FIG WORKING WEEK 2019

22–26 April, Hanoi, Vietnam

"Geospatial Information for a Smarter Life and Environmental Resilience"

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"Geospatial Information for a Smarter Life and Environmental Resilience"

A Proposed Methodology to Assess Disaster Risk within a Land Use Cover Change Model, Contributing to SDGs - Case Study: Bogota, Colombia.

Lina Maria González (Colombia), Abbas Rajabifard (Australia), Daniel Paez (Colombia), Soheil Sabri (Australia) and Ricardo Camacho (Colombia).

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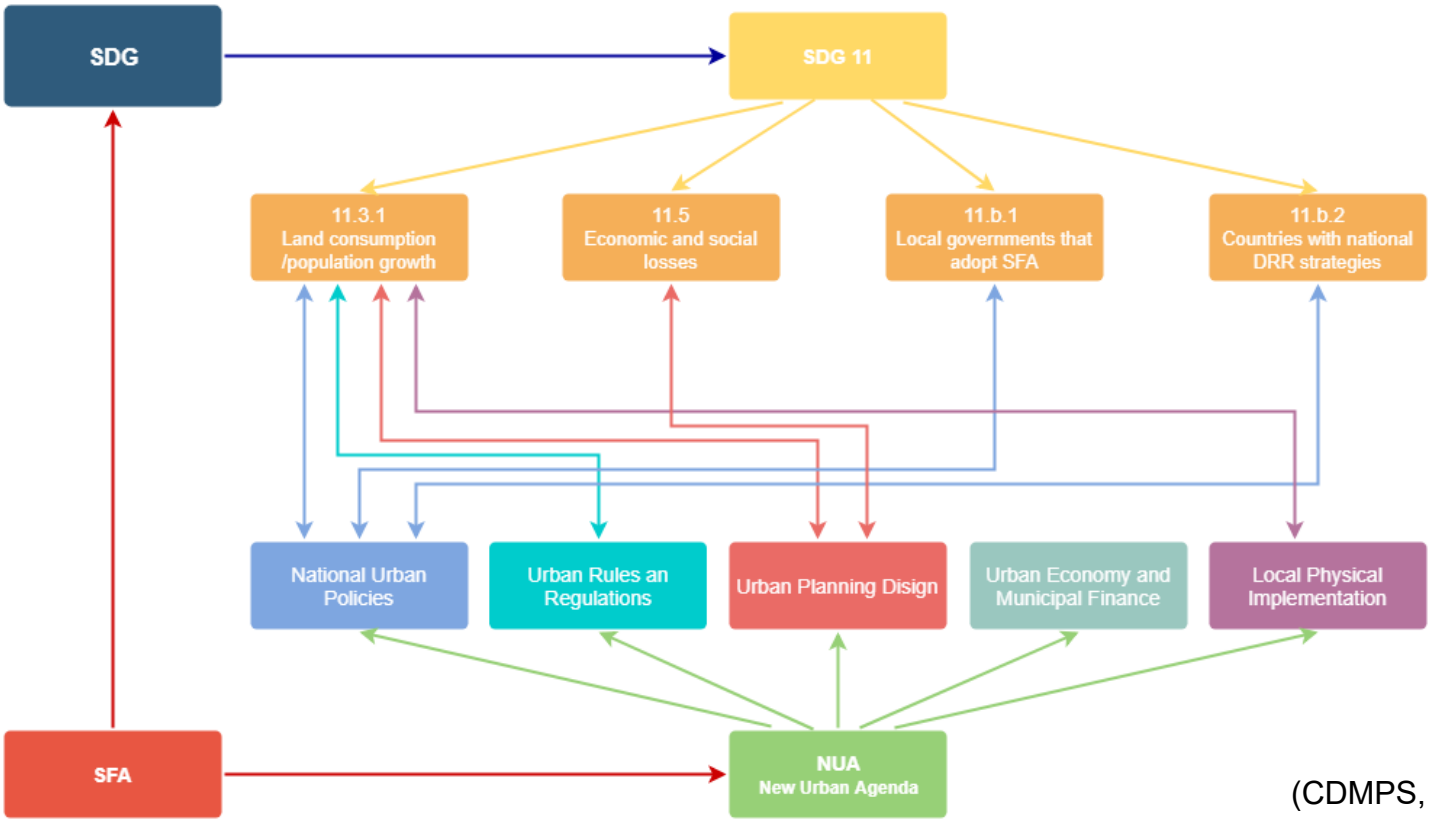
SHAPPING A BETTER FUTURE FOR ALL



