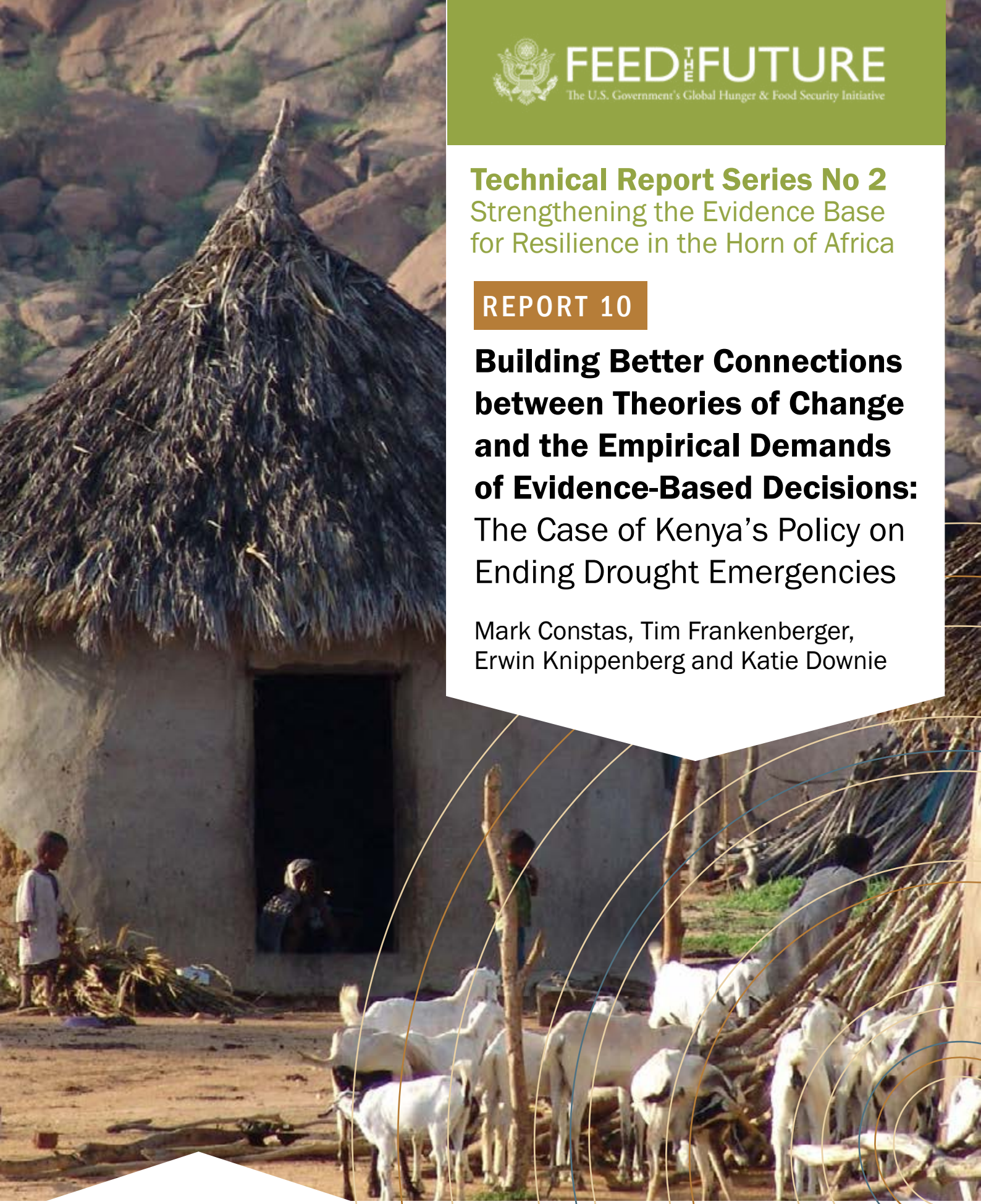

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**Technical Report Series No 2**
Strengthening the Evidence Base for Resilience in the Horn of Africa

REPORT 10

# Building Better Connections between Theories of Change and the Empirical Demands of Evidence-Based Decisions: The Case of Kenya's Policy on Ending Drought Emergencies

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technical consortium
Building Resilience in the Horn of Africa

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# 1 Introduction

It is well known that the world's poor live in highly stressed conditions, and they are exposed to risks that are detrimental to their wellbeing. A wide variety of policies and programs are implemented with the goal of helping vulnerable populations better prepare for and respond to a selection of risk exposure events such as drought, floods, social unrest and political conflict. The decision to allocate funds, distribute resources and dedicate personnel with an expectation of producing a particular outcome is based on a rationale that is rooted in a causal logic. To help make this causal logic more explicit, theories of change serve as key points of reference for organizational leadership and for program staff associated with a given program and/or policy. As a type of blueprint on which practical actions are based, a theory of change is meant to reveal the content of interventions and suggest the set of structural relationships that drive programming. Often mapped against a backdrop of situational factors, theories of change provide information on where, how, and when an intervention will be delivered. In this sense, theories of change provide contextual, substantive and sequential details related to a given program or intervention.

