



## UNREST SCALE



# Early Warning System for Social Unrest and Protests

### OVERVIEW

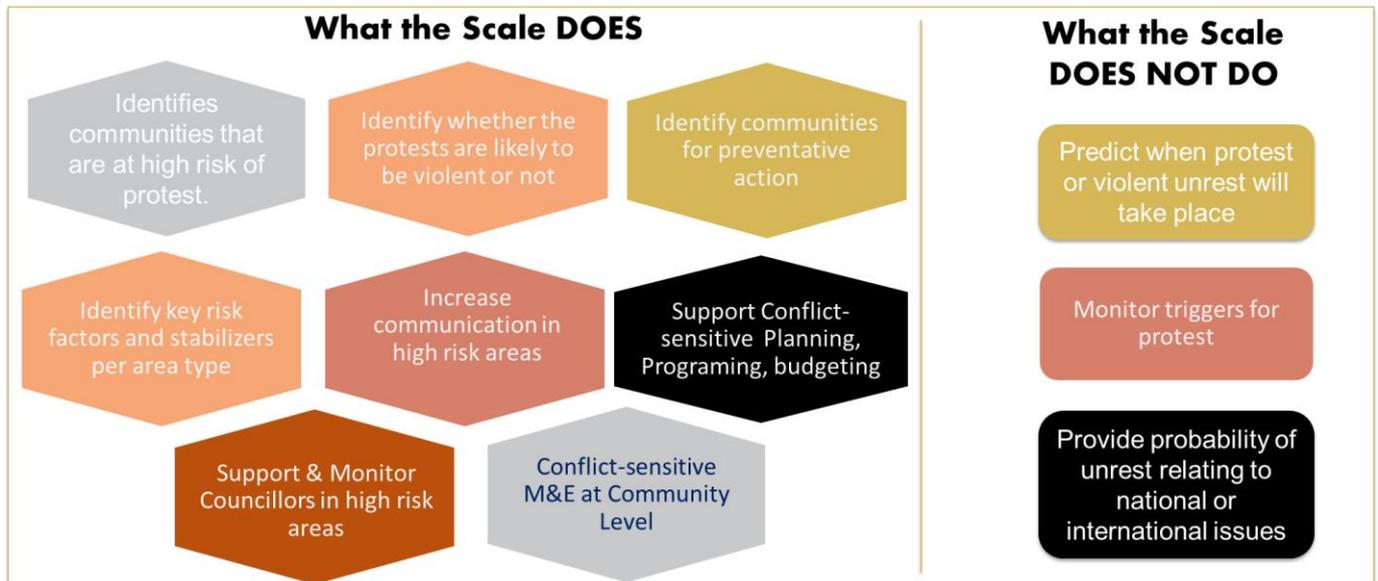
As the COVID-19 pandemic began to spread across the globe in March 2020, the number of protests initially fell due to the widespread introduction of lockdowns. However, protests quickly resumed as long standing grievances resurfaced as the initial shock of the pandemic subsided and lockdown restrictions relaxed. Protestors demonstrated anger over pre-existing socio-economic issues rising from increasing unemployment rate, poverty, political leadership, poor service delivery etc. Experience has demonstrated that social unrests and protests have often caused disruptions and damage to property and can be quite costly. For example, unrest that occurred in KwaZulu-Natal and Gauteng in July caused disruptions and direct damage to property and assets, leading to an estimated R20 billion in insurance claims. The unrests also placed a thousand of jobs at risk. Municipalities revenue collection is expected to take a massive hit for months to come owing to the looting of business and shopping malls. Business and households may not be able to pay monthly rates and municipal services rendered by the affected municipalities.

It is expected that the number of protests will continue to rise over the coming months or years due to the COVID-19 induced economic downturn and other already existing social, economic and political ills. Whilst municipalities have little power to avoid social instabilities there are measures that they can take to get ahead of the risk and be resilient in the event of volatile situation.

## WHAT THE SOCIAL UNREST RISK SCALE SEEKS TO ACHIEVE?

The Social Unrest Risk Scale provides easy access to **unrest** and **protests** information. The data is disaggregated to a Small Area Level (neighbourhood level).

