



CASE STUDY 2.2

FORESIGHT – AN AI SYSTEM FOR FORECASTING THE FUTURE OF DISPLACEMENT

RANA NOVACK • IBM

BO SCHWARTZ MADSEN AND ALEXANDER KJÆRUM • Danish Refugee Council (DRC)

The United Nations High Commissioner for Refugees (UNHCR) reported in 2023 that at least 108.44 million people had been forced to flee their homes due to persecution, conflict, violence, human rights violations, or events significantly impacting public order.³⁹

Effectively responding to growing displacement and humanitarian needs is made more complicated by limited humanitarian funding. As such, innovative solutions are needed to ensure a more efficient response based on prioritization of potential risks and impacts. With more accurate predictions and better evidence for scenario-building, humanitarian action can be improved, resulting in enhanced outcomes for people affected by displacement.

While displacement is known to be an inherently complex phenomenon, signals, metrics, and indicators can be monitored and analyzed to better understand the various drivers of a displacement crisis and the relations between them.

The Foresight System is an artificial intelligence application that provides long-term forecasts on forced displacement volumes as well as a causal analysis of displacement drivers. The system is cloud-based and open source, leveraging machine learning and advanced predictive analytics to forecast displacement. It facilitates

data-driven decision making to improve the operational efficiency and impact of international humanitarian and development actors by providing a deeper understanding of displacement dynamics through:

The integration of digital technology with displacement knowledge: causal models blend expert opinion and reliable, trusted data, and provide deeper insights into the drivers, trends, and signals that lead to a displacement crisis. It informs the operational, resource, and policy decisions of practitioners.

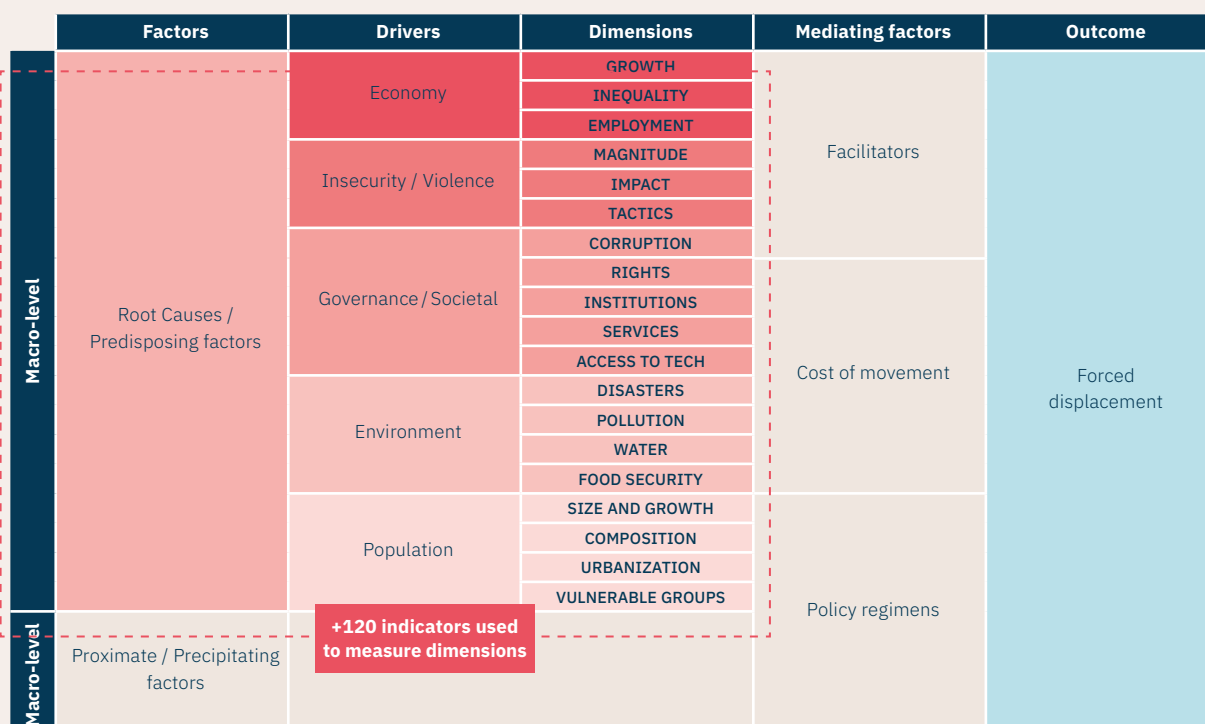
Accurate and valid displacement volumes and timing forecasts based on correlates of historic indicators with displacement volumes. More accurate displacement predictions contribute to improved operations, as actors can respond early to cover humanitarian needs and support actions on displacement.

Custom scenario analysis and visualization assess the impact of evolving conditions, evaluate alternative courses of action, and determine potential events and the outcomes of policy decisions. In turn, this enhances the situational awareness and decision making competency of practitioners.

Developed in partnership by IBM and the Danish Refugee Council, the Foresight System uses open data from 18 sources to predict the forced displacement of internally displaced persons and refugees, covering 26 countries and accounting for 87 percent of all global displacement. With a high degree of accuracy, the model can estimate the cumulative number of forcibly displaced people between one and three years into the future.

The Foresight model is based on a theoretical framework that focuses on the root causes or macro-level drivers of displacement and aggregates over 120 indicators from 18 open-source data sets (FIGURE 2.4). The different dimensions and associated indicators have been grouped into five categories: economy, security, governance, environment, and population.⁴⁰ The environmental indicators include disasters, pollution, water, and food security.

FIGURE 2.4: OVER 120 INDICATORS OF DIFFERENT DRIVERS ARE COMBINED TO GENERATE DISPLACEMENT FORECASTS IN TERMS OF VOLUME AND TIMELINE.



Source: IBM and DRC 2022.

The technology behind the Foresight System combines machine-learning models that leverage several constituent models to generate independent forecasts, which are then aggregated. Ensemble modeling detects changes when any combination of indicators changes, and the resulting displacement forecast is generated. The system also employs a “what if” scenario analysis capability, which allows practitioners to manipulate indicators to assess the impact of evolving conditions and determine the outcome of events and policy decisions before their implementation (FIGURE 2.5).

Implementing advanced predictive analytics and AI-driven forecasting solutions combined with integrated, quality data is critical in providing access to actionable intelligence and enhanced outcomes for the world’s most vulnerable populations. The Foresight System demonstrates the value in applications of machine learning across the peace and security continuum. It confirms that adopting a forward-thinking and proactive approach should be a first step in supporting displaced populations globally in the digital age. Using the scenario analysis feature, peacebuilding practitioners working in high-displacement contexts can incorporate this technology to get a better understanding of the potential consequences of their interventions.

FIGURE 2.5: THE CUSTOM SCENARIO ANALYSIS ALLOWS USERS TO MODIFY INDICATORS AND PREVIEW THE POTENTIAL OUTCOMES OF A CRISIS AND DETERMINE ALTERNATIVE COURSES OF ACTION.

Baseline overview and data per country



Scenario analysis sliders



Scenario analysis result dashboard



Source: IBM and DRC 2022.