For individuals whose work is concerned with evaluating the effects of programs and policies, the task of translating the logic of theories of change into a set of testable propositions is not straightforward. This is because theories of change are not written to satisfy the needs of analysts responsible for monitoring and evaluation. The task of translating theories of change into empirical propositions, however, is a straightforward task. Despite the lack of easy alignment, data are regularly collected, and analyses are completed. In many instances, when testable propositions have been derived from theories of change and translated into a set of empirically focused activities, such translation may have been accomplished to satisfy the analytical requirements of building estimation models more than to inform the contents and structure of a particular theory of change. Thus, the kind of back-translation that allows communication between analysts and program staff is often difficult if not impossible, and the effort to support evidence-based decision-making is not well served. While this assessment of the disconnect between, first, individuals who work on the contents and structure of programmes and, second, individuals who work on the design of empirical studies does not hold in all cases, most would probably agree that the separation between the applied interests of program implementers and analytical interests of data analysts is both pervasive and longstanding. This separation does not serve the interests of either group and leaves stakeholders, such as country-level governing bodies (e.g. Ministers of Agriculture, Ministers of Health) and international donor agencies searching for coherence without reward.

The goal of the present paper is to describe and apply an approach that will help close the distance between theories of change on which programs are based and the content of empirical studies from which evidence is derived. The approach, referred to here as Empirically Testable Theory of Change (ETTOC),

integrates knowledge of the empirical demands associated with practical context or problem with insights from a specific theoretical perspective. In its full form, the ETTOC methodology involves both a desk study drawing on key documents and a field study that involves engagement with stakeholders (e.g. policy makers, program staff). The presentations provided in this paper are based on the desk study portion only.

The practical context for the present paper is Kenya's policy framework on Ending Drought Emergencies (EDE) with special reference to the Common Programming Framework (CPF). Kenya's National Drought Management Authority (NDMA) is the lead agency responsible for implementation of the EDE CPF, which was launched in November 2015 as a country-level policy and investment plan designed to better mobilize resources in response to and in preparation for droughts. The Common Programming Framework is the operational counterpart for the EDE and therefore serves as an important source of information for constructing ETTOC that can be leveraged for prospective empirical work.

The theoretical perspective that drives the ETTOC project is comprised of two related areas of work on causal inference. One area draws on the theories that describe how causal relationship can be illustrated (Pearl, 2000) and justified (Shadish, Cook & Campbell, 2002). The second area considers how econometric and statistical methods are used to empirically test causal claims (e.g. Morgan & Winship, 2007). The development of an application of ETTOC is also informed by the various discussions that describe the types and objectives of theories of change (see Vogel, 2012). With the content of the EDE policy and the structure of causal inference as points of reference, the specific objective of the present paper is to demonstrate how Kenya's EDE, the Common Programming Framework in particular, can be translated into an empirically testable set of propositions that can underwrite evidence-based decision making.

In addition to the introductory section, the paper is organized into four main sections, followed by a final discussion and conclusions section. The second section offers a brief overview of theories of change as they are typically employed as a generative tool for structuring programs and interventions. The third section provides a brief introduction to EDE CPF as the practical point of reference for the paper. The fourth section describes the ETTOC approach and applies it to the EDE CPF. The final section provides a summary of key points and explores how to promote work that builds better connections between the contents of programmes and the accumulation of data.

2

# Overview of Theories of Change: Benefits and Limitations

A theory of change (TOC) explains how a group of actions sets the stage for producing long-range results. 'It is essentially a description of a sequence of events that is expected to lead to a particular desired outcome'.[1] Theories of Change help us understand how activities of interventions are expected to lead to desired results. They lay out impact pathways of results chains, and the sequence of steps in getting to impact (Douthwaite et al., 2007). A more complete theory of change articulates the assumptions behind the links in the pathways (Vogel, 2012).

Over the last five years, TOC approaches have moved into the mainstream in international development. While there is general agreement regarding the importance of a TOC, there is great variation in practice on what a TOC is, how to develop one, and how best to represent it (Mayne & Johnson 2015).

The concept of a TOC is not new. The current evolution draws on two perspectives that drive development and social programming practice: evaluation and informed social action (Vogel, 2012). From the evaluation perspective, TOC is an aspect of programme theory, a long-standing area of evaluation thought, developed from the 1960s onwards (Vogel, 2012). The Logical Framework approach comes from this stream of development practice. The current interest in TOC as an approach also represents the convergence of another, equally long-standing strand of development thought. Since the 1960s, the social action perspective, which relies on a participatory approach, has advocated a conscious reflection on the theories of development as a basis for social learning and action (Vogel, 2012). The blending of these two streams of development practice within TOC approaches may explain why such a wide range of organisations has taken it up. It also explains why there are so many variations in the use of the concept. Theory of change thinking is used in a number of different ways, ranging from exploring high-level change processes, to explaining the internal logic of an intervention through to hypotheses that specify cause and effect links between important changes (Vogel, 2012). Less well developed, however, is the use of theories of change to specify analytical models that will subsequently be used to construct data-based inferences about cause and effect links on which a given program is based.

