centre for humdata

OCHA

The Technical Feasibility of Conflict Prediction for Anticipatory Action

OCHA's Centre for Humanitarian Data

ACLED
Bringing clarity to crisis

GPPi
GLOBAL PUBLIC POLICY INSTITUTE

TEXAS LBJ School
The University of Texas at Austin
Lyndon B. Johnson School of Public Affairs

PRIO

ViEWS
PREDICTING CONFLICT

Speakers and Moderator

Håvard Hegre
PRIO / Uppsala University

Marie Wagner
Global Public Policy Institute

Katayoun Kishi
ACLED

Erin Lentz
University of Texas

Seth Caldwell
OCHA Centre for
Humanitarian Data

Leonardo Milano
OCHA Centre for
Humanitarian Data

ACLED
Bringing clarity to crisis

GPPi
GLOBAL PUBLIC POLICY INSTITUTE

TEXAS LBJ School
The University of Texas at Austin
Lyndon B. Johnson School of Public Affairs

PRIO

ViEWS
PREDICTING CONFLICT

Agenda

Summary of paper and findings
Seth Caldwell, Data Scientist, Predictive Analytics Team, OCHA Centre for Humanitarian Data

Current state of work on conflict prediction
Håvard Hegre, Director of ViEWS, Research Professor at the Peace Research Institute Oslo and at the Department of Peace and Conflict Research at Uppsala University

Current state of work in humanitarian research
Erin Lentz, Associate Professor, Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin

Current landscape on anticipatory action and violent conflict situations
Marie Wagner, Project Manager, Global Public Policy Institute

Panel Discussion (Q & A)
All presenters including Katayoun Kishi, Head of Data Science, The Armed Conflict Location & Event Data Project and facilitated by Leonardo Milano, Predictive Analytics Lead, OCHA Centre for Humanitarian Data

ACLED Bringing clarity to crisis
GPPi Global Public Policy Institute
TEXAS LBJ School The University of Texas at Austin Lyndon B. Johnson School of Public Affairs
PRIO
ViEWS PREDICTING CONFLICT

