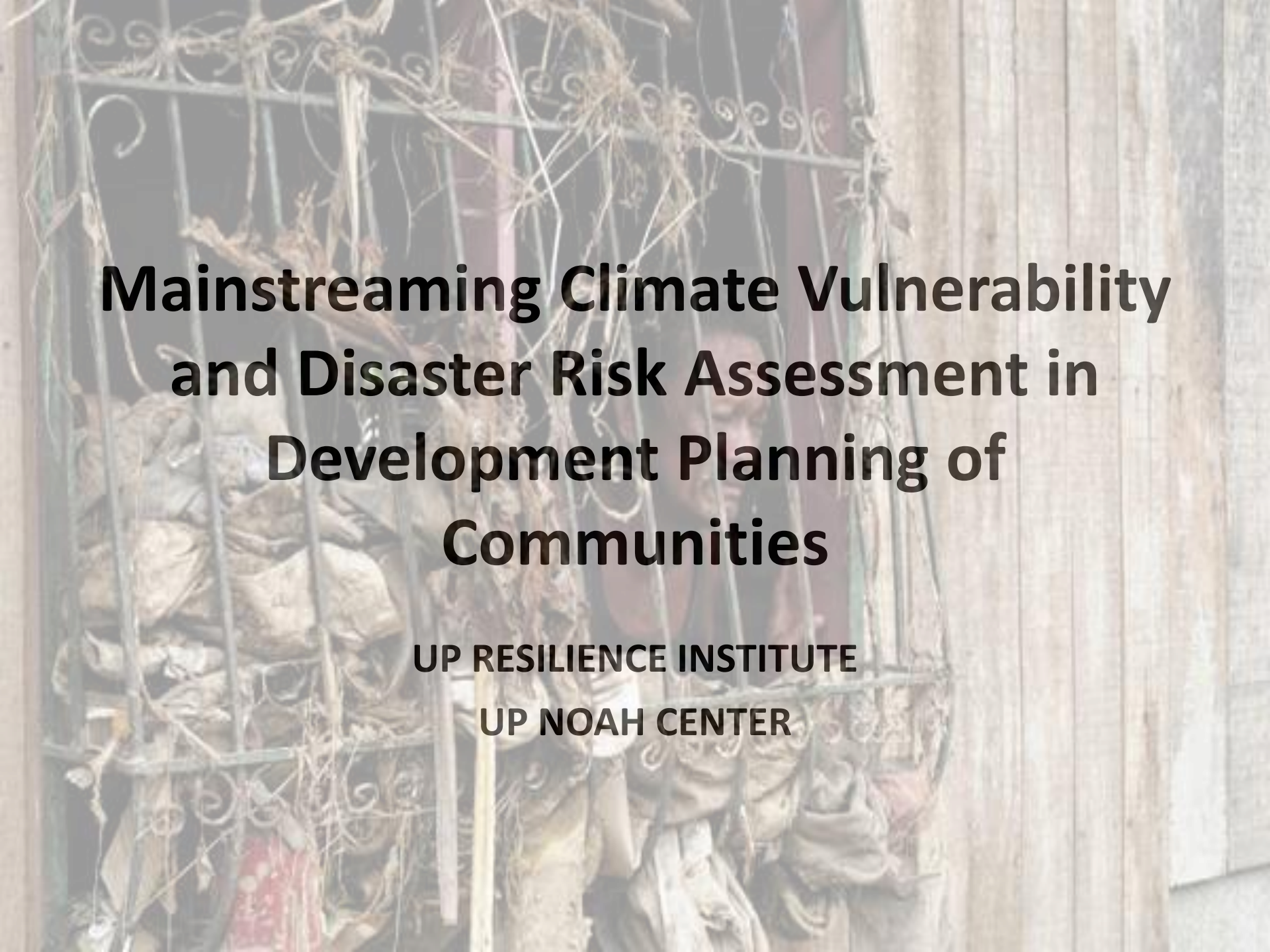


Mainstreaming Climate Vulnerability and Disaster Risk Assessment in Development Planning of Communities

UP RESILIENCE INSTITUTE

UP NOAH CENTER

Mainstreaming into local development plans

- Integration of DRR-CCA
- Cause to join the scientific approach and the best practices into the development planning process

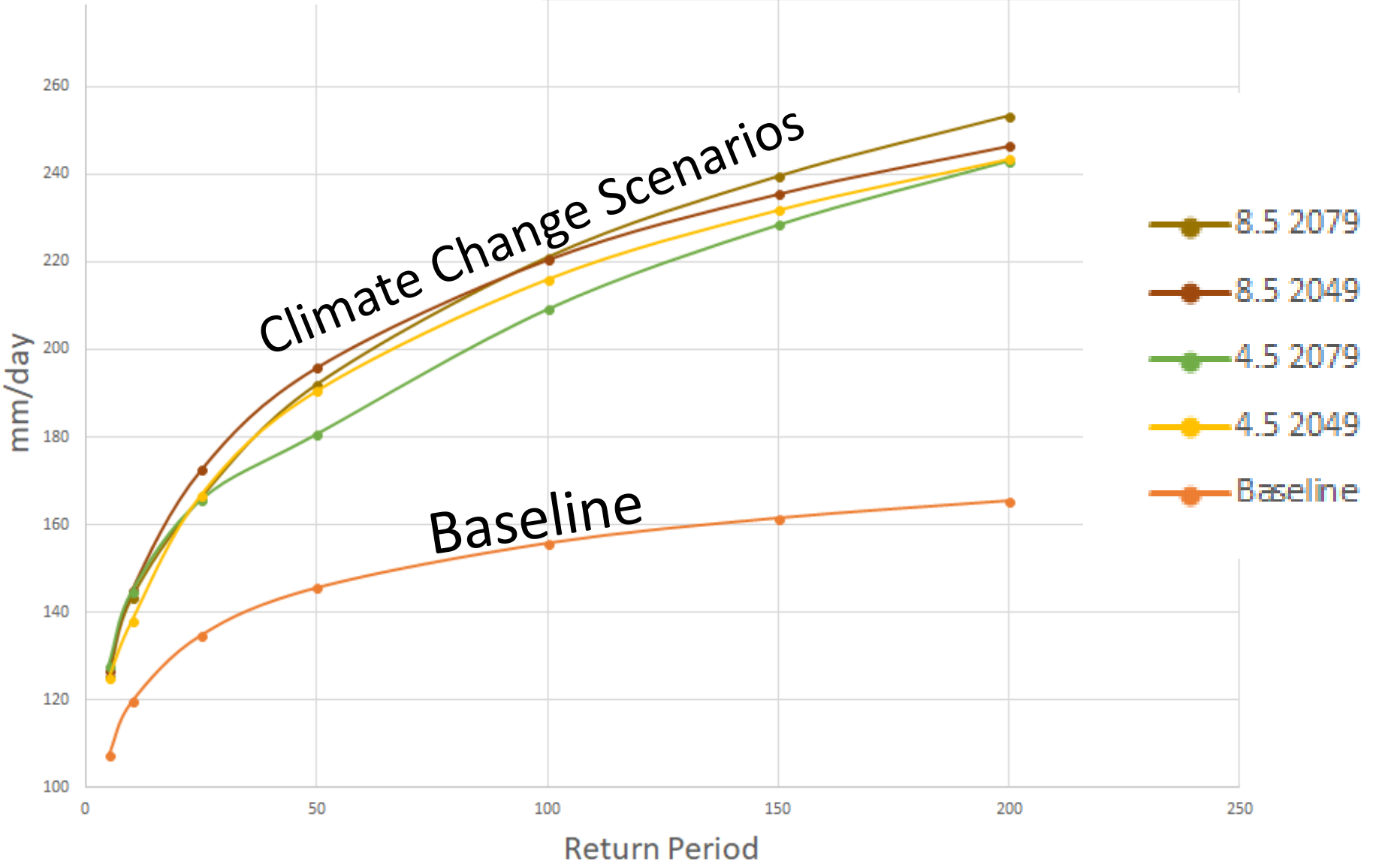
“Disasters are manifestations of unresolved development problems” (Hagman, 1984)

Disasters are thus **outcome-based indicators** of a skewed, unsustainable development paradigm based on unlimited growth, inequality and overconsumption.

DRR-CCA

- Disaster Risk Reduction (DRR) – Reduce the damage caused by the impacts of natural hazards
- Climate Change Adaptation (CCA) - Actions taken to help communities and ecosystems cope with changing climate conditions. Adapt to the impacts of Climate Change to become resilient (e.g. sea-level rise, worsening floods, more landslides)

- **In both cases, we refer to the impacts of hazards**


Climate Change Scenarios
Baseline
mm/day
Return Period
100
120
140
160
180
200
220
240
260
0
50
100
150
200
250
8.5 2079
8.5 2049
4.5 2079
4.5 2049
Baseline