According to Vogel (2012), there is consensus on the basic elements that make up the theory of change approach. At a minimum, TOC is considered to encompass a discussion of the following elements:

- Context for the initiative, including social, political and environmental conditions, the current state of the problem the project is seeking to influence

[1] *Rick Davies, April 2012: Blog post on the criteria for assessing the evaluability of a theory of change. http://mandenews.blogspot.co.uk/2012/04/criteria-for-assessing-evaluablity-of.html*

and other actors able to influence change,
- Long-term change that the initiative seeks to support for those who are the ultimate beneficiaries,
- Process/sequence of change anticipated to lead to the desired long-term outcome,
- Assumptions about how these changes might happen, as a check on whether the activities and outputs are appropriate for influencing change in the desired direction in this context and
- A diagram and narrative summary that capture the outcomes of the discussion.

The variations seen in TOCs in terms of form, scope, focus and level of detail reflect the motivations within different organisations and the purpose for using a theory of change analysis (Vogel, 2012). At the country level, governments' and donors' TOCs would include high-level mapping of drivers of change, key contextual issues, and pathways of change that might be informed by evidence and learning from multiple sites. A good example of this would be the development of a TOC for the EDE CPF for Kenya. These types of TOCs provide a broad conceptual framework for change, which can then be used to hone in on strategic choices for a particular context, as well as help focus evaluation questions (Vogel, 2012).

TOCs developed by implementing agencies are much more detailed to support their decision- making, performance management and evaluation frameworks (Vogel, 2012). Most of the elements of the TOC are developed in depth: assumptions, multiple pathways, and cause and effect logic. TOCs for evaluators tend to drill down into the detail of cause-effect logic, the different pathways, actors and mechanisms the programme has influenced or could have influenced, as well as significant contextual conditions that had an influence (Vogel, 2012). Evaluators may test, critique or validate the implementing agency's TOC.

While TOCs have been, and will continue to be, a productive tool for planning and evaluation, TOCs have limited use as tool that might focus and direct an empirical study. Limitations of TOCs as a tool to bridge the divide between planning processes and analytical practices can be traced to three conditions. The first condition arises when the set (or some important subset) of causal assumptions on which theories of change are based remains implicit. The second condition arises when high level TOCs for governments and donors are overly elaborate, with only a general level of associated descriptions. The absence of detail makes it difficult to translate a theory of change into an analytical plan that may be applied to an empirical study. The third condition arises when the empirical work of analysts is not well aligned with a given theory of change. The fact that that

a TOC may not have the details or level of operational specificity required by analysts may explain this lack of alignment. It does not, however, justify the lack of alignment. As a result of these conditions, a gap frequently exists between the content of theories of change and subsequent studies of the policies and programs. The procedures described and results reported in the present paper are meant to help close this gap.

# 3

# **Kenya's Ending Drought Emergencies** Common Programme Framework

Following the 2011 drought in the Horn of Africa (HoA) region, governments from the Intergovernmental Authority for Development (IGAD) member states (Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda) came together in September of that year at the Summit of the Heads of State and Government, which was convened in Nairobi. For the first time, after decades of the affected countries being overwhelmed by emergencies, these governments publicly and vociferously declared their commitment to end drought emergencies and vulnerabilities from the IGAD region. One of the major outcomes of this Summit was the resolution to "do business differently". As Engineer Mahboub Maalim, the Executive Secretary for IGAD noted at the time, "It is highly gratifying to note the huge positive response and goodwill expressed by the affected countries and their development partners to support this initiative, in spite of the global economic meltdown. It appears that the problem of drought emergencies is finally receiving the attention it demands and is becoming effectively addressed."

In the spirit of providing further support to this "ending drought emergencies" initiative, the Technical Consortium for Building Resilience in the Horn of Africa, a project of the CGIAR and funded by the United States Agency for International Development (USAID), was formed and tasked in partnership with the Food and Agriculture Organization of the United Nations (FAO) Investment Centre to formulate regional and national investment programmes for the long-term development of arid and semi-arid lands (ASALs) in the HoA. These investment programmes became the Ending Drought Emergencies papers, each containing a portfolio of projects and interventions for the dry land areas in the respective IGAD countries.

