

Geospatial Data and Borders:

Some Lessons Learnt From Fragile Borders

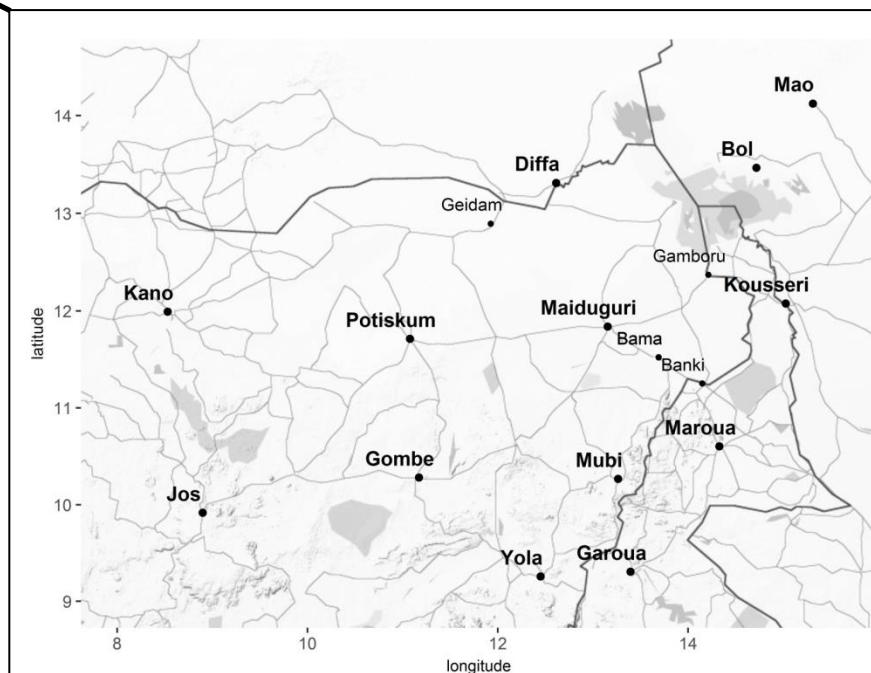
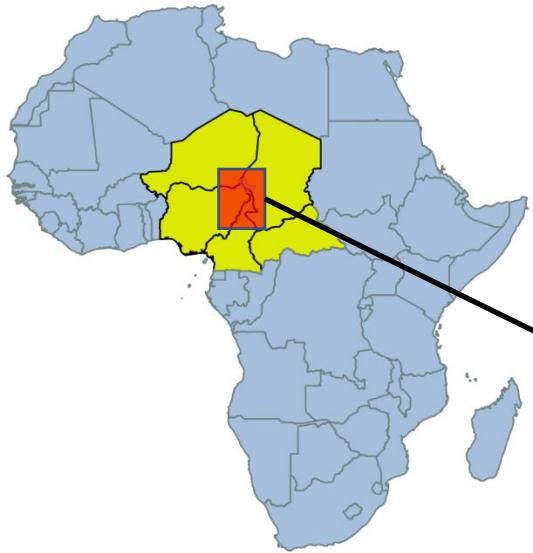
2017 TI Forum Tokyo



Thomas Cantens

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Auvergne University School of Economics



Boko Haram crisis

2,564 Boko Haram incidents
between 2010 and 2017

More than 30,000 fatalities

4 to 9 % of GDP lost

Borderlands =
28% of the territories
41-49% of the incidents
53-75% of the fatalities

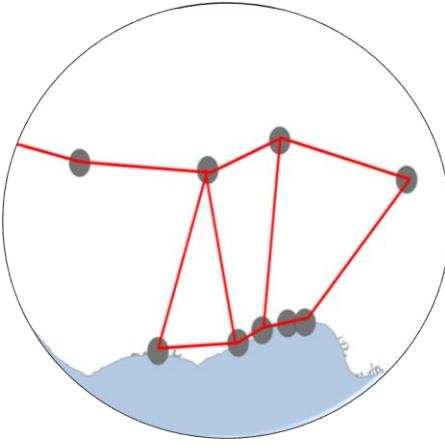
WHAT HAPPENS
BETWEEN THE POINTS?



What Happens Between The Points?

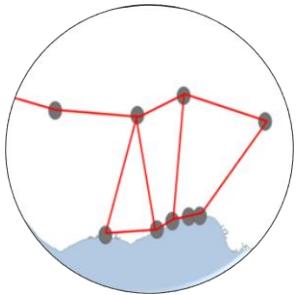
a questionning from
8 fieldworks in fragile
borderlands





A Customs culture
in « one dimension »

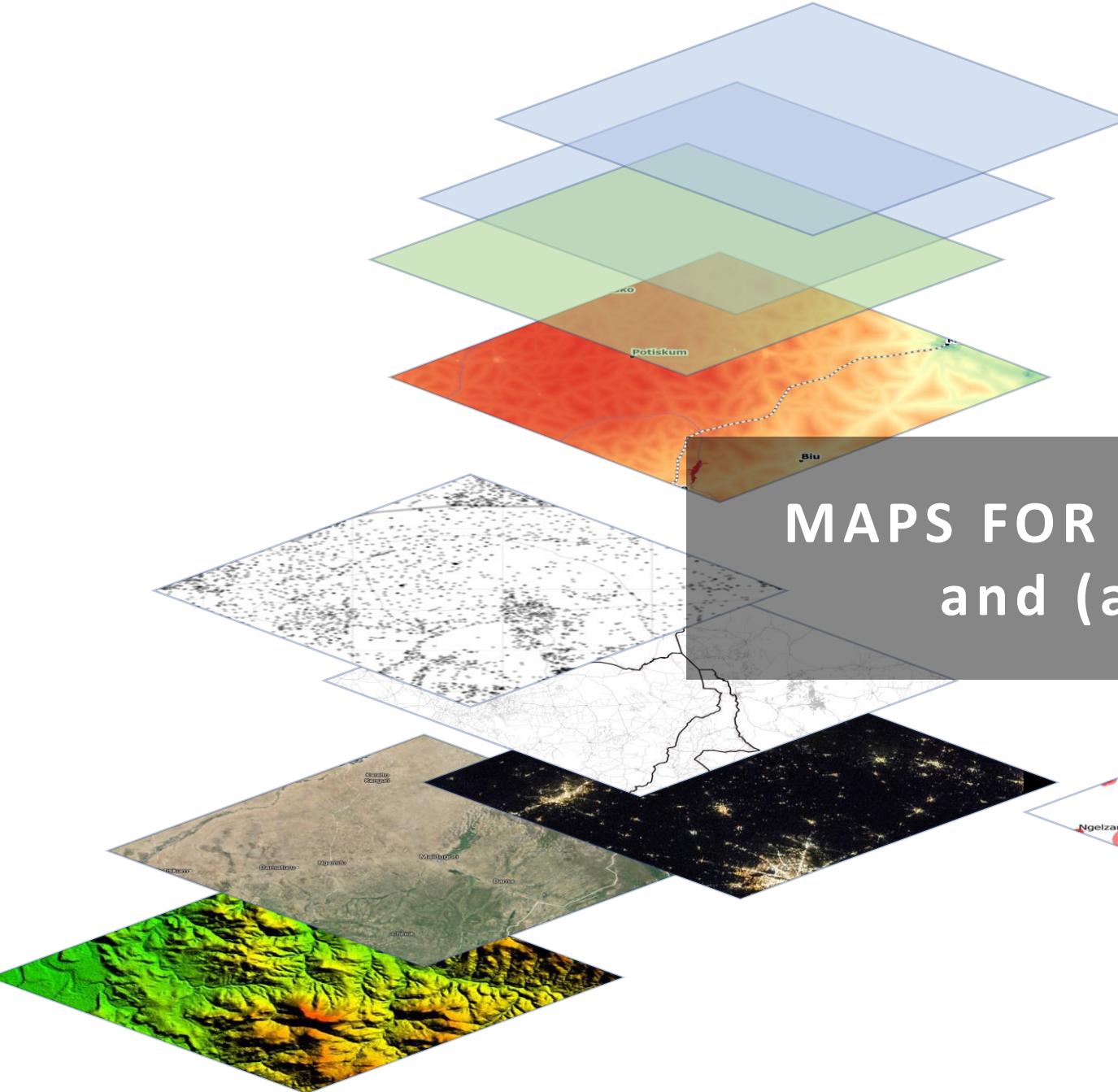
**What Happens
Between The Points?**



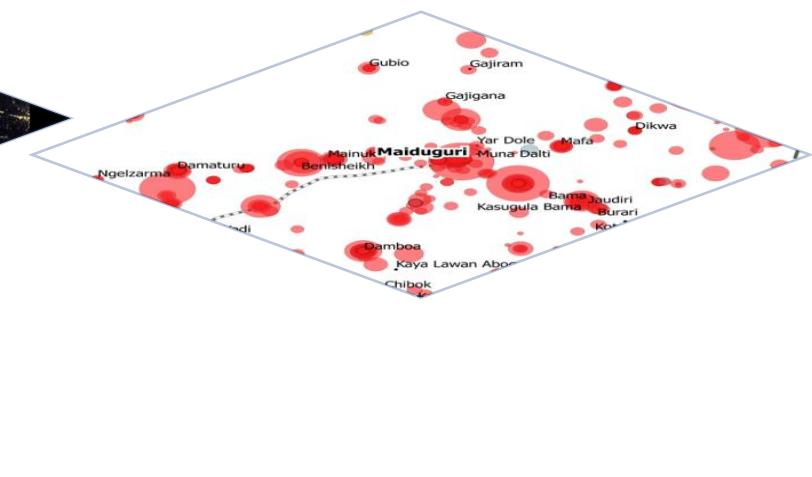
?

A necessary shift
from
« being alerted on what we know »
to
« being able to discover what we ignore »

**What Happens
Between The Points?**



MAPS FOR COOPERATION and (a more) open governance

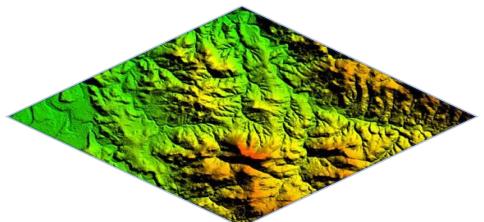


Maps For Cooperation (& Open governance)

Maps enable different kinds of people to discuss together
(example of COMPSTAT in Police)

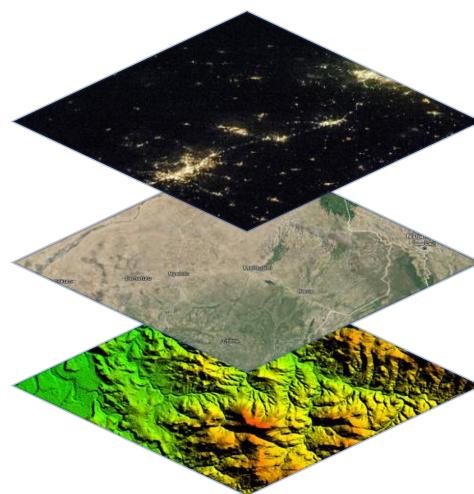
Space is concretely common to all of us

Maps For Cooperation (& Open governance)



Natural data (elevation, waterways, vegetation,...)

Maps For Cooperation (& Open governance)

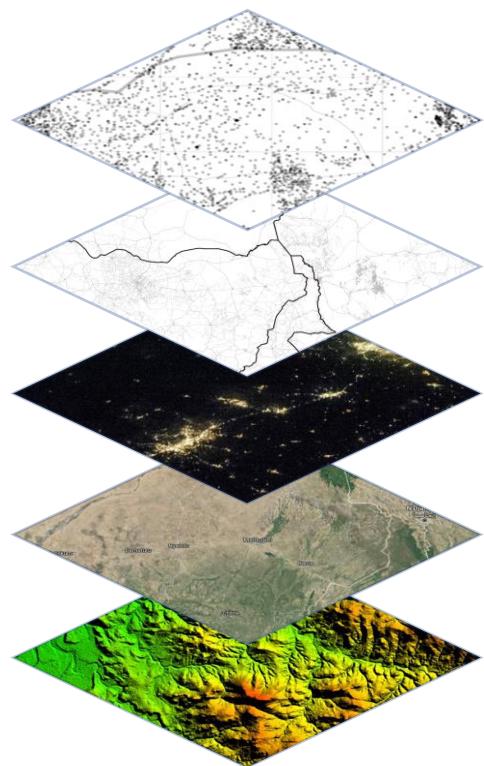


Satellite imagery (nighttime light series...)

Satellite imagery (evolution of no go zones...)

Natural data (elevation, waterways, vegetation,...)

Maps For Cooperation (& Open governance)



Settlements, demography

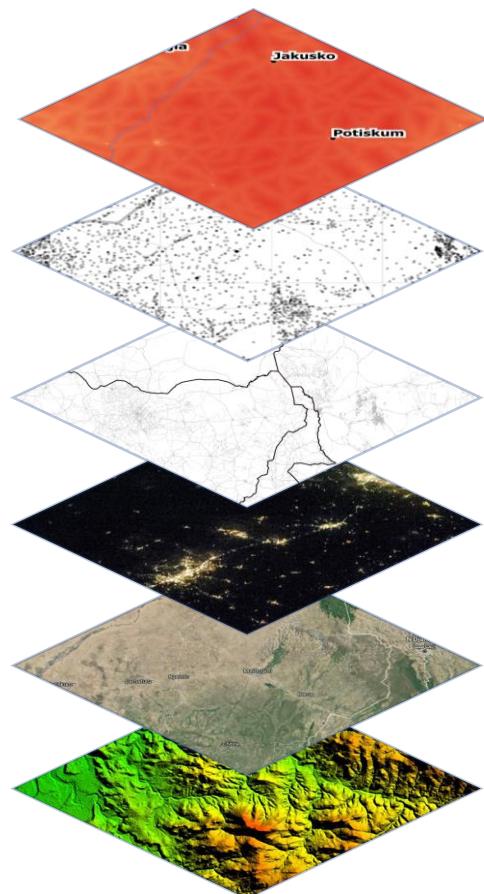
Paths and ways, borders

Satellite imagery (nighttime light series...)

Satellite imagery (evolution of no go zones...)

Natural data (elevation, waterways, vegetation,...)

Maps For Cooperation (& Open governance)



Economic data (markets, infrastructures...)

Settlements, demography

Paths and ways, borders

Satellite imagery (nighttime light series...)