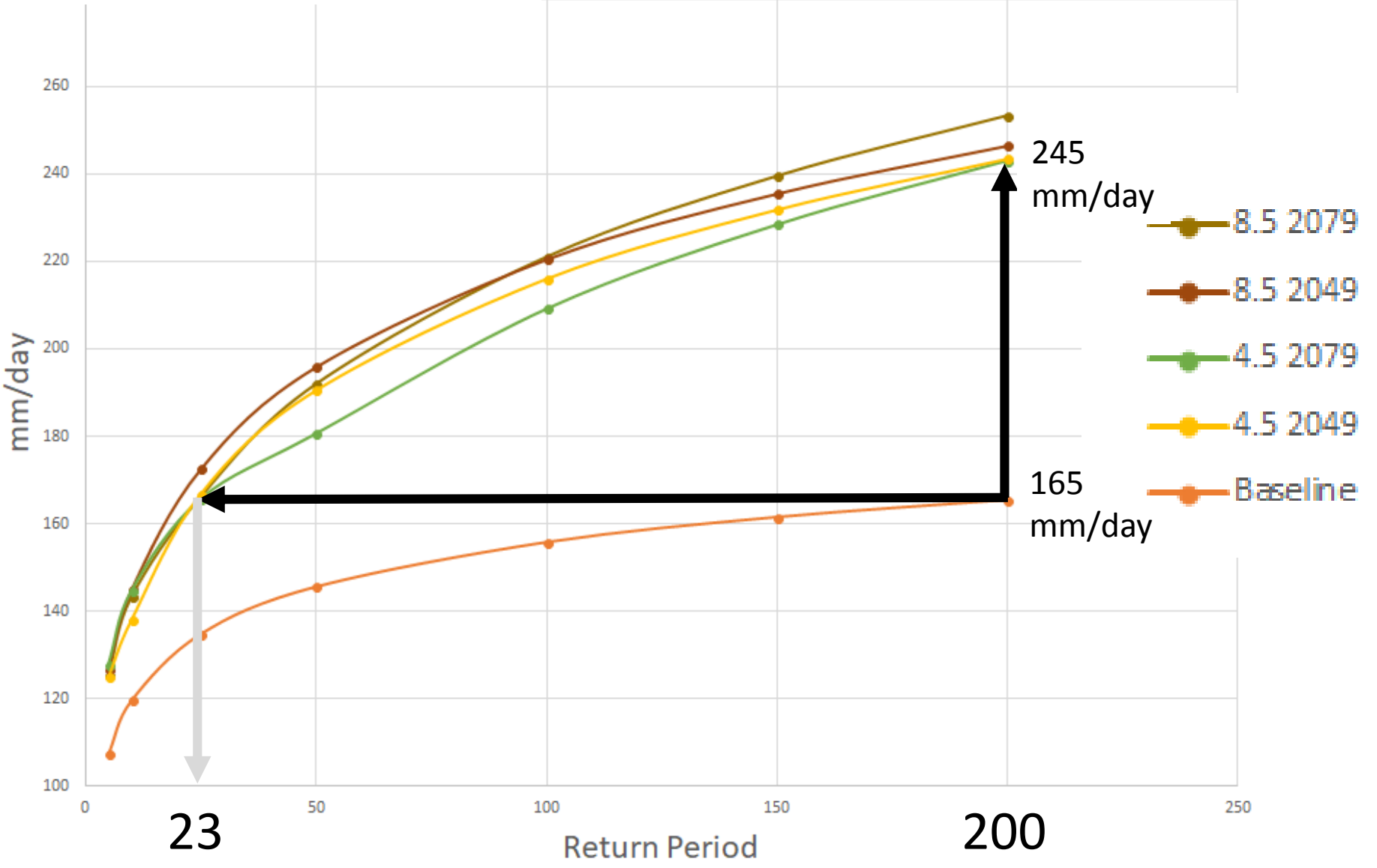
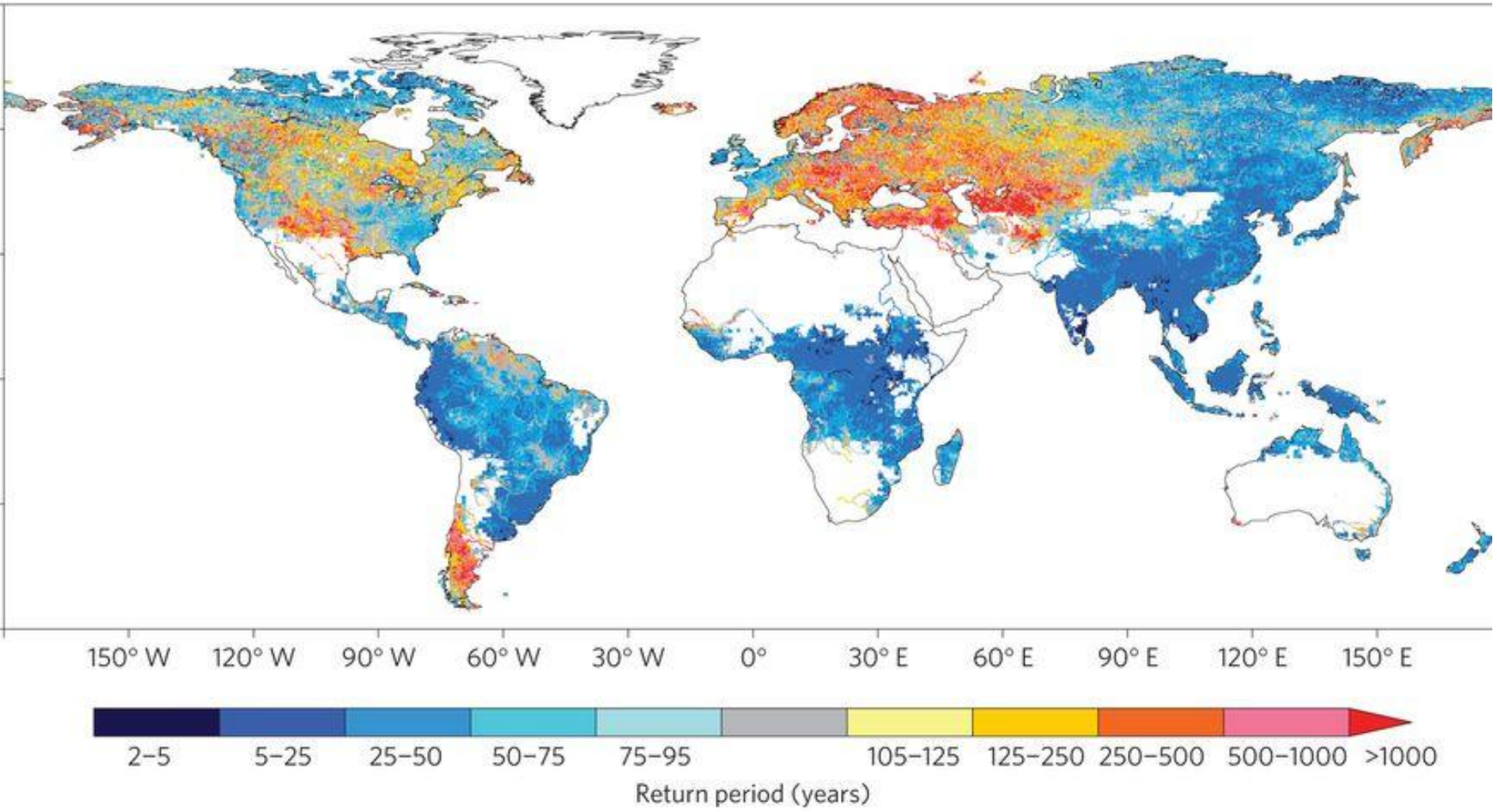
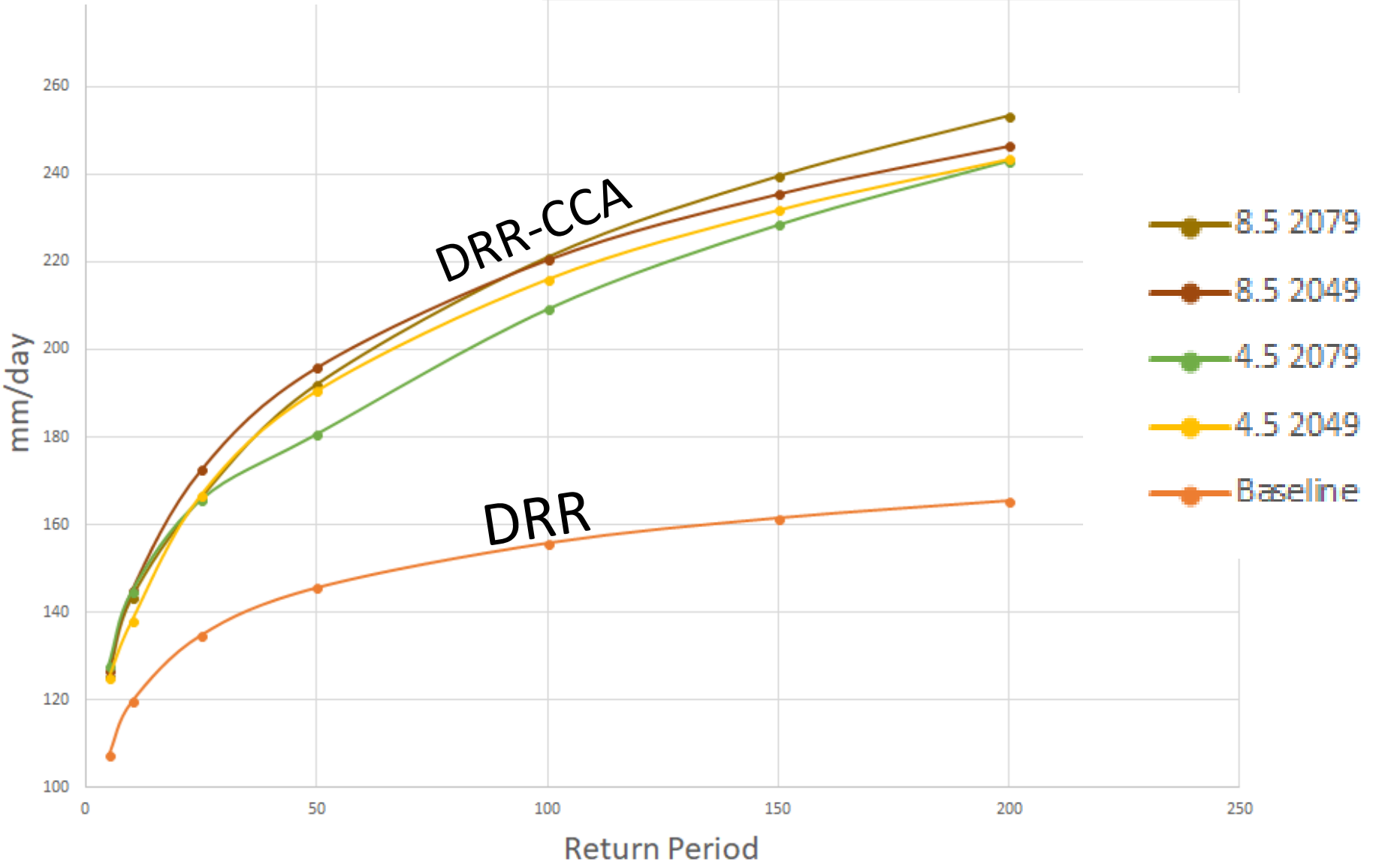

260
240
220
200
180
160
140
120
100
mm/day
0
50
100
150
250
Return Period
23
200
245
mm/day
165
mm/day
8.5 2079
8.5 2049
4.5 2079
4.5 2049
Baseline

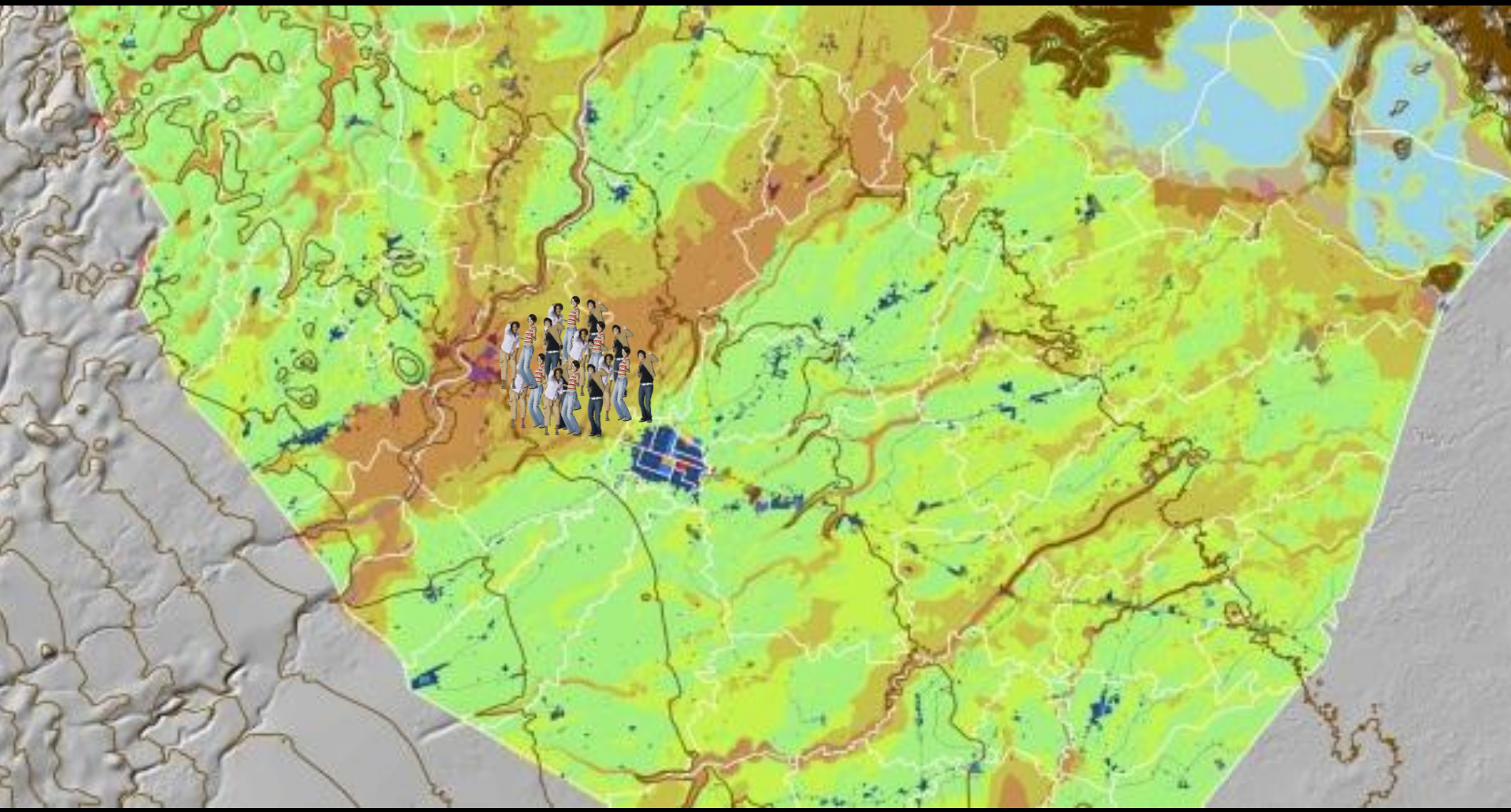

Image © 2013 DigitalGlobe
St. Ferdinand
Cathedral Compound
Legend
Flow Depth
0.00 - 0.20
0.21 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 5.00
5.01 and above

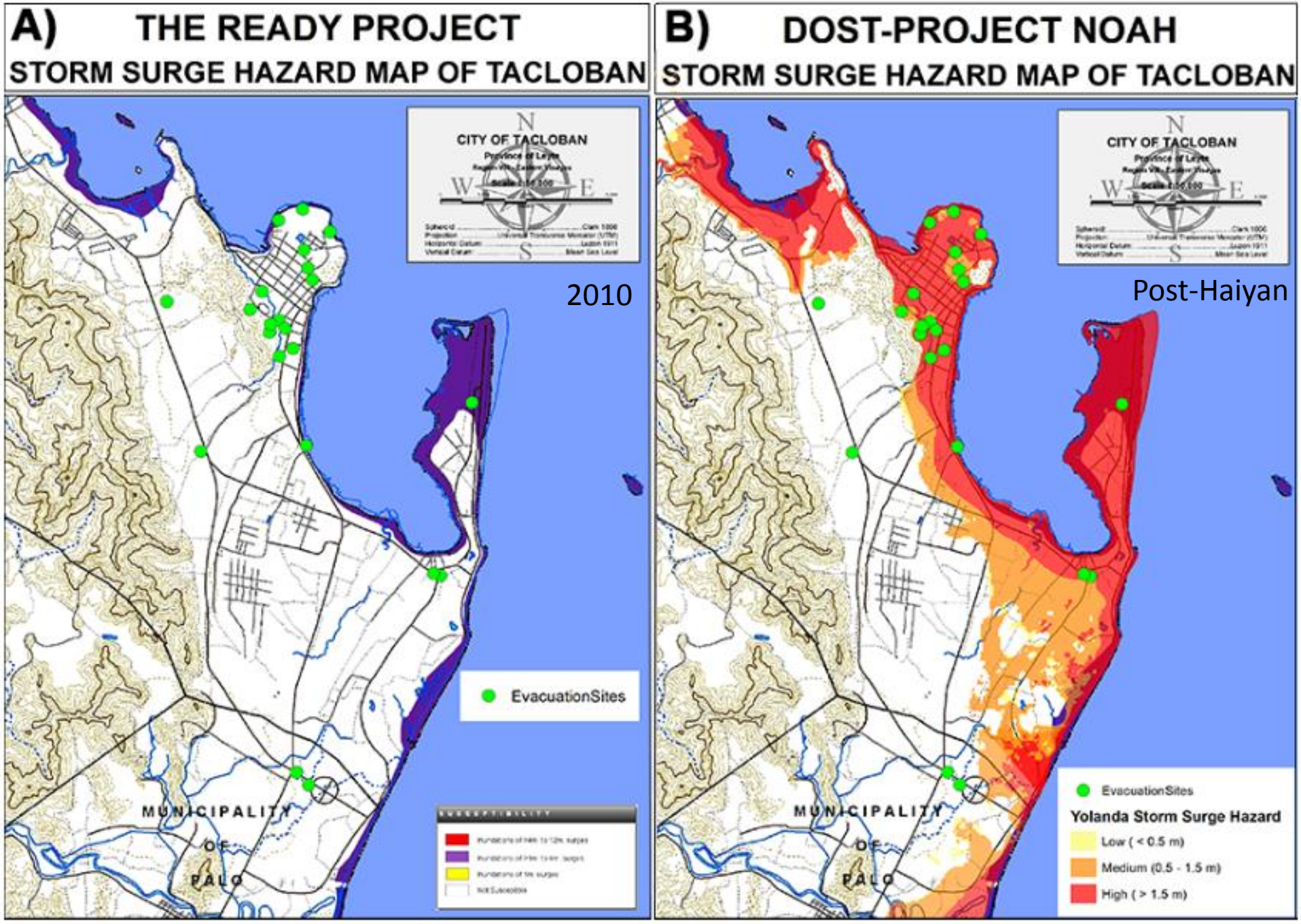


Hirabayashi, 2013 *Nature Climate Change* **volume3**, pages 816–821 (2013)