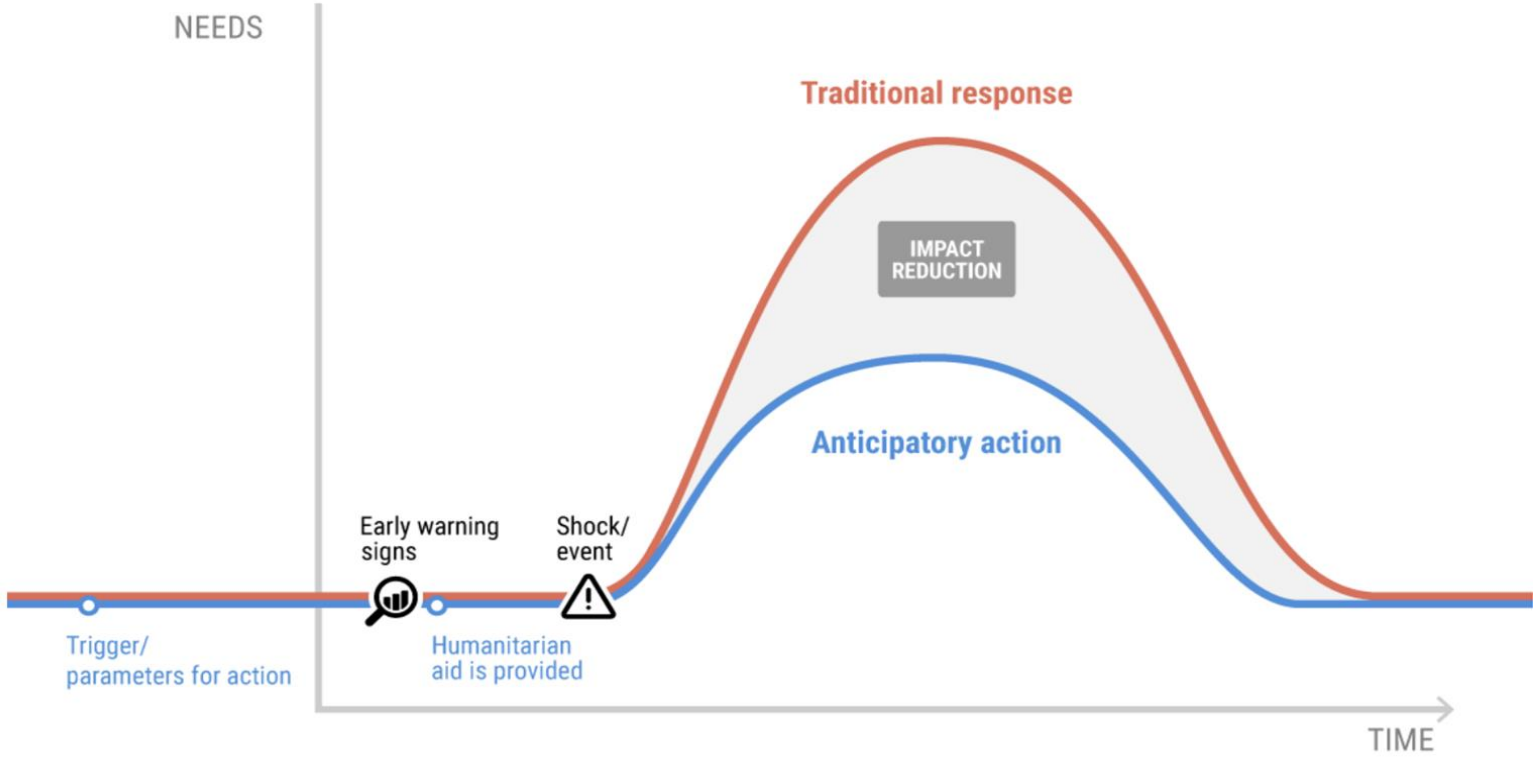
Presenter

Seth Caldwell
OCHA Centre for Humanitarian Data

Summary of paper and findings

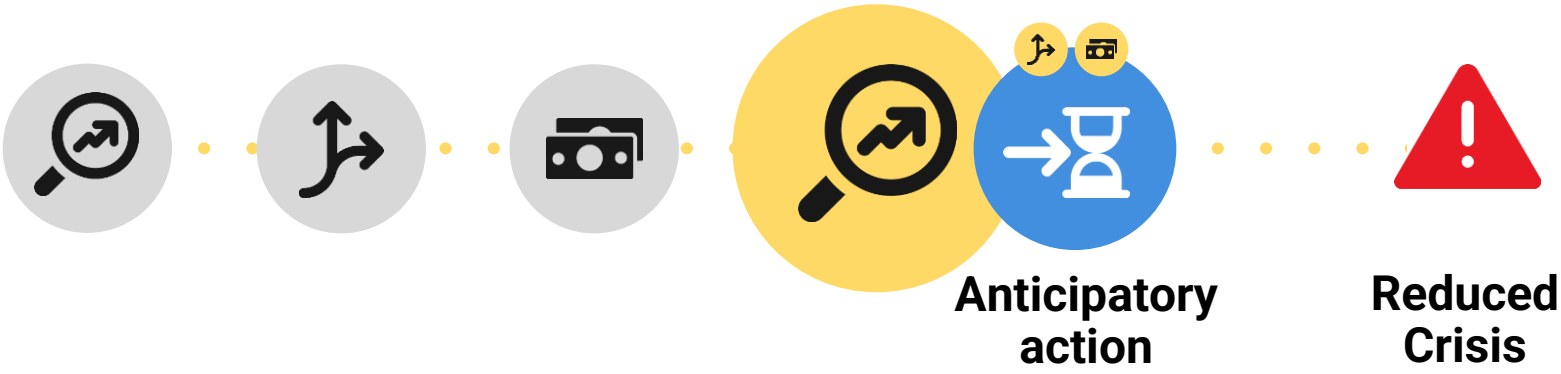
ACLED Bringing clarity to crisis
GPPi Global Public Policy Institute
TEXAS LBJ School The University of Texas at Austin Lyndon B. Johnson School of Public Affairs
PRIO
ViEWS Predicting Conflict

