



SUITABILITY MODEL

RISK INFORMED DECISIONS FOR PLANNING AND INVESTMENT



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DISASTERS CAN HAVE DEVASTATING IMPACTS





PEOPLE DISASTERS FROM NATURAL HAZARDS AFFECTED 1.4 BILLION PEOPLE*

500 Lives

DISASTERS FROM NATURAL HAZARDS CLAIMED 500
THOUSAND LIVES*

523 ECON DISAS

ECONOMY DISASTERS FROM NATURAL HAZARDS CAUSED \$523 BILLION IN ECONOMIC LOSSES*

*ASIA-PACIFIC, 2005-2014

"IF [A PLAN] IS NOT RISK-INFORMED, IT [CAN'T LEAD TO] SUSTAINABLE DEVELOPMENT

- United Nations Development Programme





IS YOUR PLAN RISK-INFORMED?

OES YOUR DEVELOPMENT PLAN TAKE HAZARDS AND VULNERABILITIES INTO ACCOUNT?

S YOUR METHOD CONSIDERING CLIMATE CHANGE PROJECTIONS?

ET YOU ARE UNAWARE ABOUT THE ECONOMIC RISKS A DISASTER CAN PUT ON YOUR COMMUNITY?





WHAT IS THE ISSUE AT HAND?

TANDARD HAZARD APPING METHODS ONLY DEPICT RISK CATEGORIES FOR FERENT HAZARDS IN PRE-DEFINED AREA NO INFORMATION ABC THE EXPECTED DAMA OR MONETARY LOSS FROM RISKS ASSOCIA WITH DIFFERENT HAZARDS

THE FINANCIAL LIABILITIES OF DISASTER AND CLIMATE RISKS ARE DIFFICULT TO PREDICT







WE SUPPORT YOU TO REVEAL THE FINANCIAL LIABILITIES OF RISKS

THE **SUITABILITY MODEL** SEEKS TO DELIVER **EASY-TO-UNDERSTAND** AND **READY-TO-PROCESS** LAND USE PLANNING AND INVESTMENT DIRECTIONS

PROVIDES CONTEXT-SPECIFIC **QUANTIFICATIONS OF RISKS** FROM POTENTIAL HAZARDS FOR LAND USE OR INVESTMENT PLANS IN A PREDEFINED AREA OF LAND

METHODOLOGY FOLLOWS A **SIMPLE STEP-BY-STEP GUIDELINE** SO USERS ONLY NEED TO HAVE BASIC KNOWLEDGE OF THE PROCESSES INVOLVED







WE SUPPORT YOU TO REVEAL THE FINANCIAL LIABILITIES OF RISKS







THE PROCESS OF THE SUITABILITY MODELLING

STEP 1

AREAS.

CONSULTING PROCESS TO DEFINE EXPECTATIONS AND PRIORITY

ADDING RISK PROBABILITIES, FACTOR IN HISTORICAL AND FUTURE CLIMATE DATA.

STEP 3

STEP 5

EVALUATING THE RESULTS AND PROVIDING A BRIEF RECOMMENDATION GUIDE.



STEP 2

ANALYSING AND REFLECTING ON EXISTING MULTI-HAZARD EXPOSURE MAPS.

STEP 4

CALCULATING THE EXPECTED DAMAGES AND DEFINE A COMMON DENOMINATOR (PERCENT, CURRENCY, ETC.).





TECHNICAL METHODOLOGY – HOW DOES THE SUITABILITY MODEL WORK?

- ✓ BUILDING A MULTI-HAZARD EXPOSURE MAP IDENTIFY POSSIBLE HAZARDS | LAYER HAZARDS ON A BASELINE MAP OF YOUR AREA
- ✓ ADDING RISK PROBABILITIES TO YOUR MAP ADD RISKS BY DIFFERENT HAZARDS | FACTOR IN LOCATIONS AND RETURN PERIODS
- ✓ HARMONISE FOR MULTIPLE RISKS DUE TO MULTIPLE HAZARDS CALCULATE THE EXPECTED DAMAGES | DEFINE A COMMON DENOMINATOR





METHOD – How does the Suitability Model work?