DRR-CCA
DRR
mm/day
Return Period
100
120
140
160
180
200
220
240
260
0
50
100
150
200
250
8.5 2079
8.5 2049
4.5 2079
4.5 2049
Baseline

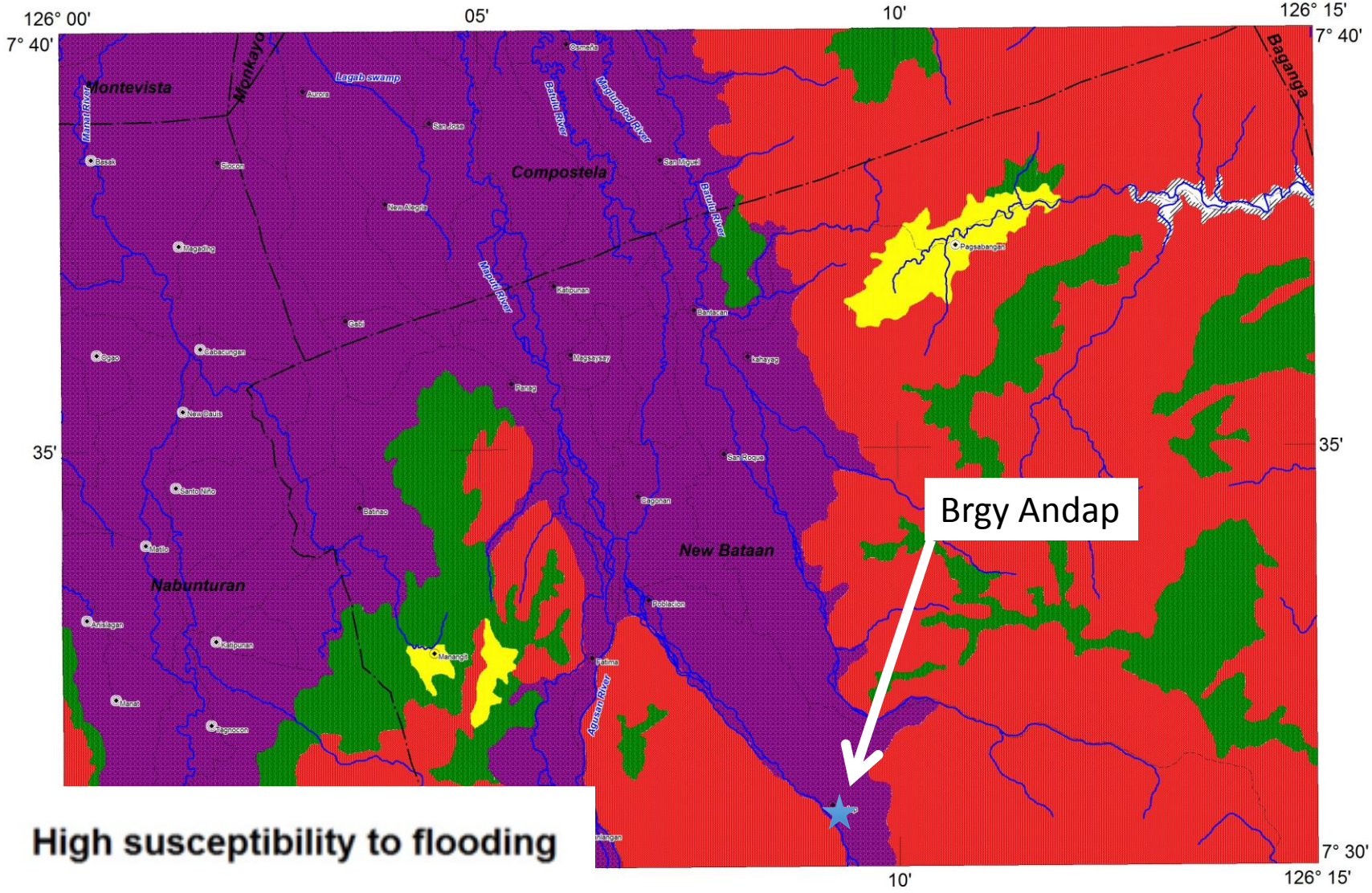
100 –year rain
return flood

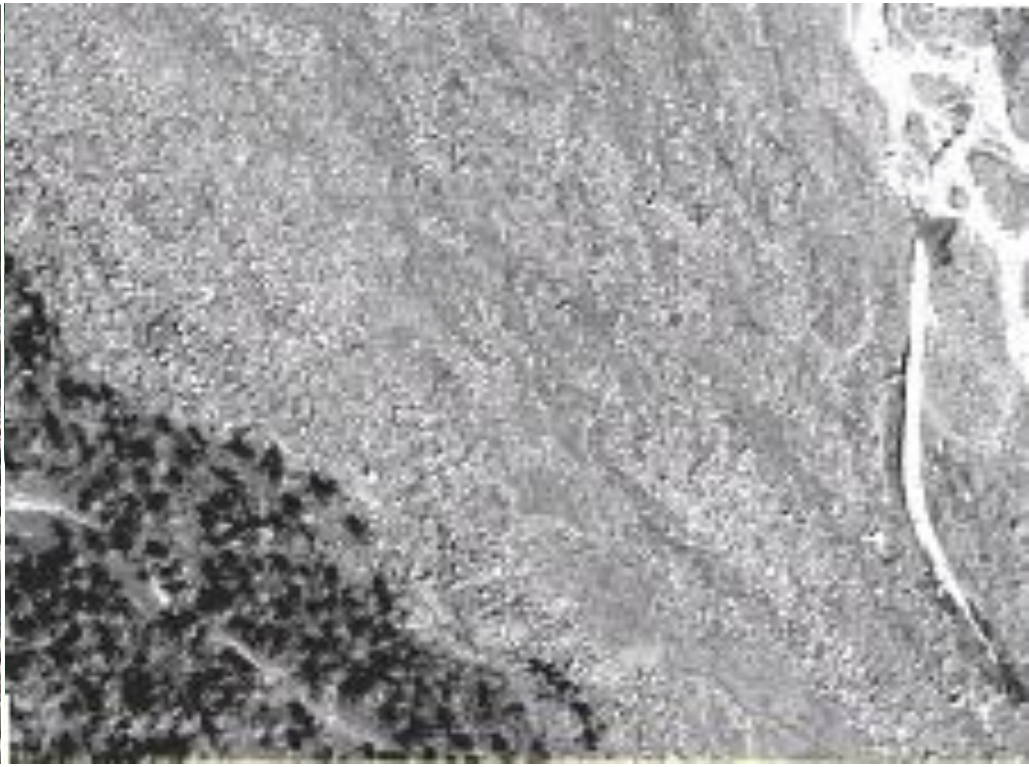



A) THE READY PROJECT
STORM SURGE HAZARD MAP OF TACLOBAN
CITY OF TACLOBAN
2010
EvacuationSites
MUNICIPALITY OF PALO
B) DOST-PROJECT NOAH
STORM SURGE HAZARD MAP OF TACLOBAN
CITY OF TACLOBAN
Post-Haiyan
EvacuationSites
Yolanda Storm Surge Hazard
Low (< 0.5 m)
Medium (0.5 - 1.5 m)
High (> 1.5 m)
MUNICIPALITY OF PALO

70 % of evacuation centers in Tacloban were hit by storm surges

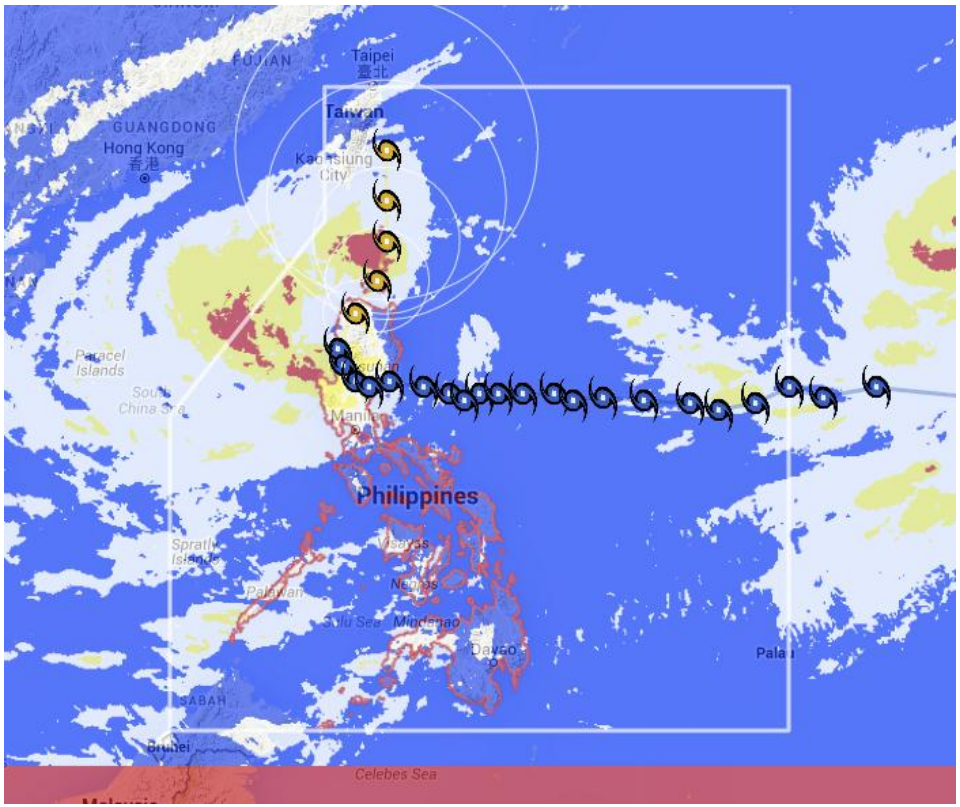
LANDSLIDE AND FLOOD SUSCEPTIBILITY MAP OF MANAT QUADRANGLE COMPOSTELA VALLEY AND DAVAO ORIENTAL PROVINCES, PHILIPPINES

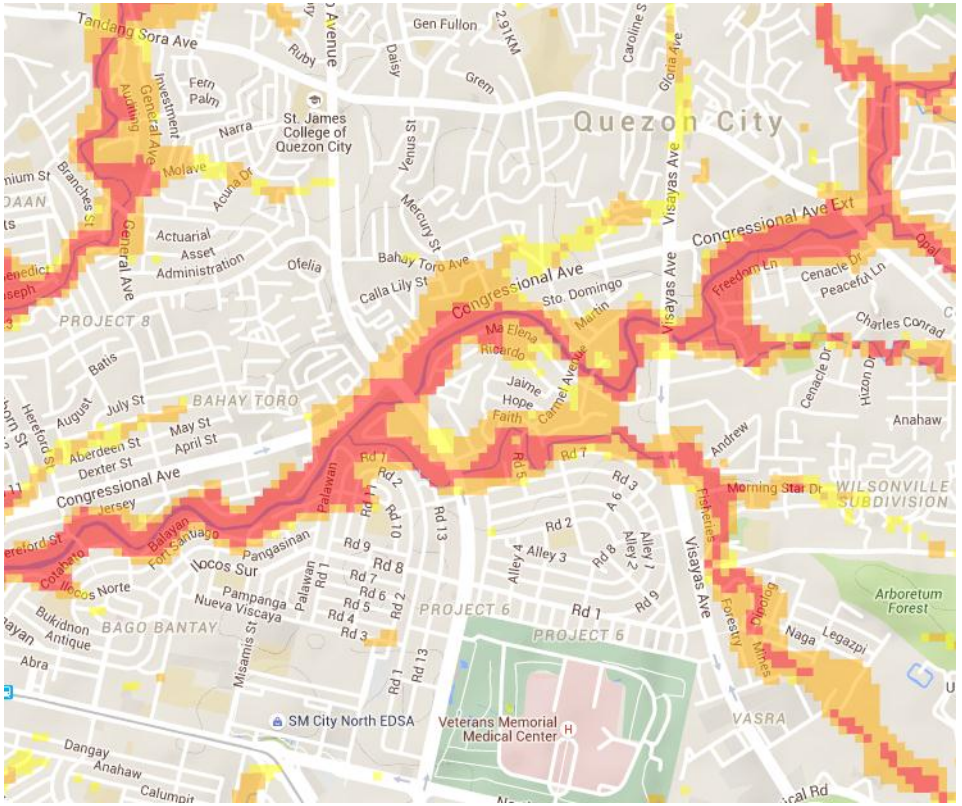




566 people were placed in an evacuation center overwhelmed by debris flows (This picture) which is a type of landslide