- **Municipalities can use the information to anticipate and plan for future unrest or protest action.**
- **SALGA can use the information to support and advice municipalities.**



## HOW DO I ACCESS THE SOCIAL UNREST RISK SCALE?

The Social Unrest Risk Scale is accessible from this link: <https://salga-unrest.herokuapp.com/salga/municipality> as well as from the SALGA Mobi App which is easily accessible from the Google and Apple play stores.

## HOW DO I INTERPRET THE RISK SCALE?

### What are the Protest Risk Scale?

The Protest Risk Scale: likelihood of protest occurring (either peaceful or violent).

- ❖ **Blue:** low likelihood of protest.
- ❖ **Red:** high likelihood of protest.
- ❖ **White:** uncertain likelihood of protest.

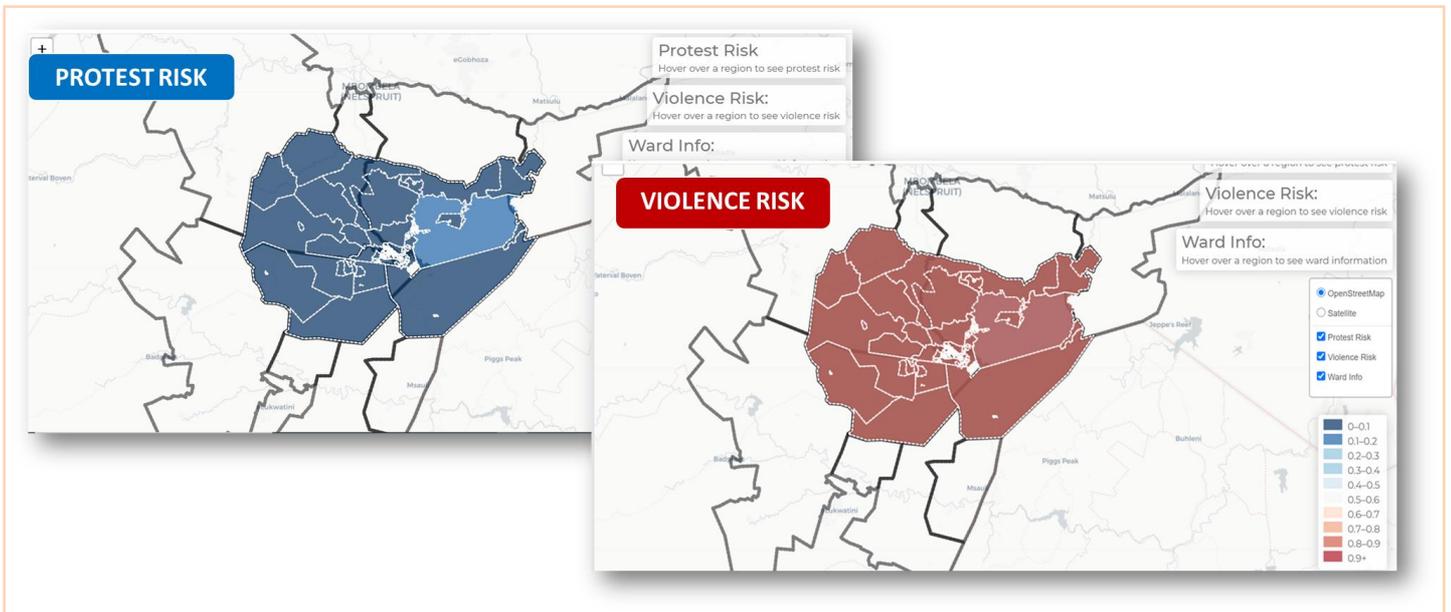
### The Violent Unrest Risk Scale?

The likelihood of protest being violent (if protest occurs).

- ❖ **Blue:** low likelihood of violent unrest.
- ❖ **Red:** high likelihood of violent unrest.
- ❖ **White:** uncertain likelihood of violent unrest

## Example of a map view of a community with both protest risk and violence risk

This example indicates that the selected community has a low protest risk in general – however should members of the community protest, the protests have a high risk of being violent.



## WHAT KINDS OF PROTEST AND UNREST ARE INCLUDED IN THE SCALES?

The scales used the Public Violence Dataset compiled by the Institute for Security Studies as the underlying source of data on protest and unrest incidents. The Public Violence Dataset categorizes protests into peaceful and violent. Some types of protest and unrest were excluded from this analysis as they do not relate to the underlying socio-economic characteristics of the communities where the protest/unrest occurs.