Drought remains one of the biggest threats to economic development in Kenya. Not only does it portend dramatic consequences in the form of widespread suffering and loss among drought-prone communities, it also has a major impact on the economy; the 2008-2011 drought cost Kenya US$ 12.1 billion in damages and losses combined, and it slowed the GDP by an average of 2.8 % per annum (FAO, 2010; RoK, 2012). Droughts are a national concern and affect the whole of Kenya, directly and indirectly. As well as their direct impacts on the economy, droughts affect linkages between different sub-economies, ecologies and communities. For example, there may be structural problems of over-production in one area which could compensate for under-production in another if infrastructure were improved. Similarly, poor management of water towers has extensive downstream consequences, while drought stress can exacerbate conflict over natural resources between neighbouring social groups.

The direct impacts of drought, however, are most severe in the ASALs, which make up 80% of Kenya. These are regions characterized by precipitation ranges from 150-550 mm per year in arid areas to 550-850 mm in semi-arid areas. Certain parts of the ASALs have the lowest development indicators and the highest incidence of poverty in Kenya; poverty levels of more than 60% for the general population are not unusual, and can be as high as 90%. Livelihoods are undermined by unfavourable market conditions, inadequate infrastructure, limited access to services such as animal health, and a poorly developed financial sector (RoK, 2013).

Because droughts evolve slowly, their impacts can be monitored and reduced. Kenya will eliminate the worst of these impacts by pursuing two simultaneous strategies. First, on an ongoing basis and regardless of prevailing drought conditions, Kenya will take measures to strengthen people's resilience to drought. These measures will be the responsibility of all sectors, since drought vulnerability is the product of deeper inequalities in access to public goods and services. Second, it will improve the monitoring of, and response to, emerging drought conditions in ways that harness the efforts of all actors – communities, the government and its development partners – in an effective and efficient manner. This will be the responsibility of the new National Drought Management Authority.

The Kenya country paper seeks to create 'a more conducive environment for building drought resilience'. It will do this primarily by investing in the critical foundations for development (e.g. infrastructure, security and human capital) and by strengthening the institutional and financing framework for drought risk management with the new National Drought Management Authority at its core. The Kenya paper commits the government to end drought emergencies within ten years.

The Common Programme Framework to End Drought Emergencies is the product of a series of discussion between the Government of Kenya and its development partners which took place between October 2013 and August 2014.[2] It represents the first phase of a ten-year programme to mitigate the effects of drought on vulnerable populations and will endeavour to do this by placing emphasis on three streams of intervention, (1) eliminating the conditions that perpetuate vulnerability, (2) enhancing the productive potential of the entire region and (3) strengthening the institutional capacity for effective risk management. The Framework focuses on the 23 most drought-prone counties in Kenya. Its implementation is being led by the relevant parts of the national and county governments, working in ways that strengthen the synergy between sectors and agencies and deepen accountability to these drought-affected communities (NDMA, 2015).

*[2]Full details of the process of these discussions can be found in Annex 3 of the Ending Drought Emergencies Common Programme Framework, which was launched in November 2015. NDMA (2015). Kenya Ending Drought Emergencies Common Programme Framework. In Ministry of Devolution and Planning (Ed.). Nairobi: Republic of Kenya.)*

The EDE Framework is divided into six pillars, each of which has its own common programme framework document and its own configuration of agencies interested in its agenda. The pillars are described as follows:

- **Pillar 1** – Peace and Security
- **Pillar 2** – Climate-proofed infrastructure
- **Pillar 3** – Human Capital
- **Pillar 4** – Sustainable Livelihoods
- **Pillar 5** – Drought Risk Management
- **Pillar 6** – Institutional Development and Knowledge Management

All current and future projects will be aligned against these pillars. The results delivered by each pillar are important not just in the context of the endeavours of the pillar, but also because they have a bearing on the impact of the other pillars. The interdependence and connectedness of the pillars highlights the need for collaborative planning, resource mobilization, monitoring and impact assessment, promoted by cross-pillar coordination structures (NDMA, 2015).

For the purposes of illustrating how the ETTOC approach may be applied to EDE, only Pillars 1 through 5 have been analysed. This decision was made because Pillar 6, which is crosscutting, does not involve causal relations of the kind found in other pillars.

# 4 Application of Theory of Change for Empirical Testing

To demonstrate the way in which ETTOC may be applied to an actual policy, this section describes how simple and compound causal statements may be derived from the CPF and also shows how a set of empirically testable models may be constructed for the EDE. The statements are used to construct graphic depictions that illustrate the causal logic on which the CPF is based, either implicitly or explicitly. The models, which are expressed as reduced form econometric or statistical models, demonstrate how the content of a policy document can be translated into as a series of empirically testable expressions. As noted above, the full version for the ETTOC methodology includes a desk study and field based component. The study described here, however, includes just the desk study portion of the ETTOC method.

## METHODS

The methods that directed the EETOC work were designed to produce a set of outputs. The first output is a set of simple and compound causal propositions that reflect the causal structure of the EDE CPF. The second output is a set of causal diagrams that illustrates possible interactions among the propositions. The third output is a set of estimation models organized into a table that shows how the pillars could be used to test the causal propositions. The estimation models, which are meant to be generative rather than definitive, are useful because they give one a point of reference to create linkage between the causal assumptions found in a theory of change and the empirical requirements that need to be satisfied to conduct an empirical test of such assumptions.

