The Hague Centre
for Strategic Studies

Not When But Why

Embedding Causal Methods in Policy and Programming

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Abstract

The explanatory power of causal reasoning is potentially a game-changer for policy. This paper lays out the case for causality in policy and programming. It continues by outlining a step-by-step explanation of the development of a causal model in the context of a specific case. Next, it provides a non-technical manual of a causal assessment framework that explains how causal models can be developed, applied, and embedded into development policy and practice. Finally, it offers concluding thoughts and practical recommendations on the way forward.

The Case for Causality

We live in a world of increasingly complex and interconnected policy challenges. As a result of artificial intelligence, machine learning, and the big data revolution, policymakers have more information at their fingertips to monitor developments and design and assess policy options than ever before. However, much of that information is not offered in a structured or intuitive way, and problems persist pertaining to the accuracy, the meaning, and the utility of the data at their disposal. This stands in the way of developing effective, reliable, and timely policy interventions.

Major advances are being made to support data-driven policymaking. Early warning systems (EWS), for example, offer data-driven support in terms of monitoring and increasingly also prediction of crisis events with significant negative effects for human well-being that require urgent policy action, such as natural disasters or the outbreak of violent conflict.[1] However, the use of predictive EWS, while they can help clarify the risk of crisis events, do not adequately answer the questions: what explains why they erupt and what are the most effective policy interventions to prevent them from happening?

It is widely recognised that the toughest development challenges – from adapting to climate change to boosting food security or fighting corruption – require policy interventions that target the economic, environmental, political, and social factors that underlie state fragility and the onset of conflict. Development policy in general and EWS in particular would thus benefit from a better understanding of these factors and their interaction that lead to negative outcomes, prior to them becoming issues that require emergency management and response.

1 Tim Sweijs and Joris Teer, Practices, Principles and Promises of Conflict Early Warning Systems, HCSS: February 2022, https://hcss.nl/report/practices-principles-and-promises-of-conflict-early-warning-systems/.

If you understand causality, you can get to the heart of the matter. Causality explores '*why* things are the way they are' so that it becomes possible to select the right option, and you can act on that knowledge. The explanatory power of causal reasoning is potentially a game-changer for policy. This is already broadly acknowledged in the field of international development, where the use of causality in theories of change[2] is already commonplace, although not fully embedded in monitoring and evaluation systems.

Both qualitative and quantitative methods are necessary for sound, causality-driven policy making. Qualitative approaches help understand the context in which a policy issue needs to be understood and evaluated and yield important clues about what courses of action are possible or desirable. Quantitative methods can be used to validate qualitative findings and to get a better grip on the causal mechanisms that lead to – or away from – an outcome.[3] They can also assist to elucidate the potential effects of different types of interventions which can be simulated through the formal modelling of causal dynamics. Taken together, these approaches and methods may be instrumental in selecting the best course of action, given multiple options.

Using the UK Foreign Commonwealth and Development Office (FCDO) funded HCSS study *'The Climate Security Nexus: Understanding the Pathways that Lead to Violent Conflict'* as a reference, this document provides a non-technical 'how to' manual of a causal assessment framework that explains how causal models can be developed, applied, and embedded into development policy and practice.

The document is structured as follows: first, it reviews the role of causality within theories of change to contextualise the growing recognition of the need to understand causal dynamics in policy programming. It continues by outlining a step-by-step explanation of the development of a causal model in the context of a specific case. Finally, it offers concluding thoughts and recommendations on the way forward.

2 A theory of change is a standardised UN method that explains how a given intervention, or set of interventions, are expected to lead to a specific development change, drawing on a causal analysis based on available evidence. United Nations Development Group (UNDG), 'Theory of Change,' UNDAF Companion Guidance, 2017. https://unsdg.un.org/sites/default/files/UNDG-UNDAF-Companion-Pieces-7-Theory-of-Change.pdf.

3 Tim Sweijs and Joris Teer, "Practices, Principles and Promises of Conflict Early Warning Systems," HCSS: February 2022, 32.