Data for anticipatory action



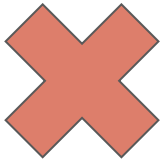
Three key elements needed for anticipatory action

1. A robust forecasting embedded in a clear decision-making process (the model).
2. Pre-agreed action plans that can fundamentally alter the trajectory of the crisis (the delivery).
3. Pre-arranged finance (the money).



Research focus on conflict prediction for anticipatory action

Our research explored **the feasibility of applying conflict prediction models for anticipatory action**, as we have done for drought or floods.

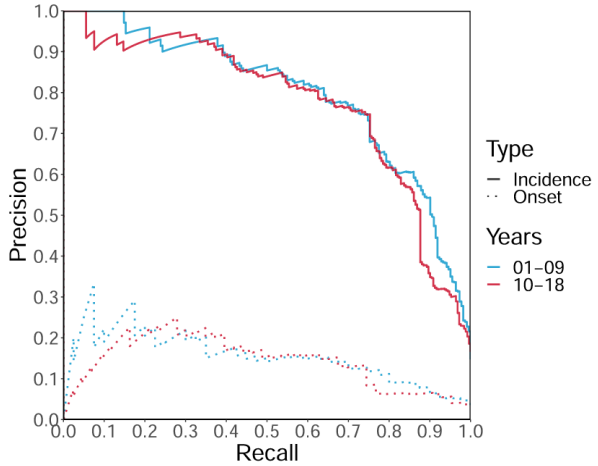


We did not answer questions on the feasibility of using conflict prediction for disaster risk reduction, peacebuilding, or purposes beyond anticipatory action.

RESEARCH FINDINGS

Insufficient justification for using conflict prediction for anticipatory action

1. Poor performance in predicting the onset of new conflicts.
2. Lack of clear connection between predicted conflict and resulting humanitarian impact.
3. The dominance of ongoing conflict as a predictor of future conflict.



	WPS model	Simple model
Recall	0.86	0.71
Precision	0.47	0.73
F2	0.74	0.71
ROC AUC	0.89	0.84
AUPRC	0.42	0.55
Brier score	0.084	0.057

Water, Peace and Security model underperformed a simple model on key metrics such as AUPR and Brier score[79]

Research on conflict prediction should focus on:

1. Utilize flexible models that do not pre-suppose a theoretical framework of conflict causality.

2. Focus models on predicting shifts in conflict, such as an increase in intensity or onset.

3. Explore the use of human inputs through superforecasters or prediction markets and to use local data to improve model performance in specific contexts.

Research on conflict prediction should focus on:

4. Improve predictions on the humanitarian impact of conflict as opposed to conflict itself.

5. Ensure that model development and evaluation is done in a reproducible and transparent way that highlights the model performance in all relevant metrics.

6. Learn from the state-of-the-art research underway in the academic field and ensure that applied research is relevant for humanitarian decision making.