### Included

**WHO:** Collective violence  
**ABOUT:** Community-based grievance  
**WHERE:** Protest/Unrest occurs in same place as grievance (community-based)

### Excluded

**WHO:** Individual violence (crime)  
**ABOUT:** National, international, institutional (e.g. university, employer) or spatially undefined grievance  
**WHERE:** Protest/Unrest is spatially removed from grievance (e.g. protest at Parliament buildings, etc.)

## HOW IS 'COMMUNITY' DEFINED IN THE PROTEST AND VIOLENT UNREST RISK SCALES?

The scales use 2011 Statistics South Africa Census data, disaggregated at the Small Area Layer (SAL), to define a 'community'. SAL is the smallest publicly available level of data available from the census. It is smaller than a ward and generally covers a 'neighbourhood' that is internally homogenous in terms of the type of housing and the socio-economic welfare of residents.

## HOW CAN I USE THE PROTEST AND UNREST RISK SCALES?

Support Councilors in areas with high risk of violent unrest. Protest and Unrest are often triggered by how community concerns are received and how service plans are communicated by local government, even more than whether or not services have actually been provided. Councillors in high protest and unrest risk areas can therefore be supported to communicate more and with greater conflict sensitivity.

The scale can also be used to target specific conflict prevention activities in communities with high probability of violent protest. ***All programming by municipalities should be conflict-sensitive. Decision on which services to provide, where, in what way should take the unrest potential of each location into account.***

## WHAT ARE THE MAIN INSIGHTS FROM THE PROTEST AND UNREST SCALE STUDY?

- ❖ Protest and unrest relate statistically to the **socio-economic conditions** in communities where they occur. Socio-economic data from the census can explain 80% of community-based protest & unrest.
- ❖ Peaceful protest and violent unrest occur in communities with different socio-economic characteristics.
- ❖ Violent unrest is not simply an escalation of peaceful protest and requires distinct prevention approaches.
- ❖ Communities with high probability of peaceful protest may have higher levels of social cohesion (ability to organise for a collective goal) while communities with high probability of violent unrest may have lower levels of social cohesion, impacting on the way in which municipal interventions are received.

## HOW RELIABLE ARE THE PROTEST AND UNREST RISK SCALES?

The scales are 80% accurate in predicting whether there is likely to be protest. This is an extremely high confidence level for a complex social process. When tested against a sample of past protest incidents, 96% of all protest cases and 99% of violent unrest cases were predicted correctly. The probability confidence of

the model is higher towards each end of the scale. It shows with high confidence if a community is red (high risk) or blue (low risk), while probability levels of communities with medium risk (yellow) are less certain.

## HOW WAS THE UNREST RISK SCALE GENERATED?

1. The **Public Violence Dataset** (Jan 2013 - Jan 2018) compiled by the Institute for Security Studies was filtered to select all incidents of peaceful protest and violent unrest related to community-based grievances and located within the community (*see note above about included and excluded incidents*). All selected incidents were spatially located in a small area layer (SAL). A total of 1327 unrest incidents were included in the analysis.
2. **Census 2011 data** was aggregated to SAL level and any SALs with relevant missing data (1463) were excluded from the analysis. A total of 83444 SALs across the country were used for the analysis. 1055 of these had one or more recorded unrest incidents.
3. Two comparisons were carried out:
  - a. communities with recorded peaceful protest vs communities with recorded violent protest;
  - b. communities with any kind of recorded protest vs communities with no recorded protest.
4. The SALs in the two sets were compared in terms of the following **census variables**, all of which were found to be statistically significant:

### DEMOGRAPHICS

- Pop\_Density
- Extent\_Density
- Percent\_Female\_Head
- Percent\_Head\_under\_20
- Age\_Dependency
- Percent\_Children
- Percent\_Youth
- Percent\_foreign\_citizen

### EDUCATION

- Adults\_No\_Matric
- Percent\_No\_Internet\_Access

### MUNICIPAL SERVICE

- Percent\_Unimproved\_Pit
- Percent\_No\_Refuse\_Removal
- Percent\_No\_Piped
- Percent\_No\_Electricity