AVOIDING DISASTERS





WARN

Based on weather forecasts and near-real time information

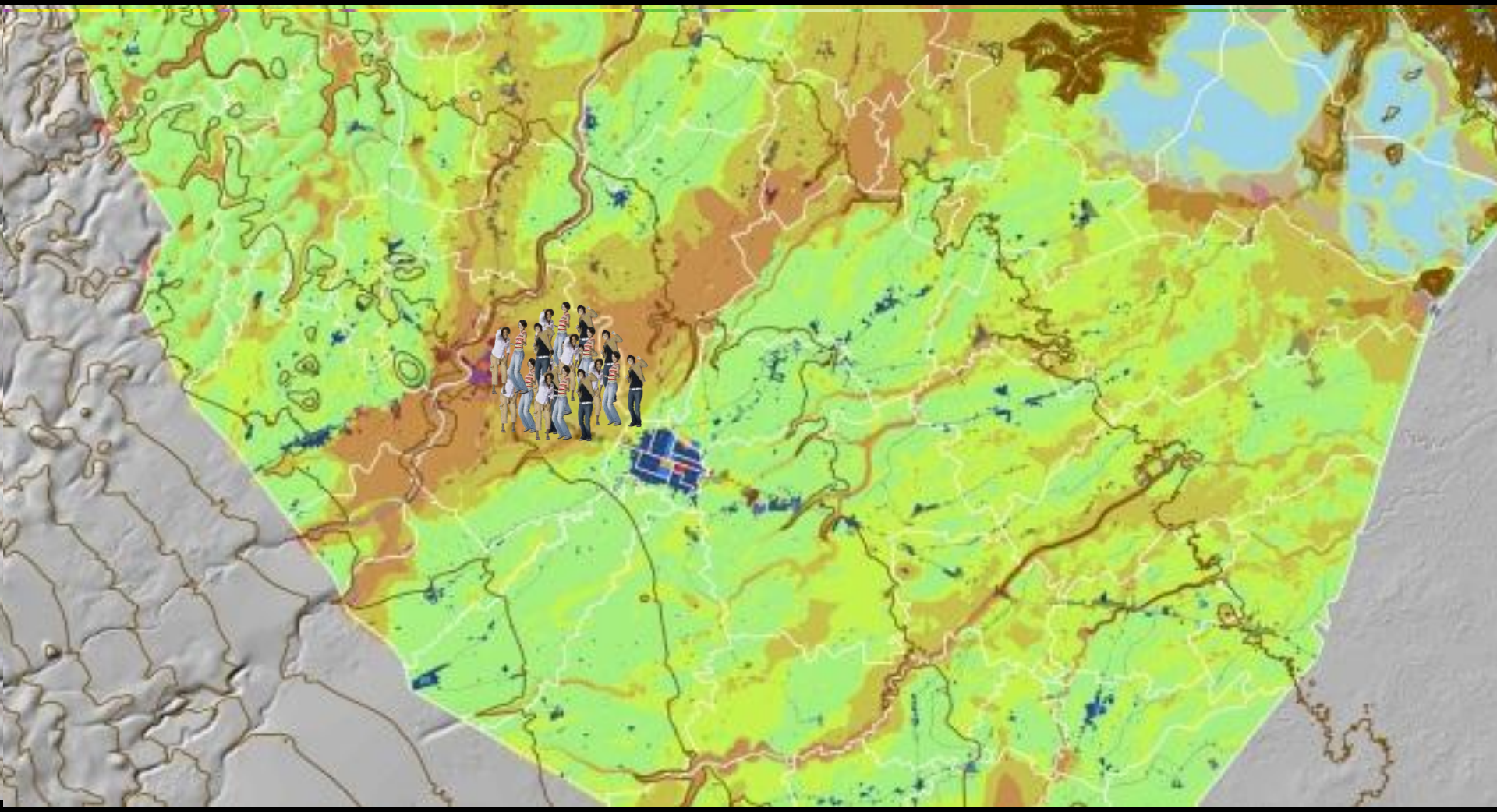
RESPOND

Based on awareness of hazards, education indivuals and access to accurate hazard maps