Causality and Theories of Change

International development policy increasingly relies on theories of change. If development is about achieving human, social, and economic progress, then it follows that it should clarify what works and what does not work under different circumstances.[4] A theory of change (ToC), therefore, is a purposeful model of how an initiative – such as a policy, a strategy, a programme, or a project – contributes through a chain of early and intermediate outputs and outcomes to achieve the intended result. In essence, a ToC is a description and illustration of how and why a desired change is expected to happen in a particular context. They support causal explanations of how and why a sequence of logically linked events, or pathways of change, should lead to an ultimate outcome.[5] They can help to assess how well a programme has performed against specific indicators, support learning and thus inform about the policy interventions needed to accommodate change. ToC models are considered a good practice approach for measuring and monitoring progress of complex processes. They can help to guide the development of sound and evidence-based programme strategies, with assumptions and risks clearly analysed and spelled out.[6] Theories of change are adopted by the United Nations, NGOs, private foundations, and national governments around the world, including the development ministries of the Netherlands and the United Kingdom.[7]

Despite their wide acceptance and usage, ToCs still suffer from some important weaknesses. One major criticism is that they tend to be altogether linear or simplistic representations of complicated challenges and fail to adequately describe the causal relationships that articulate their underlying assumptions.[8] They presume that inputs lead to outputs and that outputs lead to outcomes. On occasion this may happen, but not necessarily. Linear explanations often fail to capture complex social phenomena, such as poverty. Designing an effective programme on, for example, poverty alleviation requires a thorough understanding of the underlying social, political, economic, and environmental factors that play a role in poverty. ToCs simplify multi-dimensional concepts such as 'poverty alleviation' to a few key horizontal principles, such as 'the importance of work', or 'the right to education', so that a narrow set of intervention strategies can be defined, rather than look at all the available information and then draw conclusions about the most suitable intervention options. Consequently, the events that make

4 Olivier Serrat, "Theories of Change," In *Knowledge Solutions: Tools, Methods, and Approaches to Drive Organizational Performance* (Singapore: Springer Nature, 2017), 238.

5 Olivier Serrat, Ibid., 239.

6 UNDG, "Theory of change," 3. https://unsdg.un.org/sites/default/files/UNDG-UNDAF-Companion-Pieces-7-Theory-of-Change.pdf

7 The OECD presents the UK as a good practice example for developing guidance for more adaptive theories of change that measure both attainment of a core set of benchmark results and more intermediate measures of progress. This enables assessment of whether the theory of change is proving correct or whether modifications are required. OECD, *Managing for Sustainable Development Results: Development Co-Operation Fundamentals*, 2021. https://read.oecd-ilibrary.org/view/?ref=1112_1112683-sr6wf7xp34&title=Managing-for-sustainable-development-results

8 Rob van Tulder and Nienke Keen, "Capturing Collaborative Challenges: Designing Complexity-Sensitive Theories of Change for Cross-Sector Partnerships," *J Bus Ethics* **150,** 315–332, 2018. https://link.springer.com/article/10.1007/s10551-018-3857-7

up pathways of change in ToCs are often connected superficially or as part of a larger group of activities. Even where a connection is made and described, there are usually more causal pathways that require evaluation. Moreover, in practice, ToC do not fully account for feedback loops between the different variables, reducing the likelihood that the theory of change works as prescribed.[9]

The reason for these shortcomings is understandable. Creating a web of wider connections and integrating broader feedback mechanisms would turn the theories of change approach into a complex-systems theory that would be difficult to implement. Nonetheless, it points to the need for smarter tools that can support existing methods, especially when it comes to visualising real world dynamics in a more intuitive and interactive manner. Causal modelling helps to address the above problems. Like ToCs, causal models formally describe and measure the direction and magnitude of causal effects and in turn make it possible to simulate the effect of different policy interventions.[10] However, they do so differently. The causal assessment framework approach outlined below offers a starting point for upgrading theories of change by: first, capturing the dynamics of systems which are complex and non-linear; second, accounting for the overlaps and interdependencies between systems we conceptualise as separate, such as 'climate', 'conflict', and 'development'; and third, integrating frontier statistical methods, adding another layer of confidence to our models and further enabling us to model the effects of interventions through the system. Ultimately, this allows policy and decision makers to consider outcomes that can take better account of human behaviour, relationships between a wide variety of variables, as well as novel situations that emerge from the interaction between them.[11]

9 Rick Davies, Representing Theories of Change: A Technical Challenge with Evaluation Consequences (London: CEDIL, 2018).

