Conflict forecasts for Mali and Burkina Faso

October 2020–September 2023

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Figure 1. Predicted probability of at least one fatality from state-based, non-state and one-sided violence in Mali and Burkina Faso in December 2020. Red cells face a probability close to 100%, purple cells equal to or less than 0.1%, and orange cells to that of a coin toss.

This report presents the October 2020–September 2023 conflict forecasts for Mali and Burkina Faso, as of 1 October 2020. The report is based on data up until and including August 2020.

To learn more about the data sources and methodology underlying the forecasts, please visit http://views.pcr.uu.se or consult our methodology and evaluation publications, Hegre et al. (2019) and Hegre et al. (2020a), in Journal of Peace Research.

In what follows, we elaborate on the forecasts in Figure 1 and discuss the recent conflict history in the two countries. We then raise our gaze to the overall and long-term country-level forecasts, offering some further insight into the underlying data and the modelling system that has informed the forecasts.

State-based violence (sb)

The high-risk clusters in the December 2020 forecasts are concentrated around the regions of Kidal, Mopti, Ménaka, Segou and Bamako in Mali, as well as the Nord, Centre Nord, and Boucle du Mouhoun regions in Burkina Faso (see Figure 1a). Risks are high in these locations since this is where violence has been occurring recently (see the conflict history maps in figures 2a, 2b and 2c).

The three conflict history maps are informed by UCDP conflict data up until and including August 2020 (the last
month of available data). Red cells were home to one or more fatalities as late as August (distinguished by black markers) or July 2020, whereas purple cells have not seen fatal violence for many years. The color distribution in the maps, particularly that in Figure 2a, illustrate very well the transient nature of the local conflict dynamics.

The change maps on the bottom row of Figure 2 serve a similar-dual-purpose. They plot the differences between the three-months-ahead forecasts generated by the ViEWS system in the current month, as compared to those generated in the previous month. Where cells are colored bright red, the ViEWS system expects a significant risk increase since last month, and where cells are colored dark blue, it predicts a substantial risk decline. Because conflict history is not only one of the most important but also one of the most frequently updated data sources informing ViEWS’ models, the culprit of variations in the change maps are most often located in these data. More specifically, changes are most often a result of monthly fatality counts that differ from current conflict trends at the grid cell level, be it due to conflict eruption in new locations or due to unexpected intensity levels in continued conflicts. As such, results displayed in 2d are not only to be used as a warning signal of impeding escalations, but can also serve as a second informant about the general conflict dynamics.

Last, but certainly not least, a third conclusion can be drawn from the results displayed in Figure 2: the number of fatalities from state-based violence across the region continue to decline following the outbreak of the COVID-19 pandemic.

In Burkina Faso, the monthly death tolls have plummeted from well over 100 in May 2020, to 23 in June, 15 in July, and only nine in August. Three of the latter were a result of a low-intensity continuation of the conflict between JNIM and the Government of Burkina Faso in Centre Nord and Boucle du Mouhoun regions, whereas the remaining six were a tragic result of a blast from an improvised explosive device in Bembéla village (Nord region), which may be re-coded to another form of violence once

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All fatality counts referenced in this report derive from the UCDP-Candidate Events dataset (Hegre et al. 2020b).
more information about the incident and its victims is made available.\(^6\)

In Mali, death tolls from state-based violence amounted to nearly 100 fatalities in March, and dropped to around 50 in April and May. Reports over the summer months, in turn, have not exceeded the 25 that were reported in August. The latter is particularly striking given the military coup that on August 18 ousted President Keïta from his post. Soldiers from the National Committee for the People’s Salvation stormed the President’s home in Bamako, abducted and detained him, and ultimately forced him to resign on state television later the same night. The events culminated in the installment of an 18-month transitional government that under the leadership of retired military officer Bah N’Daw will rule until the planned elections in 2022. The coup resulted in only four casualties, the circumstances of which, furthermore, remain unclear. The remaining 21 fatalities in August were all related to continued activity between Government of Mali and JNIM on the one hand, and the Government of Mali and IS on the other. Albeit a high death toll in itself, it is a moderate number when compared to previous months.

The declining fatality counts discussed above are illustrated by the blue cells in Figure 2b.\(^6\)

Non-state violence (ns)

Plummeting death tolls have been observed also for non-state violence. In Burkina Faso, not a single fatality was reported in this category in August. May, June and July combined, moreover, resulted in no more than one fatality, as compared to the 79 in April 2020. Consequently, faint blue cells can be observed in Figure 2c in localities where the conflict intensity is diminishing and/or violence has desisted altogether. From Figure 1b we also see that the forecasts across the country are relatively low–averaging at a risk around 5% for December 2020.

In Mali, an unfortunate upswing was reported in August with a total of 31 fatalities. 18 of these were the result of a conflict between JNIM and IS. Ten resulted from tribal clashes near the border to Mauritania, and three were reported from yet unclear circumstances in the Gao region. May, June and July combined, however, only accumulated to 19 fatalities. This is to be compared to the 144 and 107 lives were claimed in April and March, respectively.