Example for development planning and locating evacuation centers

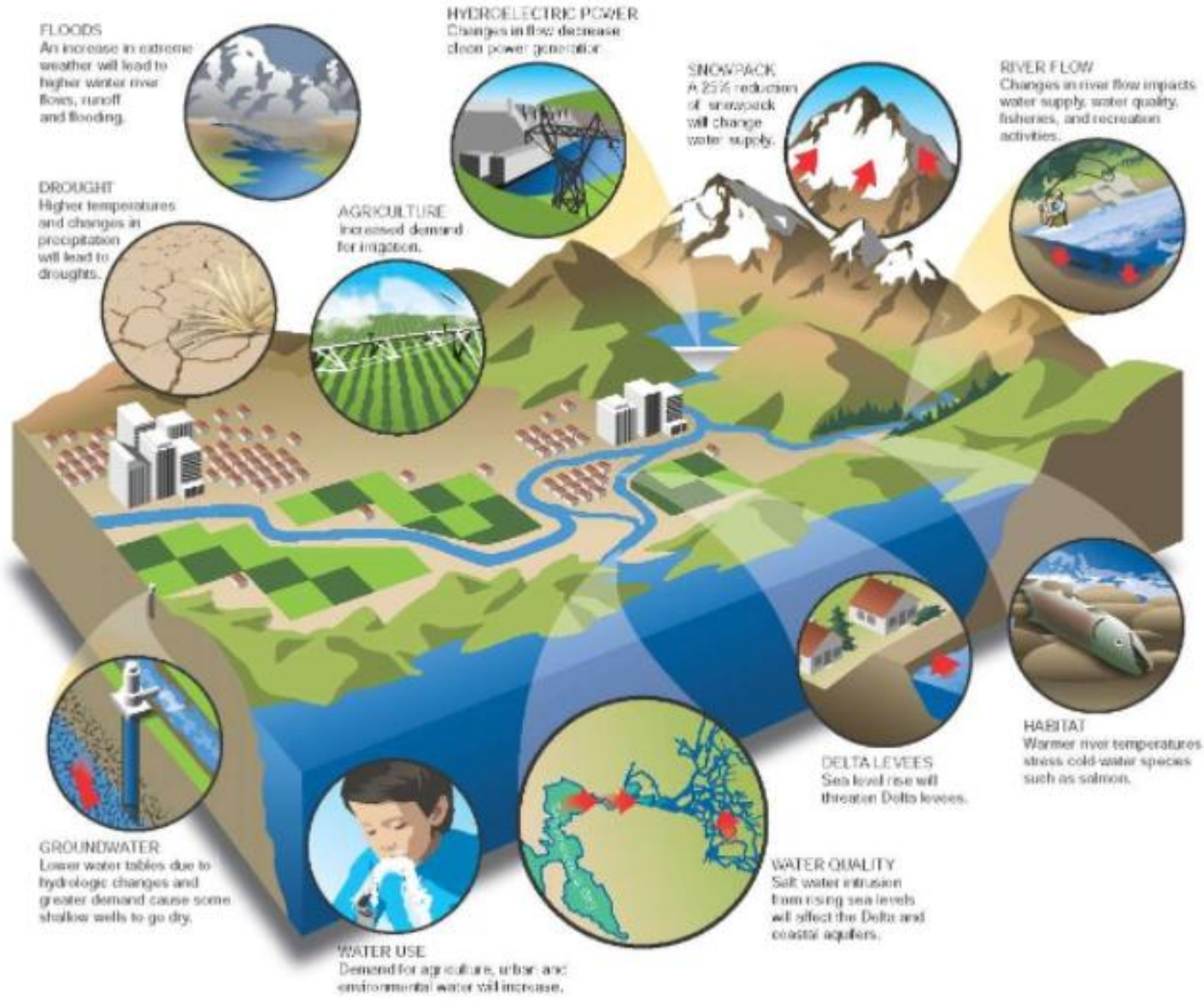
Municipality of Alang Alang, Leyte

Multi-scenario-based probabilistic hazard maps

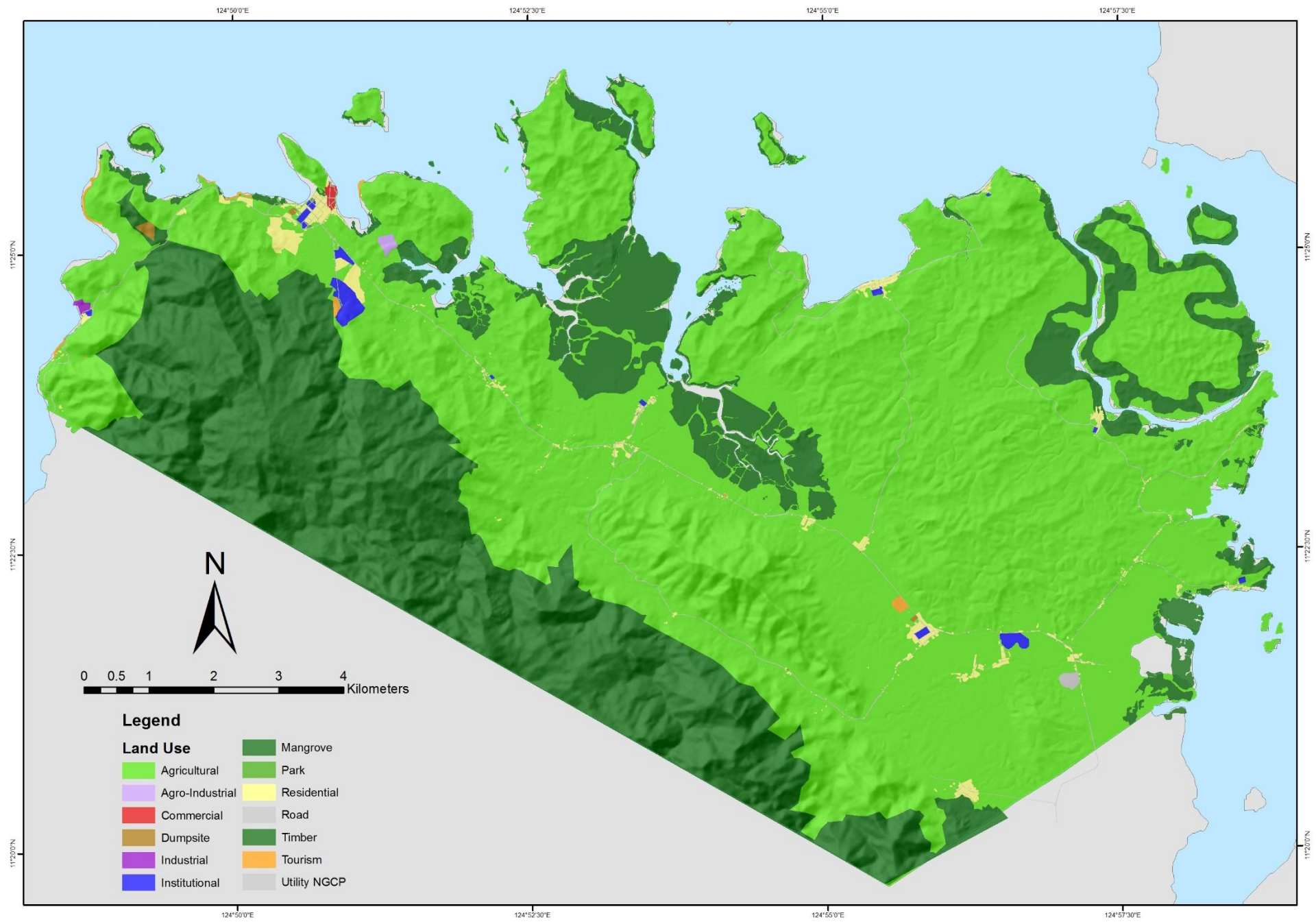


Plans cut across all sectors

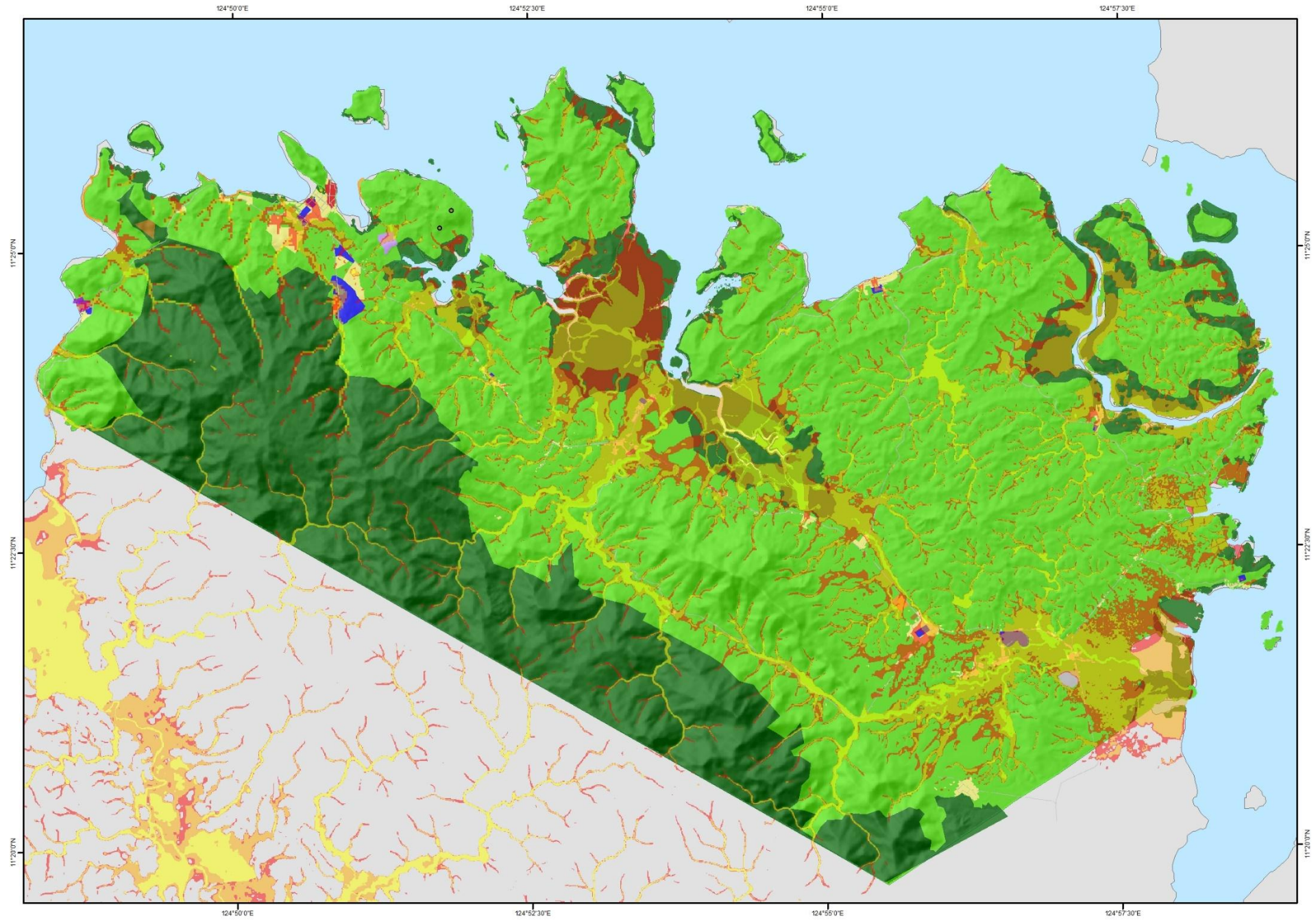
- Agriculture
- Coastal
- Water
- Health
- Forestry
- Biodiversity
- Environment
- Energy
- Education
- Tourism
- Infrastructure
- Settlement
- Mining



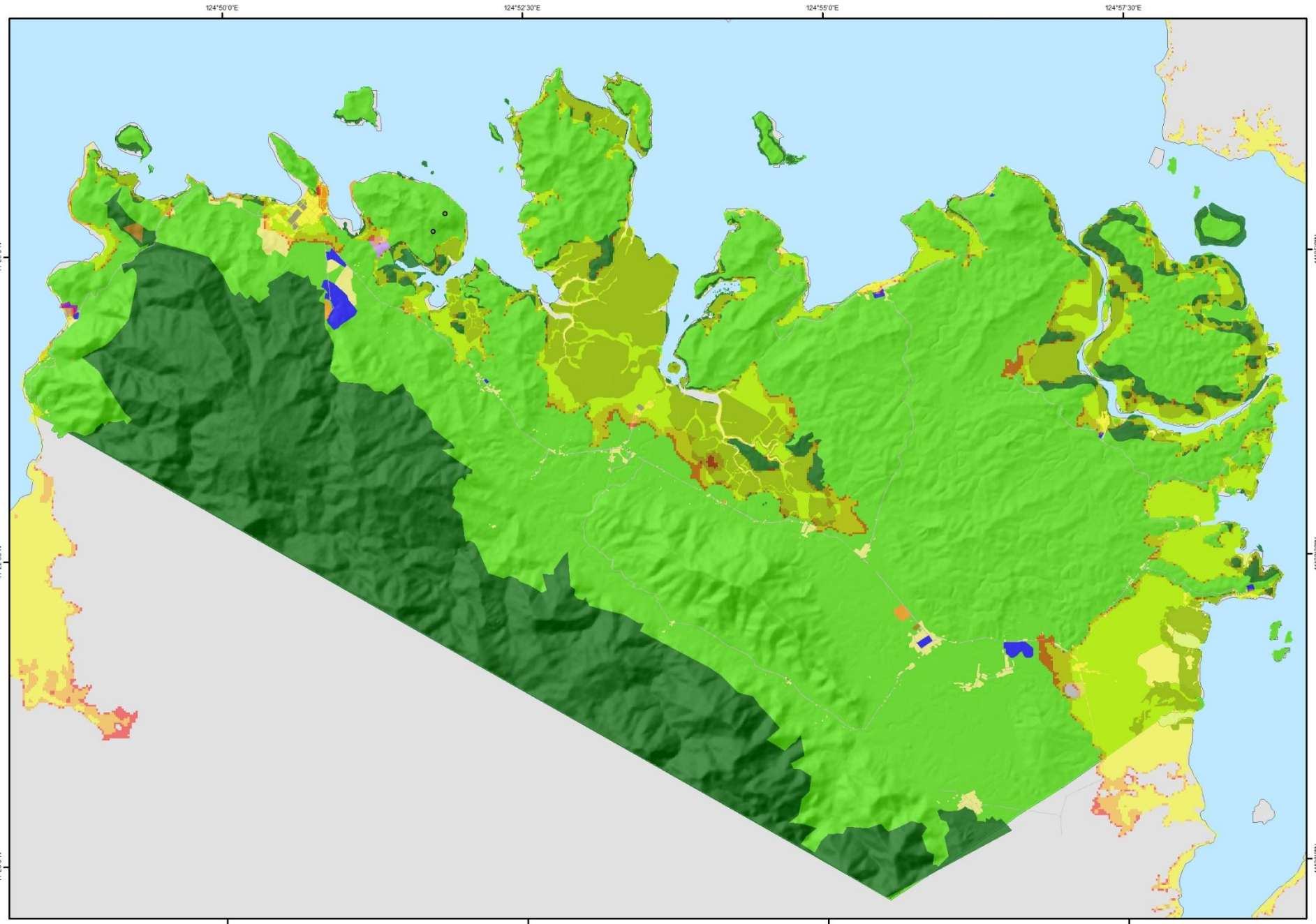
EXISTING LAND USE MAP



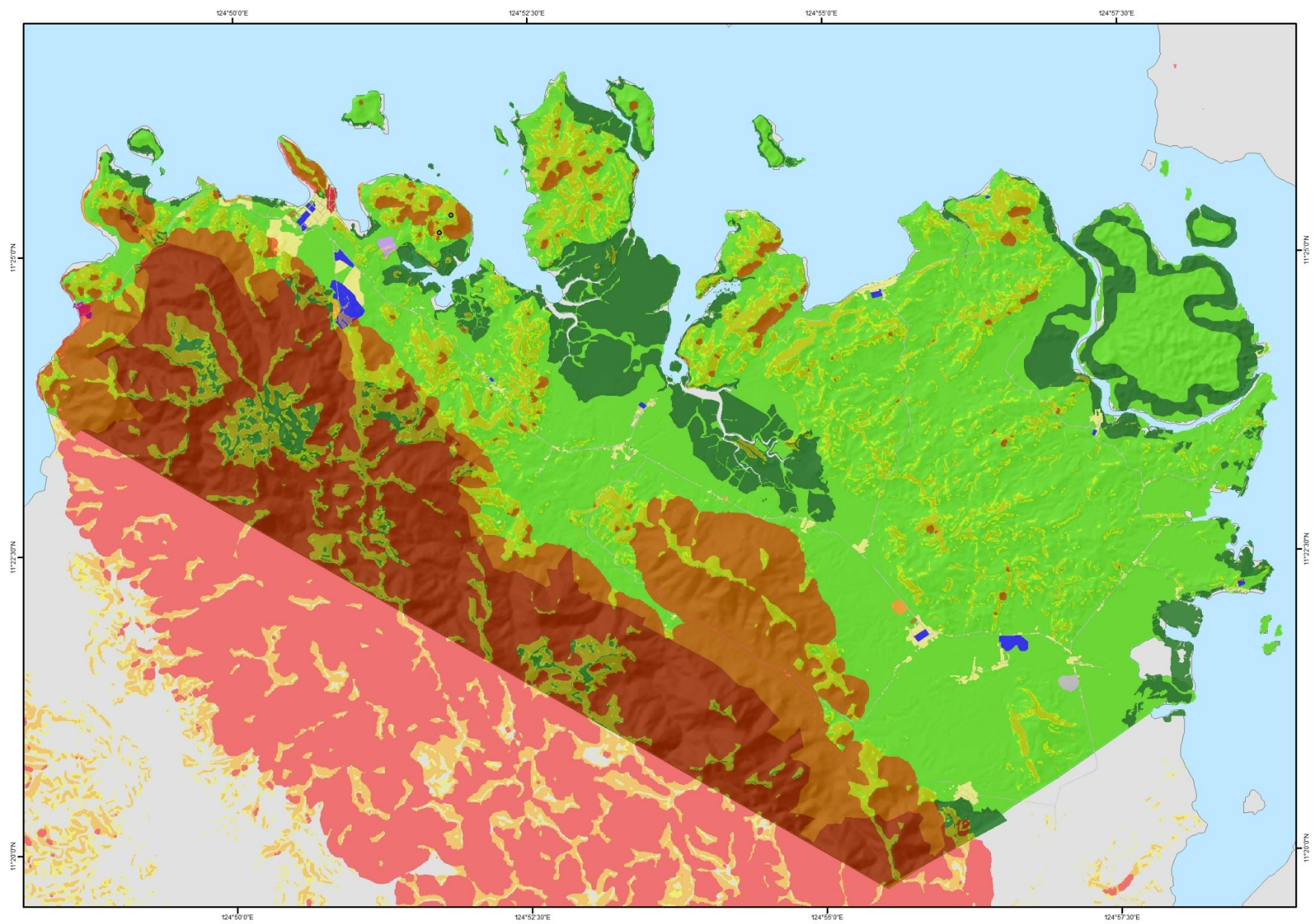
EXISTING LAND USE OVERLAID WITH FLOOD HAZARD



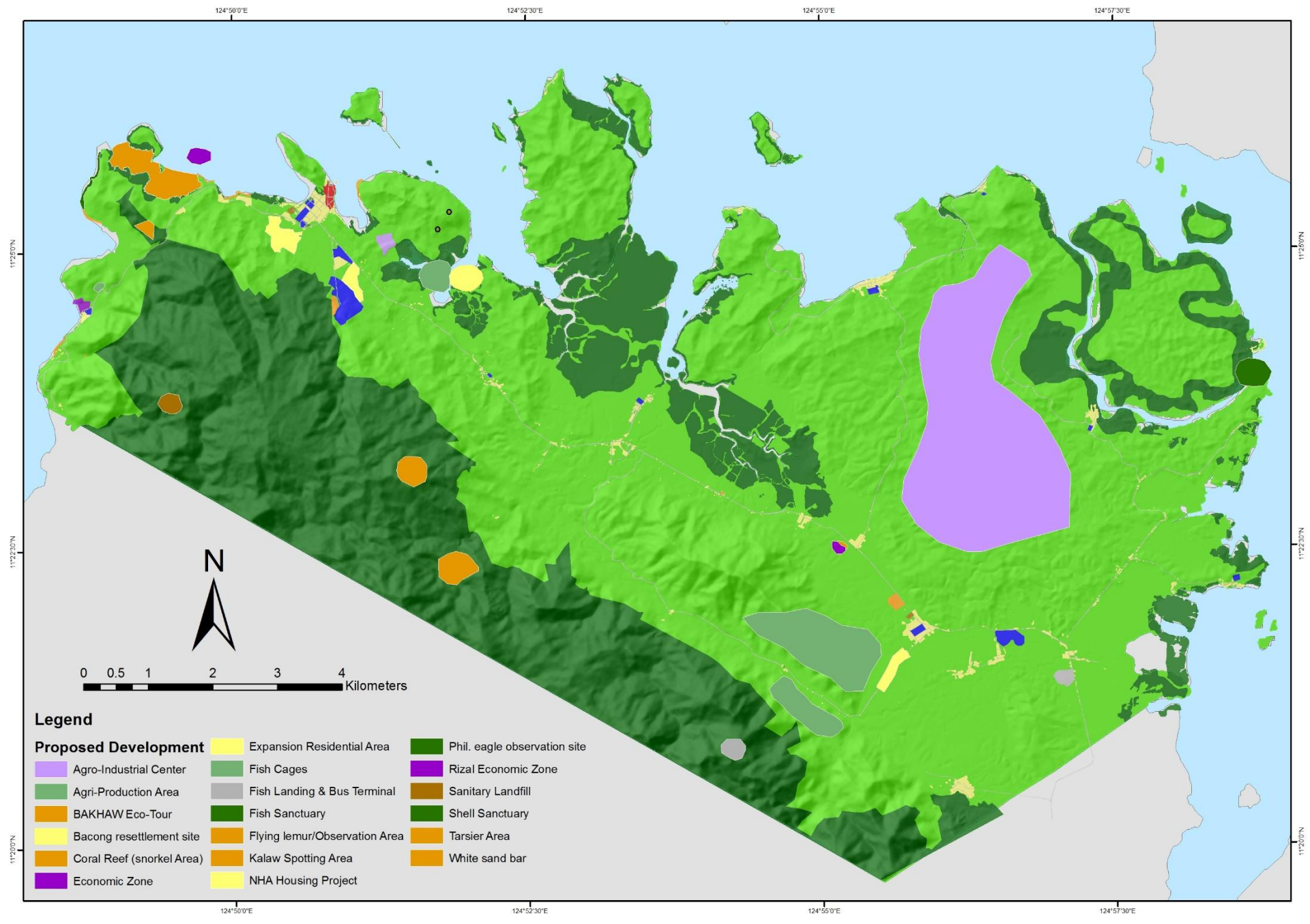
EXISTING LAND USE OVERLAID WITH STORM SURGE HAZARD



