



THE CONFLICT IN SUDAN: *SEARCHING FOR SOLUTIONS*

PHASE 3: PROJECT | PETER GADUEL

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1: INTRODUCTIONS

Overview & Problem statement

Sudan has been a violent hotspot in Africa due to political instability since 1997.

With the increasing level of violence, there is need to understand, the drivers of violence in Sudan, the role of various actors in violent conflict.

This project uses the ACLED Data to analyze Sudan violence and predict the impact on fatalities using regression model and random forest.



1.2: BUSINESS UNDERSTANDING

- Peacebuilding interventions require thorough understanding of local context such as influence of actors, affected categories of people.
- The analysis from this project will advise peacebuilding partners on how to address the underlying causes of violence in Sudan.
- It will draw conclusions aimed at choosing appropriate peace building program such as strengthening rule of law and security institutions.



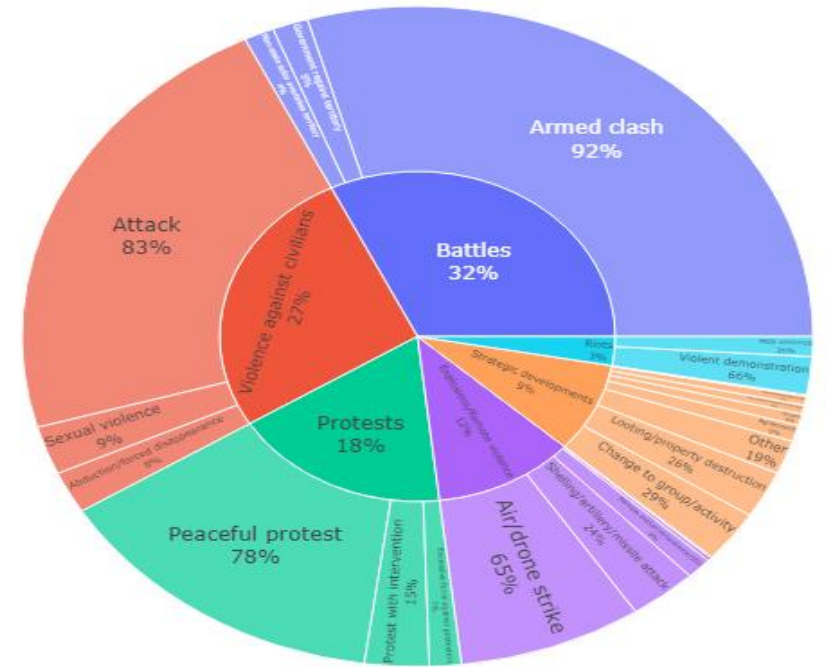
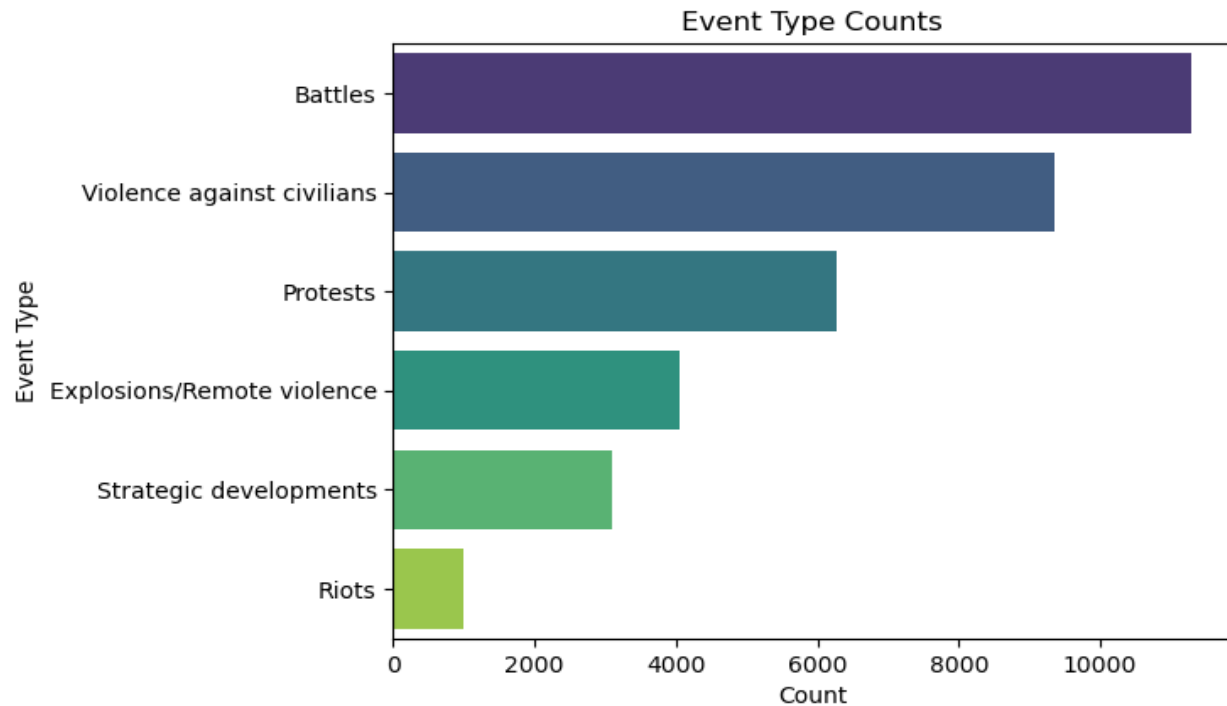
2. EDA & KEY FINDINGS