10 On how causal modelling deals with the problem of feedback loops, please see the paper by Nino Malekovic et al., Angling for Causality Behind Security (forthcoming)

11 Deborah Ghate, "Developing Theories of Change for Social Programmes: Co-Producing Evidence-Supported Quality Improvement," *Palgrave Communications* 4, no. 90 (2018): 1–13. https://doi.org/DOI: 10.1057/s41599-018-0139-z.

Causal modelling: Why is it important, what is it, how can it be conducted, and what can it do?

Why is causal modelling important?

Causal modelling helps to formally identify and assess causal relationships between variables of interest. A well-designed experiment is a golden standard of causal inference. However, we generally cannot rely on experiments for policy because they tend to be either prohibitively costly, ethically unacceptable, or practically unfeasible. Fortunately, not all is lost if experimental evidence is unavailable. As the newest advances in biostatistics and computer science show, valid causal inference is also possible with non-experimental data. By combining observed facts and causal calculus, a causal model, can specify conditions in which correlation reveals causation. Hence, even if non-experimental evidence is all we have, we can still infer, quantify, and model causal relationships between climate and conflict variables.

What is causal modelling and how can it be conducted?

Causal modelling of armed conflict, as applied to 'the HCSS study The Climate Security Nexus: Understanding the Pathways that Lead to Violent Conflict', is a data-driven analytical activity that explains how natural, climatic and environmental conditions can trigger armed conflict activity. The process of causal modelling includes three steps: discovery, identification, and estimation of causality. First, causal discovery aims at retrieving a web of causal relationships from observations of natural, climatic, and environmental conditions and armed conflict activity. The web of causal relationships is referred to as a causal graph. Second, causal identification aims at enabling identification of causal connections between different natural, climatic, environmental and conflict activity variables that can then be estimated without bias. Third, estimation is intended to distil real reasons that cause armed conflict activity from otherwise noisy observations. These three components, a causal graph, causal paths, and causal estimates constitute an instance of a causal model.

What can causal modelling do?

Using causal modelling, HCSS was able to identify and estimate causal drivers behind conflict outcomes that have to do with climate change. HCSS also assessed how to manage such causal drivers, by mitigating conflict dynamics, and steering it towards peace. It is with causal modelling that HCSS mapped causally mediated relationships between climate change and conflict outcomes as they emerge from non-experimental evidence. This quantitative approach to causality powerfully complements more traditional qualitative analysis.

A Causal Assessment Framework: A Step-by-Step Guide

The HCSS study *'The Climate Security Nexus: Understanding the Pathways that Lead to Violent Conflict'* provides a systematic, mixed-method approach to explore the causal relationship between climate change and violent conflict. It supports the integration of causal methods and approaches into broader policy making processes. This section summarises the main steps for applying a causal assessment framework: moving from, first, the high-level identification of causal pathways to, second, the selection of a single pathway for the development of a case study to, third, the creation of a causal model to, fourth, the embedding of causal modelling in the policymaking process.

Step 1: Developing a typology and identifying causal pathways

The first step of the causal assessment framework entails the development of a typology that describes key causal pathways of the phenomenon under consideration.

Approach taken in the HCSS study

On the basis of an extensive literature review, key pathways connecting climate to violent conflict were identified. To construct the typology, a large set of relevant articles were sorted based on how their definition and operationalisation of conflict and the specific social, political, and economic variables they included. The articles were analysed for the variables that interact with climate change to contribute to the onset of conflict, the pathway by which they do so, the type of conflict that was triggered, and the geographical region in which this pathway was prevalent. This resulted in the identification of seven so-called causal climate-conflict pathologies.[12] (see Table 1)

12 The term "pathology" originates from within the medical field, where the Oxford Dictionary refers to it as the "science of the causes and effects of diseases," the "typical behaviour of a disease," or a "pathological condition". The term is also commonly referred to within the field of mathematics, where it describes an object which "possesses deviant, irregular properties, that make it different from a typical object in the same category." Both definitions offer relevant handles for applying the concept to the relationship between climate change and violent conflict. Source: Tim Sweijs, Marleen de Haan, Hugo van Manen, Unpacking the Climate Security Nexus: Seven Pathologies Linking Climate Change to Violent Conflict, HCSS: February 2022, 4.