- BUILDING A MULTI-HAZARD EXPOSURE MAP
 IDENTIFY POSSIBLE HAZARDS | LAYER HAZARDS ON BASELINE THOUAKES YOUR AREA
 FLOODS STORM SURGE INPHOONS TSUNAMI LANDSLIDES
- ADDING RISK PROBABILITIES TO YOUR MAP ADD RISKS BY DIFFERENT HAZARDS FACTOR IN LOCATIONS AND REFURN PERFOR

HARMONISE FOR MULTIPLE RISKS DUE TO MULTIPLE HAZARDS

- CALERINGETE THE EXPECTED DAMAGES | DEFINE A COMMON DENOMINATOR
- ROADS
- RIVERS





ADDING RISK PROBABILITIES TO YOUR MAP ADD RISKS BY DIFFERENT HAZARDS | FACTOR IN LOCATIONS AND RETURN PERIODS

• **GENERALLY**

Adding risks caused by different hazards gives a Multi-Hazard Risk Map







✓ ADDING RISK PROBABILITIES TO YOUR MAP ADD RISKS BY DIFFERENT HAZARDS | FACTOR IN LOCATIONS AND RETURN PERIODS

! But

SOME AREAS OF LAND ARE LESS, OTHERS ARE MORE EXPOSED AND VULNERABLE TO NATURAL HAZARDS

! LIKEWISE

DIFFERENT RETURN PERIODS OF SPECIFIC HAZARDS NEED TO BE ACCOUNTED FOR





- ✓ ADDING RISK PROBABILITIES TO YOUR MAP ADD RISKS BY DIFFERENT HAZARDS | FACTOR IN LOCATIONS AND RETURN PERIODS
 - EXAMPLE





SEA LAND SIDE SIDE DECREASING IMPACT OF STORM SURGES HEIGHT AT SHORE **EXPECTED DAMAGE ACCORDING TO WATER HEIGHT** 10% 5м 5% 40% **60%** 80% 4м **5%** 10% 40% 60% 3м 5% 10% 40% 5% 2м 10% 1м **5%**





ADDITIONALLY

Taking into Account Different Return Periods



HEIGHT AT SHORE	RETURN PERIOD	PROBABILITY	Ехресте	D ANNUAL	DAMAGE P	PER WATER	HEIGHT
5м	500 YEARS	0.002	0.01%	0.02%	0.08%	0.12%	0.16%
4M	300 YEARS	0.003		0.02%	0.03%	0.13%	0.20%
Зм	200 YEARS	0.005			0.03%	0.05%	0.20%
2м	100 YEARS	0.010				0.05%	0.10%
1м	50 YEARS	0.025					0.10%
<u></u>		TOTAL	0.01%	0.04%	0.14%	0.35%	0.76%





HARMONISE FOR MULTIPLE RISKS DUE TO MULTIPLE HAZARDS
 CALCULATE THE EXPECTED DAMAGES | DEFINE A COMMON DENOMINATOR

- QUANTIFYING the EXPECTED DAMAGES caused by hazards in PERCENT OF VALUE PER YEAR
- 'Expected Damages' CAN therefore EASILY BE TRANSLATED into any OTHER VALUE according to user requirements







OUTCOME – WHAT DOES THE **S**UITABILITY **M**AP LOOK LIKE?

- At first glance, a Suitability Map looks similar to a classic hazard map
- But

COLOUR-CODED INFORMATION provides EXPECTED DAMAGES IN % per year







THE FINAL PRODUCT

MULTI-HAZARD SUITABILITY MAPS FOR RESIDENTIAL BUILDINGS IN THE PHILIPPINES









EXAMPLE 2

ZOOMED-IN PERSPECTIVE EXPECTED % DAMAGE PER YEAR







APPLICATION – How will data derived from the model benefit **YOU**?

- Allows for STRATEGIC DECISION-MAKING
- Allows for climate change and hazard RISK INFORMED land use PLANNING decisions
- Entails PRECISE INFORMATION regarding area-specific hazards, vulnerabilities, exposure and climate change projections AND the IMPACT ON specific types of INFRASTRUCTURES

• EXAMPLE 1







Re-classifcation of Land-use



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• EXAMPLE 2 CEBU PROVINCE

- Provincial LGUs in Cebu applied to ACCESS FUNDS through the PEOPLE'S SURVIVAL FUND of the Philippine Government
- Knowledge and application results from the SUITABILITY MODEL significantly INCREASED CHANCE to access 2 billion PHP or <u>40</u> <u>MILLION US\$</u>

How Suitability Modeling will Influence your Impact Chain?







Human Settlement and Security: Ensuring inclusive, equitable and fair distribution of resources, services and impacts in order to achieve growth, livability, safety, environmental friendliness, and to maintain the identity of the society



CONCLUSION

- There is no safe place on earth and also no place with infinite risk. What risk is acceptable, is up to people and their political representatives, but this might be considered;
- Especially vital installations (e.g. hospitals, rescue service, fire brigade, administrative building, etc.) should be in the safer places within a given area;
- Zoning ordinances can show where the safer area are located;
- Suitability map inform zoning ordinances;
- Suitability maps summarize and visualize the results of a risk assessment independent of the specific environment

THANK YOU FOR YOUR INTEREST

CONTACT INFORMATION

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