MAPPING SPATIAL VULNERABILITY OF THE ELDERLY TO A HEALTH PANDEMIC

Challenging the Engineering Community to develop more resilient cities

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RATIONALE BEHIND THE RESEARCH STUDY

Casualties recorded worldwide, indicated that the elderly are most at risk to the COVID-19 disease.

AIMS & OBJECTIVES

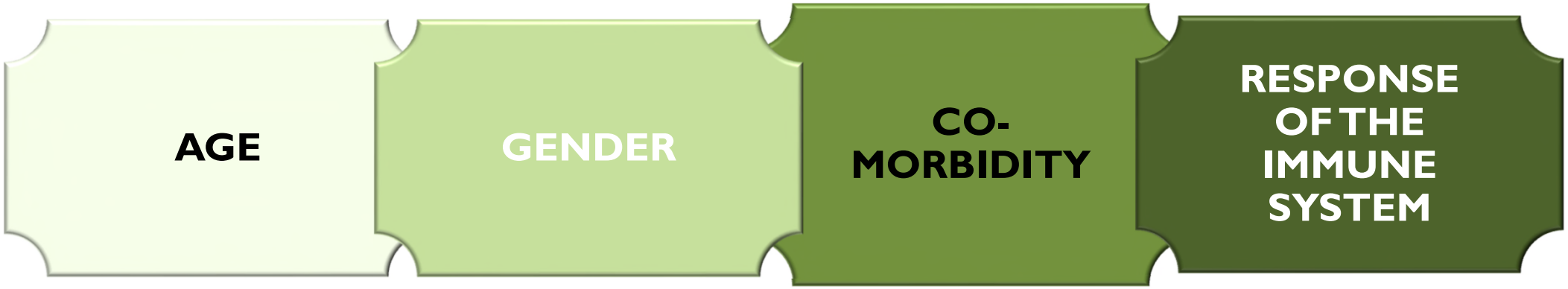
AIM

To capture the challenges faced by the elderly during the COVID-19 health pandemic for better preparedness in the future.

OBJECTIVES

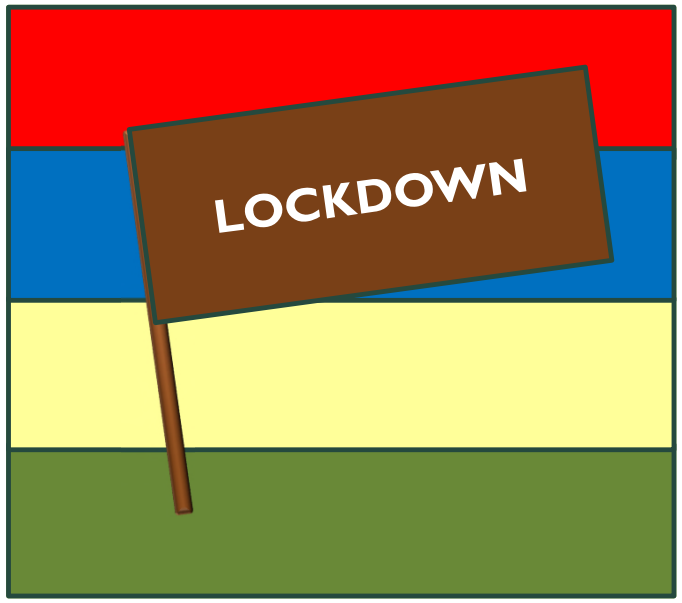
- ✓ *To conduct field surveys with the Elderly*
- ✓ *To extract vulnerability indicators from CENSUS data*
- ✓ *To develop vulnerability maps at District, Ward and Village level*