Table 1. Typology of Climate-Conflict Pathologies[13]

#	Pathology description	
1	**Climate change-related resource scarcity leads to conflict between pastoralist and sedentary communities**	Changes in temperature and precipitation cause forms of scarcity that force pastoralist groups to alter their transhumance routes. This precipitates resource competition between groups, infringes on traditional customary regulations, and increases conflict risk.
2	**Climate change-related resource scarcity leads to larger-scale inter-communal violence**	Climate change-induced scarcity of water, food, and land resources, in combination with social, political, geographic, and economic variables, can trigger inter-communal tensions.
3	**Climate change precipitates (internal) migration, leading to social unrest**	Climate change can lead to migration, whether from rural to urban areas or between rural areas. This can spark social unrest by increasing resource competition and exacerbating feelings of relative deprivation, as well as the severity of inter-cultural clashes.
4	**Climate change-related social unrest empowers nonstate armed groups**	Climate change interacts with state fragility and contributes to livelihood deterioration, creating fertile ground for the emergence and expansion of non-state armed groups (NSAGs).
5	**Policies aimed at mitigating the effects of climate change have adverse effects**	Climate change policies can trigger political exploitation and marginalization of groups, aggravating existing grievances and tensions.
6	**Climate change-related social unrest precipitates large-scale political movements, provoking a government crackdown**	Climate hazards can provoke a window of opportunity for violent and non-violent opposition to further undermine authorities. This erodes state capacity and exacerbates social vulnerability. Conflict arises as a result of the state's (violent) crackdown on dissent.
7	**Disputes over transboundary resources cascade into interstate conflict**	Climate change can foster tensions over transboundary resources in three main ways: 1) water scarcity raises tensions over transboundary freshwater resources; 2) temperature increases create a new frontier for disputes in the Arctic; 3) diplomatic disputes over climate mitigation measures and responsibility.

Use of the typology

The identification of high-level causal pathologies is useful for four principal reasons. First, it offers a baseline understanding of the types of causal interactions that take place between the different variables in the climate-security nexus. Second, the pathways provide the foundation for carrying out deep case studies designed to unpack the link between climatic conditions and conflict onset. Third, the mediating factors associated with each of the climate-related conflict pathologies can be targeted to reduce the risk of climate change resulting in the onset of conflict[14]. Finally, the pathways form a useful framework from which further case studies can be developed to gain a more granular and finetuned understanding of the causal relationship between climate change and conflict.

13 Tim Sweijs et. al. (2022), Unpacking the Climate Security Nexus: Seven Pathologies Linking Climate Change to Violent Conflict, HCSS: February 2022, 9.

14 Mediating factors are the social, economic, political, institutional, ethno-cultural and environmental conditions that guide climate-related events or risks to specific outcomes. Kendra Saraguchi, et. al, "Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict," International Studies Review 19, no. 4 (2017): 9-10.

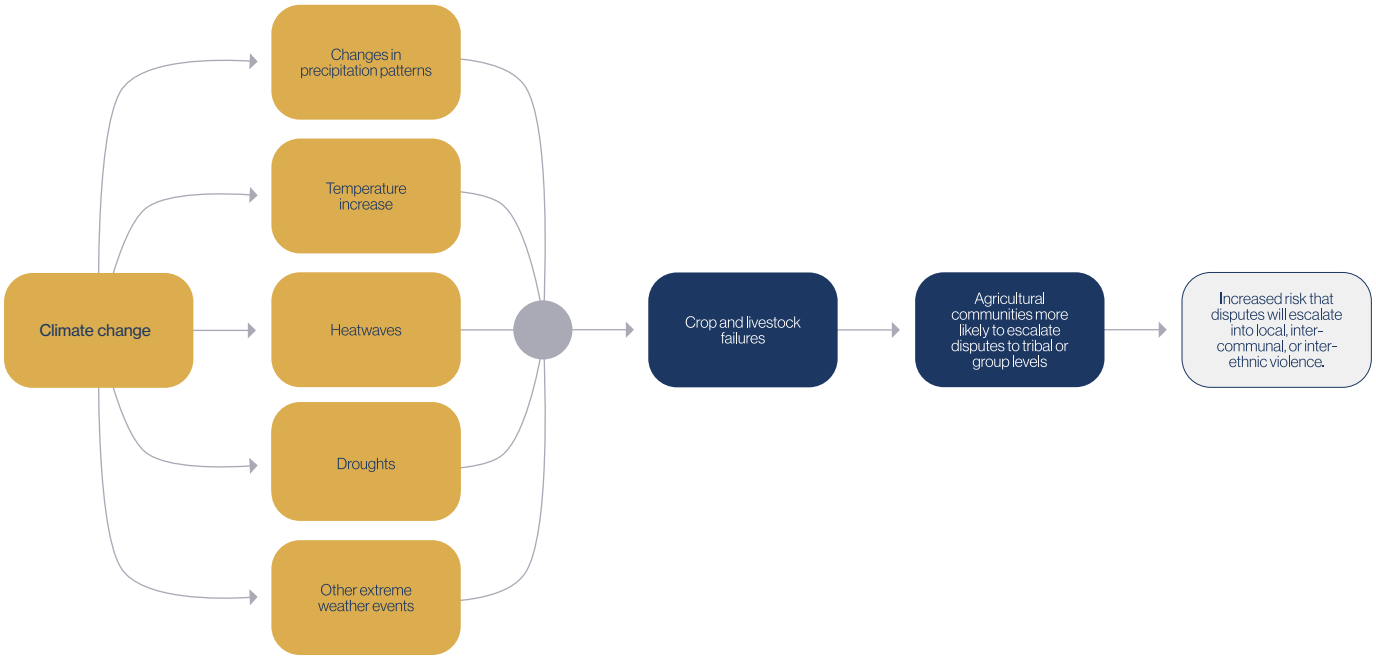
Step 2: Develop a context-specific case study