- **This section involve inferential analysis based on key variables**

It will answer the following questions:

- ✓What is the most common type of violence in Sudan?
- ✓Which actors are responsible for most of violent counts in Sudan?
- ✓Where is violence concentrated in Sudan ; and what are the top 10 regions in Sudan with the highest count of fatalities?

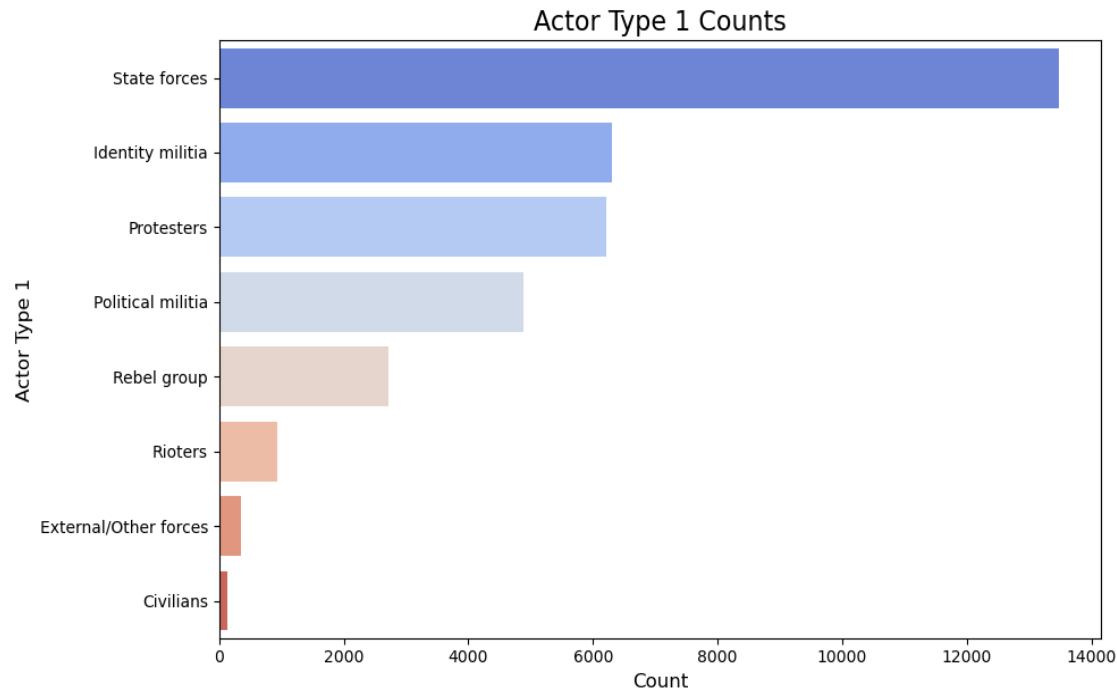
2.1: EDA & KEY FINDINGS



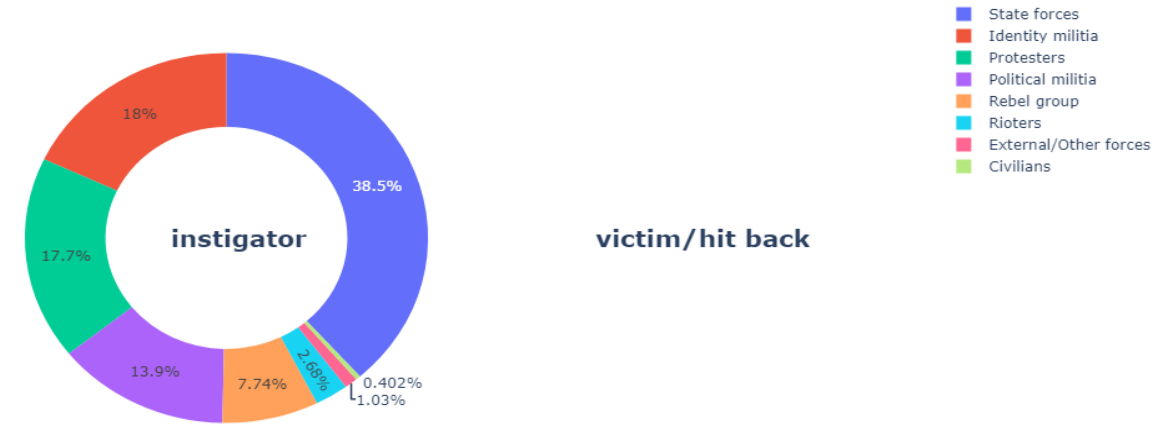
What is the most common type of violence in Sudan?

- From the visuals, battles constitute the largest proportion of violent incidents with more than 10,000 counts of fatalities per year.
- Riots are the least type of violent incidents in Sudan
- Most of the battles are basically armed clashes.

2.2: EDA & KEY FINDINGS-CONTIN.