Presenter

Håvard Hegre
Uppsala University / ViEWS

Current state of work on conflict prediction

ACLED Bringing clarity to crisis
GPPi GLOBAL PUBLIC POLICY INSTITUTE
TEXAS LBJ School The University of Texas at Austin Lyndon B. Johnson School of Public Affairs
PRIO
ViEWS PREDICTING CONFLICT

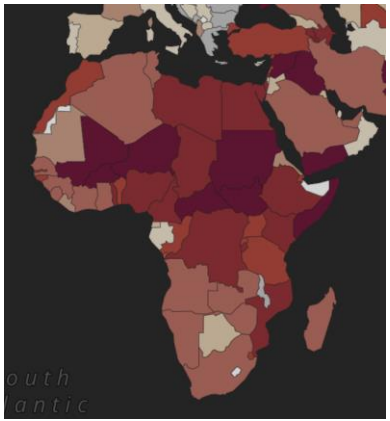
State of the art in conflict prediction research

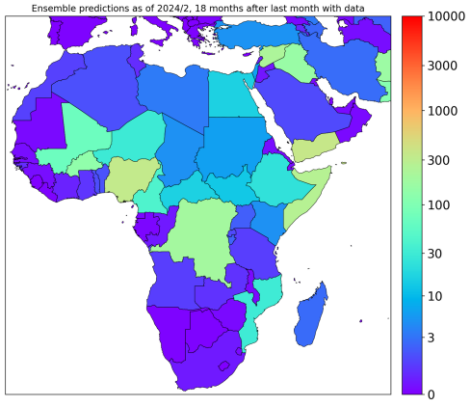
Strengths

- **New academic research on conflict forecasting**:
  - Forecasting gradually enters mainstream conflict research
  - ViEWS prediction competition
- **New systems with regular update schedule:**
  - Good at predicting continued levels of violence
  - Scores well in terms of transparency and openness
  - Some systems make the evaluation of performance publicly available

Weaknesses, challenges

- **Predicting shifts in violence is hard:**
  - Problem is intrinsically difficult
  - Optimization criteria may be sub-optimal
  - Field is in its infancy
  - Lack of publicly available data



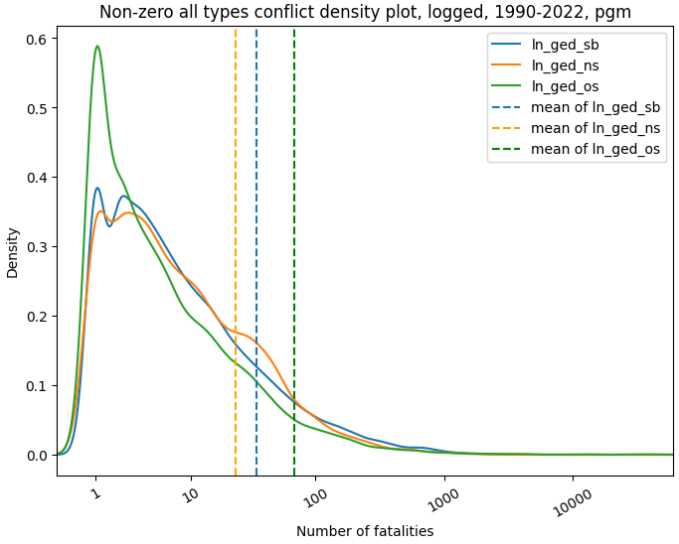


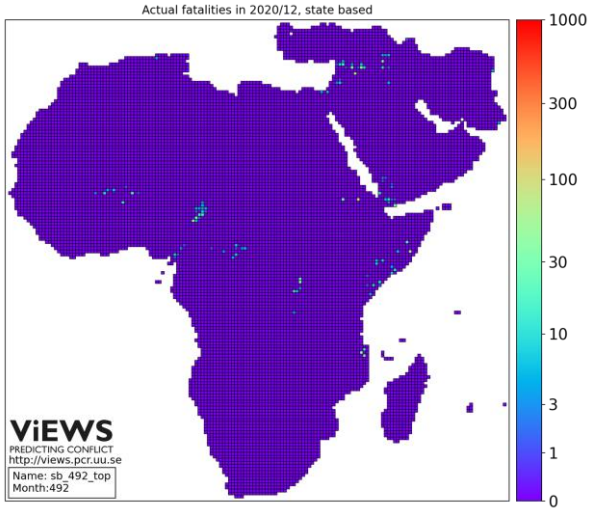
Building continuous prediction models

- **Challenges**:
  - Distribution of fatalities
  - Relatively few instances of sudden change
  - Hard to monitor unknown actors
  - Armed conflicts are complex and have many causes