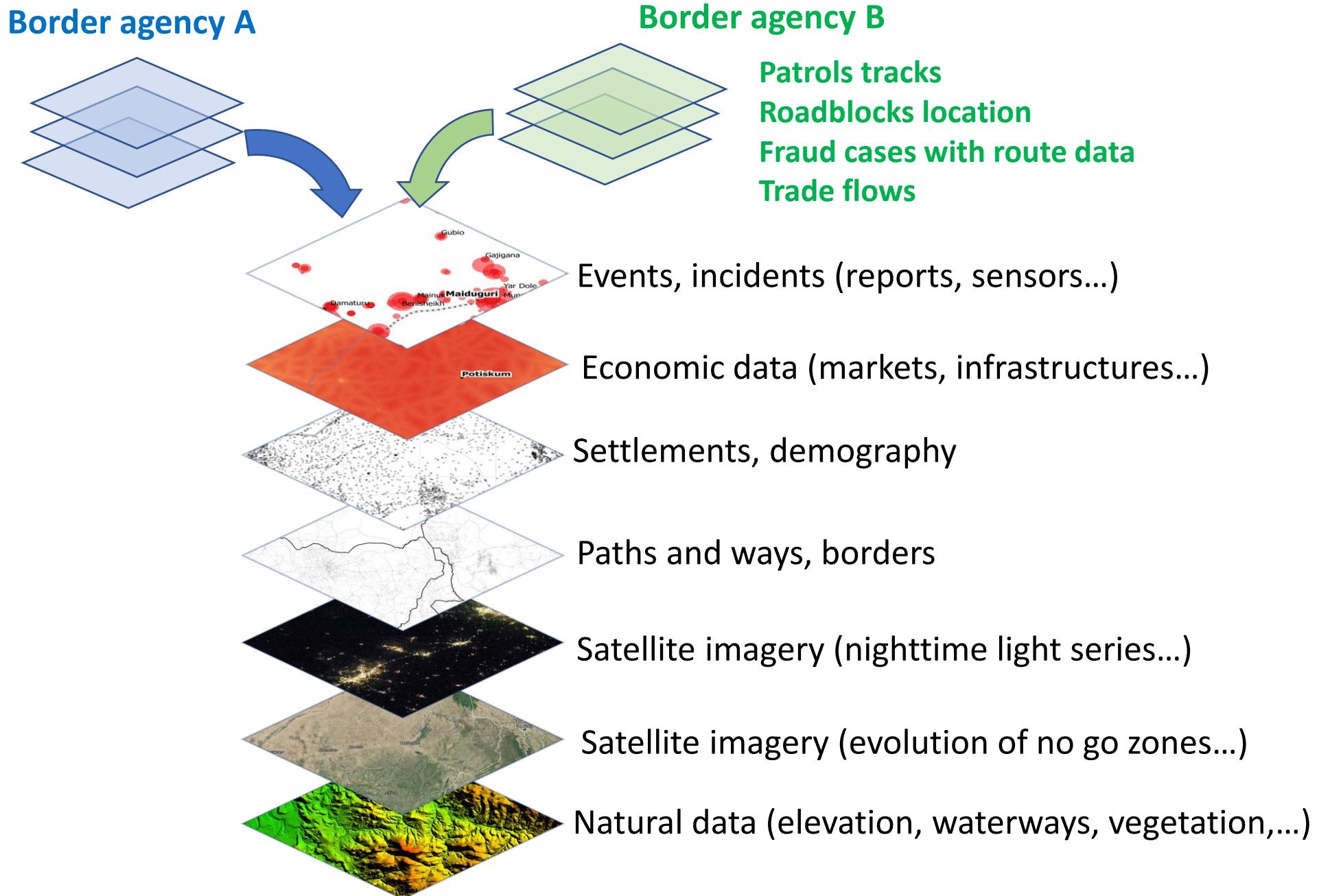
Satellite imagery (evolution of no go zones...)

Natural data (elevation, waterways, vegetation,...)

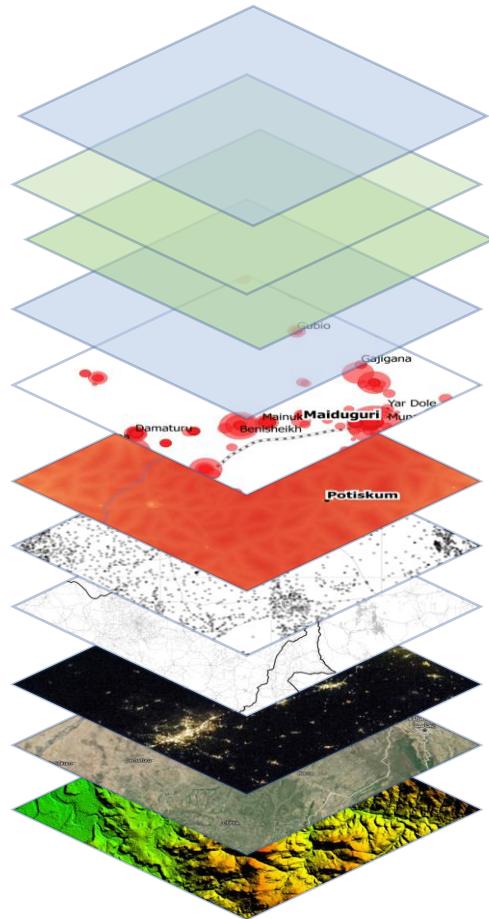
Maps For Cooperation (& Open governance)



Maps For Cooperation (& Open governance)



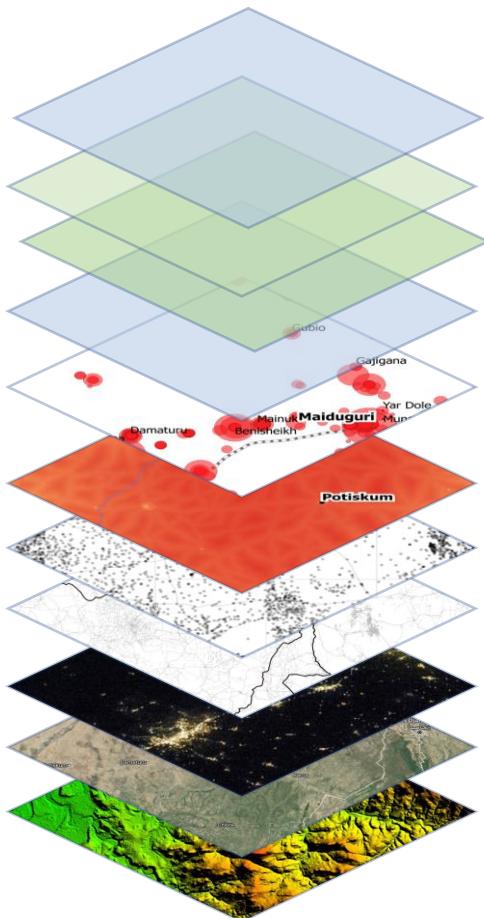
Maps For Cooperation (& Open governance)



Border
agencies
cooperation

...but not too
much

Maps For Cooperation (& Open governance)



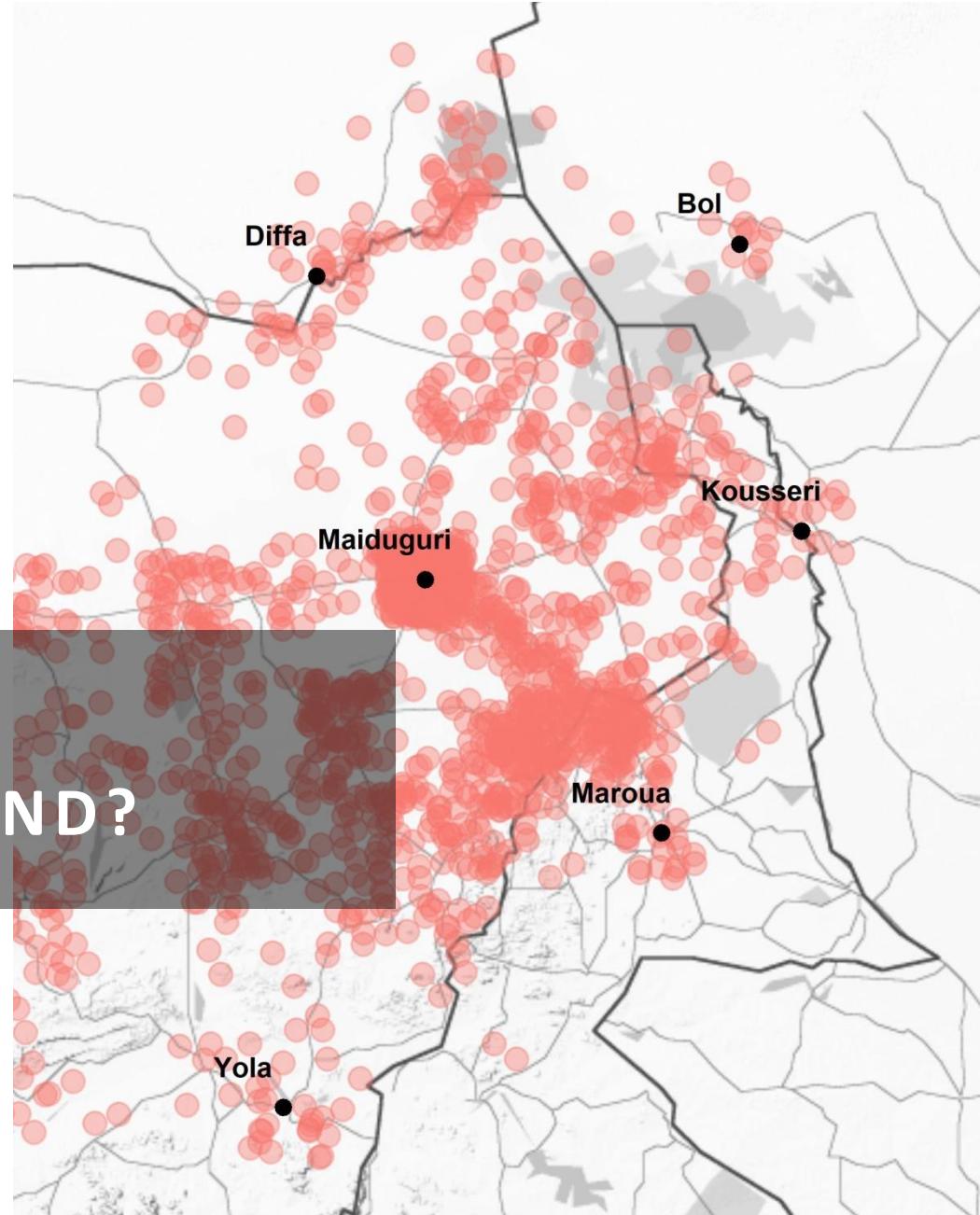
Border
agencies
cooperation

Participation of
border communities,
trade & transport
communities

Enabling people to
« say » what is
important for them

(it is not science
fiction, it exists in
some developing
countries)

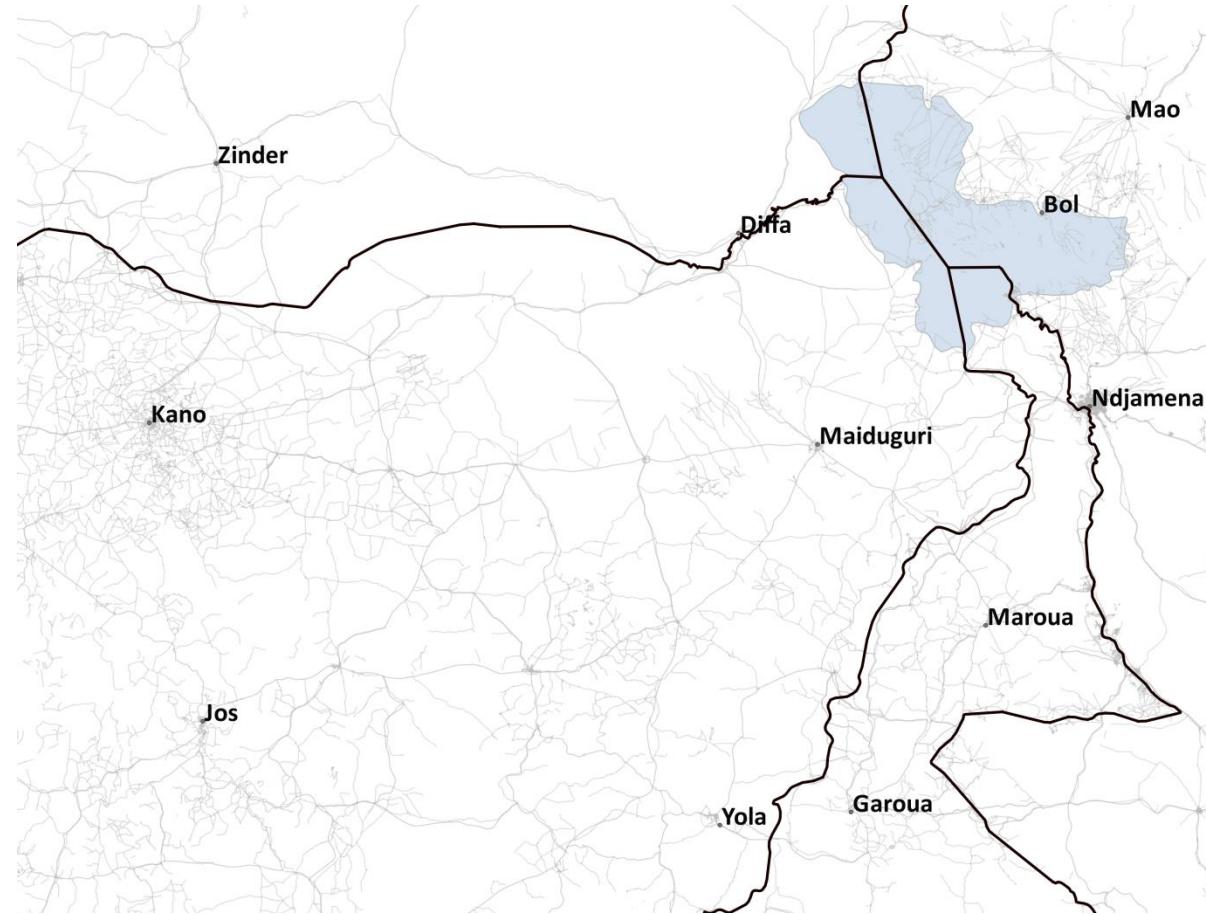
WHERE IS THE BORDERLAND?