Foreign and development policy is not an exact science. It requires a deep understanding of the specific contexts in which people live, operate, and function. To give meaning to the causal paths identified in the typology a thick case-based description is required.

Approach taken in the HCSS Study

In the HCSS study, one of the pathologies (see Figure 1) was selected for a case study of Dhī Qār province in South Iraq, a region that is highly dependent on agriculture, vulnerable to the effects of climate change and suffers from deeply embedded social, economic, political and security challenges. The purpose of the case study was to enhance understanding of the different factors connecting the onset of a climate-related event to inter-communal violence. It provides descriptions of a series of mediating factors and dynamics that informs the reader about the link between climate and conflict in the region. It also serves to support the identification of the pathway's individual variables and their interconnections, which is beneficial to the study's broader aim of modelling the climate-conflict relationship causally. Finally, the case study also serves the eventual qualitative validation of the causal model's outputs.

Figure 1. Climate Change-Related Resource Scarcity Leads to Larger Scale Inter-Communal Violence



Use of a case study

Case-based studies of causal pathways have three important benefits for policy. First, they provide policymakers with performance indicators which facilitate the design and taking of preventative action. Second, they offer a qualitative methodology for investigating the risk that a conflict might break out, meaning that they contribute to early warning. Third, they yield research-based insights into the factors linking climate change to, in this case, inter-communal conflict. There are also several limitations. Case-based studies offer qualitative insights in what causes armed conflict. However, insights from case-based studies are generally not sufficiently validated to offer a calibrated assessment of uncertainty, risk, scale, and magnitude of such causal effects. Causal modelling, on the other hand, can ensure that theoretical considerations or insights that are derived from case studies of climate-related conflict provide a validated, fine-grained understanding of the relative importance and (statistical and practical) significance of the conflict's causes, a key consideration for policy and decision makers constrained by budgets and political priorities. In short, if one resorts to asking interviewees to score different causes and interrelationships for their causal relevance, one can do much better than taking such scores at their face value: first, by treating such scores as observations; and, second, by validating these observations with techniques that are intended to assess how causally relevant they really are.

Step 3: Create the causal model and test hypotheses

The third step of the causal assessment framework entails the creation of a causal model that traces armed conflict in Iraq to natural, climatic and environmental causes, and includes causal hypothesis testing.

Approach taken in HCSS study

Using the case study results as a basis, the HCSS data team formulated a set of key hypotheses to be quantitatively investigated. Drawing from the case study results and relevant literature, hypotheses were formulated on how climatic conditions and their interactions, mediated by scarcity of vital environmental resources, cause the emergence and escalation of conflict activity in local populations. The hypotheses explained how interactions between natural, climatic and environmental conditions and mediations between these conditions and conflict activity could, in principle, cause armed conflict to emerge in Iraq. The variables identified in the case study were taken up for quantitative analysis making use of a formal causal modelling approach. Data was collected on armed conflict activity, as well as natural, climatic and environmental conditions, along hypothetical causal pathways that could impact armed conflict activity at the level of subdistricts. The table below lists the datasets, along with their descriptions and sources.