## REVIEW OF EDE CPF

Using the content of the EDE CPF as the point of reference, the task of identifying causal claims followed a three stage process. Stage one involved searching through the text of the CPF to identify language that reflected or suggested cause and effect statements. Causally oriented terms and phrases used as search terms included *cause, influence, impact, affect, effect, produce, and generate.* The phrases in which these terms were embedded were identified and retained as candidates for causal propositions. For the second stage, each line of the CPF was reviewed to see if additional phrases could be identified from which causal propositions could be derived. The third stage of analysis involved a review of all graphics and/or tabular presentations that may have contained, either implicit or explicitly, causal propositions. Across all stages of the analysis, the text of the CPF was reviewed to reveal cross-pillar interactions.

## CROSS-PILLAR INTERACTIONS

**Compound Causal Statements and Assignment of Estimation Models:** Once causal statements were identified through the search, the assertion of cross-pillar interactions noted in the EDE CPF document were taken at face value. Causal statements associated with the five pillars were identified and integrated to illustrate possible interactions. A five-by-five matrix was constructed, minus the diagonal, which yielded 20 compound causal statements. To illustrate how quantitative expressions could be introduced as part of theories of change, reduced form estimation models were assigned to each of the 20 compound causal statements.

# 5 Results

The results from the ETTOC approach are presented in three sections. The first section shows the findings from the effort to derive causal propositions from the EDE CPF. The second section shows provisional graphics, both at general level for the EDE CPF as a whole and a more specific level for a given pillar. The third section shows how content of the EDE CPF was used as a point of reference to construct a general set of statistical expressions that can set the stage for empirical testing. The organization of results is therefore presented in the following sequence:

- Causal propositions extracted from EDE CPF policy document
- Causal diagrams constructed from extracted from causal statements
- Reduced form models based on compound causal statements.

This sequence is presented for the purpose of communicating how the results are presented and to suggest how theories of change that are causally focused and empirically generative could be presented, moving beyond the sole reliance on a graphic presentation.

## CAUSAL PROPOSITIONS

Text that contained explicit causal terms or phrasing was identified from review of the EDE CPF. The search was carried out using a simple search protocol within MS Word. This yielded a large variety of statements that suggested the kinds of cause and effect relationships commonly associated with the logic that drives the construction of theories of change. Examples of phrases that were identified in the EDE CPF are shown in Table 1.