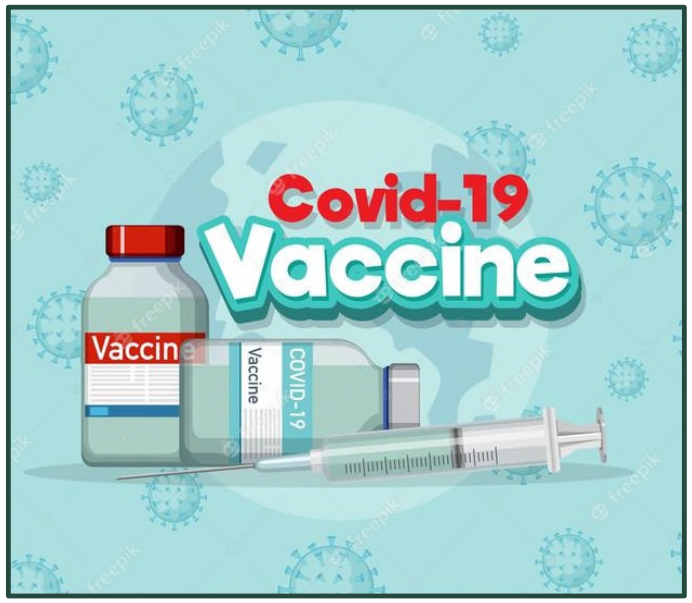
FOUR MAIN HEALTH RISK FACTORS



Placing thus, the Elderly in the category of those most at risk to this health pandemic.

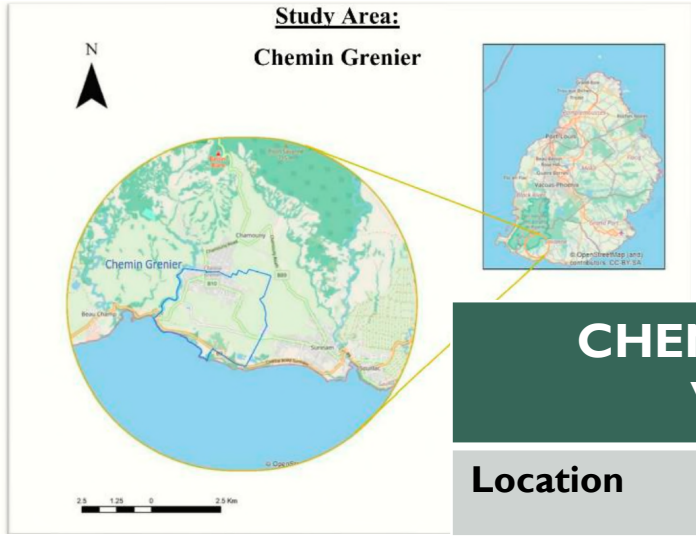
RISK REDUCTION STRATEGIES



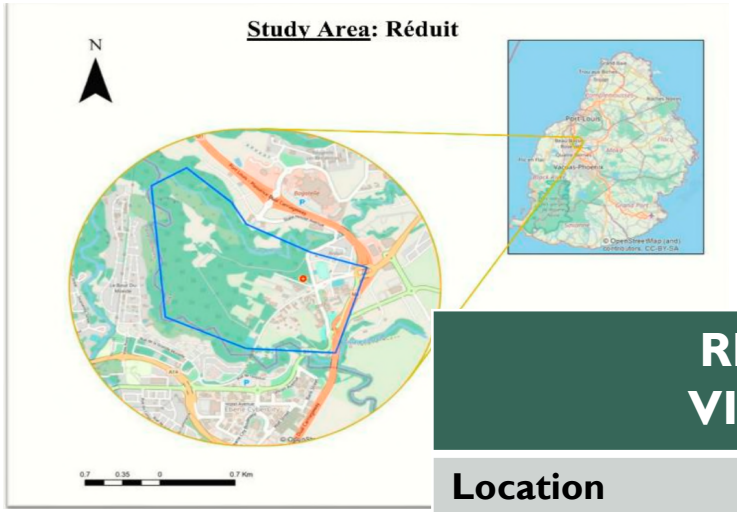


Social Vulnerability Maps to support Health Risk Reduction Strategies

SITES SURVEYED



CHEMIN GRENIER VILLAGE	
Location	South
Type	Middle Sized village
No. of Elderly	940
Total Population (2011)	12223



REDUIT VILLAGE	
Location	Centre
Type	Small Village
No. of Elderly	831
Total Population (2011)	8846

QUESTIONNAIRE & INDICATORS

- ✓ 23 Questions to assess **the Coping Capacity** of the Elderly to the health pandemic
  - ✓ Access to basic needs
  - ✓ Living Conditions
  - ✓ Health Conditions
  - ✓ Mobility
  - ✓ Support facilities
  - ✓ Communication Facilities