Table 2. Datasets, descriptions and sources used to develop the HCSS causal model

Dataset	Description	Source
Armed Conflict Event and Location Dataset	This dataset provides one of the two data standards in conflict research. The variables include conflict events, reported fatalities, battles, battle fatalities, violence against civilians, civilian fatalities, and strategic developments.	Data Export Tool - ACLED (acleddata.com)
ERA5-Land Dataset	The dataset is provided by European Centre for Medium-Range Weather Forecasts. The variables include temperature, volumetric soil water layers, skin reservoir, evaporation, and precipitation.	ERA5-Land | ECMWF
Integrated Multi-satellite Retrievals for Global Precipitation Measurement Data	The dataset is provided by NASA and Japan Aerospace Exploration Agency. The variables include precipitation.	Data | NASA Global Precipitation Measurement Mission
Famine Early Warning Systems Network Land Data Noah Version 3.6.1. datasets	The dataset is provided by NASA. The variables evapotranspiration, precipitation, water runoff, heat, temperature, and moisture.	GES DISC Dataset: FLDAS Noah Land Surface Model L4 Global Monthly 0.1 x 0.1 degree (MERRA-2 and CHIRPS) (FLDAS_NOAH01_C_GL_M 001) (nasa.gov)
MODIS 006 MOD16A2 Terra	The dataset is provided by The United States Geological Survey. The variables include evapotranspiration, heat.	LP DAAC - MOD16A2 (usgs.gov)
Terra Climate: Monthly Climate and Climatic Water Balance for Global Terrestrial Surfaces	The dataset is provided by University of Idaho. The variables include evapotranspiration, precipitation, and runoff, soil moisture, and temperature.	TerraClimate - Climatology Lab
WAPOR Actual Evapotranspiration and Interception dataset	The dataset is provided by Food and Agriculture Organization. The variables include evapotranspiration.	FAO Water Productivity
Global Spatially-Disaggregated Crop Production Statistics Data for 2010 Version 2.0	The dataset is provided by MapSPAM. The variables include production, value of production.	Data Center | MapSPAM
Gridded Population of the World Version 4.11	The dataset is provided by Center for International Earth Science Information Network at Columbia University. The variables include population count and density.	Population Count, v4.11: Gridded Population of the World (GPW), v4 | SEDAC (columbia.edu)

Subsequently, several causal models of armed conflict emergence were developed by applying specific methods from the causality toolbox (i.e., causal discovery, identification, and estimation methods) to the collected data. The principal output of the quantitative research is two such causal models. Each of the two models respectively consists of a retrieved causal graph, identified causal paths, and estimated causal effects. More details on the techniques, the results, and the relationship between the two causal models, are set out in a research article and technical note accompanying this article.[15]

The added value of the causal model

By empirically retrieving a web of causal relationships from the collected and curated variables, one can identify how causality flows from climatic conditions through environmental conditions to armed conflict activity. By subjecting the causal paths from the web of causal relationships to estimation, valuable observations can be distilled that reveal how these conditions causally trigger armed conflict activity. The added value of the causal model is most visible in separating real causal effects of natural, climatic and environmental conditions on armed conflict activity

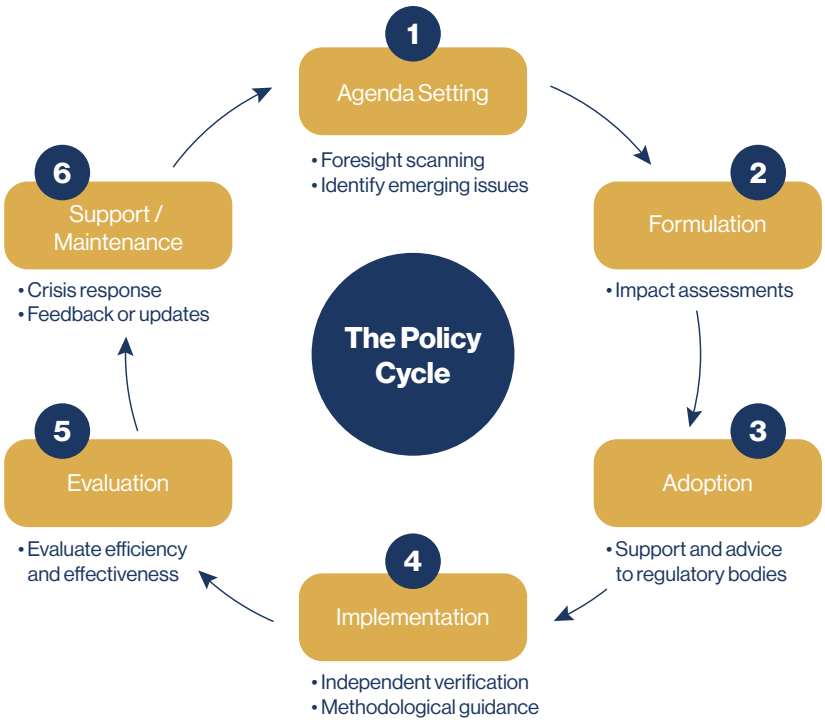
15 Nino Malekovic et al., Angling for Causality Behind Security (forthcoming).