The way we represent space
determines the way we will
act within it

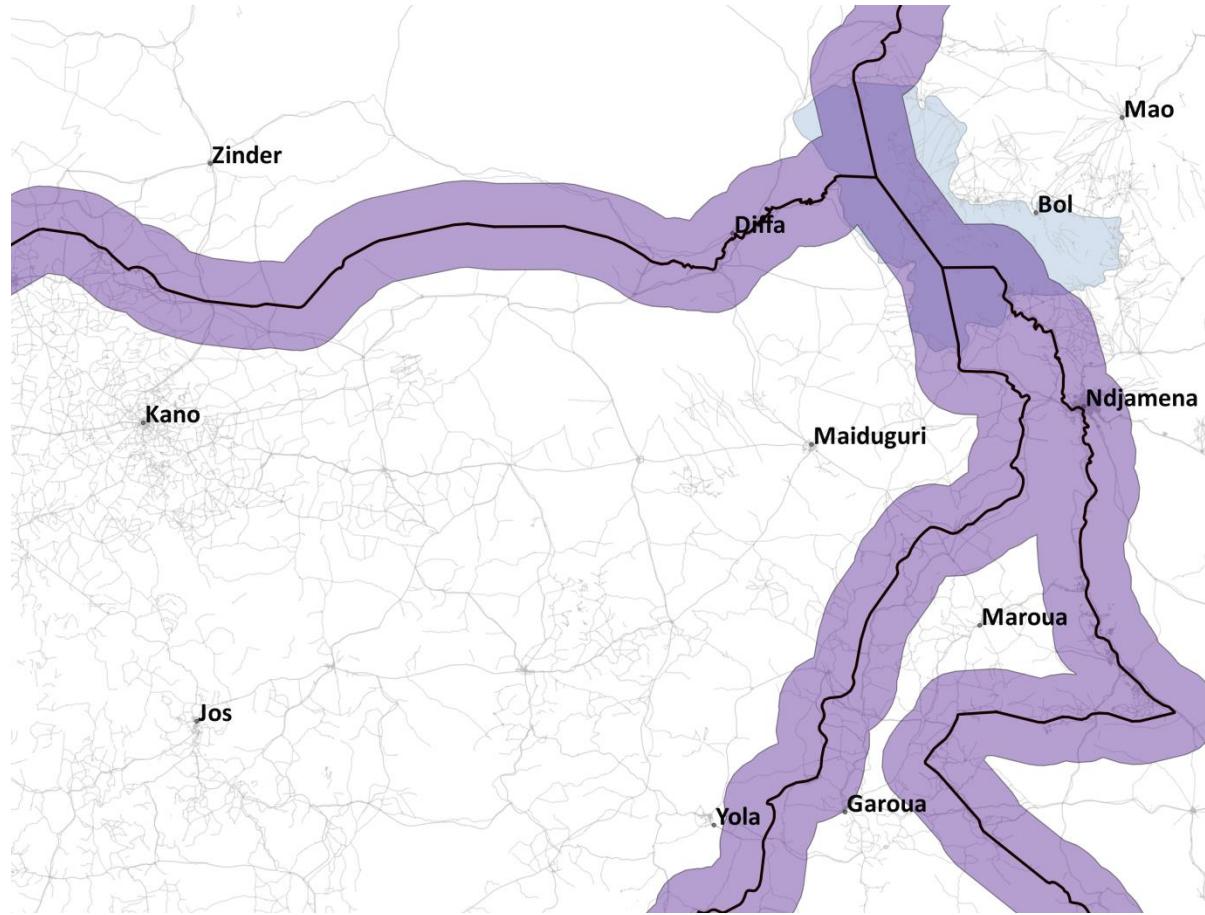
(important for Customs)

**Where is
the borderland?**

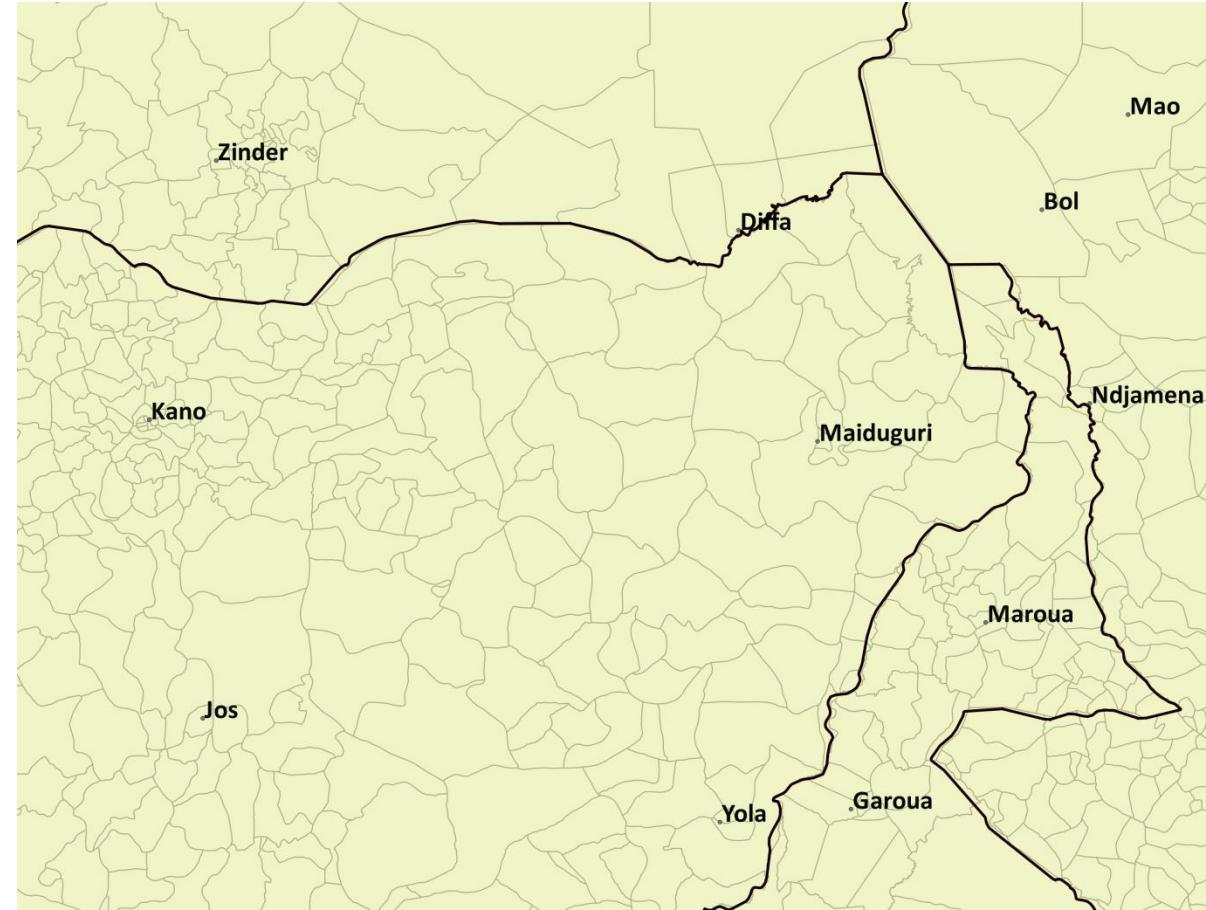


Buffer zones?

Where is
the borderland?



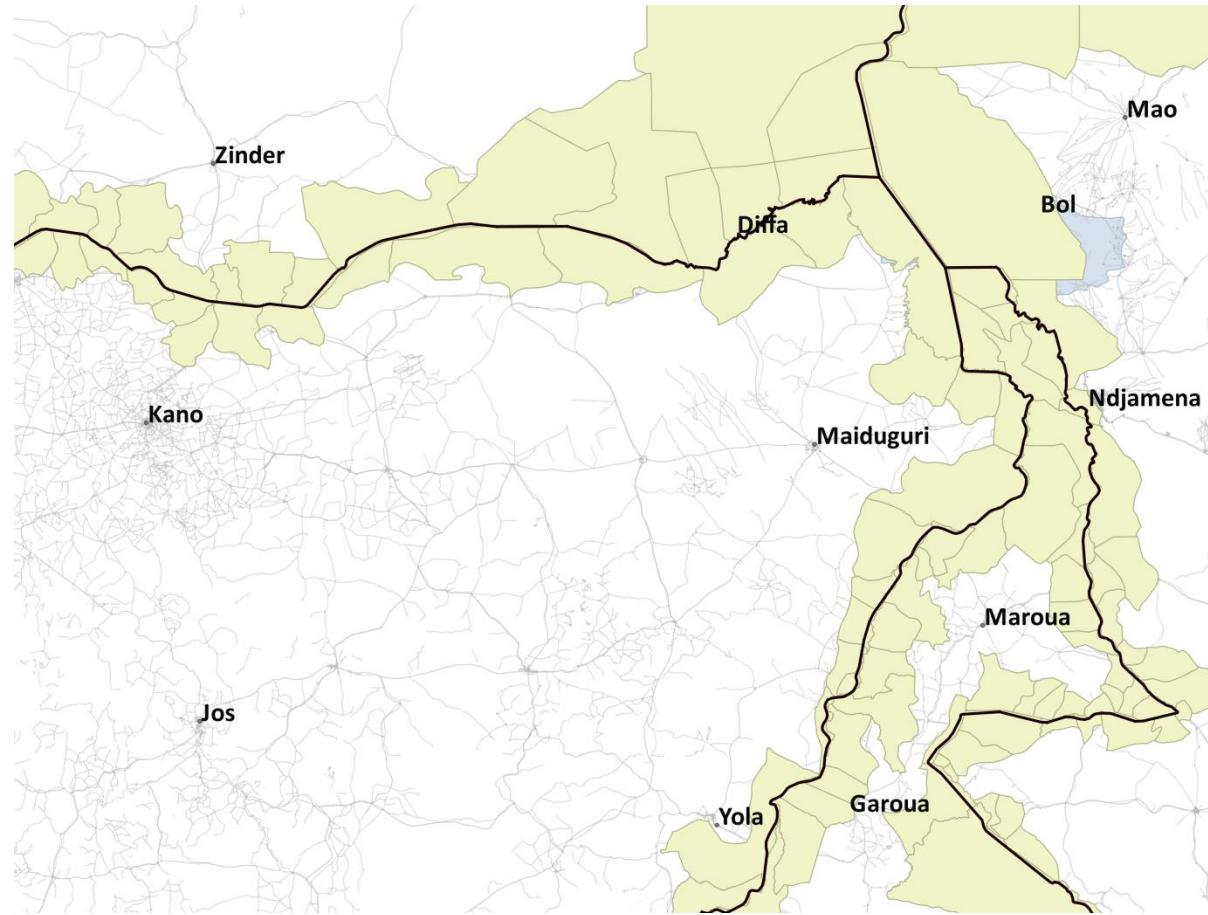
Administrative delineation?



Where is
the borderland?

Administrative delineation?

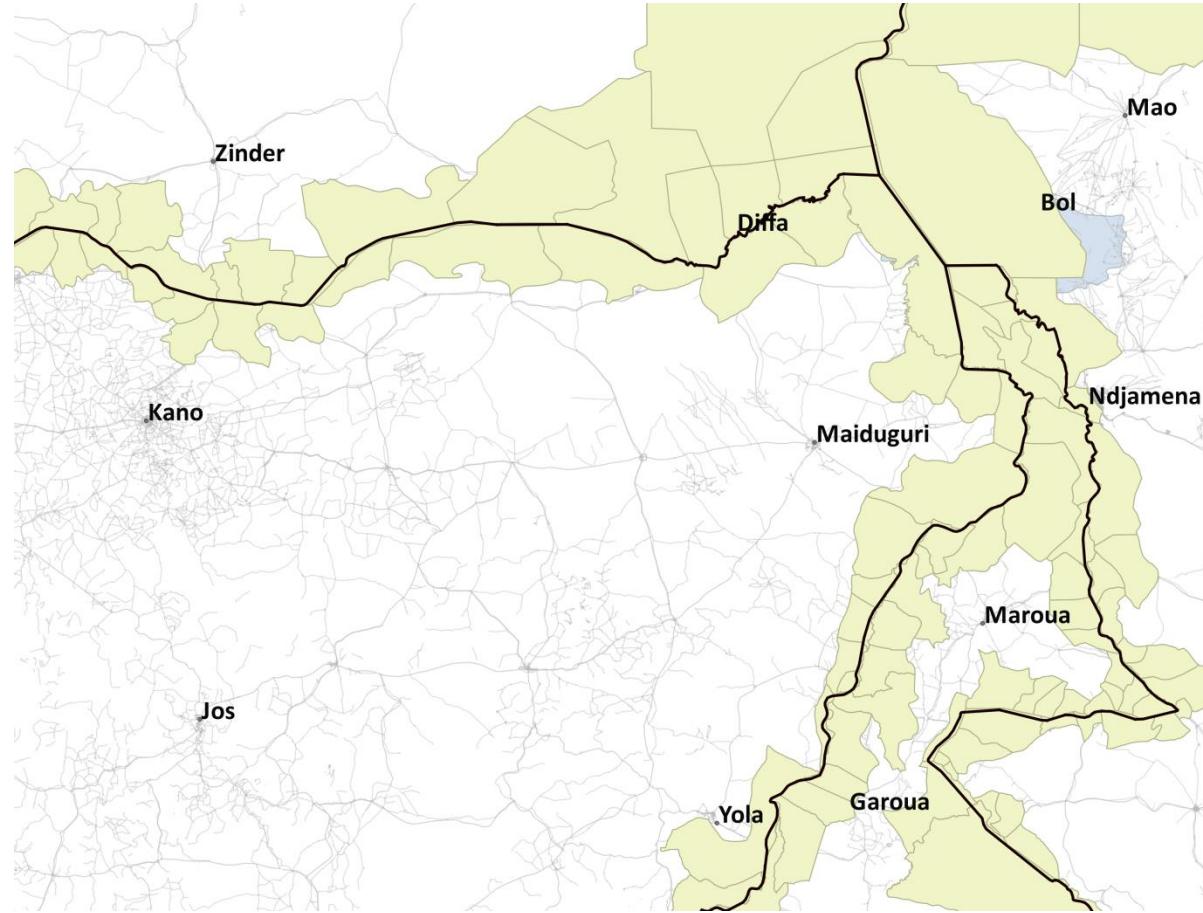
Where is
the borderland?