Actor type involved in Sudan conflict



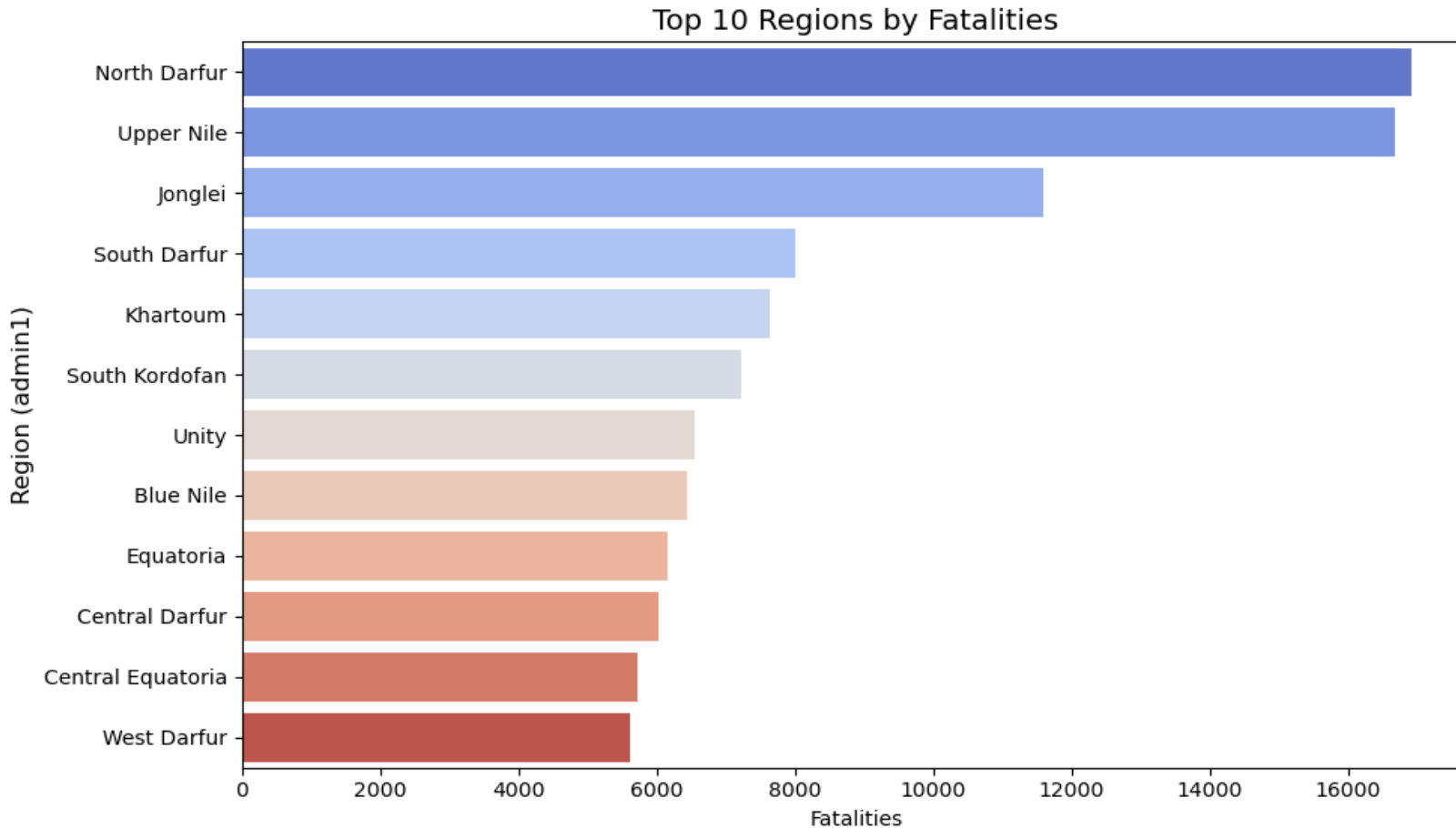
victim/hit back

Which actors are responsible for most of violent counts in Sudan?

- The state forces are the primary perpetrators in Sudan conflict linked with over 38% of violent counts
- Other actors are identity militia and protestors

2.3: EDA & KEY FINDINGS-CONTIN.

What are the top 10 regions in Sudan with the highest count of fatalities?