Table 1: Illustrative Causally Oriented Text Segments from the EDE CPF

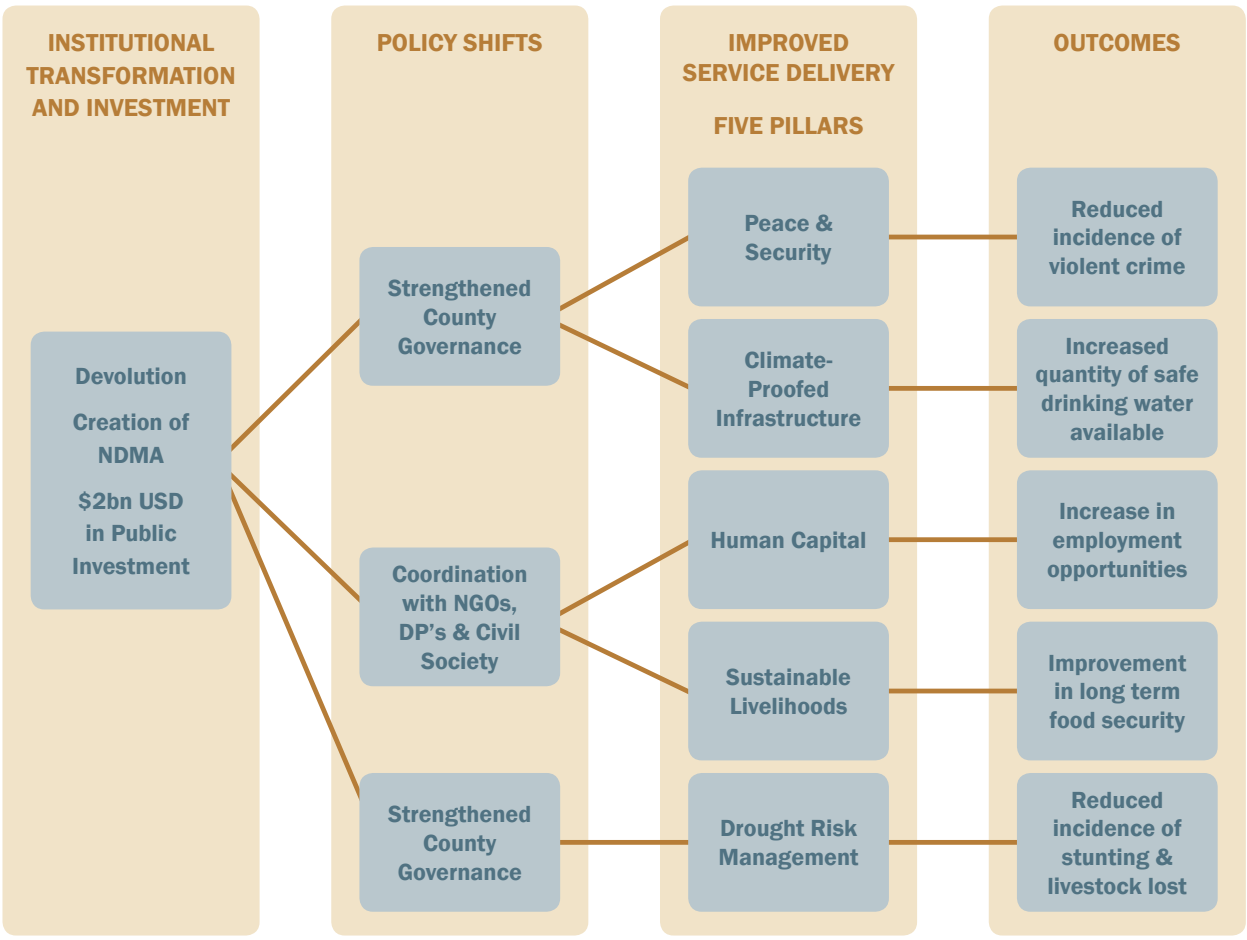
| KEY WORD | EXAMPLE TEXT SEGMENT FROM EDE CPF | PAGE |
|---|---|---|
| **Cause** | This emphasis on the structural causes of drought emergencies is the principal point of departure from previous drought management efforts in Kenya. | 1 |
| **Influence** | "Drought vulnerability is significantly influenced by social systems and by cultural values and practices…" | 18 |
| **Impact** | "The results delivered by each pillar are important not just in their own terms (for example, in fulfilling basic rights) but because they have a bearing on the impact of the other pillars…" | 19 |
| **Affect** | "Joint planning of large-scale infrastructure that affects multiple counties…" | 26 |
| **Effect** | "Enhanced resilience of ASAL livelihoods to the effects of drought and climate change…" | 17 |
| **Produce** | Isolation, insecurity, weak economic integration, comparatively limited political leverage and a challenging natural environment combine to produce high levels of vulnerability and chronic poverty. | 3 |
| **Generate** | "Strong systems will be needed to ensure that the large amounts of information likely to be generated are used effectively to guide decision-making and practice…" | 18 |

The results obtained from the search for causally oriented CPF text is meant to illustrate the process of using a lexical search protocol to identify the basic causal aims of the EDE CPF. While the entire text was searched and phrases identified, the above presents only a partial listing of the results for this stage of the ETTOC analysis.