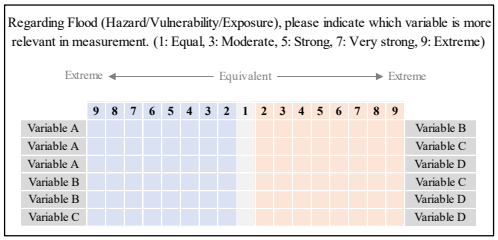
(CDMPS, 2018)

CASE STUDY: BOGOTÁ

Bogotá is in constant growth both spatially and in term of its population, the question we must ask is: How is the risk changing within this growth? Favourably?

HOW TO UNDERSTAND THIS?

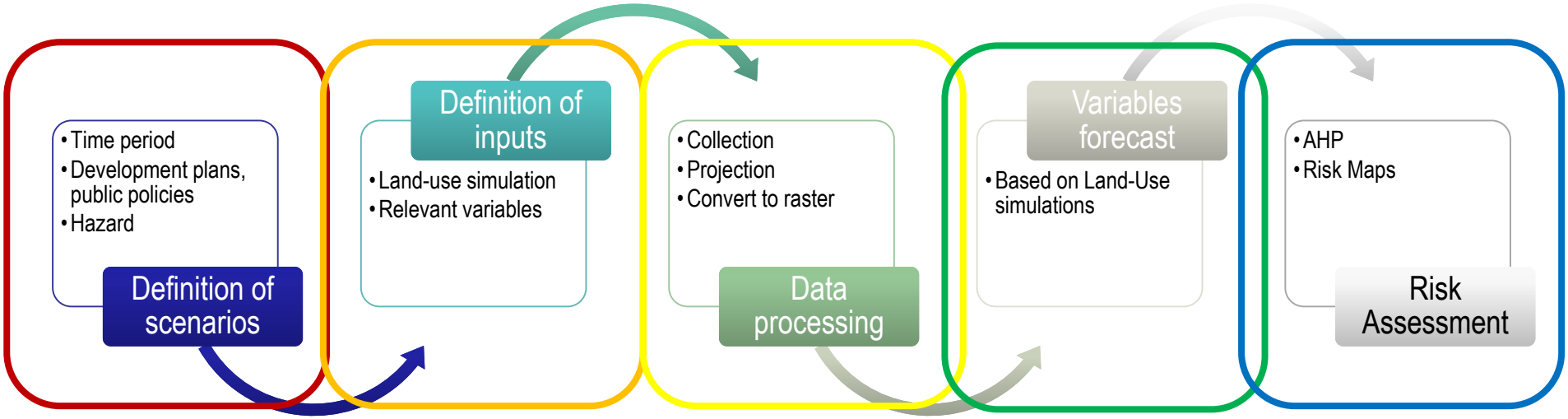
- Develop a disaster risk assessment within a land use cover change model to analyse different scenarios of land development plans in Bogota, supporting a sustainable development.


Regarding Flood (Hazard/Vulnerability/Exposure), please indicate which variable is more relevant in measurement. (1: Equal, 3: Moderate, 5: Strong, 7: Very strong, 9: Extreme)