LOCATION	AGE	GENDER	EDUCATION LEVEL	INCOME	MARITAL STATUS
PERSONAL MOBILITY	COMORBIDITY	FREQUENCY OF VISITS TO HEALTH CENTRES	FIRST POINT OF CONTACT FOR ANY HEALTH PROBLEM	ANY SOCIAL GROUP SUPPORT	EASE OF ACCESS TO HEALTH CENTRES
TRANSPORT FACILITIES	EXTENT OF FAMILY SUPPORT	CONFIDENCE TO COPE WITH A HEALTH PANDEMIC	MAIN CONCERNS IN A PANDEMIC SITUATION	HOUSING CONDITIONS	ACCESS TO RUNNING WATER
ACCESS TO ELECTRICITY	ACCESS TO PHONE	ACCESS TO INTERNET	ACCESS TO BASIC FOOD NECESSITIES	EASE OF ACCESS TO GAS FOR COOKING	23

KEY FINDINGS OF FIELD SURVEYS

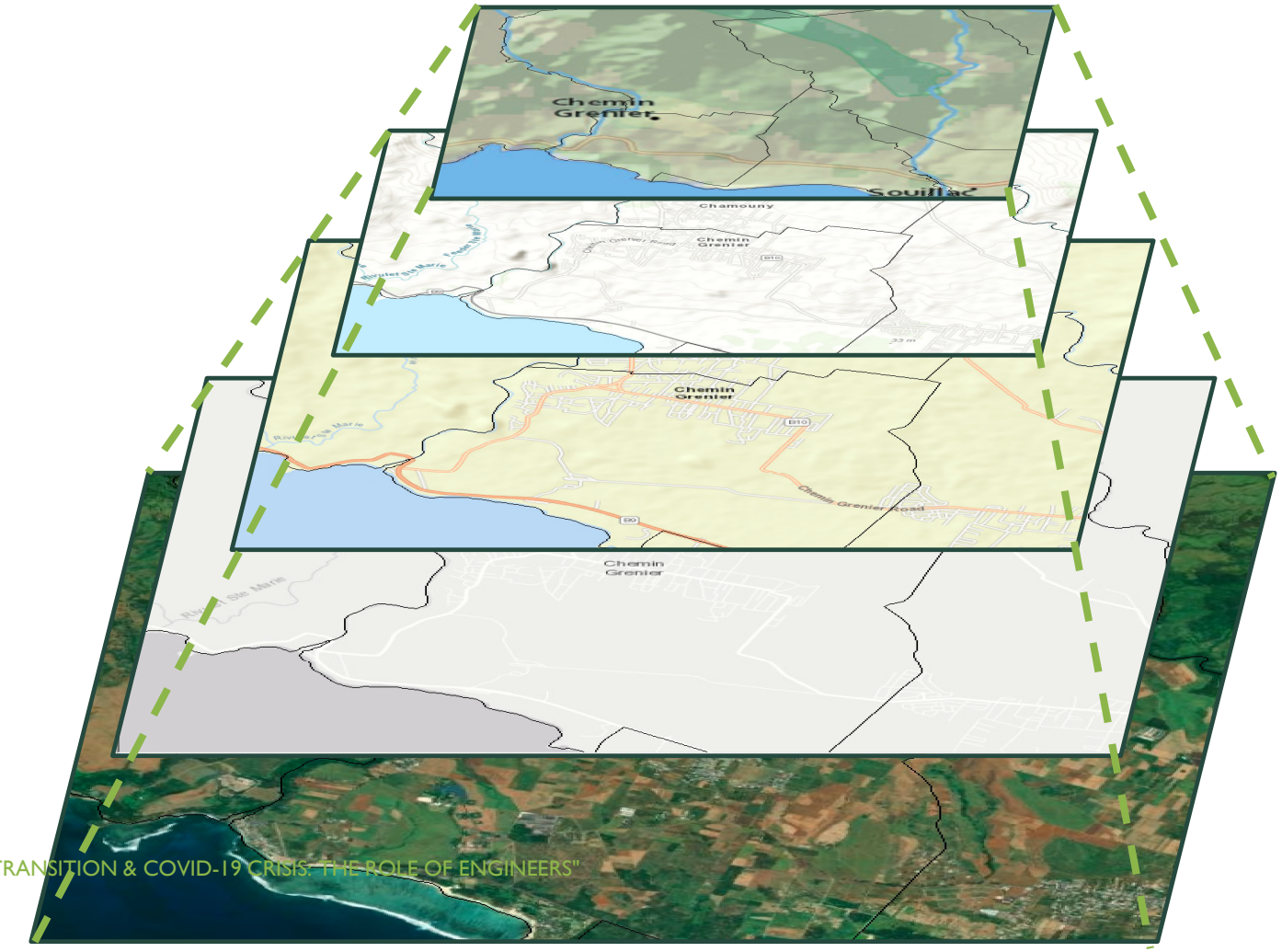
INDICATORS RELFECTING LOW VULNERABILITIES

