, there is some focus on fostering local consumption, facilitating intra-state, inter-regional trade and state support for localized value chains and these initiatives are coherent with the different causes of resilience. However, they are outweighed by objectives and strategies that focus specifically on 1) industrialization and technification of agriculture aimed at increasing food production (which will benefit agribusiness), 2) increasing the number of tourists visiting the basin through internationalization of the sector and 3) attracting investment and building infrastructure aimed at connecting urban areas with national

and international markets. These types of initiatives undermine resilience because they contribute to exposure to market fluctuations (especially in agriculture and tourism), they promote informality in rural areas, and they provoke further inequity by establishing markets in which existing resources provide access while those who are marginalized (such as small coffee growers) cannot compete.

Table 5: Objectives of State Development Plan

| Dimension | Normative Coherence for Protection | Normative Coherence for Formality | Normative Coherence for Equity | Normative Coherence for Resilience |
|------------------|---|--|---------------------------------------|---|
| Economic | -17 | -4 | -10 | -31 |
| Social | 46 | 29 | 19 | 94 |
| Political | 6 | 9 | 6 | 21 |
| Environmental | 25 | 20 | 13 | 58 |
| Security | 17 | 14 | 14 | 45 |
| Overall | 77 | 68 | 42 | 187 |

Source: Table established by authors.

Table 6: Strategies of State Development Plan

| Dimension | Normative Coherence for Protection | Normative Coherence for Formality | Normative Coherence for Equity | Normative Coherence for Resilience |
|------------------|---|--|---------------------------------------|---|
| Economic | -26 | -3 | -15 | -44 |
| Social | 130 | 105 | 74 | 309 |
| Political | 14 | 12 | 14 | 40 |
| Environmental | 47 | 32 | 16 | 95 |
| Security | 24 | 22 | 21 | 67 |
| Overall | 189 | 168 | 110 | 467 |

Source: Table established by authors.

These scores are indicative of general NCR trends but they cannot be compared directly because the number of objectives and strategies in each sector differ significantly which affects the results presented in tables five and six. For example, the social dimension in the plan includes 25 objectives and 67 strategies whereas the political dimension has only 6 and 10. For this reason, the research team divided each individual score in tables five and six by the potential

maximum score available per dimension (+3 x total number of objectives and total number of strategies). This is shown in table seven.

Table 7: Maximum possible scores for objectives and strategies by dimension

| Dimension | Maximum Objective Score | Maximum Strategy Score |
|------------------|--------------------------------|-------------------------------|
| Economic | 16 objectives x 3 = 48 | 37 strategies x 3 = 111 |
| Social | 25 objectives x 3 = 75 | 67 strategies x 3 = 201 |
| Political | 6 objectives x 3 = 18 | 10 strategies x 3 = 30 |
| Environmental | 10 objectives x 3 = 30 | 19 strategies x 3 = 57 |
| Security | 7 objectives x 3 = 21 | 16 strategies x 3 = 48 |

Source: Table established by authors.

This division led to the establishment of NCR Coefficients for each cell and for each dimension and cause which are now directly comparable. These results are presented in table eight for the plan's objectives and table nine for the plan's strategies. Because the economic dimension is normatively incoherent for resilience and the coefficient is a proportion of a maximum value

Table 8: Objectives of State Development Plan: NCR Coefficients

| Dimension | Normative Coherence for Protection | Normative Coherence for Formality | Normative Coherence for Equity | Normative Coherence for Resilience |
|------------------|---|--|---------------------------------------|---|
| Economic | 0 | 0 | 0 | 0 |
| Social | 0.61 | 0.39 | 0.25 | 1.25 |
| Political | 0.33 | 0.5 | 0.33 | 1.16 |
| Environmental | 0.83 | 0.67 | 0.43 | 1.93 |
| Security | 0.81 | 0.67 | 0.81 | 2.29 |
| Overall | 2.58 | 2.23 | 1.82 | 6.63 |

Source: Table established by authors.