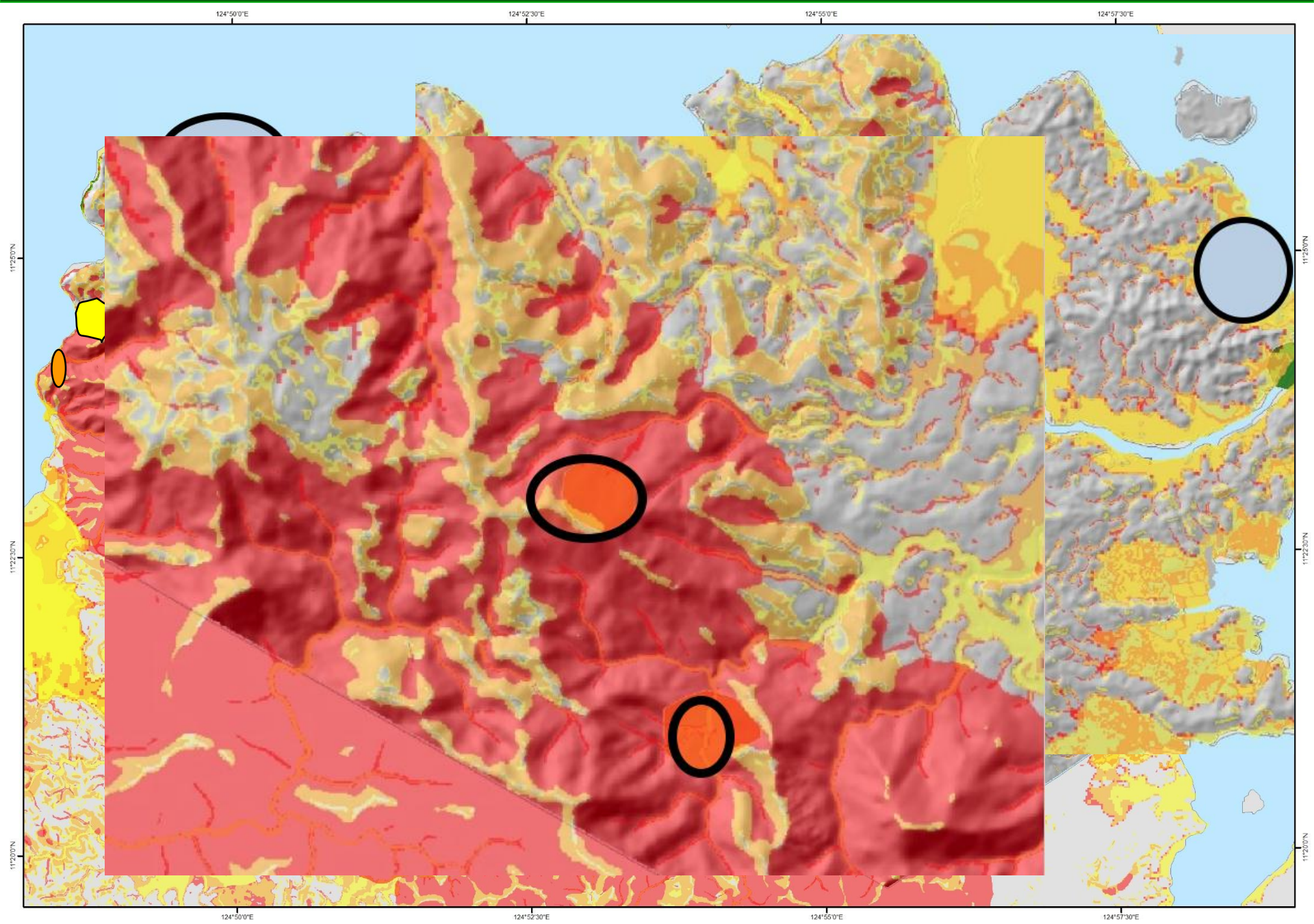
EXISTING LAND USE OVERLAID WITH LANDSLIDE HAZARD



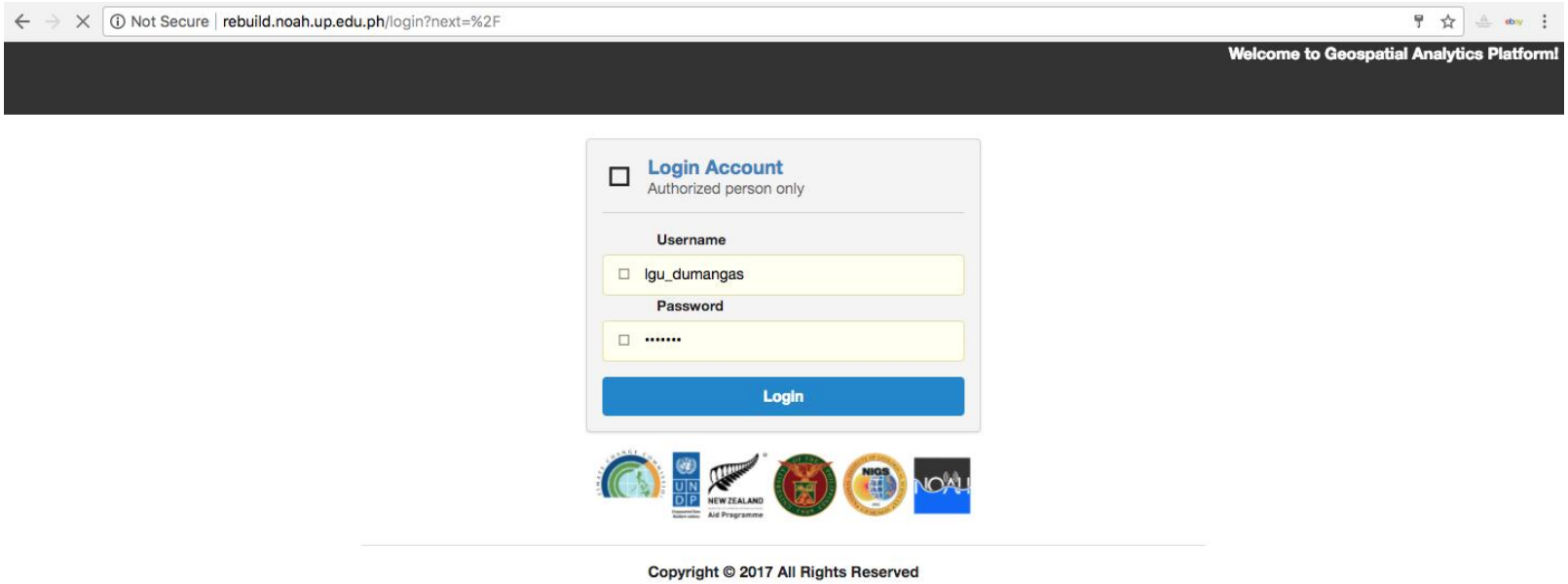
(CONCEPTUAL) PROPOSED LAND USE MAP



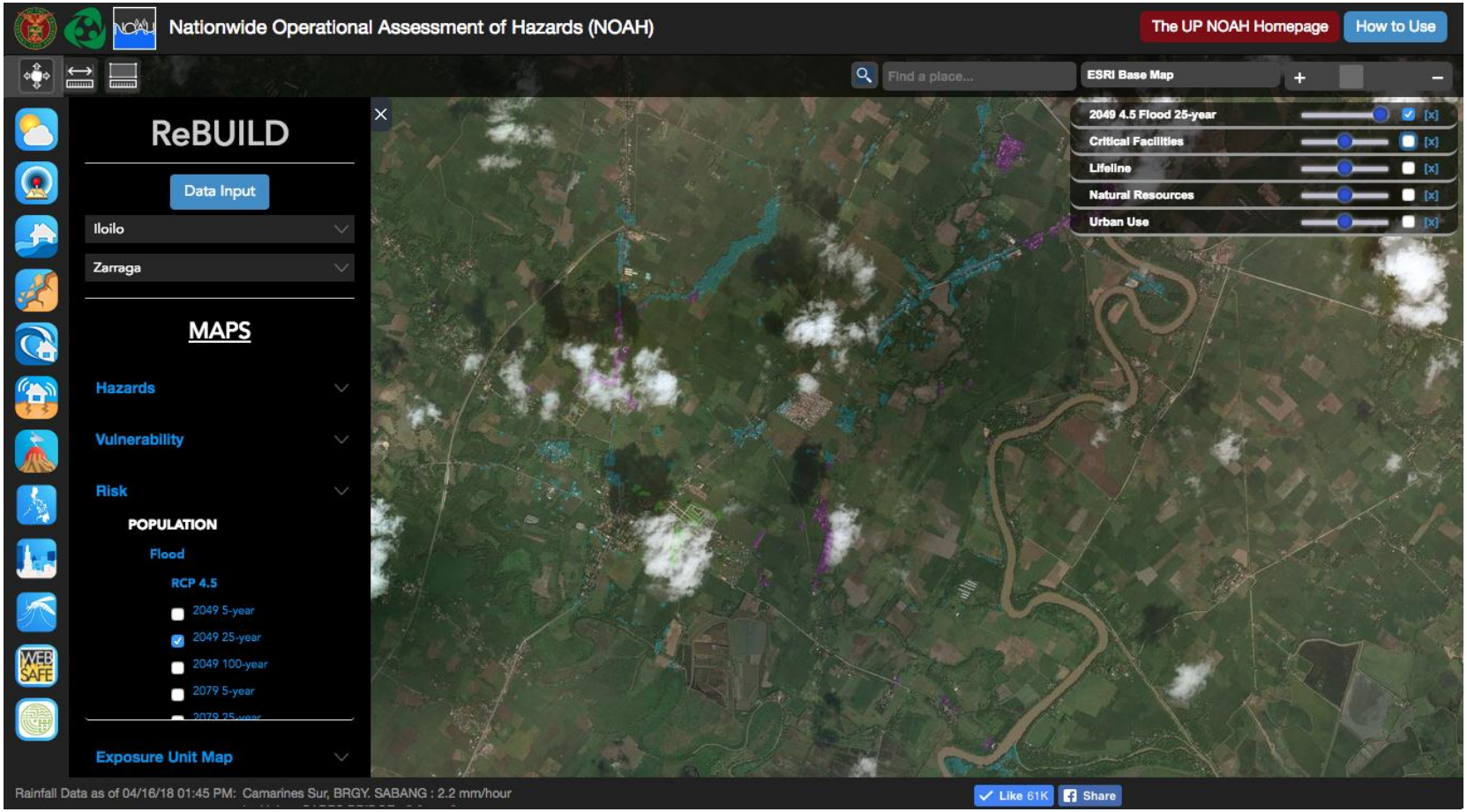
(CONCEPTUAL) PROPOSED LAND USE OVERLAID WITH MULTI-HAZARD MAP



Creation of an online analytics platform and repository for LCCAP and other development plans of the community