## CAUSAL DIAGRAMS

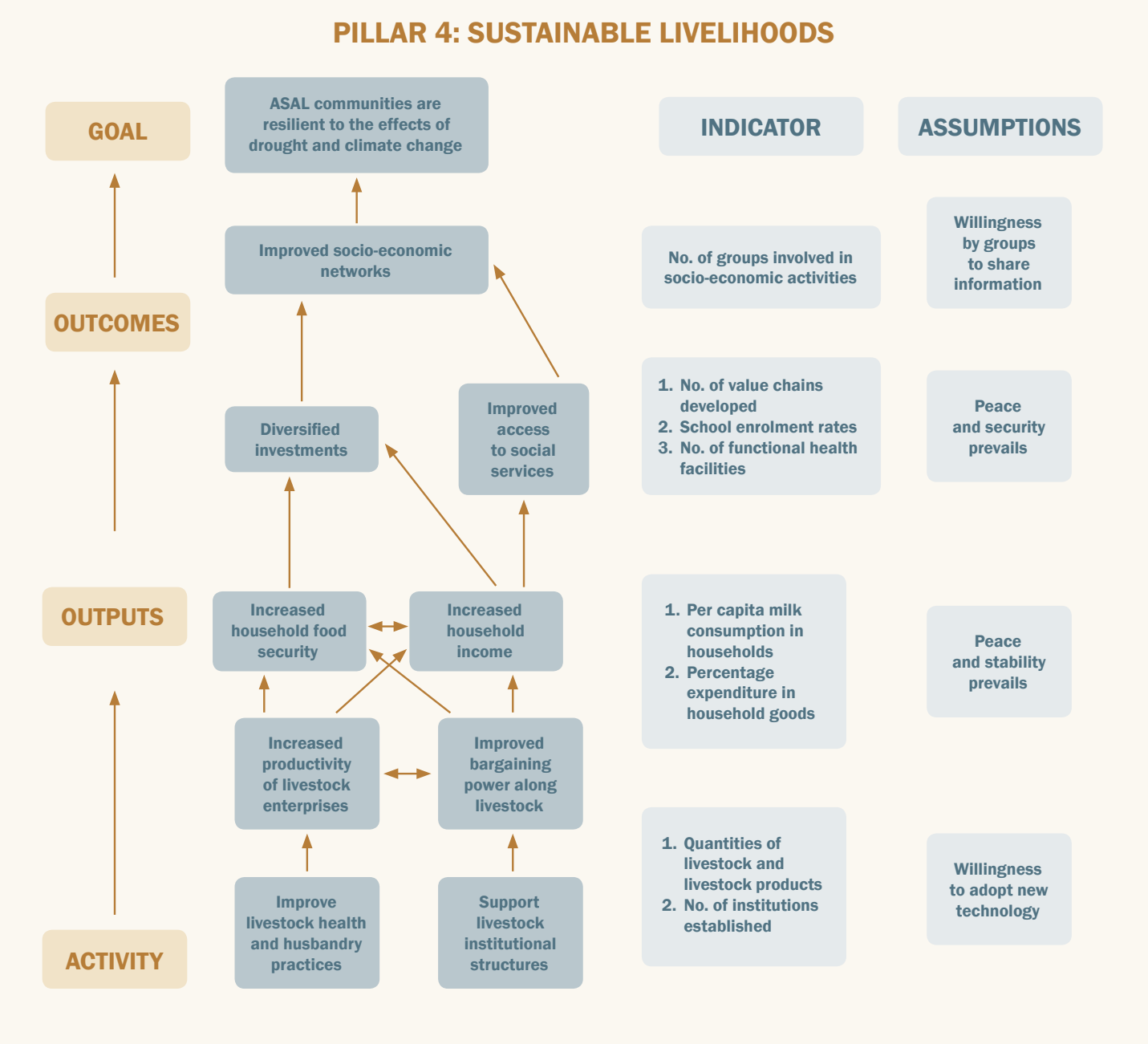
Once the causal phrases were identified, the next step involved articulating a provisional causal graphic. Using a template derived from TOC theory, we match the causal sentences to respective EDE components, creating an outline. This allows us to begin visualizing the paper's logical flow. This outline provided the foundation for creating visual depictions of the causal relationships, including holistic ones providing a broad overview of the causal structure that appears to serve as the driver for the EDE CPF. Figure 1 provides a graphic depiction of the causal structure derived from a causally oriented reading of the EDE CPF and based on a set of casual statements obtained from the first stage of the review.

Figure 1: Overarching Causal Structure




In addition to developing a diagram for the overall EDE CPF, a second diagram was developed for a single pillar – Pillar 4 (sustainable livelihoods). Using the causal statements as input, the diagram for Pillar 4 was organized according to activities, outputs, outcomes and goals. To move the analysis of EDE CPF in the direction of an empirically testable TOC, a sample of indicators was also included. Figure 2 provides a diagram that suggests a provisional causal structure for sustainable livelihoods.

Figure 2: Causal Structure for Sustainable Livelihoods




**Source:** NDMA Pillar 6 - Technical sub-group for Knowledge Management - M&E Technical Working Group, 2015.

As noted earlier, the EDE CPF highlighted the importance of cross pillar interactions. The way in which pillars might intersect with each was explored, and a set of causal propositions was developed. Table 2 shows the set of simple two-way cross-pillar interactions.

Table 2: Articulation of Compound Causal Propositions

| SURFACING OF CAUSAL PROPOSITIONS: INTERACTIONS OF COMMON PROGRAMME FRAMEWORK PILLARS | | | | | |
|---|---|---|---|---|---|
| **PILLAR** | **Peace & Security** | **Climate-Proofed Infrastructure** | **Human Capital** | **Sustainable Livelihoods** | **Drought Risk Management** |
| **Peace & Security** | | A decrease in the incidence of violent events should lead to an increase in investment. | Does conflict, as a proxy for fear, affect school attendance? | Heightened insecurity decreases economic activity. | Insecurity, reduces access to resources, increasing vulnerability to shocks. |
| **Climate-Proofed Infrastructure** | Infrastructure strengthens communities, which in turn increases security. | | Does investment in infrastructure affect the working environment, improving service delivery? | Public investment generates externalities which increase GDP growth rate. | Investments in infrastructure increase the cost effectiveness of policy interventions. |
| **Human Capital** | We expect a negative correlation between education & violence. | The combination of infrastructure and human capital generates a multiplier effect. | | Identifying the wage returns on education and health. | Improvements in nutrition and education should increase resilience. |
| **Sustainable Livelihoods** | Test the extent to which variations in food security explain variations in human security. | Growth is a function of change in investment over time. | Does an increase in income lead to an increase in education and health expenditures? | | Households manage risk by trading of safe but low return investments with risky but high return ones. |
| **Drought Risk Management** | Timely response to drought should alleviate tensions, late response has a smaller but still significant effect. | Do the returns on investment in infrastructure depend on the incidence of drought? | Humanitarian aid should 'crowd in' investments in human capital, such as schools and clinics. | Policy interventions reduce the impact of a shock on welfare outcomes such as food security. | |