- ✓ 54% Female Respondents
- ✓ 41% Respondents were aged below 70 years
- ✓ 75% had children
- ✓ 83% were retired
- ✓ 100% access to running water & electricity
- ✓ 92% access to phone
- ✓ 67% access to internet facilities
- ✓ 40% had their own transport
- ✓ 79% earned a monthly income between Rs. 10,000 to Rs. 20,000.
- ✓ 80% received social support – friends, family, neighbours

INDICATORS REFLECTING HIGH VULNERABILITIES

- ✓ 59% were educated up to primary level only
- ✓ 58% suffered from NCDs
- ✓ 18% find medium difficult to access to basic food needs
- ✓ 48% find access to cooking gas difficult to very difficult
- ➢ 27% were affected by reduced mobility
- ✓ 5% were living in poor housing conditions
- ✓ 34% considered the support fair to weak
- ✓ 28% faced difficulties to access medical care
- ✓ **44% found it difficult to cope with the pandemic**

THE GEOSPATIAL TECHNOLOGY



MULTIVARIATE ANALYSIS
(Field Survey Data)

Vulnerability Indicators grouped into 4 FACTORS:

- ✓ **Living Conditions**
- ✓ **Access to Basic Facilities**
- ✓ **Mobility**
- ✓ **Economic Conditions**