Given the slightly higher death toll over time, the general risk assessment for the sub-national level, as seen from Figure 1b, is somewhat higher in Mali than in Burkina Faso. Changes in the risk assessment as compared to last month (Figure 2b) are with the exception of only a few grid cells nevertheless non-existent.

One-sided violence (os)

Albeit overall risk declines are observable, the conflict trends are less conclusive for one-sided violence (Figure 2f).

In Burkina Faso, the monthly death tolls have varied since the peak of 219 in March 2020: 54 in April, 68 in May, 25 in June, nine in July, and 25 in August (20 of which were claimed by an attack on a cattle market by unidentified individuals in the Est region). Several local risk elevations are thus visible in the change map, in addition to two local

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\(^6\)This event was originally coded by the UCDP as a conflict between JNIM and the Government of Burkina Faso (thus state-based violence) due to the location of the blast, but the victims appear to be the by-passers and the event has yet to be confirmed.
declines.

Also in Mali the trends are inconclusive. While a general decline is visible since the 97 fatalities from one-sided violence in March, the death tolls have varied since. In April, the number was as low as 23, only to increase to the 60s throughout May-July, and then plummet to none in August 2020. Consequently, the lagged effects of the summer’s death tolls continue to influence the forecasts as of October; local risk increases for December 2020 are expected by the modelling system, but with only one exception the intensity thereof is estimated to be moderate. This is illustrated by the light red cells in Figure 2. Likewise, a number of local decreases are displayed.

Effects of the overall declines in the predicted probability of all three forms of violence are observable also in the long-term forecasts from the October run of the forecasting system. Figures 4 and 5 display the VIEWS forecasts at both levels of analysis for March 2021 and September 2021, respectively. The further ahead in time one forecasts, the lower the predicted probability of fatalities from any one of the three forms of violence become—at both levels of analysis.

**COUNTRY-LEVEL (CM) FORECASTS**

Shifting the focus from the sub-national level to the country level forecasts, we are able to better study the long-term trends of the predictions.

Figure 3 presents the VIEWS forecasts for both countries and over the period October 2020–September 2023. Here, a model ensemble that is tailored specifically to country level forecasts has been employed, and the alert threshold has been raised from one to at least 25 fatalities in a given month and form of violence.

Before delving into these forecasts, an introduction to the set-up of the modeling system underlying the results can be fruitful.

First, whereas the model ensemble used to generate forecasts at the sub-national level excels in accentuating effects from local conditions such as social and natural geography, precipitation levels, and even onset of low-intensity conflicts, the country level ensemble brings other valuable predictors to the mix. Still allowing data from the sub-national level forecasts to inform its own predictions—and vice versa—the country level ensemble gives greater weight to structural, slow-moving features and patterns that often characterize countries over a longer period of time. This is exemplified by stability of political institutions, democracy indices and socio-economic factors, to mention only a few. Moreover, the historical conflict data model (the cflong model)—focusing not only on the past few months or years—is a particularly influential model in the country level ensemble.

Second, when analyzing forecasts from the two levels of analysis, it is important to understand that the variances in the modeling set-up above may result in somewhat conflicting forecasts. The forecasts for state-based violence in Mali in December 2020 are a good example of this. At the sub-national level, not a single grid-cell is estimated to be at more than 60% risk of at least one fatality occurring—most localities do not even exceed a risk of 20%—yet the country level forecasts estimates a near 80% risk of 25 or more lives being lost.

Third and last, when analyzing long-term forecasts, it is also fruitful to know that some of the constituent models specialise in forecasting a specific number of months into the future (or ‘steps’, as they are referred to internally). Some models are given greater weight when forecasting e.g. three or six months into the future, whereas e.g. structural models are given precedence when looking several years into the future. The jagged trend lines visible in Figure 6a and 7a are indicative of these effects (see e.g. the dips or peaks for August/September 2021, or February 2022).

**State-based violence (sb)**

Returning again to Figure 3, we find that the predicted probability of at least 25 fatalities per month from state-based violence is very high for both Mali and Burkina Faso throughout the remainder of 2020 and the first two quarters of 2021. For Mali (dark red line), the risk surpasses 70% during each of the next four months, after which it slowly decreases. For Burkina Faso (dark blue line), the predicted probability remains stable at approximately 65% until late spring 2021. Thereafter, the VIEWS system forecasts a continuous trend of peaks and valleys, explained by the step-specific modelling set-up described above.

Figures 6a and 7a offer further ‘behind-the-scenes’ insight into the forecasts. They display the relative contribution of the constituent models that comprise the two countries’ respective forecasting ensembles for state-based violence. The relative contribution of the models are stacked on top of each other, scaled so that the sum of...
Figure 4. Predicted probability of state-based, non-state and one-sided violence in Mali and Burkina Faso in March 2021. At least 1 fatality on the sub-national level (top row) and at least 25 fatalities on the country level (bottom row). Forecasts as of 1 October 2020.