The contents drawn upon to construct Table 2 were the results from the initial search for EDE CPF causal statements. It is therefore not surprising to see that all 20 statements in Table 2 possess causal content. The next step was to move from ordinary language to a testable model that can be empirically testable. Here, proof theory provides a useful perspective. From proof theory, a causal relationship 'if x then y' is testable if it is falsifiable. One can test this directly (e.g. if x occurs, does y occur?) or indirectly (e.g. using the contrapositive 'if not y, then not x'). It is worth noting that proving the converse 'if not x, then not y', is not a logically sound way of demonstrating causality, a fact often overlooked in practice.

## REDUCED FORM MODELS

With testable relationships now identified, reduced form models can be specified. Table 3 demonstrates the way in which the content of compound causal statement can be translated into reduced form models.

Table 3: Analytical Translation of Compound of Causal Propositions

| | PEACE & SECURITY | CLIMATE-PROOFED INFRASTRUCTURE | HUMAN CAPITAL | SUSTAINABLE LIVELIHOODS | DROUGHT RISK MANAGEMENT |
|---|---|---|---|---|---|
| **Peace & Security** | | Tobit model<br>F(Peace, Years of Peace) = Investment | Latent Variable<br>Fear* = F (conflict)<br>G(fear*) = attendance | OLS<br>$B_1$ Insecurity = Trade<br>H1: $B_1 > 0$ | Insecurity-> Reduces Access to Resource-> Increases Vulnerability |
| **Climate-Proofed Infrastructure** | 2SLS:<br>Communities = F(Infrastructure)<br>Stability = G(Communities) | | TSLS<br>G (Infrastructure) = Working Environment<br>F(Environment) = Service Delivery | Solow Model with Public Investment (See Milbourne, Otto, Voss 2003) | Factors Of Productivity<br>B*Infrastructure = Δ (Service Delivery/ Cost)<br>H1:B>0 |
| **Human Capital** | Probit<br>B(Education) = P (violence)<br>H1: $\beta < 0$ | Interaction Term<br>F (Health*K) = Impact<br>G(Education*K) = Impact | | Returns On Education<br>Wage = $B_1$ Education | Impact Evaluation:<br>Improved Nutrition-> Decreases Vulnerability |
| **Sustainable Livelihoods** | OLS<br>F(Food Security) = Human Security<br>Test $R^2$ magnitude | Capital Growth Model<br>$\Delta K(t) = sY(t) - \delta K(t)$ | Household Expenditure Model<br>$\Delta Y = \Delta$Education/ Health | | Portfolio Selection<br>Y = zX + (I - z)r<br>X - Risky Asset, r - Safe Asset |
| **Drought Risk Management** | Time Series:<br>Drought at t-2<br>$\beta_1$ Response$_{t-2}$ + $\beta_2$ Response$_{t-1}$ = Tension$_t$<br>H1: $\beta_1 < \beta_2 < 0$ | Interaction term<br>$\beta_1$ Drought *Infrastructure = Welfare Outcomes<br>H0: β1 = 0 | Elasticity of Substitution<br>ΔHumanitarian Aid/ΔHuman Capital < 0 | Interaction Term:<br>$B_1$ Treatment*Shock = Welfare Outcome<br>$H_1$:$B_1 > 0$ | |

A number of different models are possible, depending on the specific data structure developed for the question in each cell. In an actual application, the next step would be to refine questions that would be empirically examined and review available data sources to determine the most feasible and productive way to move the theory of change to a set of empirical studies.

# 7 Conclusions

While TOCs have been and will continue to be a productive tool for planning and evaluation, TOCs have limited use as a tool that might focus and direct an empirical study. The specific objective of this paper was to demonstrate how Kenya's EDE, with particular focus on the Common Programming Framework, can be translated into a TOC with an empirically testable set of propositions that can underwrite evidence-based decision-making. The paper demonstrates how simple and compound causal statements may be derived from the CPF and shows how a set of empirically testable models can be constructed for the EDE. The models are then expressed as reduced form econometric or statistical models.

The paper demonstrates how to move beyond a graphic depiction of a TOC to a process that encompasses content analysis, cause and effect logic and reduced form models that can be empirically tested. The Empirically Testable Theory of Change (ETTOC) approach integrates knowledge of the empirical demands associated with a practical context with insights from a specific theoretical perspective. It presents an approach that could become a standard protocol for the development of all TOC exercises. The ETTOC creates an opportunity for dialogue between decision makers engaged with policy content and monitoring and evaluation experts trying to empirically test propositions embedded in policy documents.

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