Translated to the secondary data – Census 2011

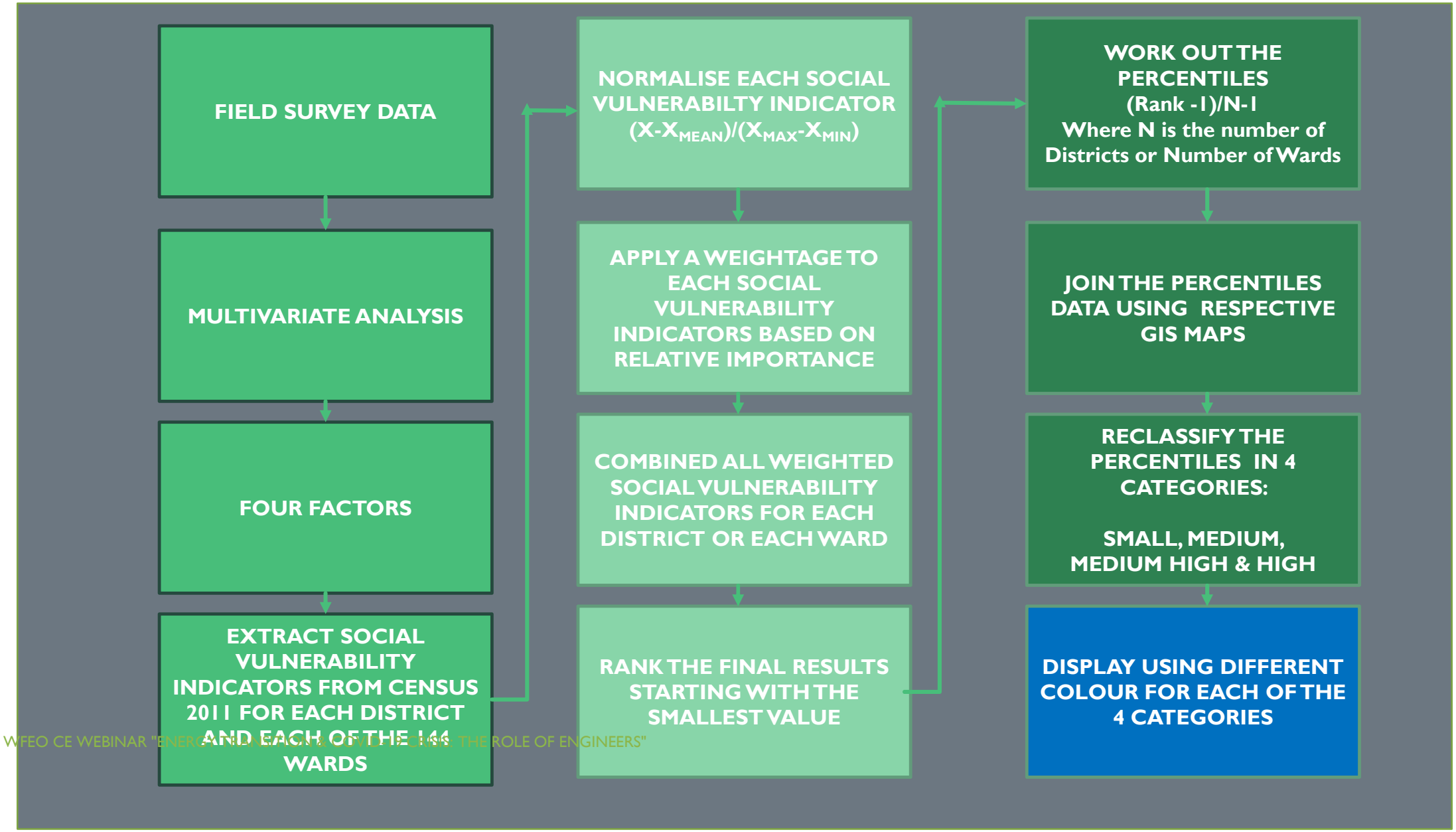
DEVELOPMENT OF THE SVI MAP

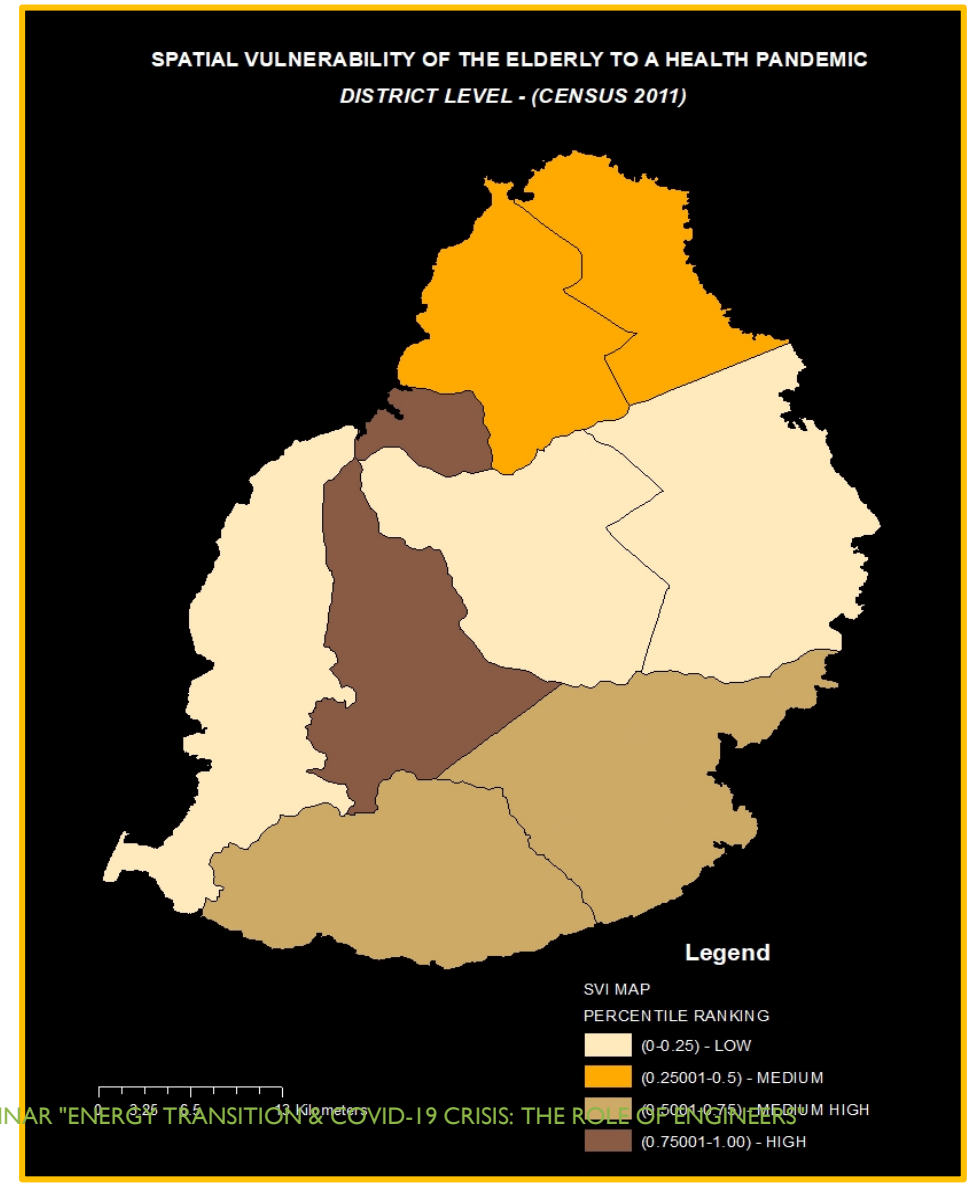
SOCIAL FACTORS	SOCIAL VULNERABILITY INDICATORS	WEIGHTAGE
LIVING CONDITIONS	Buildings with >3 housing units in a building	0.05
	Buildings with >3 persons sharing a room	0.05
	No. of People either homeless or living in communal living	0.05
	No. of crudely divided housing units & Improved Housing units	0.05
ACCESS TO BASIC FACILITIES	Housing units with poor sanitation facilities	0.05
	Housing units with no piped water supply or with no water supply facilities within remises	0.05
	Housing units with common bathroom	0.05
	Ease of access to health care centers	0.15
	No. of People depending on gas for cooking	0.05
MOBILITY	No. of People aged 65 or above	0.15
	No. of People with a disability that can affect mobility	0.1
	No. of People with low level of literacy	0.05
ECONOMIC CONDITIONS	No. of People not economically active	0.05
	Population Density	0.1