Figure 5. Predicted probability of state-based, non-state and one-sided violence in Mali and Burkina Faso in September 2021. At least 1 fatality on the sub-national level (top row) and at least 25 fatalities on the country level (bottom row). Forecasts as of 1 October 2020.
the areas are approximately equal to the predicted probability of conflict in each country, for each of the 36 months in the forecasting window.

For Mali (Figure 5a), we find that the conflict history model (cftong, the dark blue shade) and the all-encompassing global model (all_glob, the light blue shade) have been given the greatest weight when forecasting 1–6 months into the future. The former includes an extensive number of features that trace the conflict history in the country, giving precedence to more recent violence, while also taking into account the long-term conflict history in the country (the recent history of violence, displayed in the decay maps of Figure 2), will thus have played a key role in generating the forecasts for both December 2020 and March 2021). The latter, the all_glob model, includes features from all constituent models in the ensemble. It is thus informed also by the cftong and the two dynamic simulation (ds) models, all of which address different aspects of conflict history.

For long-term forecasts, we instead see an increasing role played by the socio-economic (wdi_all_glob, grey shade) model, capturing effects of e.g. youth unemployment. Throughout the forecasting window, we also see a small contribution from the political institutions model (vdem_glob, pink shade).

The relative model distributions in the forecasts for state-based violence in Burkina Faso resemble those for Mali. The jagged effects of the modelling set-up is more prominent here, but the overall influence of conflict-heavy models in short-term forecasts, and an increasing role of socio-economic factors further down the line, remain very similar. The most notable difference in terms of the model contributions is the slightly increasing role of the political institutions model over time.

### Non-state (ns) violence

The risk profiles for non-state violence are relatively low throughout the forecasting window for both countries. In Mali, the risk lies just below 30% for the first six months, after which the predicted probability of at least 25 fatalities in a given month slowly decrease to just below 20% by September 2021. The forecasts for Burkina Faso follow a similar trajectory, only starting at 20% and ending at about 15%. The relative contribution of the constituent models are largely the same for both countries: conflict history models take precedence for short-term forecasts, whereas more encompassing global models prevail in the long run. The most notable difference between the two is the small role played by the WDI model for Mali, which is missing for Burkina Faso.

### One-sided (os) violence

For one-sided violence, we see a greater variation in the model contributions underpinning the two countries’ forecasts. The risks of fatal violence are also estimated to be higher for one-sided violence than non-state violence for Burkina Faso, where the predicted probability of at least 25 fatalities per month is as high as 40% over the first four months, after which it slowly declines to land at approximately 20% by September 2021.

For both countries, we see a strong contribution from the two dynamic simulation models throughout the forecasting window. The two models are specialized for incidents of one (ds_dummy) and 25 (ds_25) BRDs, respectively, and are trained together so that their simulations inform each other, giving rise to the correlation between them over time. In both cases, the ds models are even given greater weight than the cftong model, which tends to prevail across both countries and violence forms.

Last, the wdi_all_glob contributes to both forecasts, with particular accentuation in the Burkina Faso forecasts and step-dependent variations for Mali.

### REFERENCES


Figure 6. Predicted probability of state-based (top), non-state (middle) and one-sided (bottom) violence in Mali from October 2020–September 2023. The relative contribution from each of the main constituent models in the forecasting ensemble is illustrated by the stacked shades.
Figure 7. Predicted probability of state-based (top), non-state (middle) and one-sided (bottom) violence in Burkina Faso from October 2020–September 2023. The relative contribution from each of the main constituent models in the forecasting ensemble is illustrated by the stacked shades.

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Model descriptions

Our full suite of forecasting models are described in detail in Appendix B and C to our forthcoming article in *Journal of Peace Research*, available at [https://pcr.uu.se/research/views/publications/](https://pcr.uu.se/research/views/publications/).

Levels of analysis

The results are presented at two levels of analysis:

- The country-month (cm) level, which follows the country outline determined by CShapes (Weidmann, Kuse, and Gleditsch, 2010), and;
- The PRIO-GRID-month (pgm) level, which is outlined by fine-grained geographical locations known as PRIO-GRID-cells, a global quadratic grid structure with cells measuring 0.5 x 0.5 degrees in longitude and latitude, spanning approximately 55 km² along the equator (Tollefsen, 2012 [https://grid.prio.org/#/]).

Forms of violence

The ViEWS forecasts take the form of monthly probabilistic assessments of the risk and likely severity of three forms of organized political violence occurring in a given month, as defined by the Uppsala Conflict Data Program (UCDP):

- **State-based (sb) violence**: the use of armed violence over either government or territory between armed actors, in which at least one is a government of a state;
- **Non-state (ns) violence**: the use of armed force between two organized armed groups, neither of which is a government of a state, and;
- **One-sided (os) violence**: the deliberate use of armed force by the government of a state, or by a formally organized group, against civilians.