Insurgents and smugglers
can « use » the
administrative delineation
but...

they do not respect it

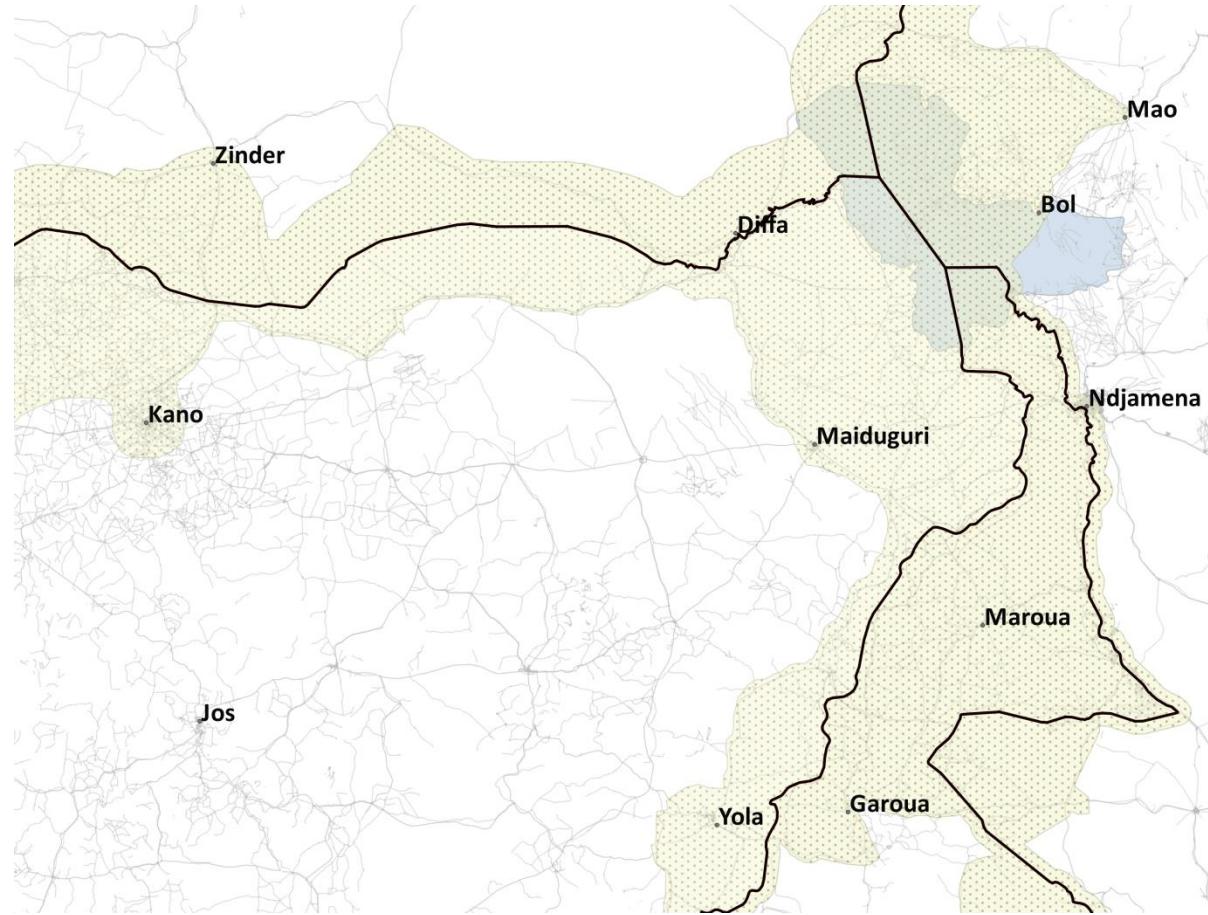
**Where is
the borderland?**

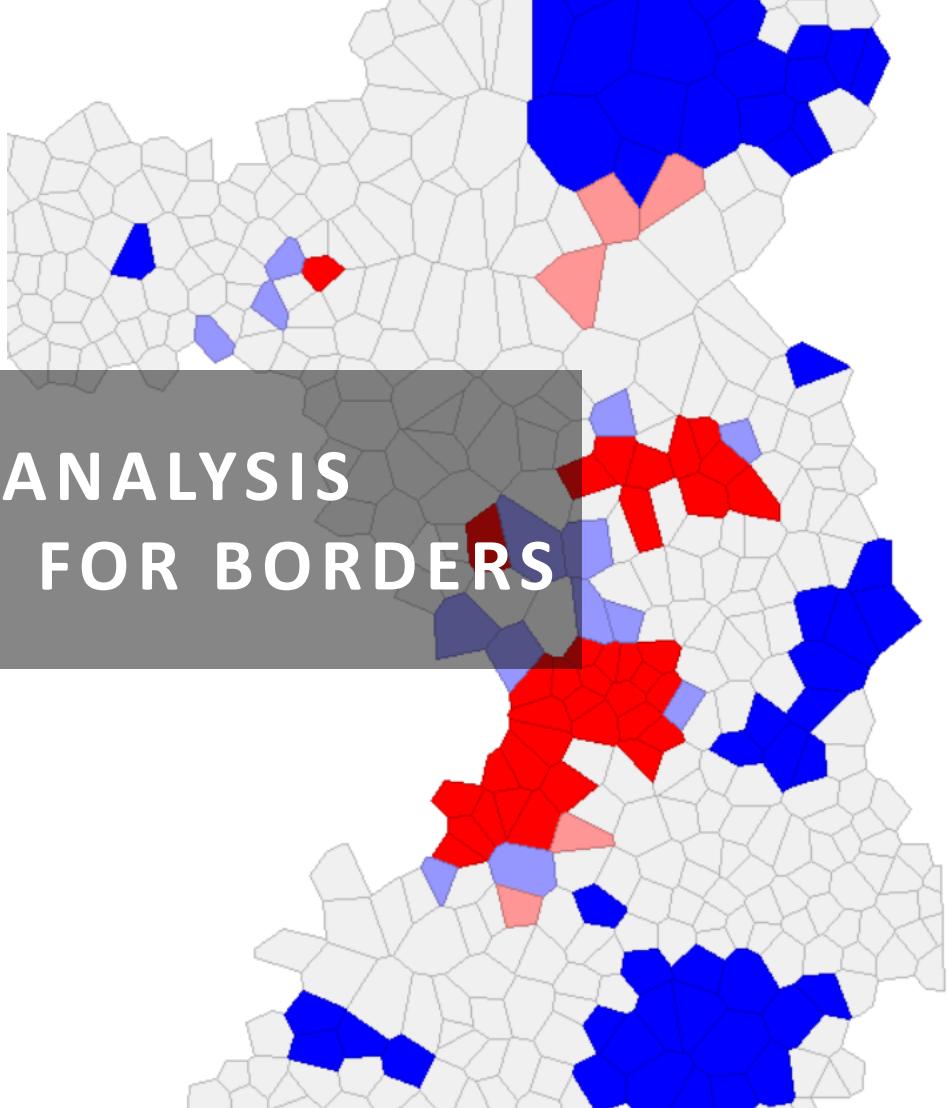


Customs vision made concrete to advocate the economic dimension of border security

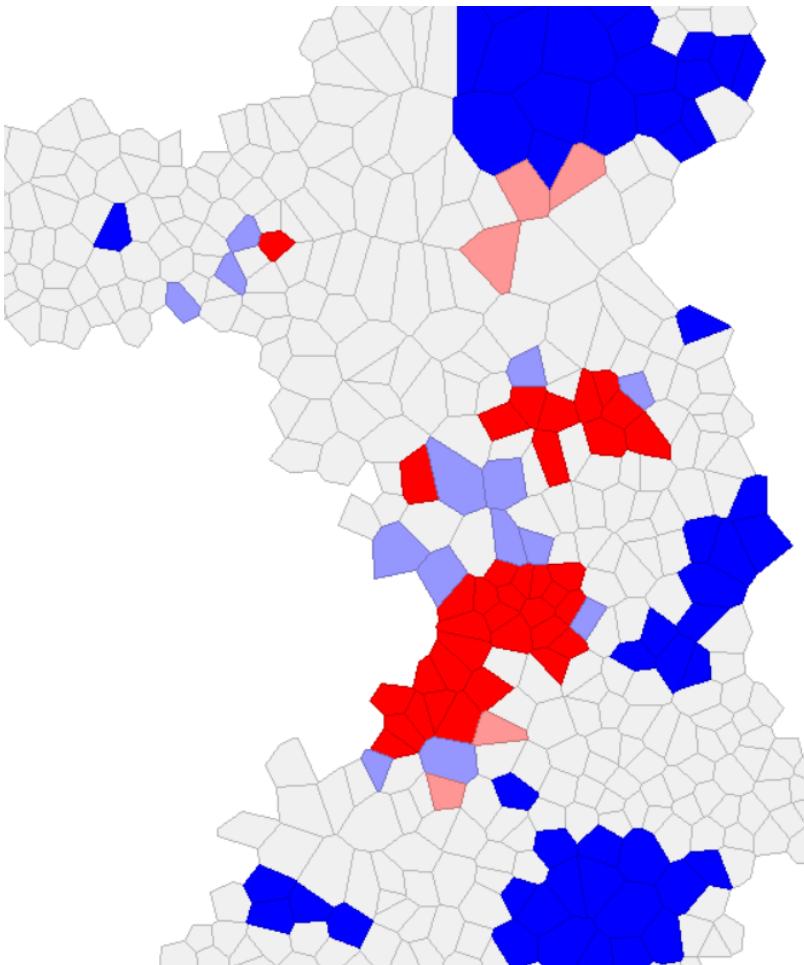
the extent to which space is structured by the border economy

**Where is
the borderland?**





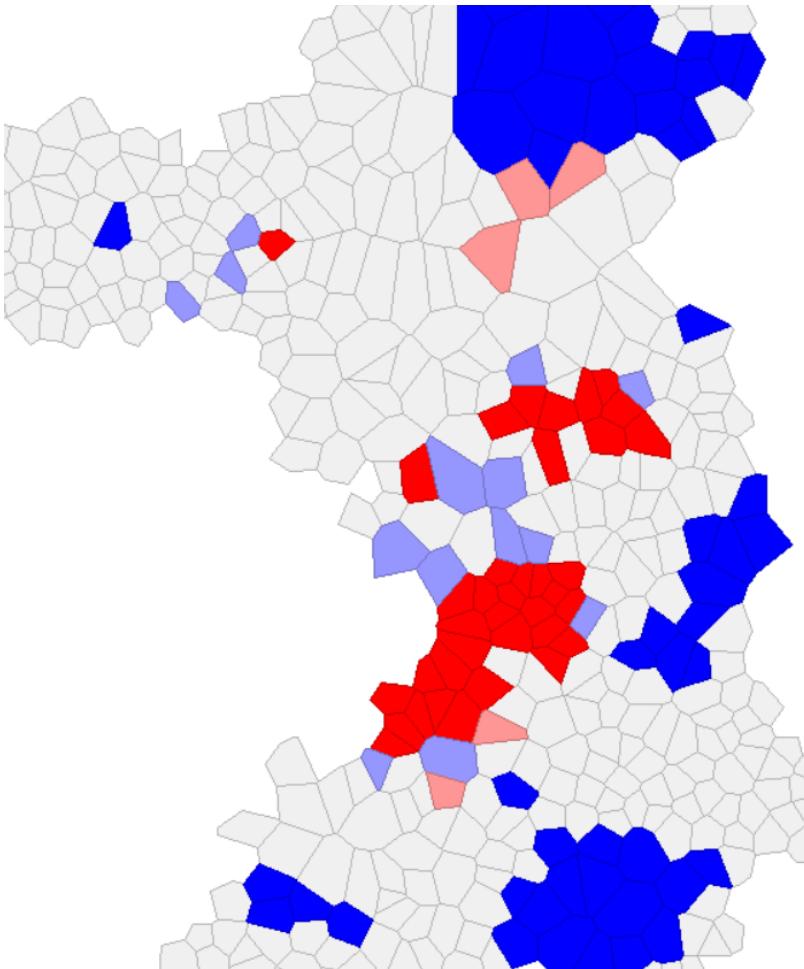
SPATIAL ANALYSIS FOR BORDERS



Spatial Analysis For Borders

Trade off between:

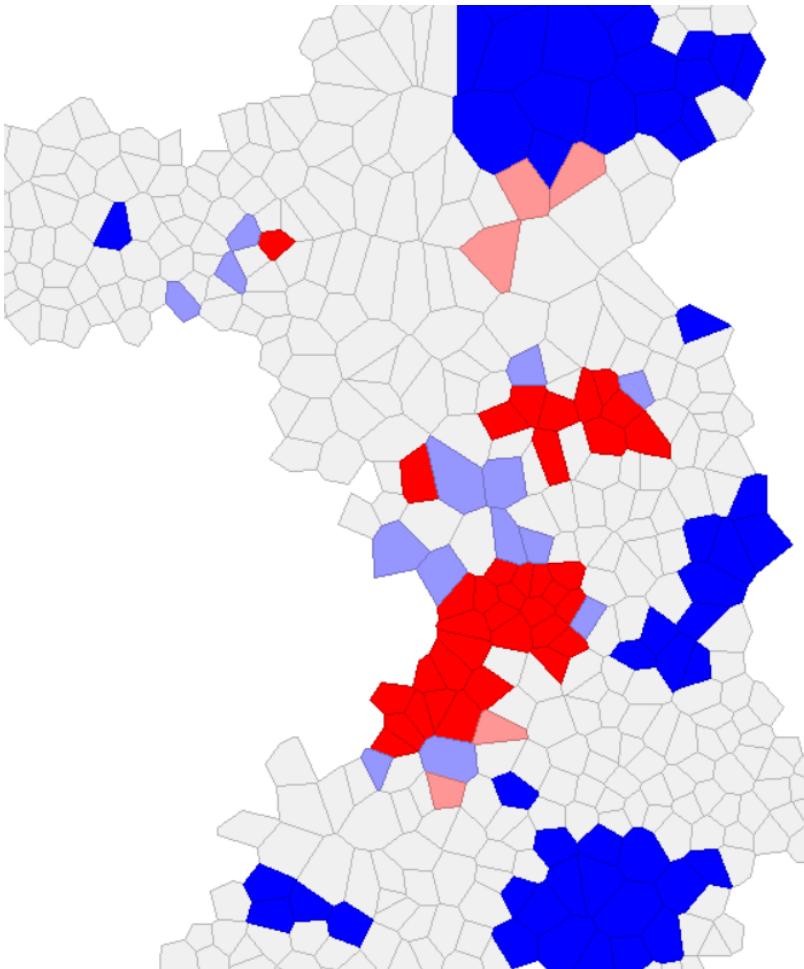
- providing information to officials operating in the field (and collecting it from them)