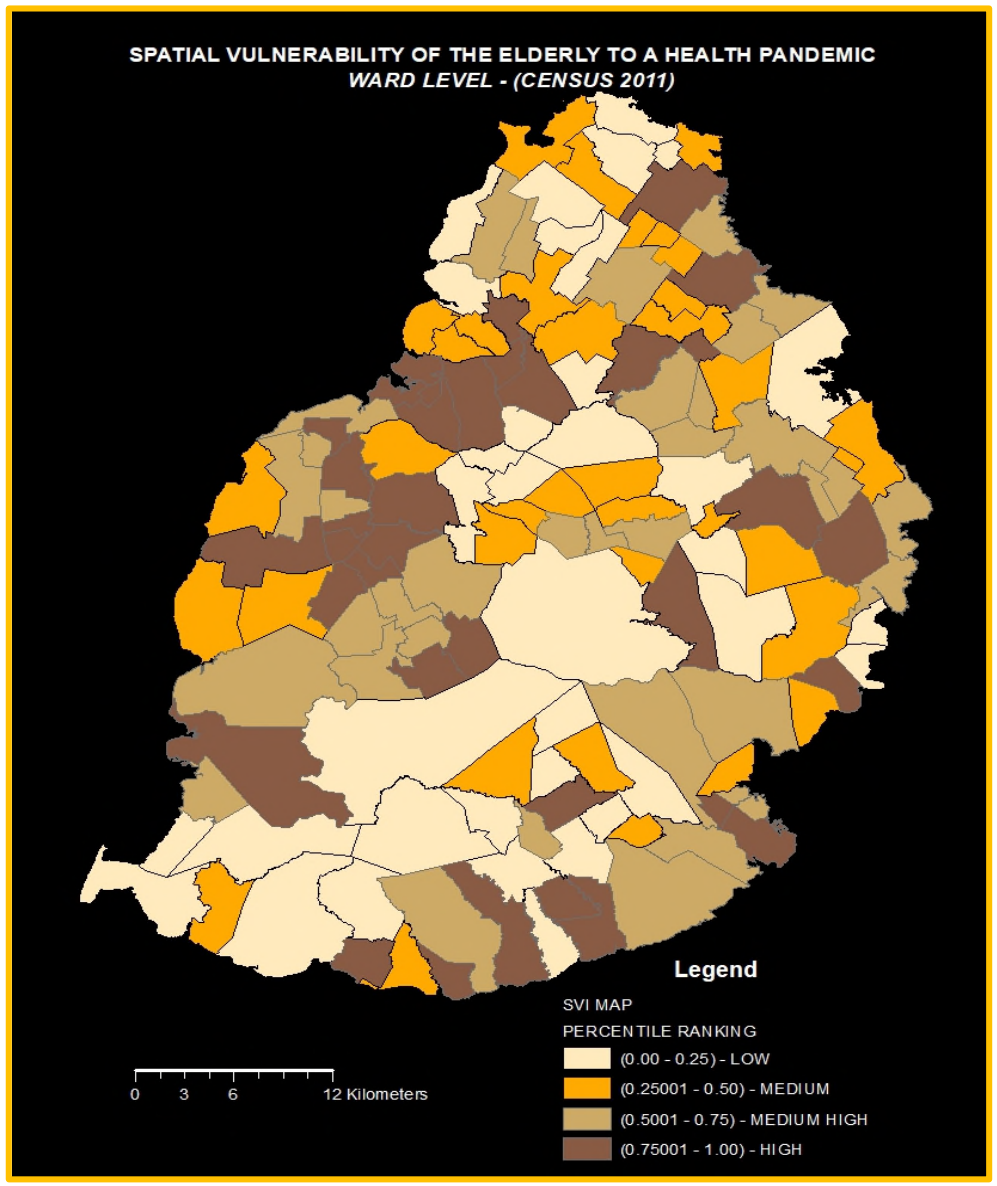
SVI MAPS

- ✓ COMBINE VALUES INTO SOCIAL VULNERABILITY INDEX VALUES FOR EACH SOCIAL INDICATOR
- ✓ RANK THE VALUES AND WORK OUT THE PERCENTILES
- ✓ RECLASSIFY IN 4 CATEGORIES AND DISPLAY IN GIS MAPS