from noisy observations. The causal model provides a rigorous validation of otherwise solely qualitative insights in climate conflict research that originate from our case study or from the presumptive theory-of-change approach to conflict research. Specifically, the causal model enables effects of the relevant climatic and environmental causes on armed conflict activity to be examined for statistical significance. Having been statistically validated, the hypotheses sourced from the qualitative case study provide more rigorous evidence for the emergence of armed conflict activity from climatic and environmental causes.

Step 4: Embed causal modelling in the policymaking process

The fourth step of the causal assessment framework entails the embedding of the causal models in the policymaking process. As a starting point, it is important to identify where causal methods can add the most value in the policy cycle. If an application of the policy cycle to a policy domain is data-driven, then the explanatory power of causal methods can generally support all the six stages of the policy cycle; from agenda setting to formulation, through to adoption and implementation, to evaluation and even the maintenance of policy (See Figure 2).

Figure 2. The Policy Cycle[16]



16 European Geosciences Union, "The policy cycle," 2022, EGU. https://blogs.egu.eu/geolog/2016/09/14/geopolicy-science-and-the-policy-cycle/ The European Geosciences Union (EGU) is the leading organisation for Earth, planetary and space science research in Europe. It is a non-profit international union of scientists with about 18,000 members from all over the world. Its aim is to foster fundamental geoscience research, alongside applied research that addresses key societal and environmental challenges.

The extent to which causal models can support the individual stages of the policy cycle is described in more detail below.

1. Agenda Setting

During this first stage in the policy making process, new issues are identified that require government action. Sometimes multiple issues are identified which can all be addressed, or specific issues may be prioritised. This is also the stage where new and emerging policy issues are identified. Causal models can be an important foundation for identifying and developing new policies and prioritising actions.

2. Formulation

Once the policy agenda has been identified, formulation helps to structure the policy issue in question. During this second stage, outcome goals and their potential impacts and costs are defined, as well as the potential stakeholder response. Causal modelling can support this process by validating variables that may lead to either a desired or undesired outcome.

3. Adoption

In the third stage of the policy cycle, the policy is approved by relevant decision makers. They will likely seek external advice that is independent to those responsible for the drafting of the policy. Causal model experts could support this process by testing interventions and the impacts thereof on (desired or undesired) outcomes, thereby providing insights into the effectiveness of the various options before they are implemented.

4. Implementation

During the fourth stage of the policy making cycle, actions are carried out to implement the policy. Causal models can be a useful tool to support the monitoring process and ensure the policy implementation process is optimally carried out. This can be done by providing causal guidance and insights on how different outputs can lead to either desired or undesired outcomes.

5. Evaluation

The fifth stage of the policy cycle concerns evaluation. This step involves assessing the effectiveness and success of policy. Causal model methods can strengthen and complement qualitative evaluation methods such as theories of change to rigorously validate findings and ensure a deeper systemic assessment of the different factors leading to an achieved result.

6. Support / Maintenance

In this sixth and final stage of the policy cycle, the question is considered whether and how a policy might be further developed or continued in case of success or discontinued in case the policy is deemed accomplished, redundant, or ineffective. Where policy is continued, causal model experts can support their effectiveness moving forward and their integration into broader results-based systems.