Spatial Analysis For Borders

Trade off between:

- providing information to officials operating in the field (and collecting it from them)
- providing information for the public (and crowdsourcing data)

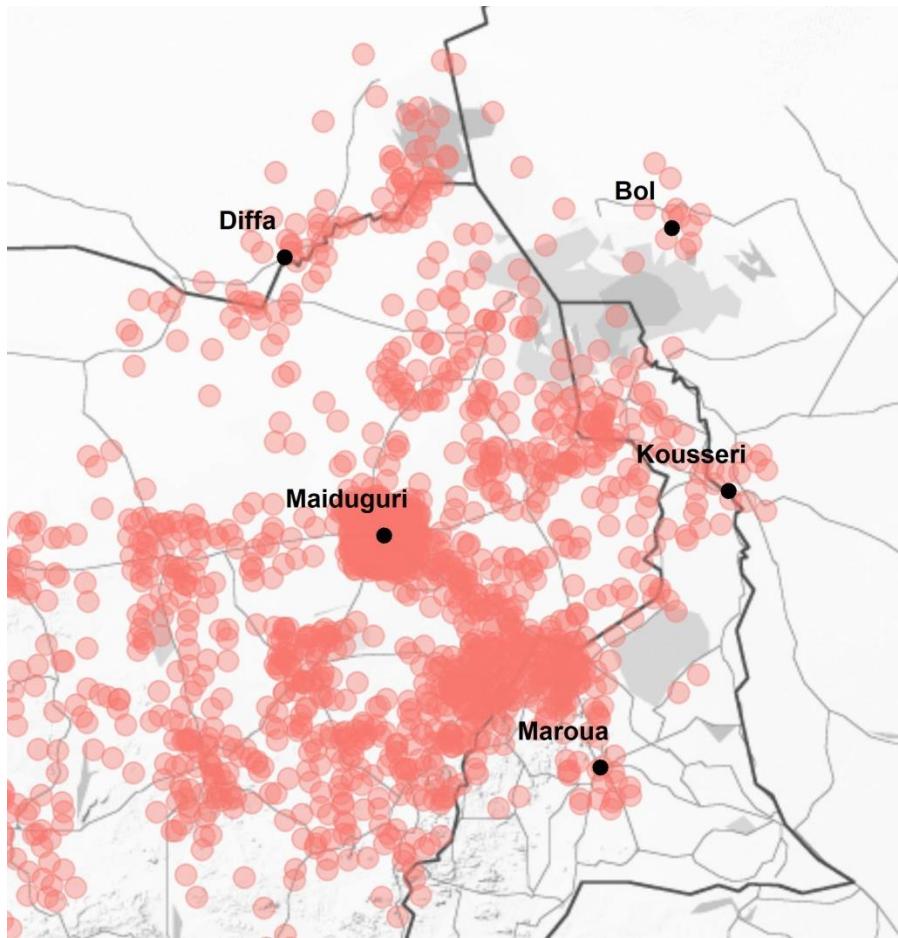


Spatial Analysis For Borders

Trade off between:

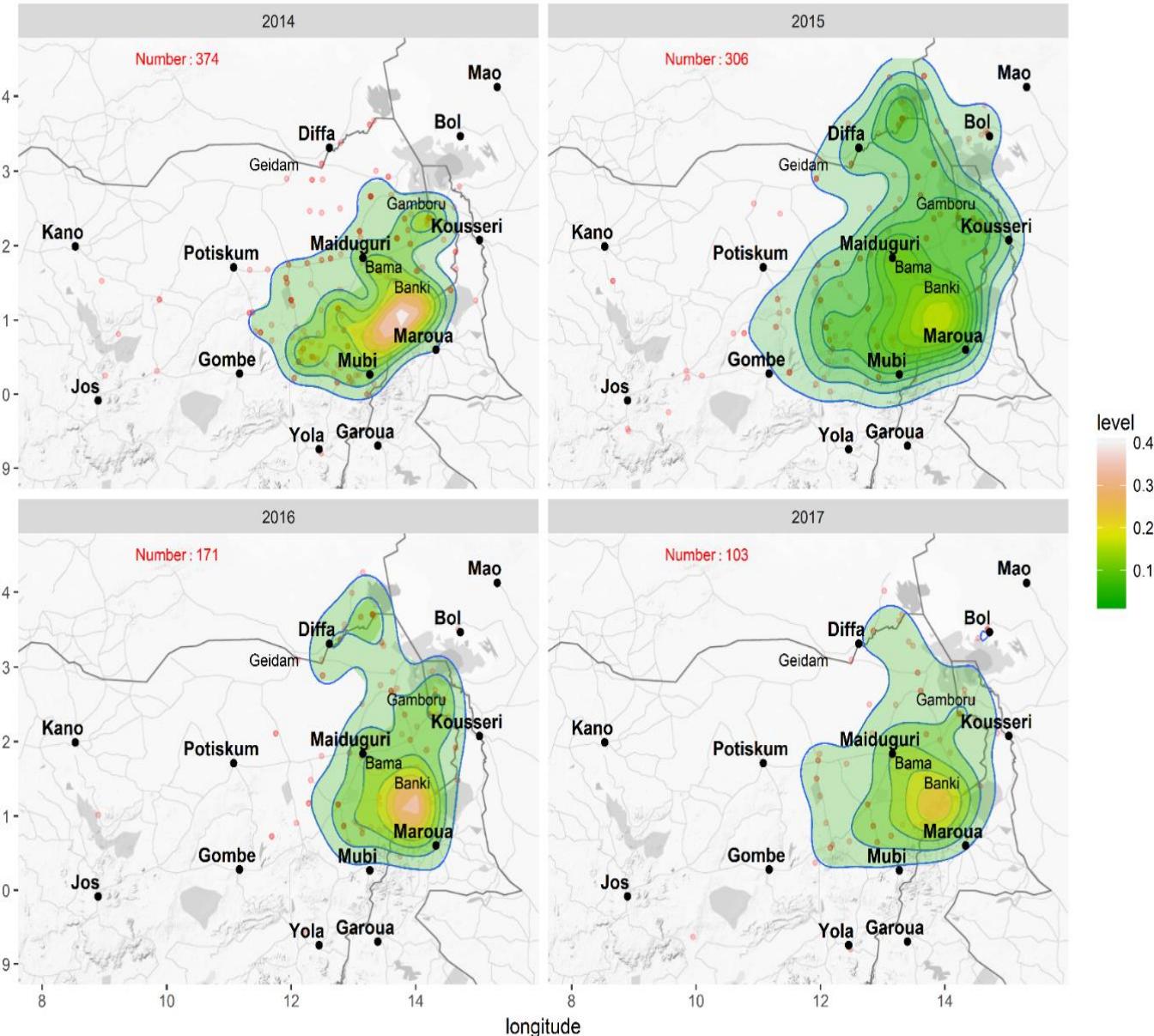
- providing information to officials operating in the field (and collecting it from them)
- providing information for the public (and crowdsourcing data)
- providing tools for analysts

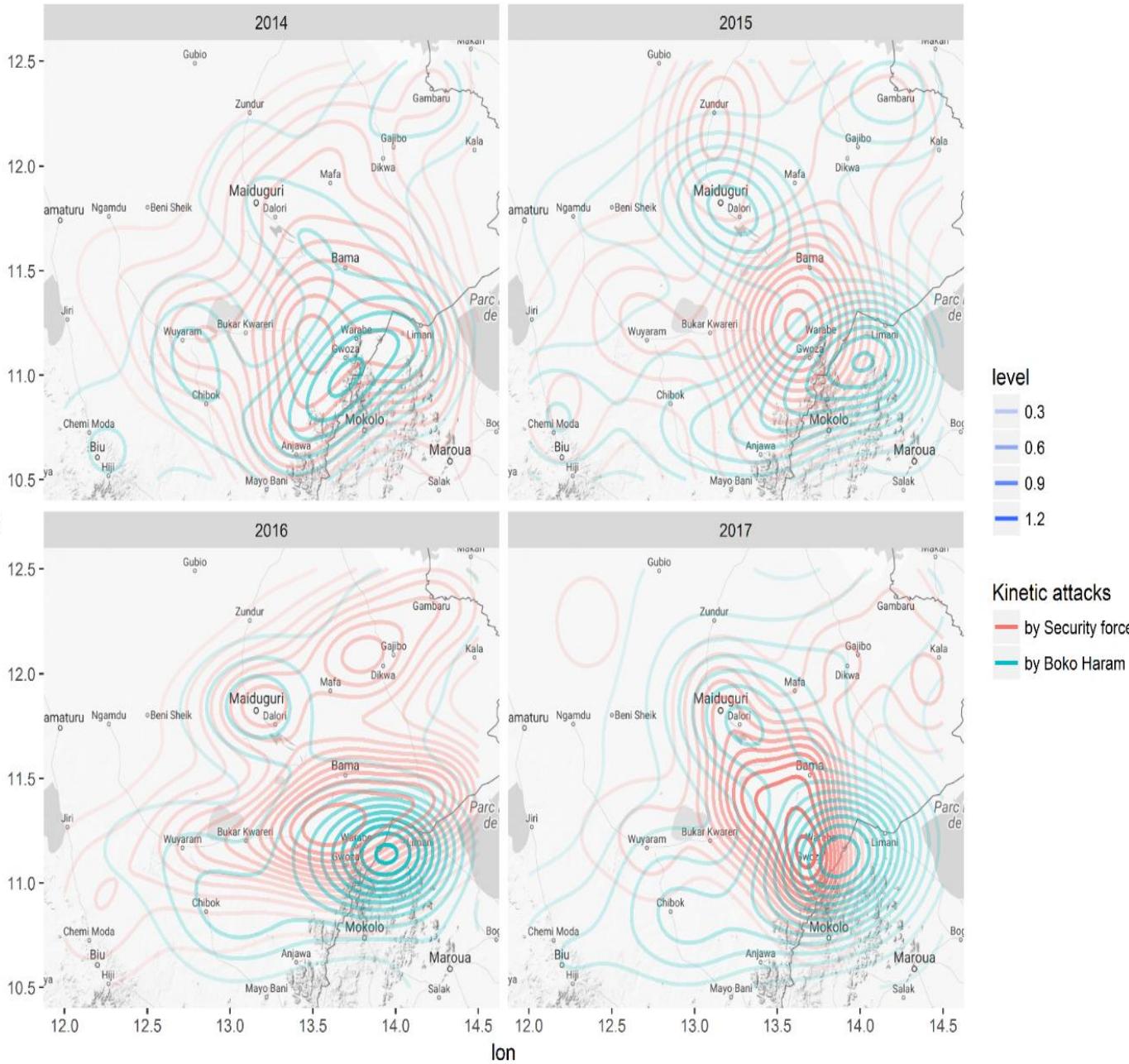
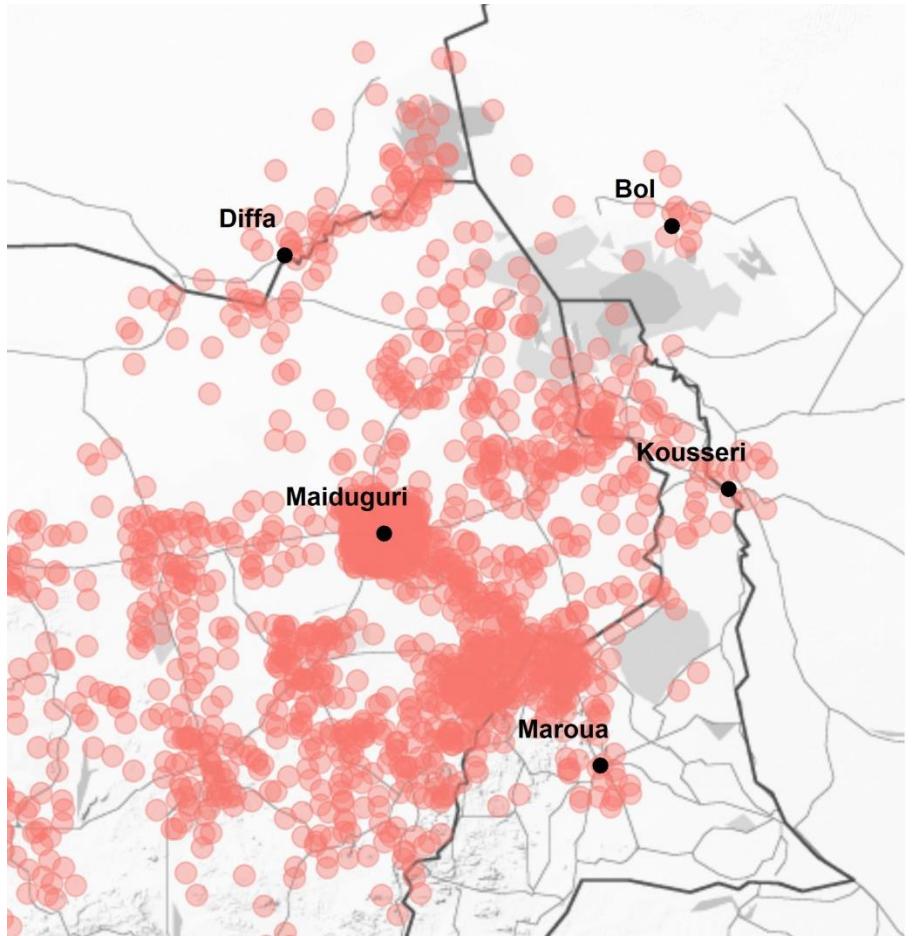
Spatial Analysis For Borders