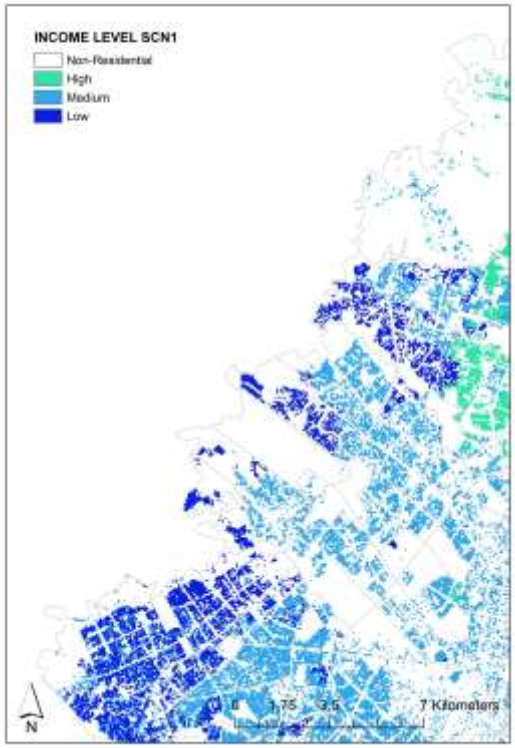
Extreme ← Equivalent → Extreme

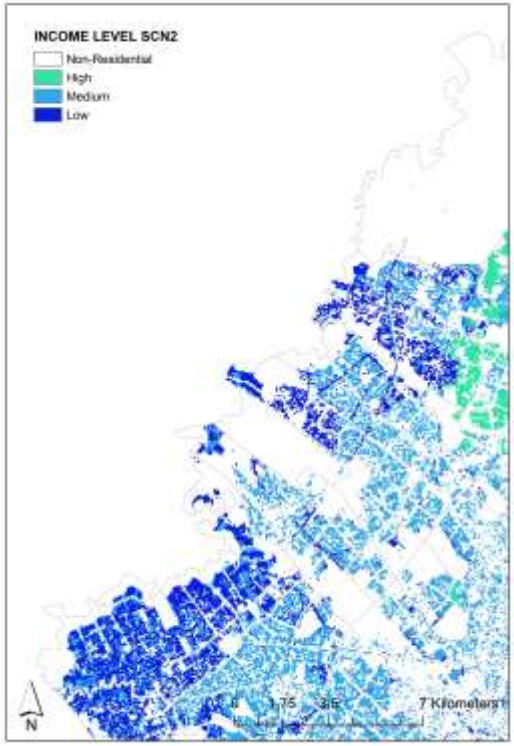
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Variable A																		Variable B
Variable A																		Variable C
Variable A																		Variable D
Variable B																		Variable C
Variable B																		Variable D
Variable C																		Variable D