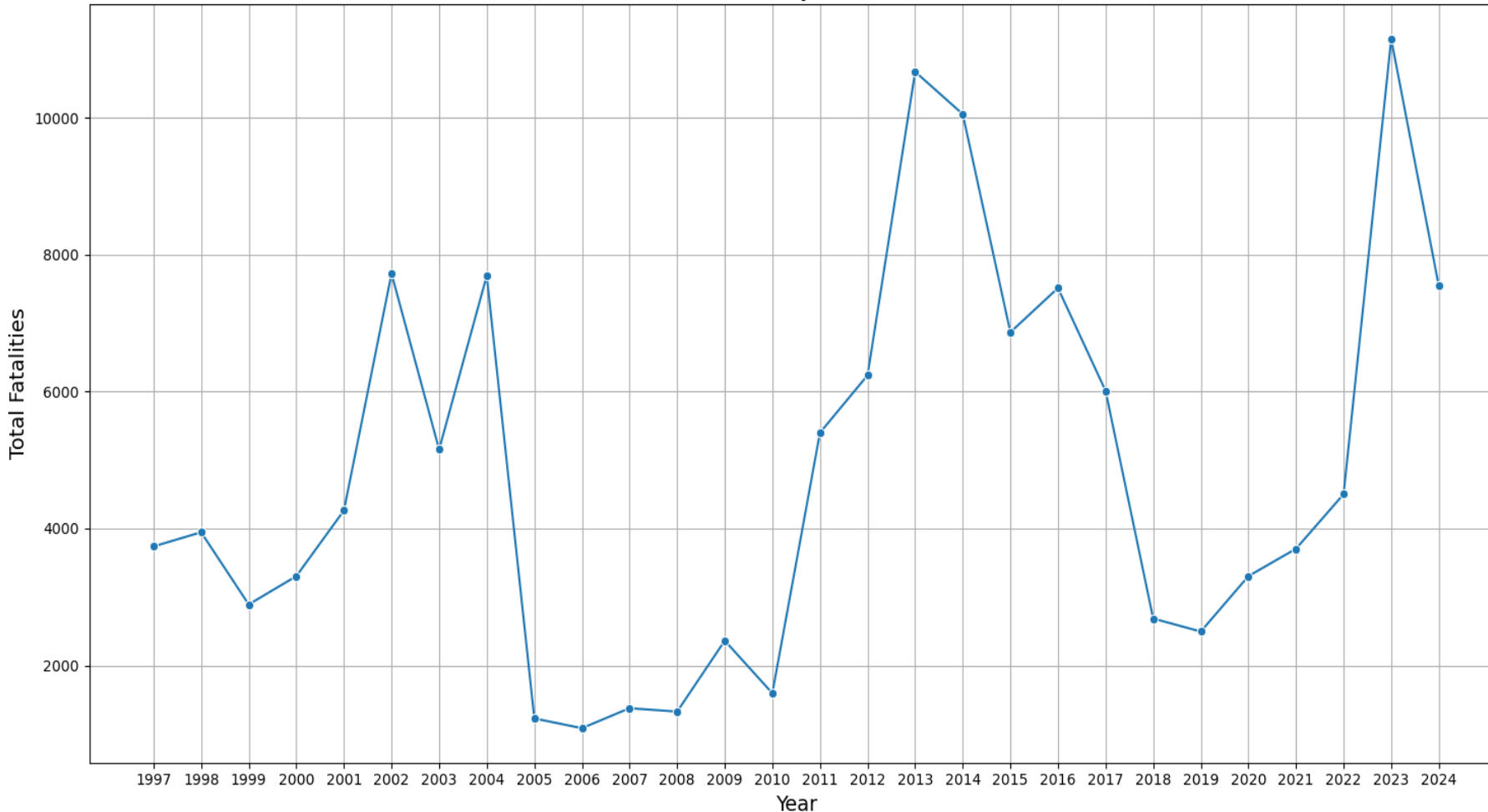
According to the Bar Chart;

- ✓ *North Darfur region is the most affected hotspot in Sudan with over 16000 fatalities*
- ✓ *Upper Nile is the second most affected region by war*
- ✓ *West Darfur is the least affected region with low fatalities count.*

2.4: EDA & KEY FINDINGS-CONTIN.

When did Sudan record the highest number of fatalities?

Total Fatalities by Year in Sudan



- ✓ The highest fatalities count in Sudan was recorded in 2023, and 2013 with over 10,000 deaths
- ✓ The quietest period was between 2005 to 2010 with lowest record of violent deaths
- ✓ There was an upward trend in violence between 1999 to 2002, 2010 - 2013 , and 2020 - 2023.
- ✓ There was a sharp decline of fatalities between 2004 - 2010, 2014 -2022.

2.5: MODELING

- I will use **linear regression** model and **Random forest regressor** to evaluate the metrics for my analysis.
- In both models, I will use the **R²_score** to evaluate the effectiveness of my prediction.
- The **R² (R-squared)** score is a measure of how well the independent variables (features) in my model explain the variability of the target variable ("**Fatalities**").