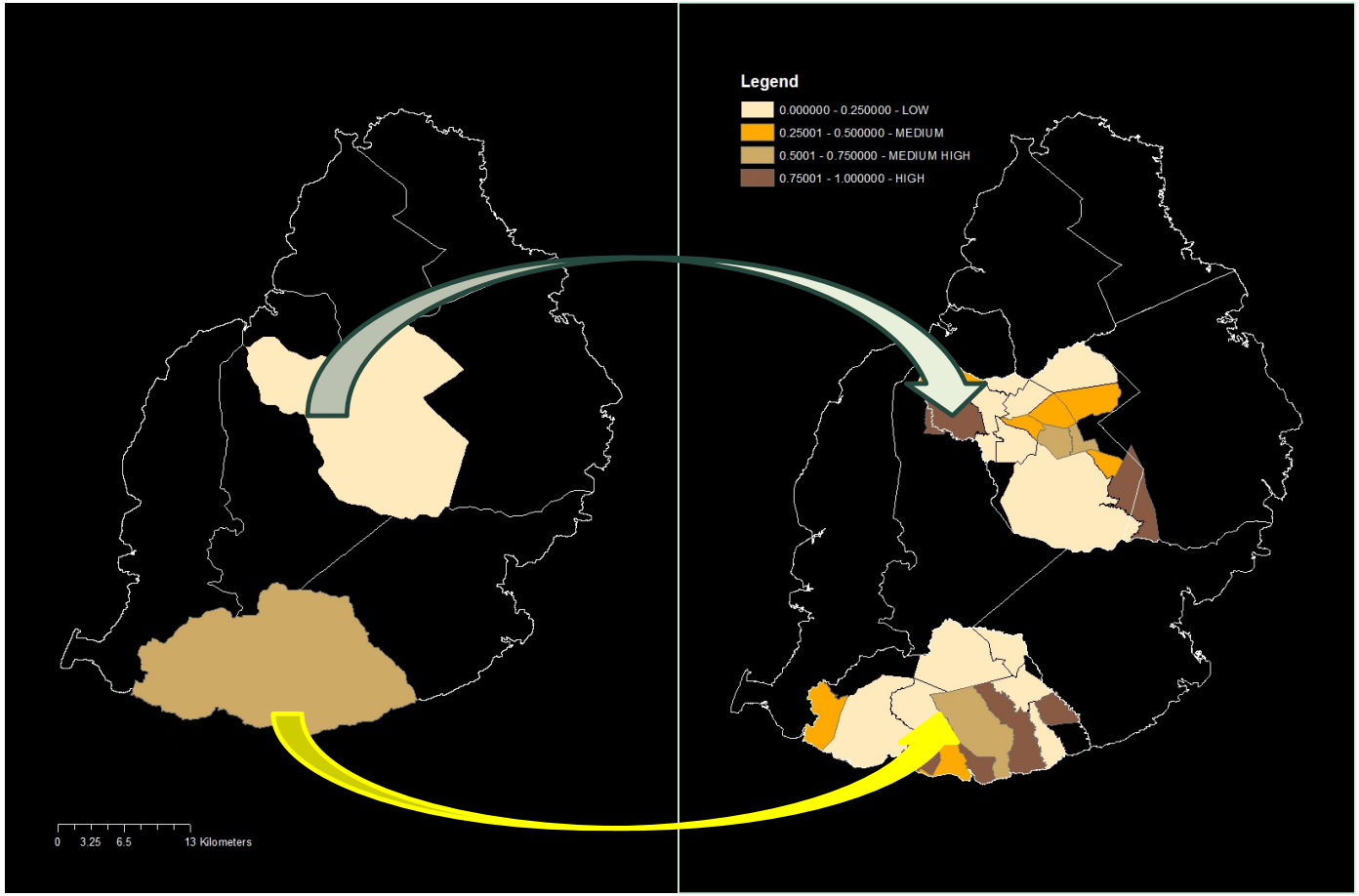
PROCESS FOR DEVELOPING SVI MAPS




SPATIAL VULNERABILITY OF THE ELDERLY TO A HEALTH PANDEMIC
DISTRICT LEVEL - (CENSUS 2011)
Legend
SVI MAP
PERCENTILE RANKING
(0-0.25) - LOW
(0.25001-0.5) - MEDIUM
(0.5001-0.75) - MEDIUM HIGH
(0.75001-1.00) - HIGH
0 3.25 6.5 13 Kilometers


SPATIAL VULNERABILITY OF THE ELDERLY TO A HEALTH PANDEMIC
WARD LEVEL - (CENSUS 2011)
Legend
SVI MAP
PERCENTILE RANKING
(0.00 - 0.25) - LOW
(0.25001 - 0.50) - MEDIUM
(0.5001 - 0.75) - MEDIUM HIGH
(0.75001 - 1.00) - HIGH
0 3 6 12 Kilometers

SVI MAP – COMPARATIVE STUDY (SVI ANALYSIS AT DISTRICT & AT WARD LEVELS)



At district levels there can be enough facilities

At community level, not everybody has the means to access all facilities.

THE CHALLENGE FOR THE ENGINEERING COMMUNITY

- Is the current developmental model of cities addressing the needs of the elderly, the needs of ageing societies, and the needs for the vulnerable groups?
- Are concerned authorities able to locate vulnerable groups quickly to provide support?
- Is the health care system adapted to reaching those with limited mobility?
- **Full lock down periods during the health pandemic – What have we learnt?**

RE-ENGINEERING SUPPORT SYSTEMS IN CITIES

- IT & Connectivity – Resilient systems
- Business which address the needs of the most vulnerable groups of the society (Ebusiness for food supplies, cooking gas supplies)
- Heath care that reach out to the vulnerable groups
- A more adapted transport system – easier access specially for those with reduced mobility
- The most vulnerable groups at the core of design of cities
- **More Energy Intensive – hence more R&D on renewable energy systems**

CONCLUDING REMAKS

- LEAVE NO ONE BEHIND
- MANY COUNTRIES EXPERIENCING AGEING POPULATION
- MORE EFFICIENT SYSTEMS NEEDED TO REDUCE ADDITIONAL STRESS ON LIMITED RESOURCES
- MAINSTREAMING CLIMATE CHANGE IMPACTS FOR RESILIENT INFRASTRUCTURES & FOR THE WELFARE OF THE COMMUNITY

RESEARCH TEAM

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Thanking you for your attenion