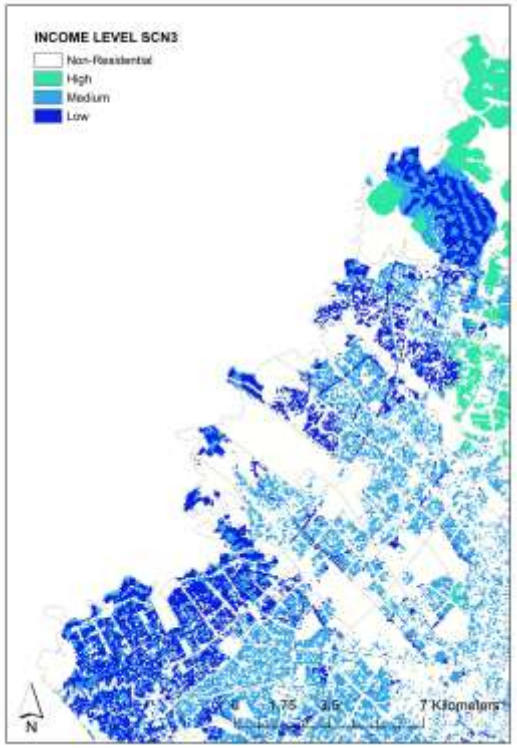
METHODOLOGY & IMPLEMENTATION



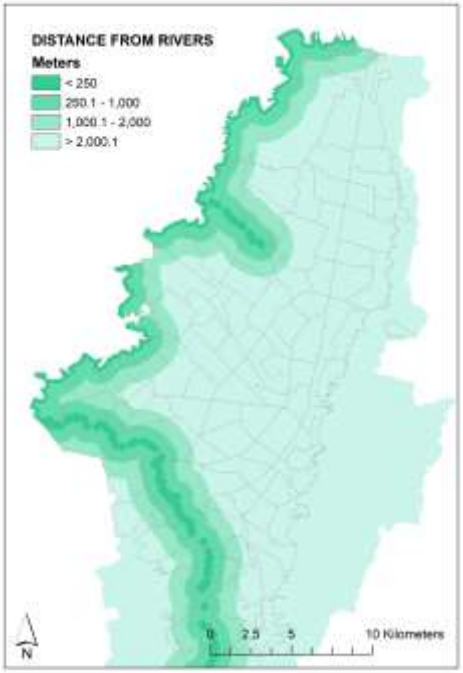
RESULTS

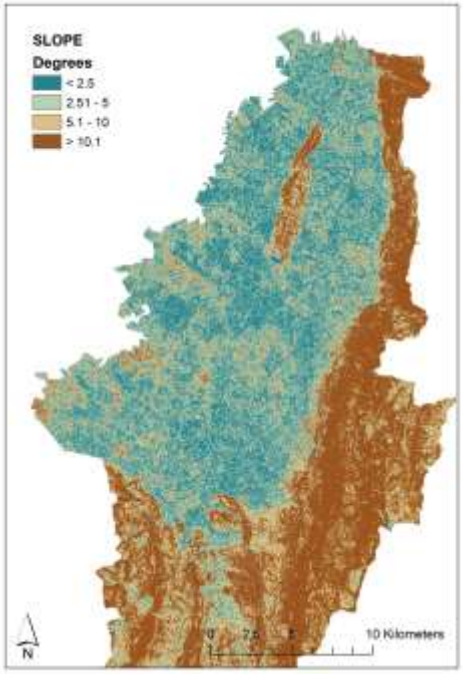

INCOME LEVEL SCN1
Non-Residential
High
Medium
Low
N
7 Kilometers

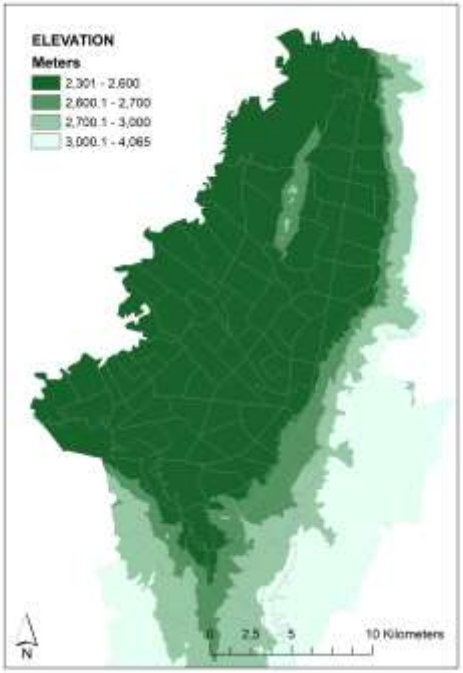

INCOME LEVEL SCN2
Non-Residential
High
Medium
Low
N
7 Kilometers


INCOME LEVEL SCN3
Non-Residential
High
Medium
Low
N
7 Kilometers

RESULTS


DISTANCE FROM RIVERS
Meters
< 250
250.1 - 1,000
1,000.1 - 2,000
> 2,000.1
N
0 2.5 5 10 Kilometers


SLOPE
Degrees
< 2.5
2.51 - 5
5.1 - 10
> 10.1
N
10 Kilometers


ELEVATION
Meters
2,301 - 2,600
2,600.1 - 2,700
2,700.1 - 3,000
3,000.1 - 4,065
N
0 2.5 5 10 Kilometers

Factor	Criteria	Sub-Criteria	Rating	Weight
Hazard	Elevation	2301-2600 m	4	0.076
		2600.1 – 2700 m	3	
		2700.1 – 3000 m	2	
		3000.1 – 4065 m	1	
	Slope	< 2.5	4	0.321
		2.51 – 5	3	
		5.1 – 10	2	
		< 10.1	1	
	Distance from rivers	< 250m	4	0.603
		250.1-1000 m	3	
		1000.1–2000 m	2	
		> 2000.1 m	1	
Exposure	Population density (p/km2)	0	1	0.83
		0.1-10539	2	
		10540-11790	3	
		> 11790	4	
	Built-up areas	Not-Built	1	0.17
		Built-up	4	
Vulnerability	Economic income level	Low	4	0.88
		Medium	3	
		High	2	
	Primary road density (m/km2)	<0.5	4	0.13
		0.51-1.5	3	
		1.51-2.5	2	
		> 2.51	1	

RISK MAPS


RISK SCENARIO 1
High
Low
N


RISK SCENARIO 2
High
Low
N


RISK SCENARIO 3
High
Low
N

CONCLUSSION

- CA-LUCC models are able to give reasonably reliable possible future scenarios, useful for decision making. Which results can be used as a basis for disaster risk forecast as implemented on this study. **Integration of CA-LUCC and MCDA in a GIS** environment is **useful for decision makers** to evaluate the impact of different public policies and development plans.
- After comparing the maps, it can be demonstrated that an urban development implies an increase in disaster risk magnitude; hence, an **appropriate control** must be put in place over developing areas, as so as the existing exposed settlements.
- An **understanding of disaster risk** can be significant regarding sustainable development since it gives insights into the priority areas that must be treated, preventing future catastrophes, creating resilience and achieving the SDGs.

THANK YOU!