- **Approach:**
  - Multi-level ensembles: country, location, (actor)
  - Machine-learning methods
  - Based on the Uppsala Conflict Data Program
  - State-based conflict, expanding to non-state, one-sided violence

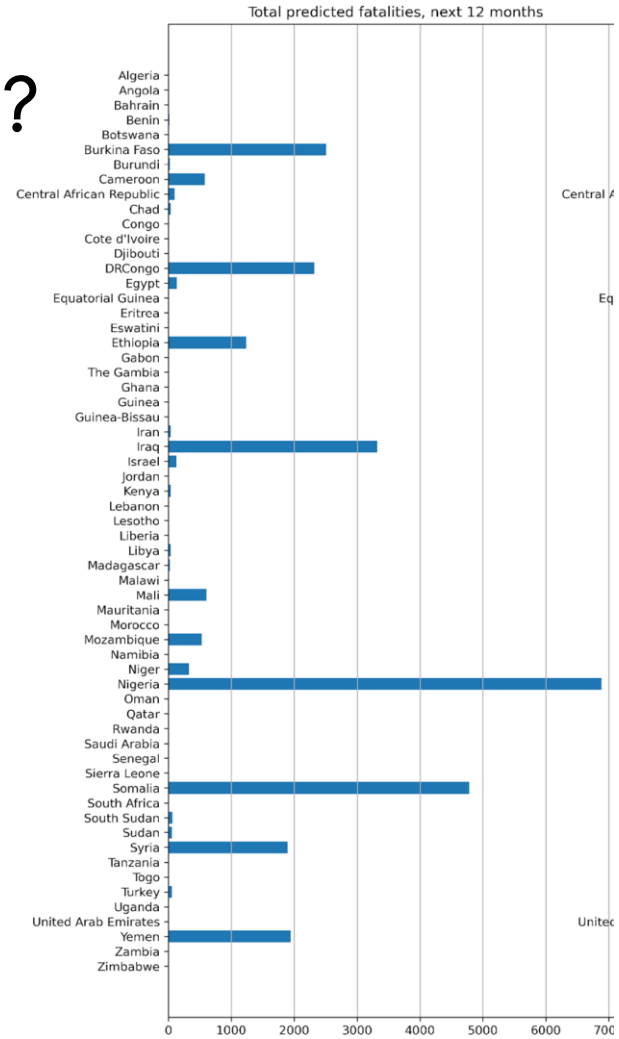
- **Transparency** and making these publicly available:
  - Forecasts
  - Code and input data
  - Methodological justification