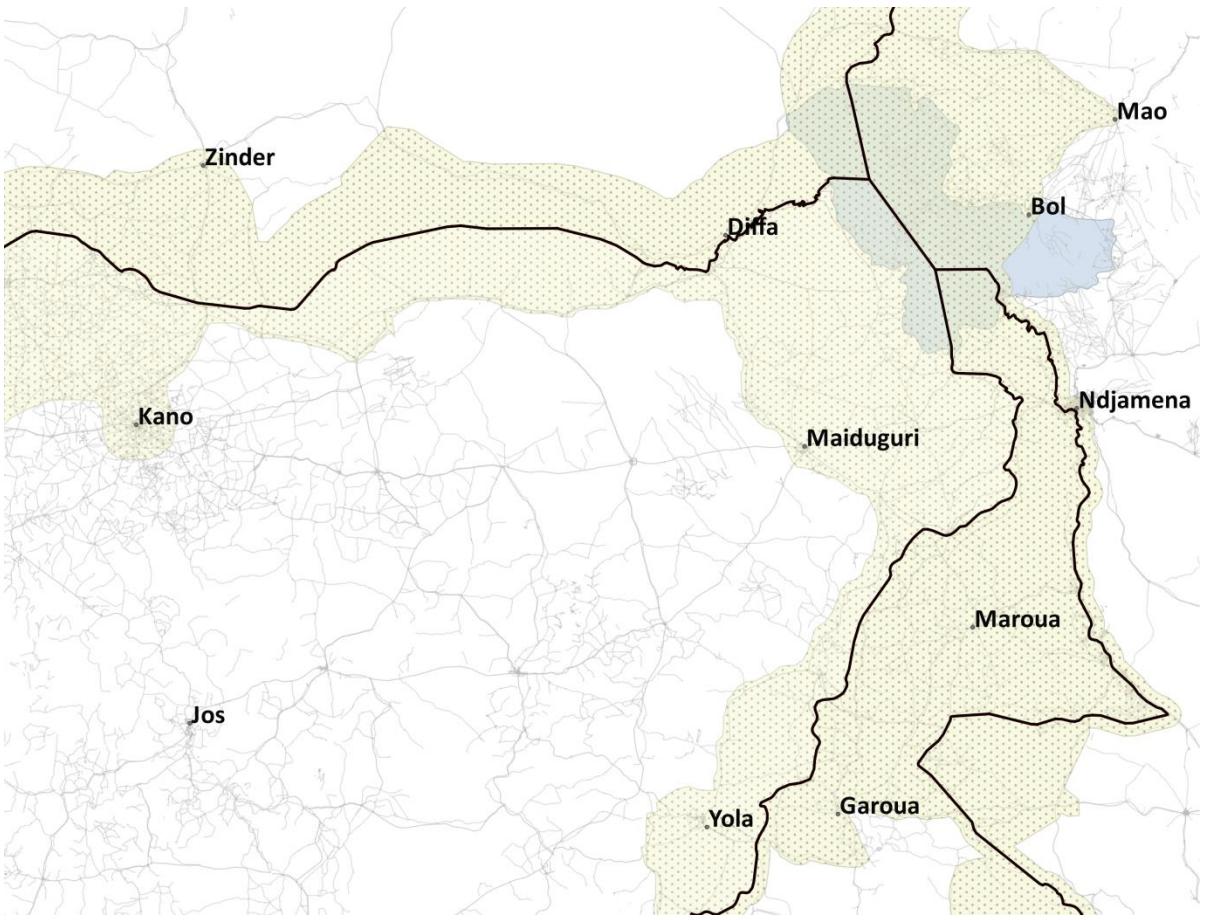
Boko Haram 2014-2017

Kernel Density of kinetic attacks led by Boko Haram

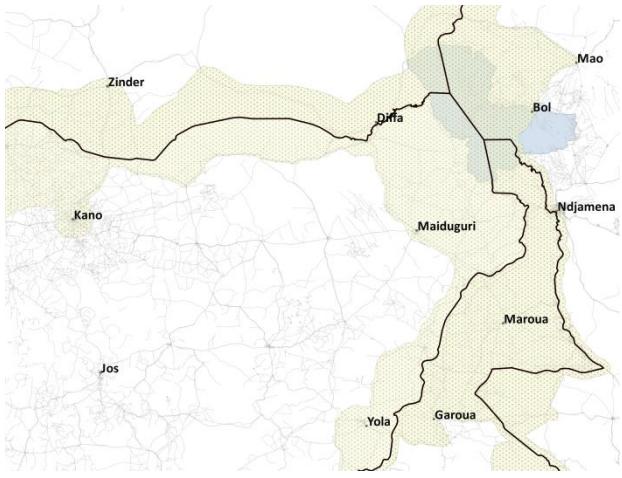




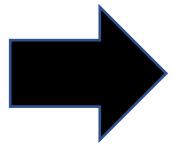
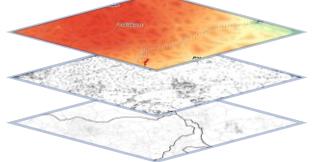
Spatial Analysis For Borders



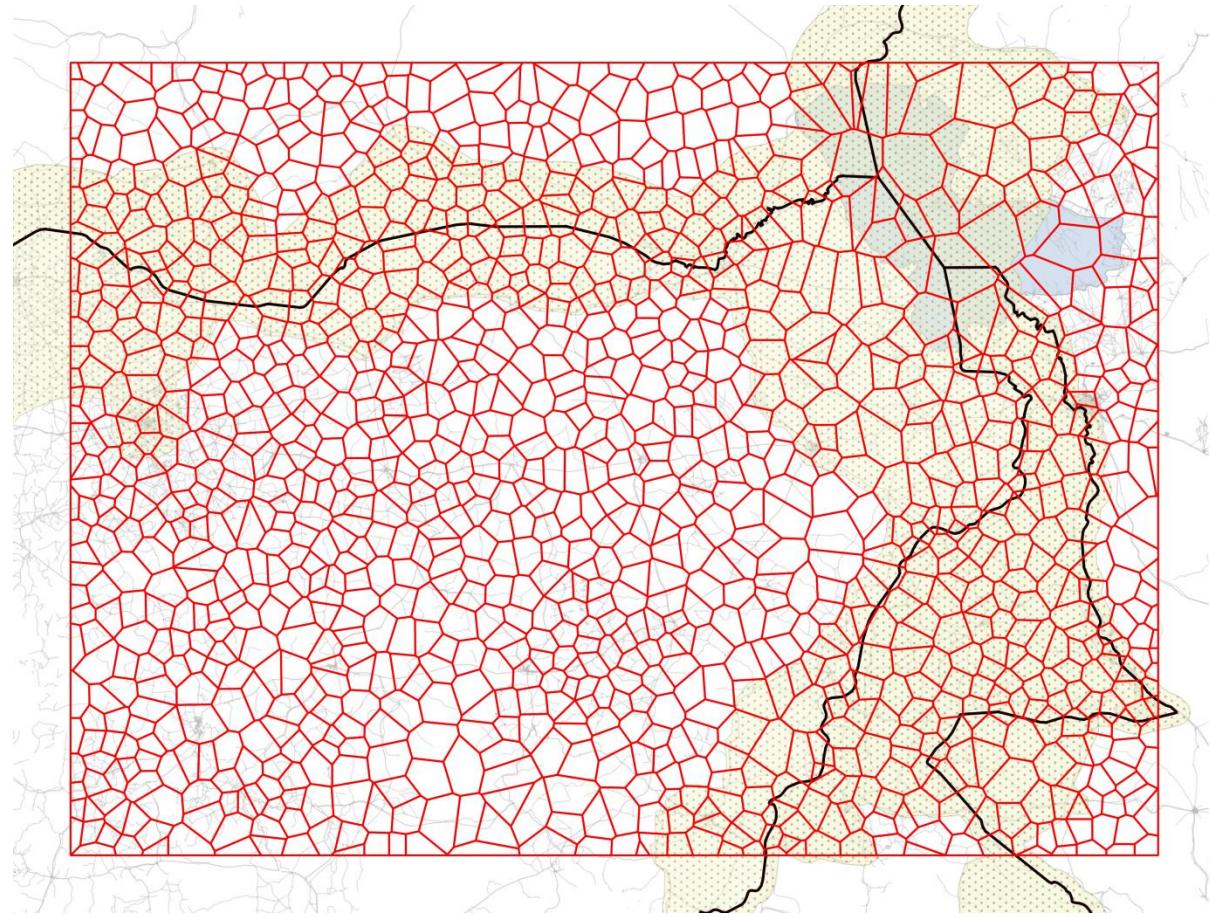
Spatial Analysis For Borders



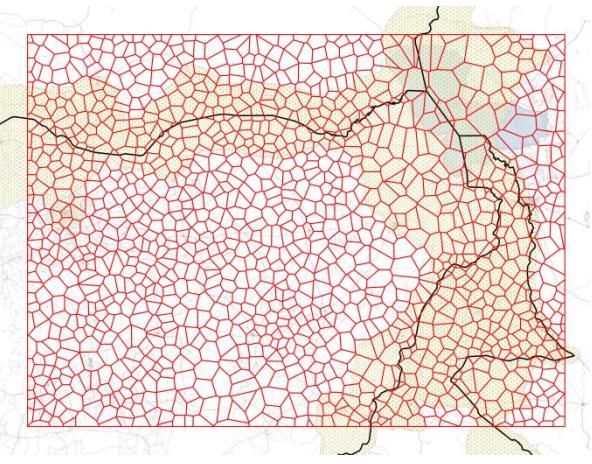
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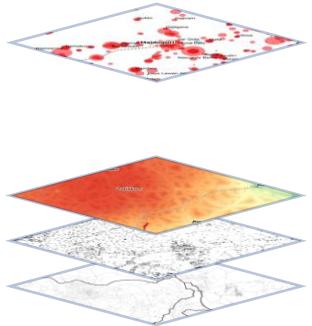
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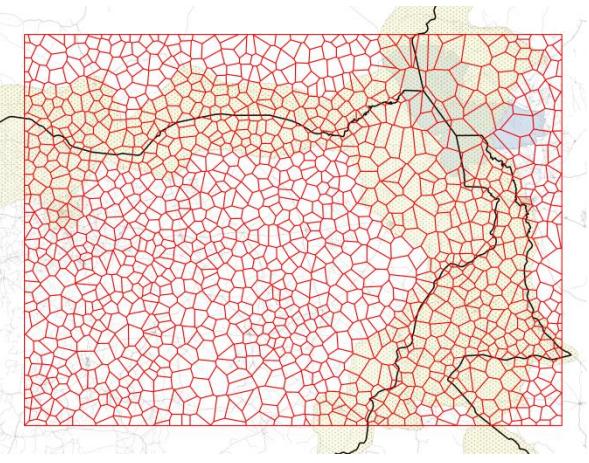
An operational representation of space for
an analysis based on border economy



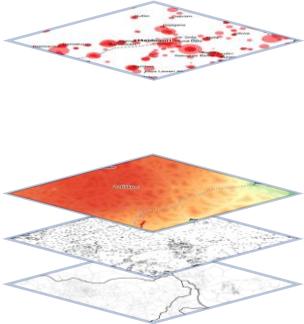
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Spatial Analysis For Borders



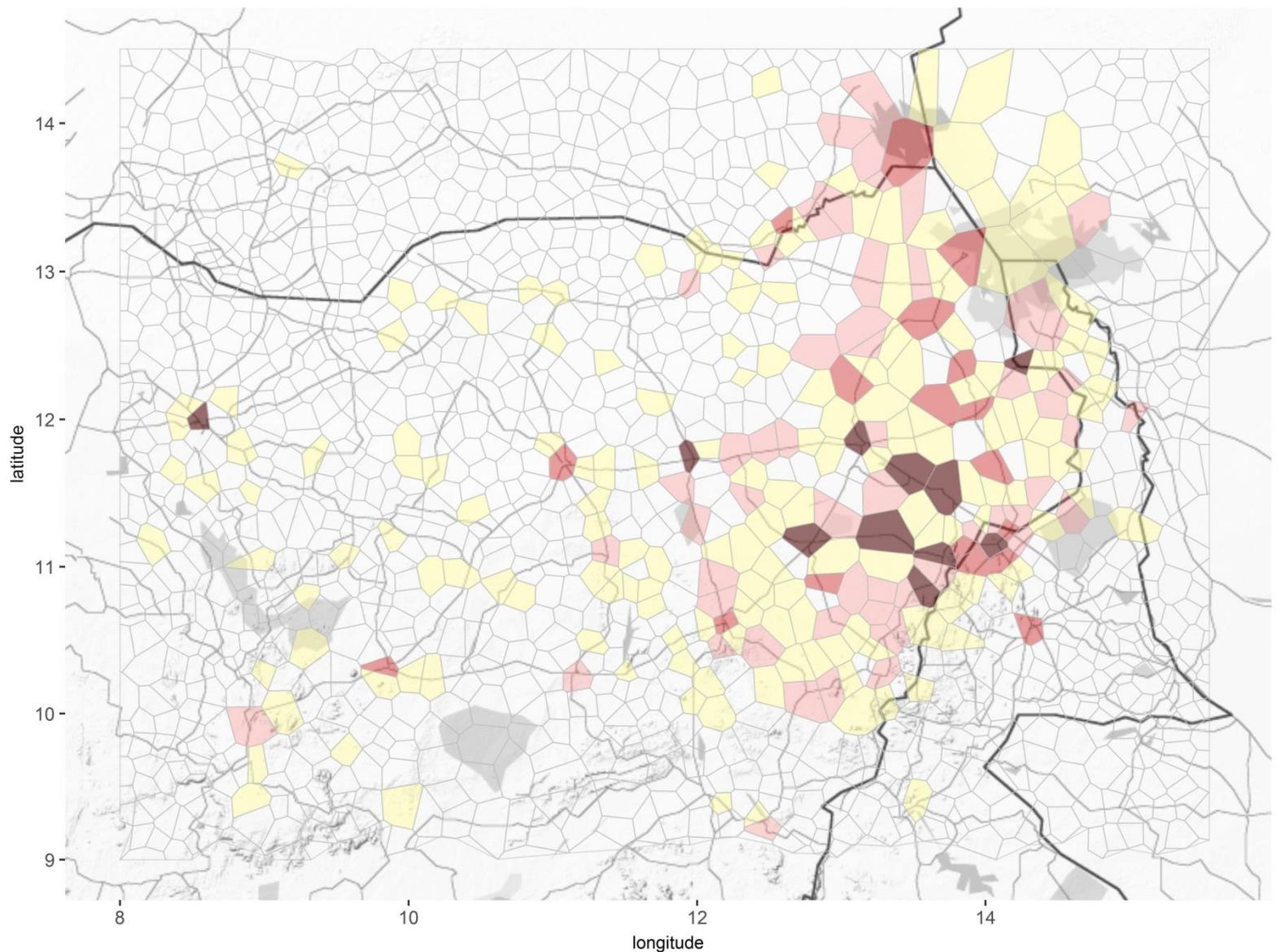
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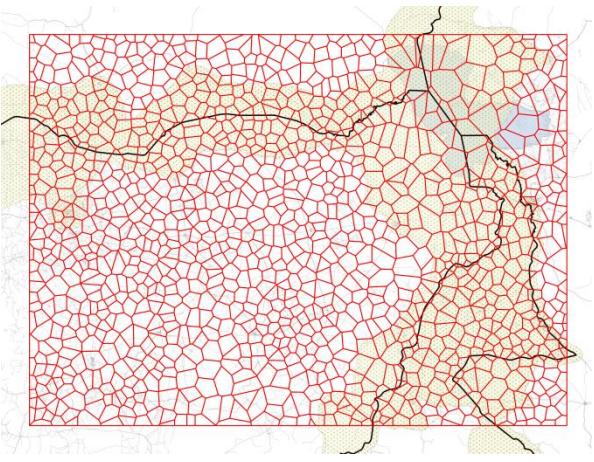
Spatial Analysis For Borders