Table 9: Strategies of State Development Plan: NCR Coefficients

| Dimension | Normative Coherence for Protection | Normative Coherence for Formality | Normative Coherence for Equity | Normative Coherence for Resilience |
|------------------|---|--|---------------------------------------|---|
| Economic | 0 | 0 | 0 | 0 |
| Social | 0.65 | 0.52 | 0.37 | 1.54 |
| Political | 0.46 | 0.4 | 0.46 | 1.32 |
| Environmental | 0.82 | 0.56 | 0.28 | 1.66 |
| Security | 0.5 | 0.45 | 0.44 | 1.39 |
| Overall | 2.43 | 1.93 | 1.55 | 5.91 |

Source: Table established by authors.

(representing an ideal type), all economic values receive “0” by definition.

Interestingly, the security dimension received an NCR score above “+2” in table eight indicating that its objectives are largely “directly and completely” normatively coherent with resilience. This is surprising as most research on security policies indicate that this sector usually undermines resilience (see Hu & Konrad, 2021; Galán Castro, Rodríguez Herrera & Rosas-Acevedo, 2021). In fact, the dimension score for security strategies is much lower at 1.39. This indicates that security becomes less normatively coherent with resilience as policies are defined and operationalized more clearly.

Another unexpected finding is that the social, political and environmental dimensions all lag behind in their NCR which indicates that even though they are normatively coherent with resilience, they only indirectly reinforce resilience according to the proposed model. The social and environmental sectors are expected to score higher according to most policy analyses in these fields (see Pardo Montaña & Dávila Cervantes, 2020; Vivekanandan, 2021).

The cumulative scores for the causes of resilience also reveal clear trends. In both tables eight and nine, normative coherence for protection scores are above “+2” followed by “normative coherence for formality” and “normative coherence for equity.” This illustrates how the state development plan focuses directly and completely on universal protection of its population followed by significant commitment to addressing informality (the plan’s objectives are above “+2” while the strategies related to formality are just below “+2” at 1.93.) Attention to equity is significantly lower. Given the high level of marginalization that exist in Oaxaca, this limited normative coherence for equity represents a significant barrier for NCR. The weak commitment to equity is even more pronounced than the score suggests given the negative NCR score for the economic dimension of resilience in the previous tables.

VI. Conclusions

Like the rest of the world, the Copalita watershed suffered significantly during the Covid-19 pandemic. Furthermore, the watershed is witnessing socio-ecological transformations linked with climate change. These phenomena raise the urgency of resilience research for the watershed and its communities.

Nobody could have predicted the arrival of a global pandemic in 2020, but crises are regular occurrences in global affairs, and they prey on vulnerabilities that cross policy sectors and affect all regions. Renown internationalist Harlan Cleveland recognized this in 1963 when he stated that “crises are normal, tensions can be promising and complexity is fun.” (cited in Koff, Maganda, Ros Cuellar, & Kauffer, 2020, p. vi) The concept of resilience embraces this approach and it has emerged as a prominent focus of sustainability debates in global affairs. NCR is proposed here as an analytical model for promoting resilience with this spirit.

The problem with resilience is operationalizing it. As resilience research has flourished, resilience-based policy analysis has been less pronounced. Debates on resilience have focused mainly on the reactivity of governance institutions and on learning processes which derive from responses to shocks. This article instead addresses resilience as a goal towards which policy frameworks should strive.

Normative Coherence for Sustainable Development has been described by Koff and Häbel (2022) as a new stage of policy coherence for development, going as far to call it PCD with a purpose. NCSD is meant to prioritize sustainable development by promoting key sustainability norms as ethical benchmarks for policy-making. Building from this approach, this report proposes NCSD methods as means through which to pursue resilience. In doing so, it re-orientes NCSD towards resilience by proposing normative coherence for resilience (NCR) as a

methodology for policy evaluation. This approach models vulnerabilities and resilience according to key characteristics and uses scales to indicate whether policies reinforce or undermine the causes of resilience. Resilience is a complex goal which cannot be achieved simply by promoting political adaptability and institutional learning. If policy definitions are not aligned with resilience and its causes, then the basis for its achievement is weak. NCR holds the potential to promote resilience by highlighting its importance as a normative framework. If Harlan Cleveland is correct and crises are normal in global affairs, then watersheds and the communities that inhabit them can respond accordingly by addressing structural vulnerabilities through normatively coherent development policies. Most watershed policy frameworks prioritize “sustainable development” as their main priority goal. Given the global challenges which have created uncertainty for us all in recent years, we should at least ask whether the moment has come to promote “normative coherence for resilience” instead.

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