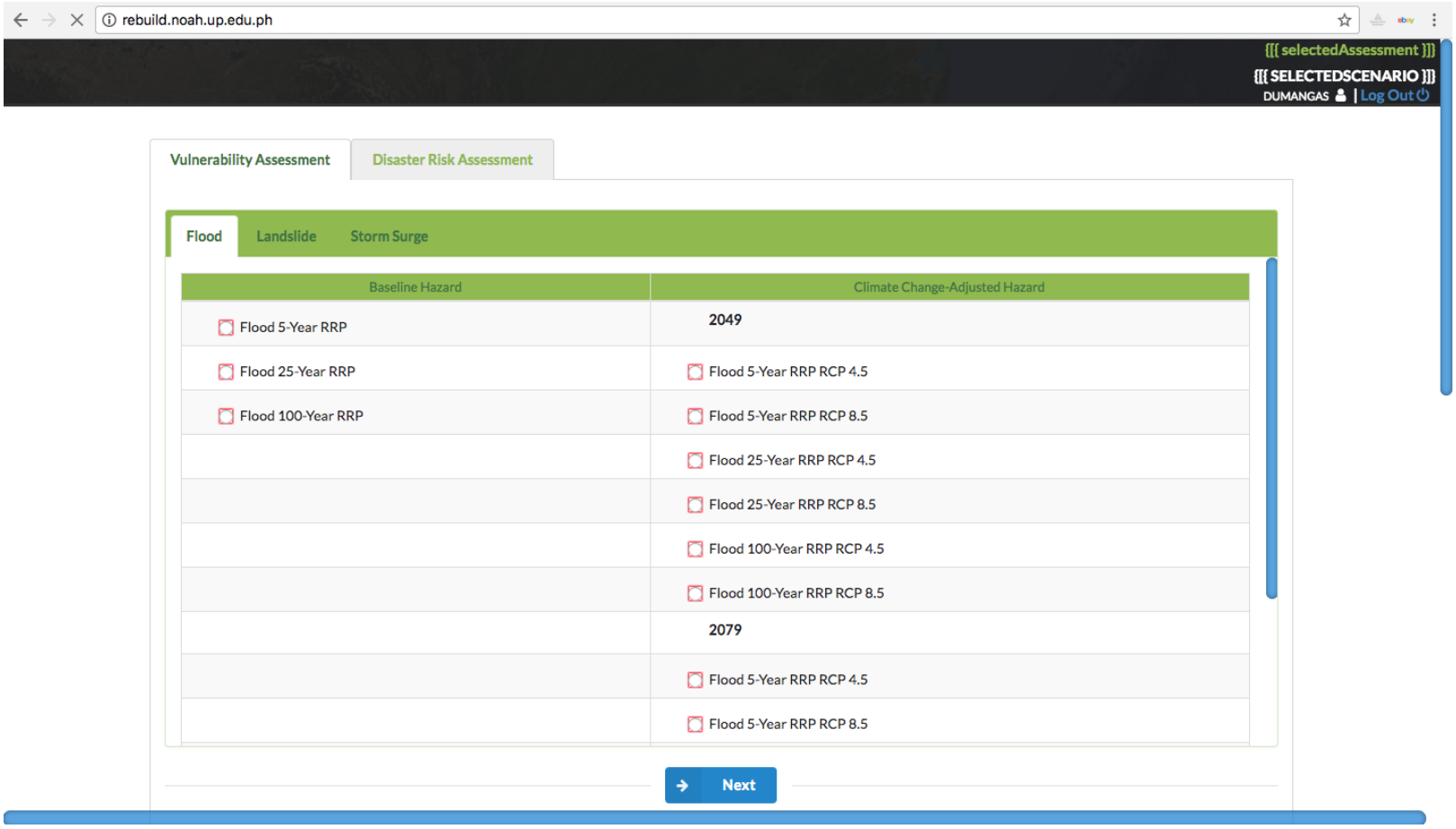


Creation of an online analytics platform and repository for LCCAP and other development plans of the community

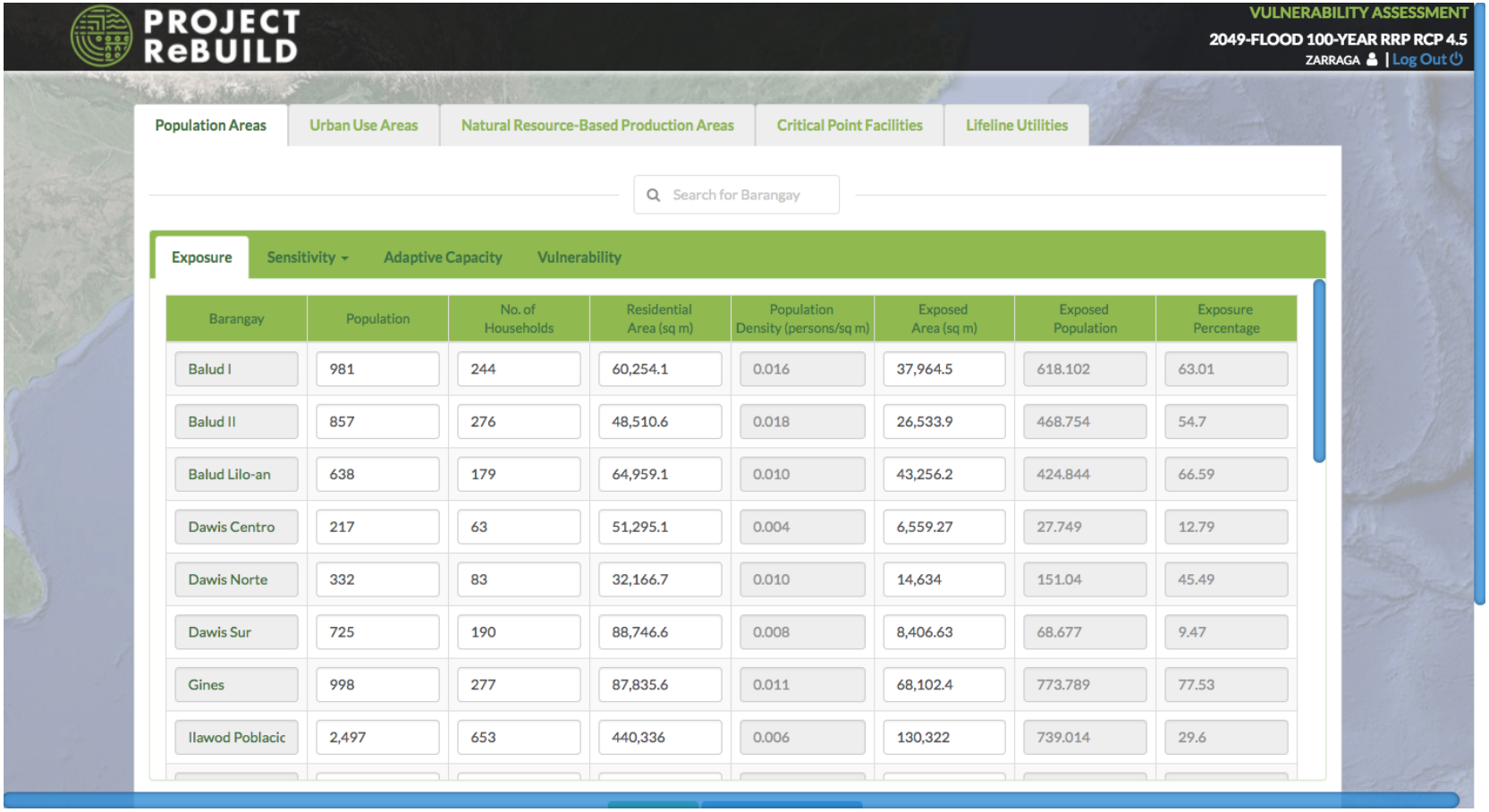


Creation of an online analytics platform and repository for LCCAP and other development plans of the community

Creation of an online analytics platform and repository for LCCAP and other development plans of the community

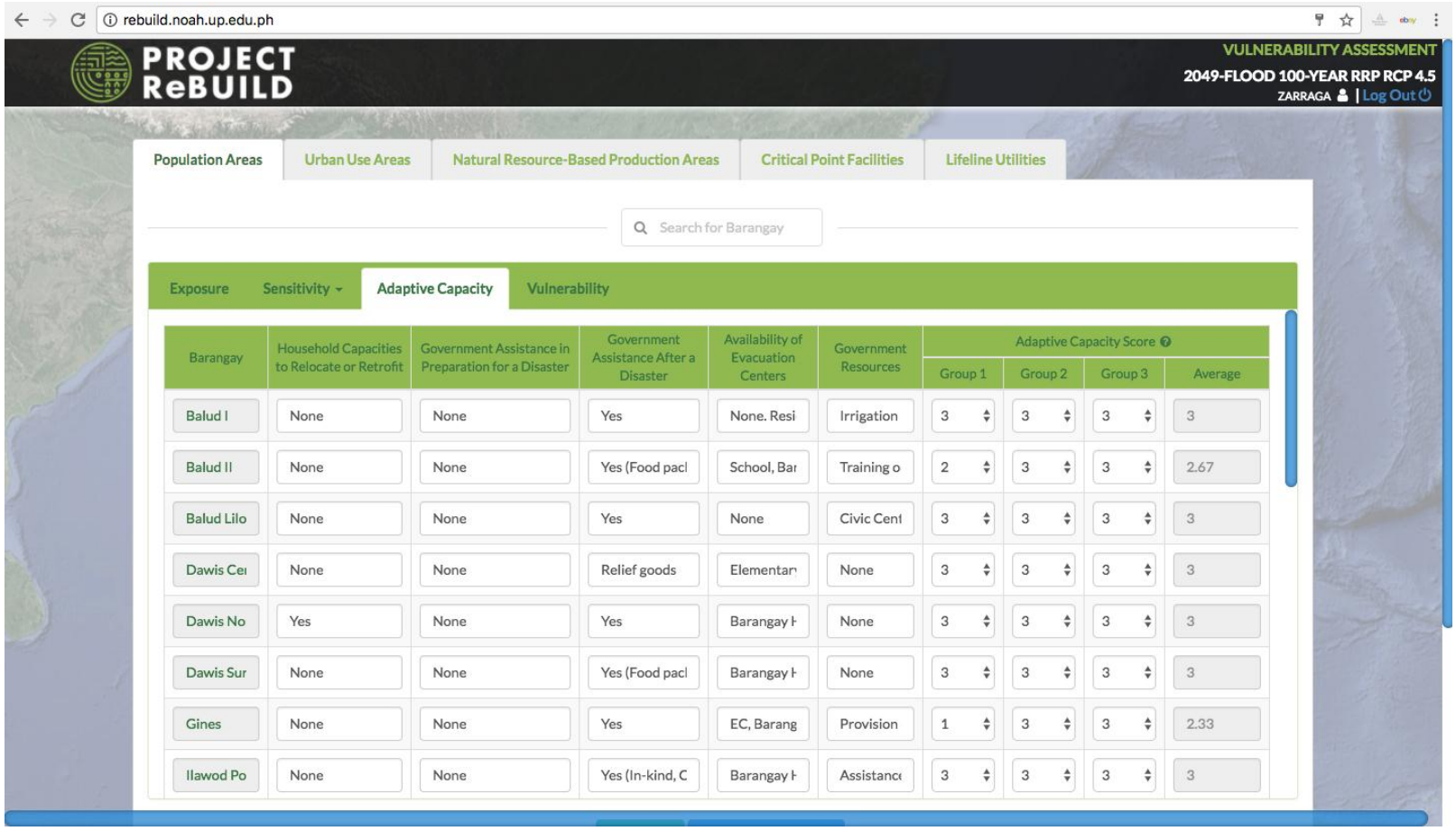


Creation of an online analytics platform and repository for LCCAP and other development plans of the community



Barangay	Population	No. of Households	Residential Area (sq m)	Population Density (persons/sq m)	Exposed Area (sq m)	Exposed Population	Exposure Percentage
Balud I	981	244	60,254.1	0.016	37,964.5	618.102	63.01
Balud II	857	276	48,510.6	0.018	26,533.9	468.754	54.7
Balud Lilo-an	638	179	64,959.1	0.010	43,256.2	424.844	66.59
Dawis Centro	217	63	51,295.1	0.004	6,559.27	27.749	12.79
Dawis Norte	332	83	32,166.7	0.010	14,634	151.04	45.49
Dawis Sur	725	190	88,746.6	0.008	8,406.63	68.677	9.47
Gines	998	277	87,835.6	0.011	68,102.4	773.789	77.53
Ilawod Poblacic	2,497	653	440,336	0.006	130,322	739.014	29.6

Creation of an online analytics platform and repository for LCCAP and other development plans of the community