In sum, causal models, such as those developed in this study, are intended to be used as a source of curated facts that can enhance evidence-based policymaking with rigorously validated causal insights. Moreover, causal models can also be tested for causal interventions, further evaluating and enhancing the effectiveness of policy recommendations with causal evidence. All of this can assist the formulation of policy. Finally, if extended with agenda-related considerations, such causal models can also protect a policy recommendation, the one that already contains an effective causal intervention, against potential voting patterns in an agenda setting, getting the most out of the policy's preserved effectiveness, while ensuring its adoption. In other words, causal models can assist rigorous tests of different policy options along the actual policy cycle *in advance* of that policy cycle.

The Way Forward

The causal assessment framework outlined in this policy manual supports the identification of causal pathways, the development of thick case-based pathway descriptions, and the creation of formal models to understand causal dynamics in social environments. This framework could help strengthen existing policy programming and evaluation tools. The integration of causal models into the policy cycle is a potential game changer for policy and decision makers, but requires effort and time, with both technical as well as process-based challenges that need to be overcome. Much work still needs to be done to collect and systemise data in such a way that it can be interpreted in a meaningful way. Qualitative and quantitative methods are not well integrated, making it difficult to use such methods both in the field and at the headquarters. Yet, the integration of causal approaches, methods and models into policymaking improves the coherence and comparability of policy, and lead to more effective interventions in the future. In order to further this process, three recommendations are offered for policymakers and programming experts:

1. **Invest in the systematic collection and curation of data for causal modelling purposes.** This can be done by completing three steps. First, a data repository should be established to store relevant data that can be used for the development of causal models. This repository should be public, inclusive, and practical in its orientation, so that it may be developed and accessed by diverse organisations working at international, national, and local levels. Second, geographical data collections requirements should be standardised for different policy domains, so that data linkages can be established across and between different policy areas. Third, programme officers at international, national, and regional levels should be issued with official requirements to guide use, collect, and compile data, and store it in the data repository. Of course, this is easier said than done. A major obstacle for developing causal models is the lack of benchmark datasets. Thus, it is essential that big players with access to large databases across various policy domains take a lead on this. Public, private, and non-profit organisations hosting large databases, such as the UN, World Bank, large NGOs, EU, multinationals, and selected academic institutions, could develop a consortium of experts to spearhead this effort. The Anticipatory Action Task Force[17] already offers a strong platform for scaling and mainstreaming anticipatory approaches in the international humanitarian and development sectors and has expressed a strong interest in causal methods and could thus play a promising role in this regard.[18]

17 The Anticipatory Action Task Force contributes to the broader efforts of the humanitarian, development and climate communities to scale-up and mainstream anticipatory approaches within national governmental disaster risk management frameworks and within humanitarian/development systems.Its approach is developed in over 60 countries by the International Federation of Red Cross and Red Crescent Societies (IFRC), Start Network, The UN World Food Programme (WFP), The UN Food and Agriculture Organization (FAO), and The UN Office for the Coordination of Humanitarian Affairs (OCHA). https://www.anticipation-hub.org/exchange/networks-and-forums/anticipatory-action-task-force-aatf

18 The Hague Centre for Strategic Studies was invited to share its approaches for anticipatory action (including causal methods) during the 2022 FAO Humanitarian Networks and Partnerships Weeks and has been invited to further engage with the Anticipatory Action in Conflict Practitioners Group.

2. **Develop causal framework approaches** by bringing together policymakers, subject matter experts and data scientists to combine qualitative and quantitative methods to understand and formalise causal dynamics. This should be done with an eye on improving the intuition behind causality, supporting relevant data collection, and integrating a diverse range of knowledge and perspectives. This can be done as part of an international capacity development programme focused on training and workshops that focus on increasing understanding of different causal methods and developing skills for using causality in policy-based applications, including the design of policy interventions and evaluations. Apart from broader training and workshops, effective machine learning techniques for causal modelling purposes should be leveraged to advance causal learning.

3. **Embed causal modelling in different steps of the policymaking cycle.** By means of their explanatory power, causal models can support the evaluation of different policy options and can be especially useful in different stages of the policy process. They can support the design and formulation of policies and enhance evidence-based decision making on policy adoption with validated causal insights. Causal models thus provide possibilities to assess the effectiveness of programmes and improve the monitoring and evaluation process. Finally, causal models can be embedded in results-based systems to track results more systematically across projects and programmes. By testing different policy options along the policy cycle before their implementation, causal models provide an unprecedented opportunity for more timely, efficient, and effective decision making.

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