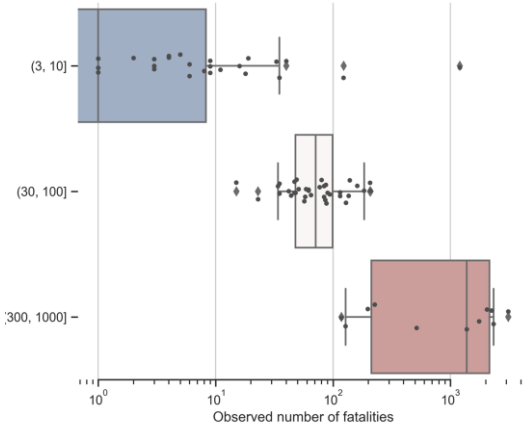


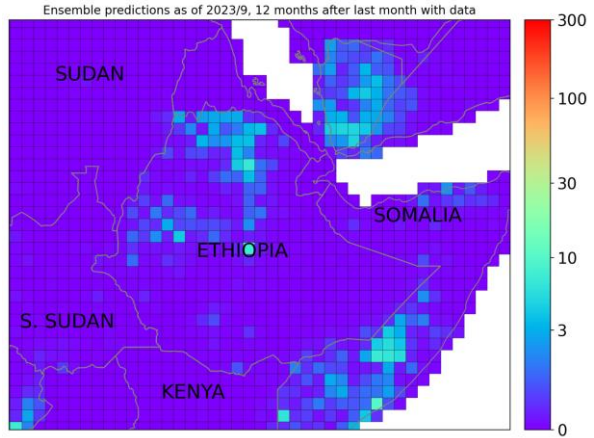


How does it work?

- **Forecasting continued violence quite precisely**
  - There is more uncertainty regarding the escalation of violence
- **Continuous violence most important**
  - We know where most deaths from political violence will be over the next 12 months







Forecasting the impact of armed conflict

- Model the impact of armed conflict in a risk framework
- Risk in location is a function of:
  - Hazard of conflict in the location and other relevant places
  - In the past and in the future
  - Exposure to conflict in the location
  - Vulnerability of impact
- Most adverse impact occurs in ongoing conflicts
  - However, there is considerable variation in the type of impact across different conflicts
- Five-year research project at PRIO and Uppsala University
  - Economists, epidemiologists, political scientists, water and natural resource specialists

Presenter

Erin Lentz
University of Texas

Current state of work in humanitarian research

ACLED Bringing clarity to crisis
GPPi Global Public Policy Institute
TEXAS LBJ School The University of Texas at Austin Lyndon B. Johnson School of Public Affairs
PRIO
ViEWS Predicting Conflict

Food Security Predictions

- Explosion of research in this and related humanitarian areas:
    - Lentz et al. 2019; Westerveld et al. 2021; Andree 2022; Martini et al. 2022; Wang et al. 2022
- Data sparse locations are least likely to be well estimated (Zhou et al. 2021)
    - Techniques like oversampling the tails can help improve model performance.
    - Could be useful for conflict too.
- Lots of ways to operationalize food insecurity for predictions: IPC classifications, variety of household measures, others. The choice matters for accuracy (Lentz et al. 2019)
    - What type of conflict measure matters?
    - Is it severity? Magnitude? Is it a threshold? Non-state vs state actors? Etc.

Opportunities

Before we get locked in to specific models and approaches:

- Co-production:
    - Models are built with assumptions.
    - Decision-makers and modelers need to collaborate. Decision-makers and domain experts can help modelers produce transparent models that are “fit for purpose”.
- Model interoperability
    - How can models “talk” to each other to allow for feedback, amplification, and dampening of predictions?
    - How to support cross pollination and learning from modelers across humanitarian (and other) sectors?

Challenge

Does predicting conflict and linking it to anticipatory action change the likelihood of conflict?

Presenter

Marie Wagner
Global Public Policy Institute

Current landscape on anticipatory action and violent conflict situations

ACLED Bringing clarity to crisis
GPPi Global Public Policy Institute
TEXAS LBJ School The University of Texas at Austin Lyndon B. Johnson School of Public Affairs
PRIO
ViEWS PREDICTING CONFLICT

Panel Discussion

Håvard Hegre
PRIO / Uppsala University

Marie Wagner
Global Public Policy Institute

Katayoun Kishi
ACLED

Erin Lentz
University of Texas

Seth Caldwell
OCHA Centre for
Humanitarian Data

Leonardo Milano
OCHA Centre for
Humanitarian Data

ACLED
Bringing clarity to crisis

GPPi
GLOBAL PUBLIC POLICY INSTITUTE

TEXAS LBJ School
The University of Texas at Austin
Lyndon B. Johnson School of Public Affairs

PRIO

ViEWS
PREDICTING CONFLICT

Thank you!

centre.humdata.org

humdata | centrehumdata@un.org

centre for humdata

OCHA