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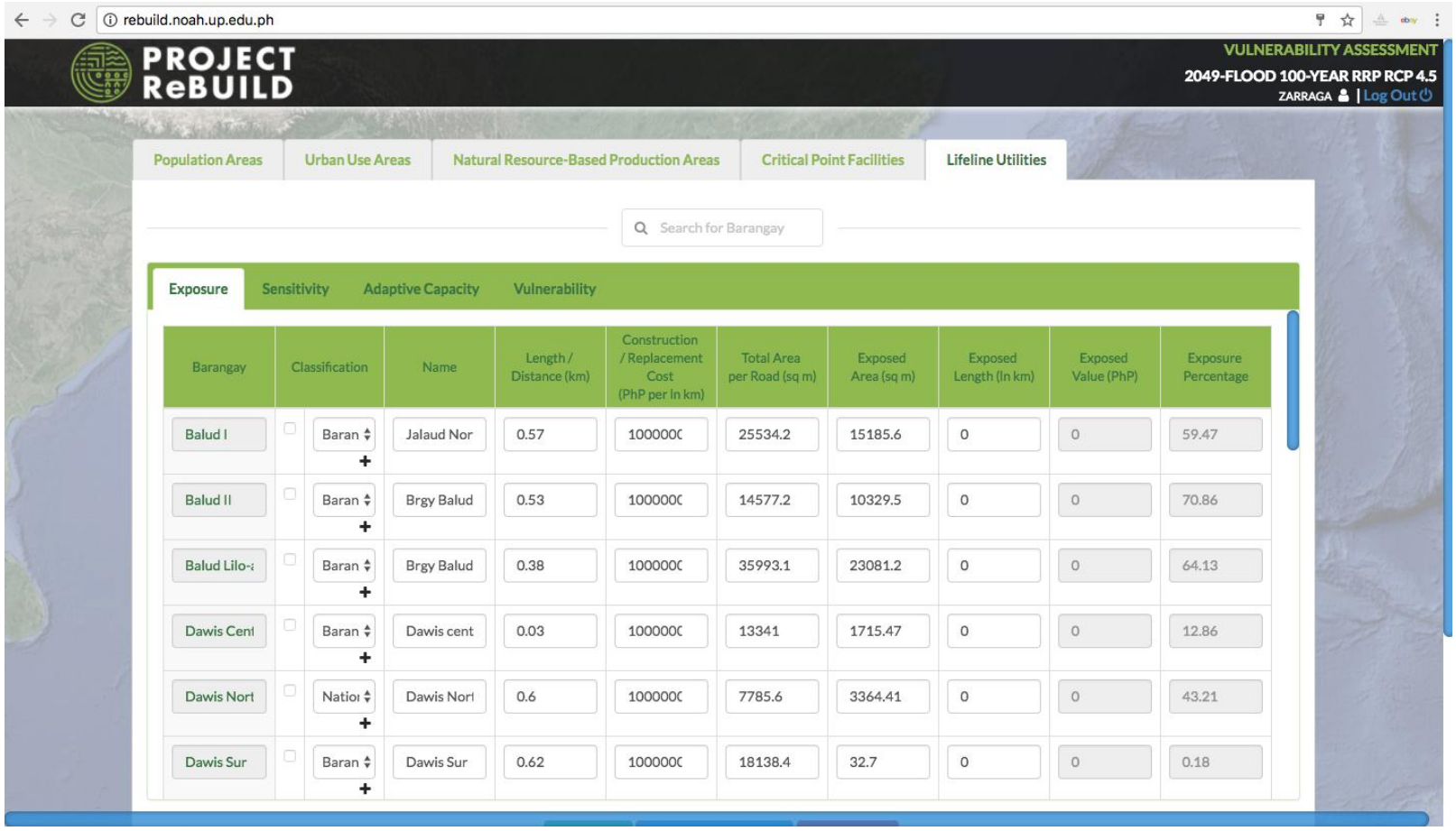
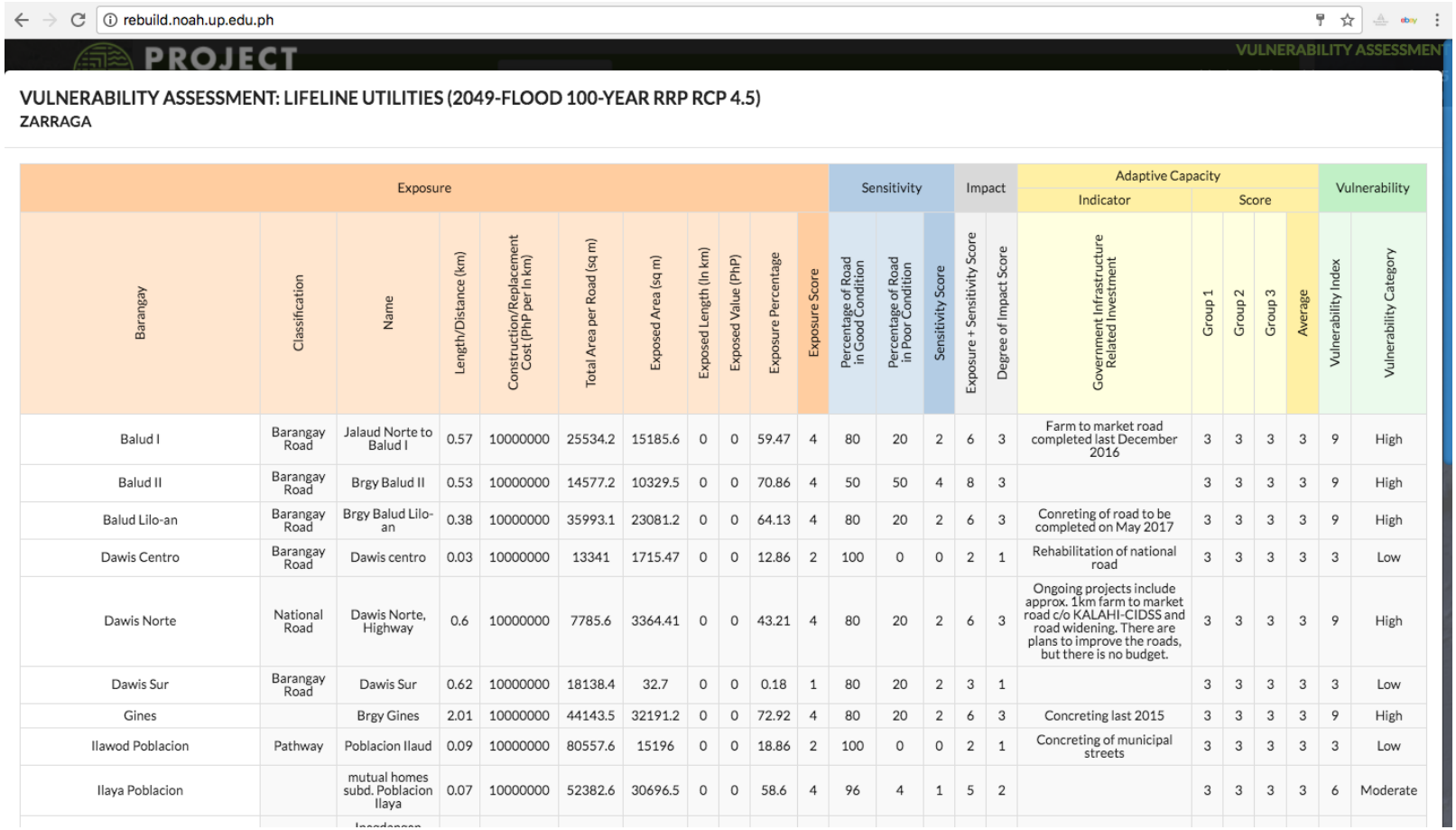


Creation of an online analytics platform and repository for LCCAP and other development plans of the community

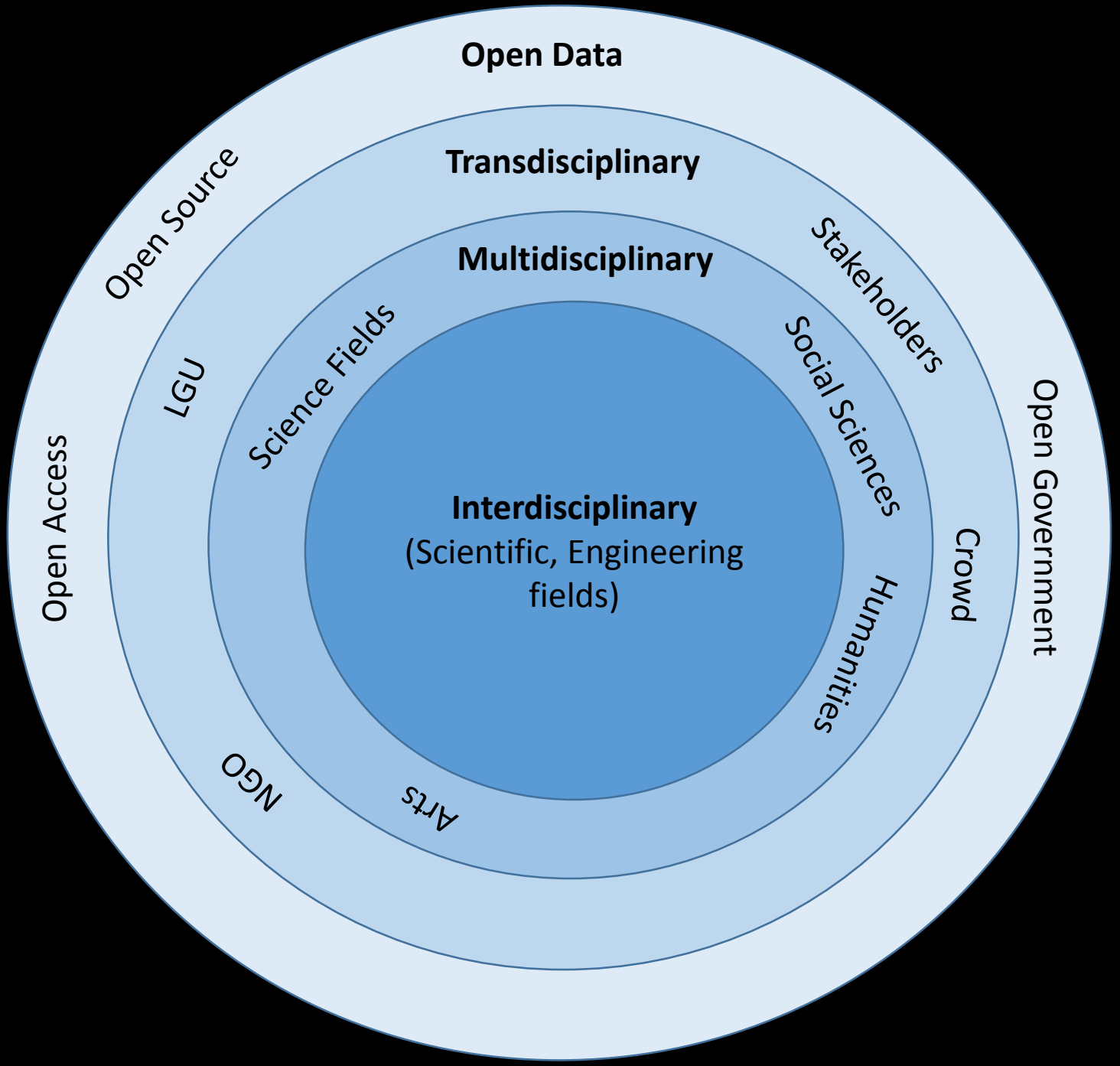


VULNERABILITY ASSESSMENT: LIFELINE UTILITIES (2049-FLOOD 100-YEAR RRP RCP 4.5)
ZARRAGA

Exposure											Sensitivity			Impact		Adaptive Capacity					Vulnerability	
																Indicator	Score					
Barangay	Classification	Name	Length/Distance (km)	Construction/Replacement Cost (PhP per ln km)	Total Area per Road (sq m)	Exposed Area (sq m)	Exposed Length (ln km)	Exposed Value (PhP)	Exposure Percentage	Exposure Score	Percentage of Road in Good Condition	Percentage of Road in Poor Condition	Sensitivity Score	Exposure + Sensitivity Score	Degree of Impact Score	Government Infrastructure Related Investment	Group 1	Group 2	Group 3	Average	Vulnerability Index	Vulnerability Category
Balud I	Barangay Road	Jalaud Norte to Balud I	0.57	10000000	25534.2	15185.6	0	0	59.47	4	80	20	2	6	3	Farm to market road completed last December 2016	3	3	3	3	9	High
Balud II	Barangay Road	Brgy Balud II	0.53	10000000	14577.2	10329.5	0	0	70.86	4	50	50	4	8	3		3	3	3	3	9	High
Balud Lilo-an	Barangay Road	Brgy Balud Lilo-an	0.38	10000000	35993.1	23081.2	0	0	64.13	4	80	20	2	6	3	Conreting of road to be completed on May 2017	3	3	3	3	9	High
Dawis Centro	Barangay Road	Dawis centro	0.03	10000000	13341	1715.47	0	0	12.86	2	100	0	0	2	1	Rehabilitation of national road	3	3	3	3	3	Low
Dawis Norte	National Road	Dawis Norte, Highway	0.6	10000000	7785.6	3364.41	0	0	43.21	4	80	20	2	6	3	Ongoing projects include approx. 1km farm to market road c/o KALAHI-CIDSS and road widening. There are plans to improve the roads, but there is no budget.	3	3	3	3	9	High
Dawis Sur	Barangay Road	Dawis Sur	0.62	10000000	18138.4	32.7	0	0	0.18	1	80	20	2	3	1		3	3	3	3	3	Low
Gines		Brgy Gines	2.01	10000000	44143.5	32191.2	0	0	72.92	4	80	20	2	6	3	Concreting last 2015	3	3	3	3	9	High
Ilawod Poblacion	Pathway	Poblacion Ilaud	0.09	10000000	80557.6	15196	0	0	18.86	2	100	0	0	2	1	Concreting of municipal streets	3	3	3	3	3	Low
Ilaya Poblacion		mutual homes subd. Poblacion Ilaya	0.07	10000000	52382.6	30696.5	0	0	58.6	4	96	4	1	5	2		3	3	3	3	6	Moderate

General Approriations Act (2018)

- The University of the Philippines Resilience Institute (UPRI), together with other state universities and colleges, **shall support the Climate Change Commission in training LGUs** to formulate and complete Local Climate Change Action Plans (LCCAP) and Comprehensive Landuse and Development Plans (CLUDP).
- The **UPRI shall empower LGUs with science-based information and technologies for development planning,** such as Climate Vulnerability and Disaster Risk Assessment (CVDA) and multi-scenario, probabilistic hazard models.


Open Data
Transdisciplinary
Multidisciplinary
Interdisciplinary
(Scientific, Engineering fields)
Open Source
Stakeholders
Open Government
Crowd
Humanities
Social Sciences
Science Fields
LGU
Open Access
NGO
Arts

Thank you