Developing Climate and Health Systems Maps for Building Shared Understanding and Identifying Priority Actions- Save the Children

1. Abstract

Save the Children worked with *KnowlEdge Srl* and country stakeholders in Colombia, Somalia, and Vietnam to develop systems-based mapping tools to understand climate and health interconnections as well as feedback relationships, which could amplify adverse impacts on health in their country contexts. Colombia focused on climate change and food insecurity; Somalia focused on drought and malnutrition; and Vietnam focused on climate and dengue transmission risk. In these resource-constrained settings, developing the mapping tool was foundational to building a shared understanding of the multisectoral impacts of—and connections between—human activities, climate change, and health, including social determinants. Building systems maps is effective for active participatory engagement to co-create understanding of climate-health relationships as a basis for identifying action. It can be done at multiple scales using systems thinking (ST)-applied methodology.

2. Background/Context/Timeframe: April — September 2023

Justification: Developing systems maps makes it possible to clearly visualize pathways and dynamics among key drivers of change, climate, and health variables—and the feedback interactions that affect them. This understanding helped identify specific actions that could make the greatest impact by reinforcing positive outcomes and minimizing adverse effects potential. Systems maps were necessary for facilitating effective communication for multi-stakeholder engagement and awareness-raising among the public and decision-makers of the urgency of addressing climate change to reduce food insecurity-related health outcomes in Colombia, dengue transmission risk in Vietnam, and malnutrition in Somalia.

Stakeholder/Level of engagement: ***Vietnam***: Map development included representatives from the province level- Control Disease Centre, Ministry of Health's health environment management agency, and The Department of Natural Resource and Environment. ***Colombia***: Map development involved representatives from health, nutrition, environmental engineering, and corporate social responsibility and experts from the WFP, UNDP, UNHCR, PAHO, and the Norwegian Refugee Council. Additional mapping events included members of the Wayúu culture, Venezuelan migrants, Colombian returnees, local Colombians, and traditional authorities. ***Somalia***: Representatives from government (Health, Agriculture, Water, Disaster Management, Statistics), academia, environment, and health institutes and CBOs participated in design and validation workshops.

Climate, health condition and demography: ***Vietnam****:* The annual average temperature between 1958–2018 increased by about 0.15^0C/decade, while annual average precipitation increased by 2.1%.[1] Under the high scenario (RCP8.5) of Vietnam's Climate Change Scenario 2020, annual average temperature will increase by 3.2–4.2^0C and rainfall will increase by 10–25% by the end of the century. Strong typhoons will increase, and the average sea level could increase by 73 cm. Rising temperatures and changing precipitation patterns, water scarcity and quality, and sea level rise can lead to increased risk of climate-sensitive diseases and waterborne illnesses, especially among vulnerable populations, who may have difficulty accessing market and financial services.[2] Health staff lack climate-induced disease monitoring systems training. Risk communication programs are not well in place, and health risks and adaptation measures research is limited. ***Colombia***: The climate trend in Colombia is characterized by a gradual increase in temperature and decrease in precipitation in specific regions. According to IDEAM,[3] temperatures increased by 0.2–0.3^0C and monthly precipitation decreased by 2–3 mm per decade between 1961–1990. Projections indicate by 2070–2100, temperature will increase by 1–4^0C and precipitation will decrease by 15% to 30%. Climate change impacts food security in Colombia, especially in the La Guajira region, where 85% of the population identifies as black, mulatto, or Afro-Colombian,

[1] Vietnam's NDC 2022
[2] Vietnam's NDC 2022
[3] Colombian Institute of Hydrology, Meteorology and Environmental Studies: http://www.ideam.gov.co/

and 80% of the population lives in poverty. In La Guajira,[4] the affected population faces food insecurity and limited access to basic services. In the first half of 2023, 1,004 children under 5 were malnourished; 78% belonged to the indigenous population. ***Somalia***: Droughts are the most common climatic shock in Somalia. They occur because of consecutive failed rainy seasons and can lead to crop failures, livestock deaths, and water shortages. This leads to food insecurity, disease outbreaks, and malnutrition, which leads to increased rates of stunting, wasting, and death. In 2022, drought crises led to an estimated 43,000 excess deaths, with half occurring in children under 5.[5] Flash and riverine floods also occur. Somalia experiences the highest malnutrition rate in the world, with causes including high food prices, conflict and insecurity, climate change-related events, and climate-sensitive diseases.

3. Approach

Systems Thinking (ST)[6] was the underlying approach for analyzing each country's climate-health challenge. By focusing on the system, ST is helpful for the identification, analysis, and interpretation of the relationship between climate, health and the feedback interactions that affect them. We created systems maps in the form of Causal Loop Diagrams (CLDs) through a co-creation and multi-stakeholder approach to identify effective entry points for interventions. Community engagement reflected an inclusive, participatory process. The path to implementation involved:

- Convene stakeholders to share ST-based methodology and its use in developing CLD systems maps
- Countries identify specific climate-health focus
- Conduct literature review of the climate-health challenge and relevant country policies
- Conduct with countries and identified stakeholders (15–25 in each country) the participatory mapping process, with expert facilitation, resulting in a CLD
- Train country stakeholders to build CLDs using Vensim
- Develop pilot quantitative model based on the country CLD

4. Discussion

Colombia identified 14 interconnected drivers for climate change and food insecurity including food access/production, road infrastructure and malnutrition. ***Somalia*** identified intervention options across food production and livestock, infrastructure, and human behavior. Coordinated actions across sectors and actors are needed because climate change has impacts on the health of people and the health system. ***Vietnam*** found that, with a systems-based understanding of climate and dengue risk, interventions for behavior change and modifying infrastructure can turn negatively reinforcing cycles into positive ones, while reducing pressure on health facilities & improving socioeconomic development. The use of CLDs allowed countries to integrate knowledge across scientific fields and assess interventions across several policy domains. A complete, systemic view also led to a comprehensive literature review and identification of critical data gaps. The underlying drivers of change can provide lessons learned to other contexts and countries.

5. Lessons Learned

- Building systems maps is an effective way to engage communities to identify impactful action based on shared understanding of climate-health relationships.
- Scientific workforce capacity is needed to conduct adaptation research. Country and local stakeholders received training materials for training of trainers to replicate the exercise.
- Using ST-applied methodology to develop and apply CLDs for policy action is possible at multiple levels.

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[4] La Guajira Health Situational Analysis: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/VS/ED/PSP/asis-distrito-riohacha-2022.pdf

[5] From insight to action: examining mortality in Somalia.

[6] Probst, G.; Bassi, A. Tackling Complexity: A Systematic Approach for Decision Makers; Greenleaf Publishing: Sheffield, UK, 2014.