### HOUSING

- Percent\_owned\_paid
- Percent\_Informal\_Housing
- Avg\_Household\_Size
- Average\_Rooms
- Avg\_people\_per\_room
- Percent\_Single\_Household

### INCOME

- Percent\_Indigent
- Gini
- Percent\_Unemployed\_Head
- Percent\_Discouraged Work Seeker\_head
- Employment\_dependency

### UNREST INCIDENTS

- Protest Incidents 2013-2018
- Violent Protest Incidents 2013-2018

5. The unrest dataset was split into a 'training dataset' (to generate the scales) and a 'test dataset' (to test the predictive power of the scales). A variety of data science models from python's scikitlearn library were tested to establish which model would generate the most reliable scales. The Support Vector Machine with a Radial Basis Function kernel had the strongest results. The Support Vector Machine gives a continuous output between 0 and 1. This label can be interpreted as our certainty of a given prediction. If the label is close to zero, the model is very certain to predict 0 (low unrest probability), while the label being close to one predicts 1 (high unrest probability) with certainty. The closer the output is to 0.5, the less certainty we have in this output.

6. The model with the best fit for the 'training dataset' (0% training error) was tested on the 'test dataset'. For the Protest Risk Scale (protest vs no protest of any kind) only 4% of the test set were wrongly predicted and for the Unrest Risk Scale (peaceful protest vs violent unrest) only 1% were wrongly predicted. All the wrongly predicted cases were in the less-certain middle ranges of the scales and not at the more-certain outer ranges.

## LIMITATIONS

There are limitations in the underlying datasets used to generate the Risk Scales. However, no better datasets currently exist.

- ❖ National census data from 2011 may not reflect current socio-economic configurations. Many of the community characteristics may have changed significantly, especially in informal settlements with high population mobility. Furthermore, the reliability of 2011 census data, when disaggregated to the SAL level, is not always high, especially for informal settlements. Other datasets are more up-to-date but cannot be disaggregated to the SAL level. There is currently no other national level survey that can provide the data required for this analysis.
- ❖ The unrest incident dataset used is based on media reports of protest and violent unrest. This may under-represent certain forms of protest and may over represent protests in urban areas. South African Police Services data on public order policing (POP) includes more incidents in total but does not adequately distinguish between protests/unrest (with grievances) and other large gatherings such as sports events. It also cannot be adequately localized to the SAL level.

The Protest and Violent Unrest Risk Scales cannot predict when protest or violent unrest will take place. They also do not guarantee that protest or unrest will take place in red communities or that they will not take place in blue communities, as they only provide a high or low probability. Reliable prediction is not possible because:

- ❖ The scales are based on 2011 census data and the conditions in some areas may have changed substantially since then, for example in informal settlements which have been upgraded.
- ❖ The existing data only reflect communities' underlying socio-economic characteristics and not the presence of institutional or political factors (e.g., the quality of local leadership) that often trigger or prevent violence. To be an effective early warning tool, these scales should be combined with other information sources about local conditions, including information from Community Policing Forums, Ward Committees, Community Development Workers, local police stations, local religious leaders and community-based organizations. These sources can be used to assess whether there are factors likely to trigger violent or factors likely to prevent violence in a particular community. Common triggers include competition for formal and informal local leadership positions and competition for business opportunities. This competition generally takes place in locations where formal local governance

structures are weak or considered illegitimate by the local population. Preventative factors are strong legitimate local leadership structures.

## WHO DEVELOPED THE PROTEST & UNREST RISK SCALES?

The South African Local Government Association (SALGA) commissioned the study to Social Surveys Africa, an independent research organization. Open Data Durban, a civic technology lab, worked with Social Surveys Africa to conduct the data science underpinning the scales. The scales used the 2011 Statistics South Africa Census as the underlying source of data on socio-economic conditions and the Public Violence Dataset (Jan 2013 – Jan 2018) compiled by the Institute for Security Studies as the underlying source of data on protest and unrest incidents.

## CONCLUSION

While protests and social unrest may occur for any reason, they occur in municipal space, and often at a cost to municipalities. Proactive planning and implementation of risk management practices can help municipalities determine the best course of action when faced with a volatile situation. Social unrests as much as they can be a threat to municipalities and communities they can also provide an opportunity for positive change or development. Whilst municipalities have little power to avoid social instabilities there are measures that they can take to get ahead of the risk and be resilient when such events unfold.

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