Boko Haram incidents

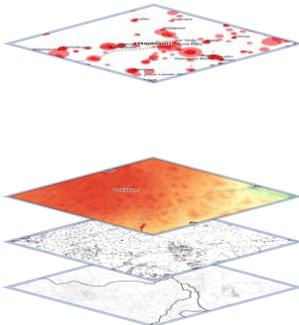
2010 - July 2017



0
1-5
6-20
21-50
>50

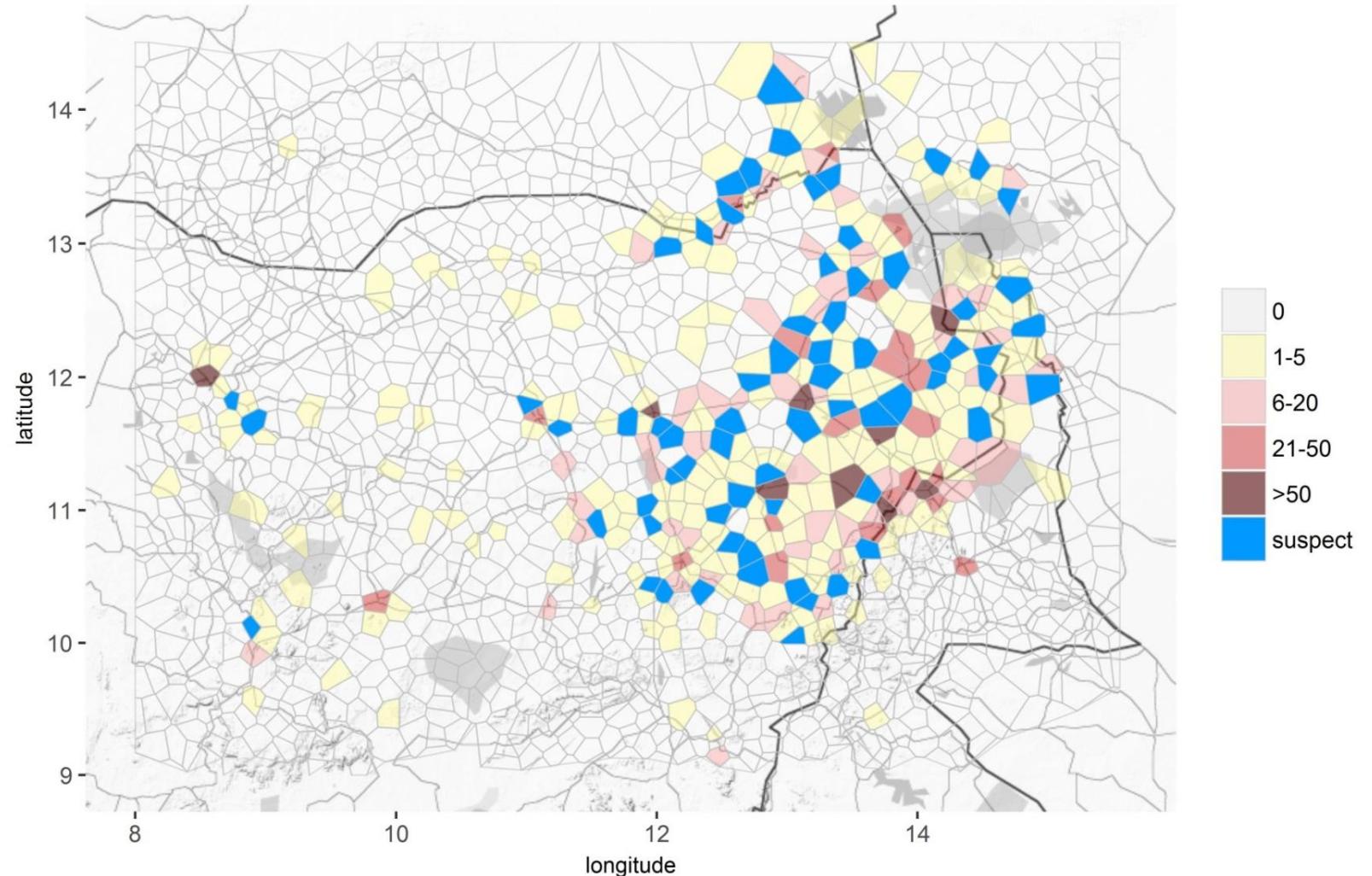


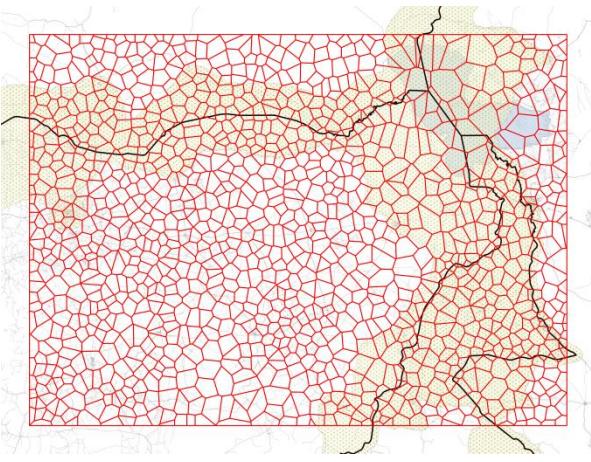
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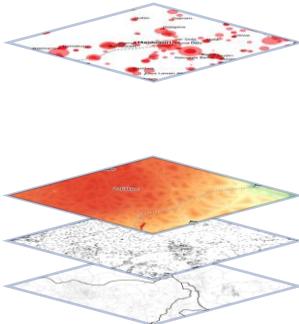
Spatial Analysis For Borders

Boko Haram incidents
2010 - July 2017

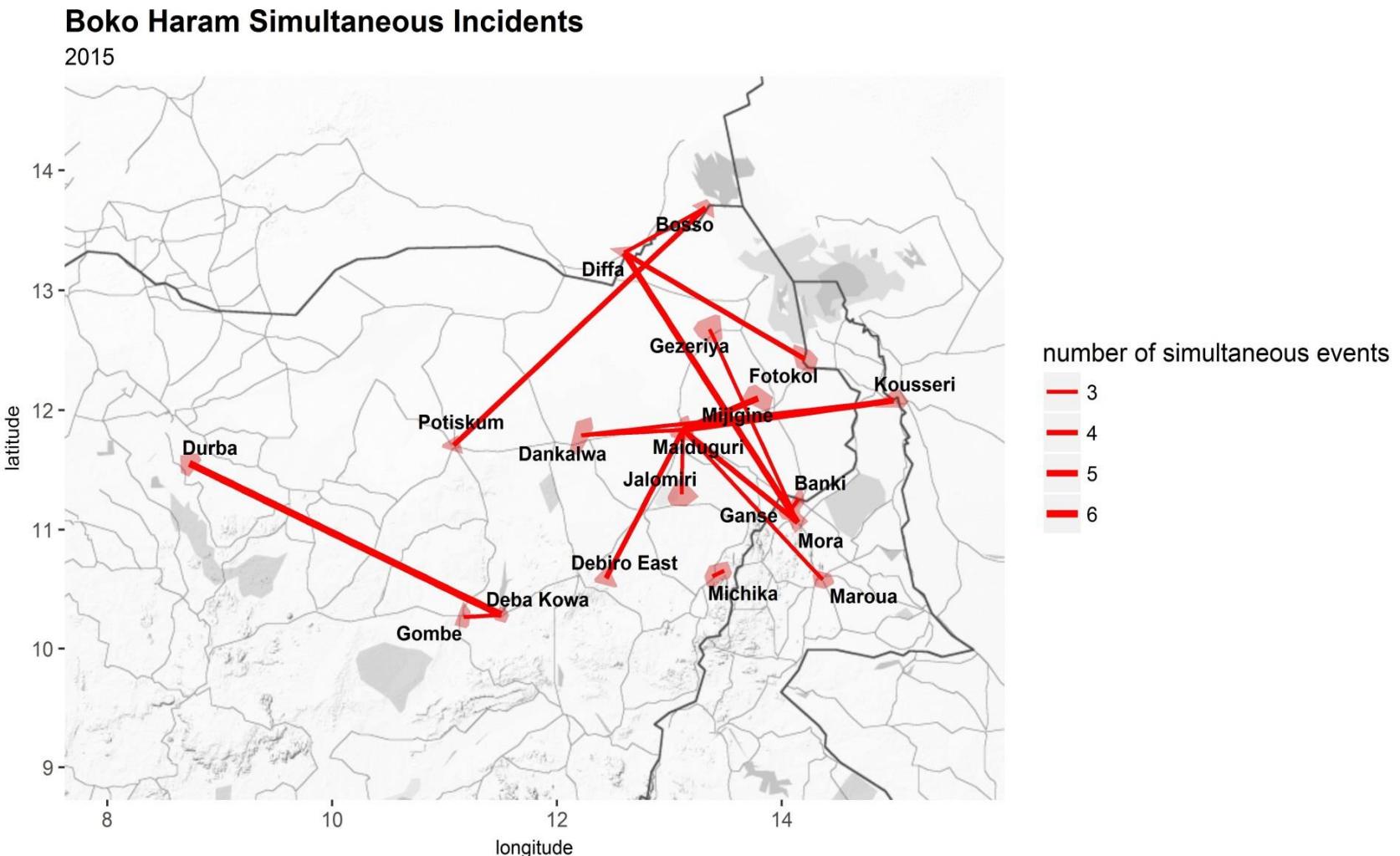


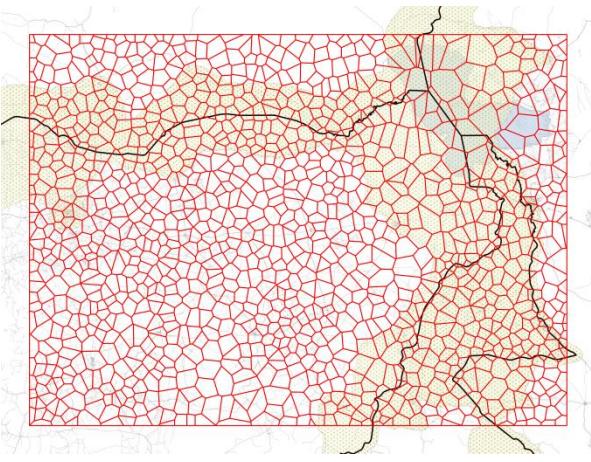


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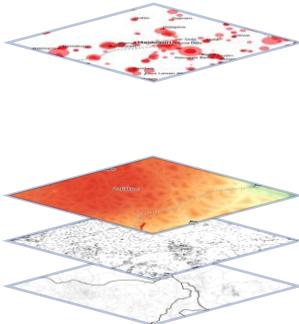