Linear Regression

Train R²: 0.4347308718794314

Train R²: 0.3043523148504288

Explanation

- **The model explain only 43.47%** of the variance in the training dataset's target variable ("**Fatalities**")
- The explanation is moderate suggesting some relationships are not clearly explained but has room for improvement.

2.6: MODELING: CONTIN..

Random Forest Regressor

- ✓ The model explains 86.18 per cent of the variance in fatalities within training dataset.
- ✓ This indicate the model fits well with training dataset.
- ✓ The model fails to generalize to unseen data, which makes it unreliable for predicting "Fatalities".

3: CONCLUSIONS



3.1: RECOMMENDATIONS

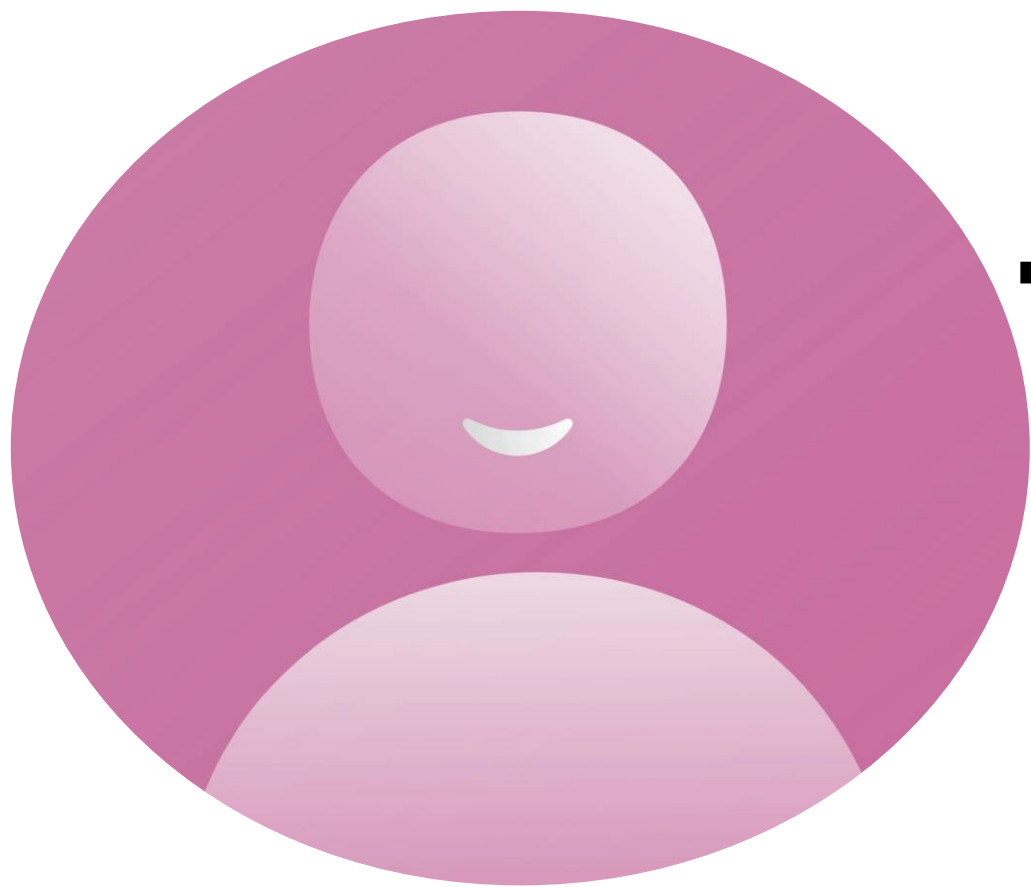
More peacebuilding efforts should be done in North Darfur, Upper Nile and Jonglei regions



Peacebuilding effort in Sudan should be directed to rule of law and security sector reform



There is need to disarm identity militias to mitigate violence



Thank you!