Spatial Analysis For Borders



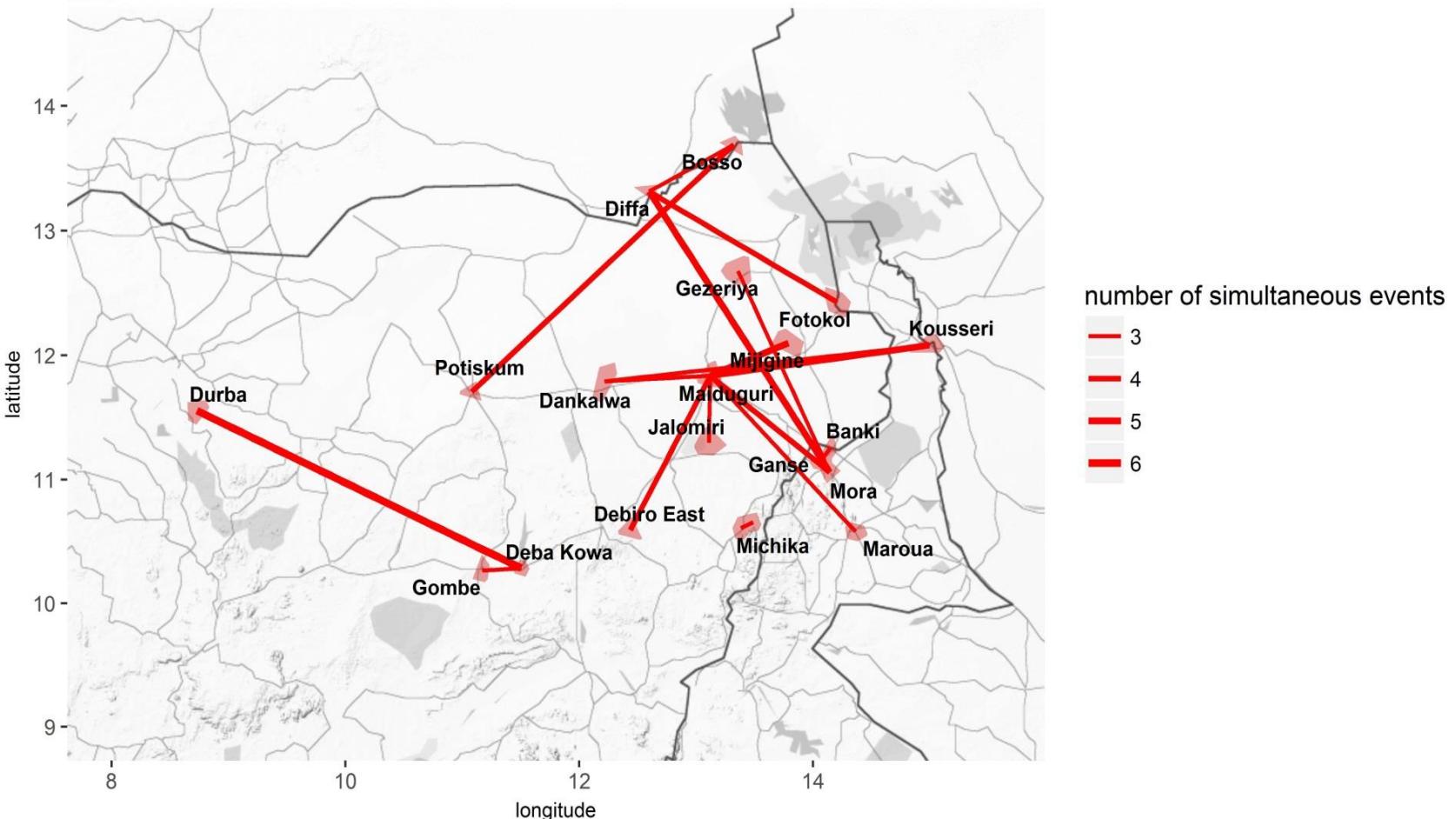


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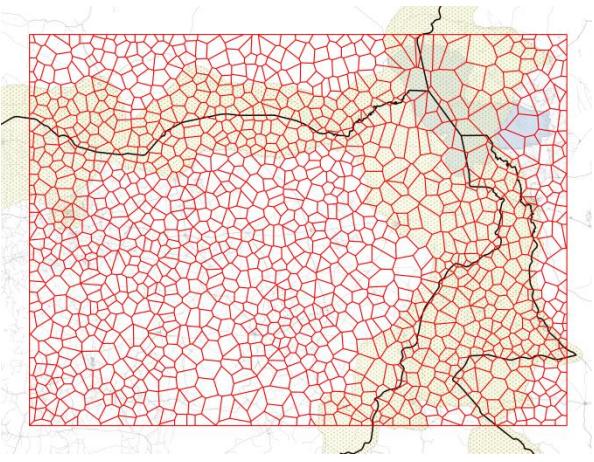


Boko Haram Simultaneous Incidents

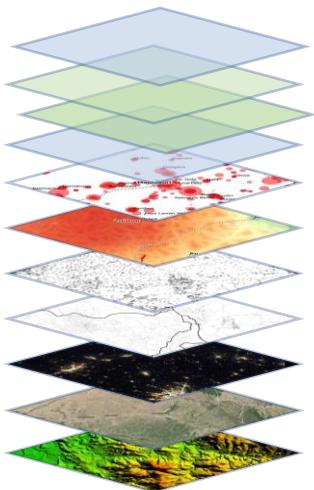
2015



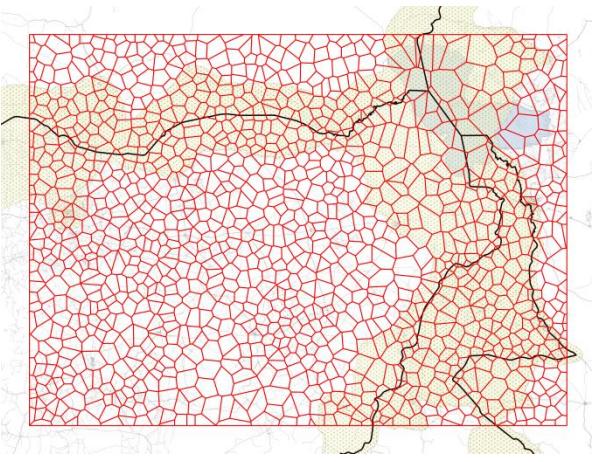
Spatial Analysis For Borders



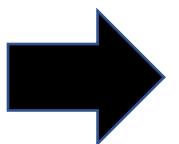
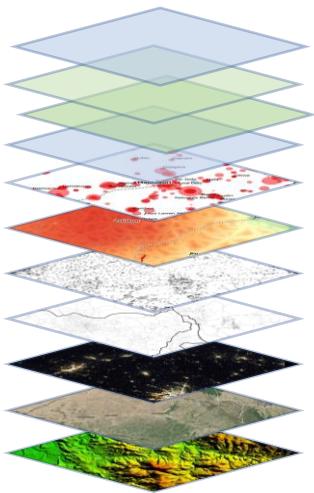
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Spatial Analysis For Borders

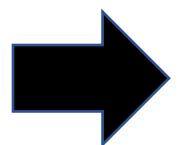
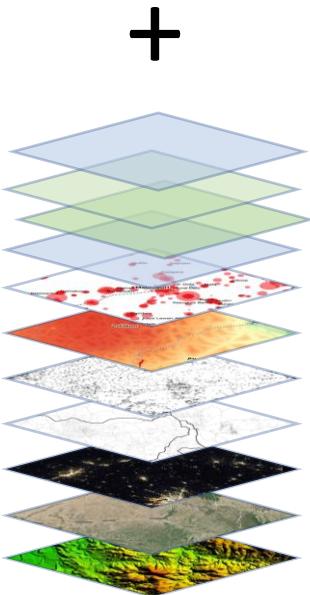
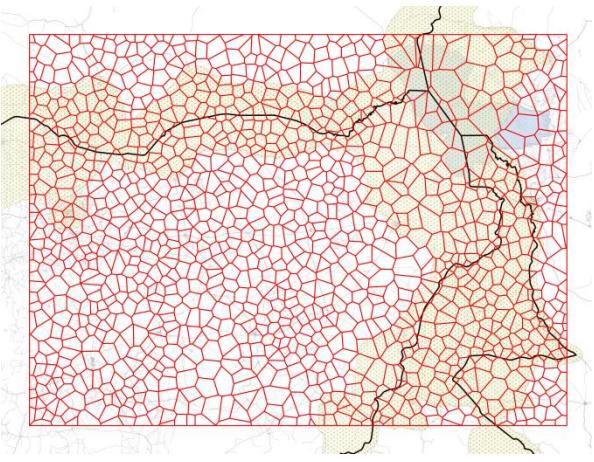


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$$y = \rho W y + X\beta + \varepsilon$$

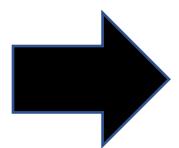
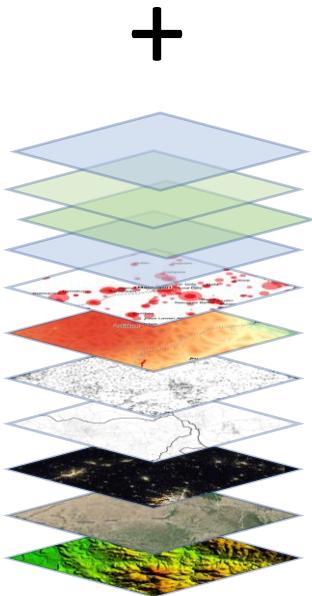
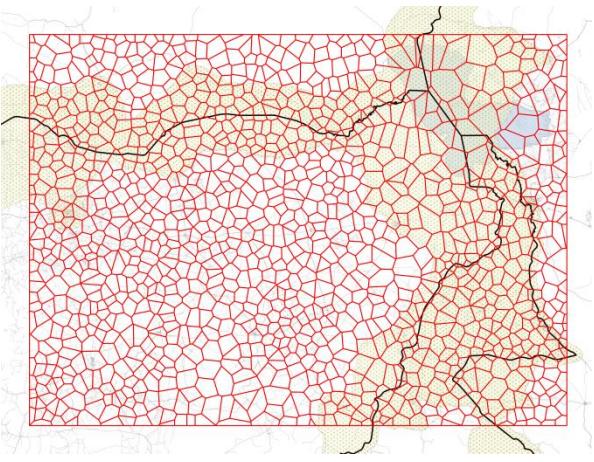
**Spatial Analysis
For Borders**



$$y = \rho W y + X\beta + \varepsilon$$

Variable to be
explained (rate of
incidents, frauds,...)

Spatial Analysis For Borders

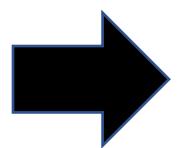
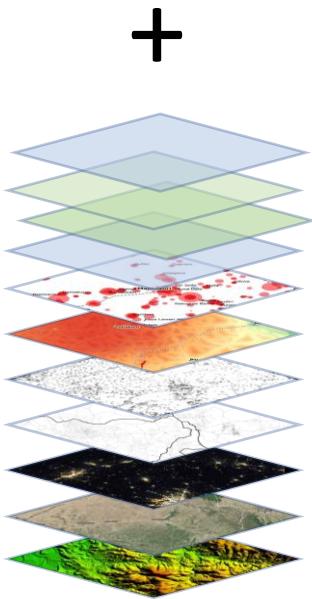
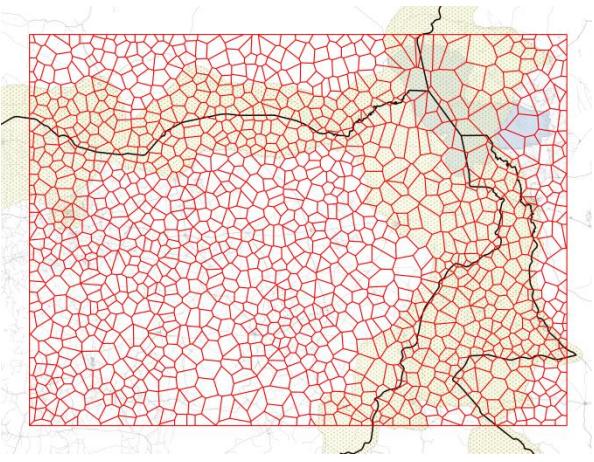


$$y = \rho W y + X\beta + \varepsilon$$

Variable to be explained (rate of incidents, frauds,...)

Explanatory variables

Spatial Analysis For Borders

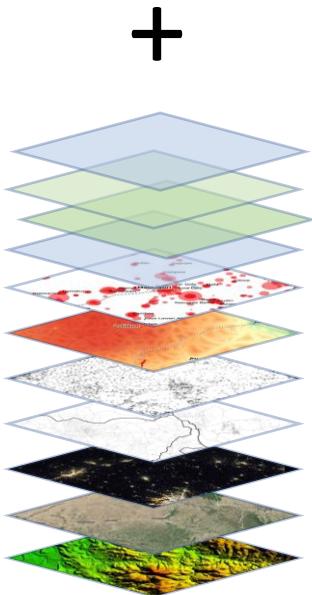
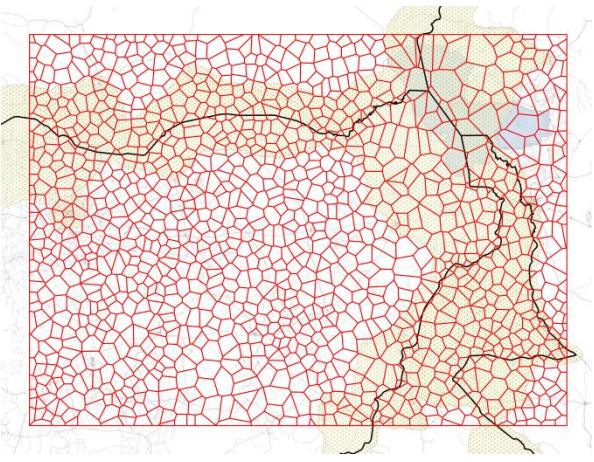


$$y = \rho W y + X\beta + \varepsilon$$

Variable to be explained (rate of incidents, frauds,...)

Explanatory variables

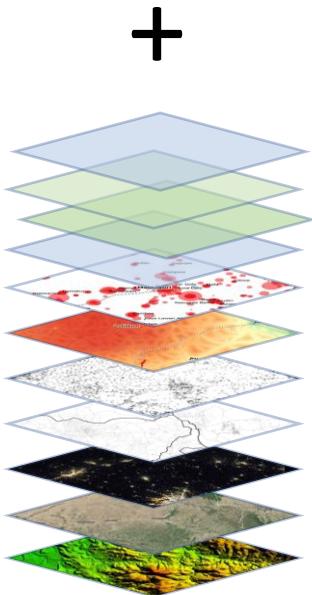
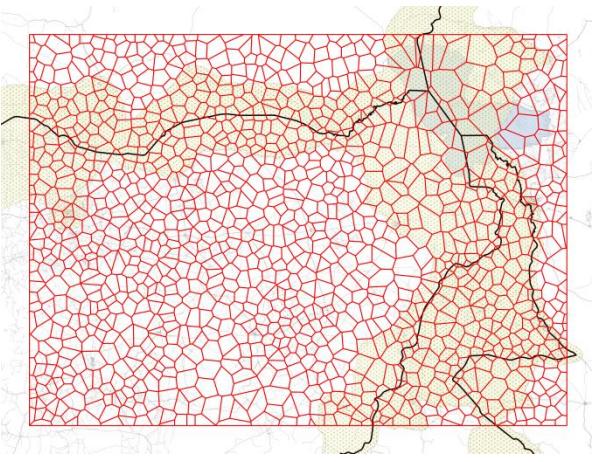
Spatial Analysis For Borders



$$\rightarrow y = \rho W y + X\beta + \varepsilon$$

the « geographical factor »
(the weighting matrix defining the
notion of contiguity and neighboring)

Spatial Analysis For Borders



$$y = \rho W y + X\beta + \epsilon$$



for counterintuitive purposes
(role of roads nodes, markets and
Customs posts in Boko Haram strategy)

very cautious with predictive
capabilities of modelling

Spatial Analysis For Borders

conclusions

Customs corporate culture about to change:

- from « one dimension » to (at least) two dimensions
- from deploying technology to be alerted to deploying technology to discover what is ignored

Customs work with « numbers », they should also work with « maps »:

- to advocate the economic dimension of border security policies
- to foster border agencies cooperation
- to generate a profitable State-society dynamic relationship

Customs constraints:

- to adopt new technologies but not too much
- to develop internal capacities in data analytics in general (not only spatial analytics)

Thank you for attention

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