Suitability Model
Risk Informed Decisions for Planning and Investment

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Antonio D. Balang Jr.
Senior DRM Specialist
GIDRM – Philippines/ Southeast Asia
antonio.balang@giz.de
+63917 831 7107
Disasters can have devastating impacts

1.4 BILLION PEOPLE
1.4 BILLION PEOPLE

500 THOUSAND LIVES
500 THOUSAND LIVES

$523 BILLION IN ECONOMIC LOSSES
$523 BILLION IN ECONOMIC LOSSES

“If a plan is not risk-informed, it can’t lead to sustainable development”
– United Nations Development Programme –

*Asia-Pacific, 2005-2014
Is Your Plan Risk-Informed?

Does your development plan take hazards and vulnerabilities into account?

Is your method considering climate change projections?

Yet you are unaware about the economic risks a disaster can put on your community?
What Is The Issue At Hand?

**Standard Hazard Mapping Methods**

*Only depict risk categories for different hazards in a pre-defined area*

**No Information About**

*The expected damages or monetary losses from risks associated with different hazards*

The financial liabilities of disaster and climate risks are difficult to predict.
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.
WE SUPPORT YOU TO REVEAL THE FINANCIAL LIABILITIES OF RISKS

MULTI-HAZARDS (TYPOHOONS, FLOODS, ETC.)

DEVELOPMENT OPTIONS (AGRICULTURAL CROPS, ETC.)

CONSTRUCTION TYPES (RESIDENTIAL BUILDINGS, BRIDGES, ETC.)

EXPECTED DAMAGE IN % OF VALUE

EXPOSURE / VULNERABILITY

HISTORICAL DATA / CLIMATE PROJECTIONS

WE SUPPORT YOU TO REVEAL THE FINANCIAL LIABILITIES OF RISKS
THE PROCESS OF THE SUITABILITY MODELLING

STEP 1
CONSULTING PROCESS TO DEFINE EXPECTATIONS AND PRIORITY AREAS.

STEP 2
ANALYSING AND REFLECTING ON EXISTING MULTI-HAZARD EXPOSURE MAPS.

STEP 3
ADDING RISK PROBABILITIES, FACTOR IN HISTORICAL AND FUTURE CLIMATE DATA.

STEP 4
CALCULATING THE EXPECTED DAMAGES AND DEFINE A COMMON DENOMINATOR (PERCENT, CURRENCY, ETC.).

STEP 5
EVALUATING THE RESULTS AND PROVIDING A BRIEF RECOMMENDATION GUIDE.
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 a BASELINE MAP in YOUR AREA

✓ **ADDING RISK PROBABILITIES TO YOUR MAP**

- **ADD RISKS** by **DIFFERENT HAZARDS** | FACTOR in **LOCATIONS** and RETURN PERIODS in **LAYERED HAZARD MAP**, including:

✓ **HARMONISE FOR MULTIPLE RISKS DUE TO MULTIPLE HAZARDS**

- **CALCULATE THE EXPECTED DAMAGES** | **DEFINE A COMMON DENOMINATOR**

BASE MAP, including:

- ALTITUDE
- 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

- Example

  ```
<table>
<thead>
<tr>
<th>Storm surges</th>
<th>Floods</th>
<th>Earthquakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>0.8</td>
<td>0.9</td>
<td>0.6</td>
</tr>
<tr>
<td>0.4</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
  NOTE:
  Figures in expected % damage per year
✓ 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**
**Decreasing Impact of Storm Surges and Tsunami**

- **Example**

<table>
<thead>
<tr>
<th>Height at Shore</th>
<th>Expected Damage According to Water Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>5m</td>
<td>5% 10% 40% 60% 80%</td>
</tr>
<tr>
<td>4m</td>
<td>5% 10% 40% 60%</td>
</tr>
<tr>
<td>3m</td>
<td>5% 10% 40%</td>
</tr>
<tr>
<td>2m</td>
<td>5% 10%</td>
</tr>
<tr>
<td>1m</td>
<td>5%</td>
</tr>
</tbody>
</table>
- **Additionally**

  Taking into account different return periods

<table>
<thead>
<tr>
<th>Height at Shore</th>
<th>Return Period</th>
<th>Probability</th>
<th>Expected Annual Damage per Water Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>5M</td>
<td>500 YEARS</td>
<td>0.002</td>
<td>0.01% 0.02% 0.08% 0.12% 0.16%</td>
</tr>
<tr>
<td>4M</td>
<td>300 YEARS</td>
<td>0.003</td>
<td>0.01% 0.02% 0.03% 0.13% 0.20%</td>
</tr>
<tr>
<td>3M</td>
<td>200 YEARS</td>
<td>0.005</td>
<td>0.01% 0.02% 0.03% 0.05% 0.20%</td>
</tr>
<tr>
<td>2M</td>
<td>100 YEARS</td>
<td>0.010</td>
<td>0.01% 0.02% 0.03% 0.05% 0.10%</td>
</tr>
<tr>
<td>1M</td>
<td>50 YEARS</td>
<td>0.025</td>
<td>0.01% 0.02% 0.03% 0.05% 0.10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>0.01%</strong></td>
<td><strong>0.04%</strong> 0.14% 0.35% 0.76%</td>
</tr>
</tbody>
</table>
✓ 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 SUITABILITY MAP 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

• EXAMPLE
THE FINAL PRODUCT

MULTI-HAZARD SUITABILITY MAPS FOR RESIDENTIAL BUILDINGS IN THE PHILIPPINES

• EXAMPLE
EXAMPLE 2

ZOOMED-IN PERSPECTIVE
EXPECTED % DAMAGE PER YEAR

1.5%

2.2%

4.1%

3.2%

5.0%
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
Abuyog | Leyte Province

Suitability Map indicates high risk area in northern part of the municipality of Abuyog

Existing land use plans do not appropriately account for hazard risk
Because of risk-informed CLUPS, the LGU, explore the potential of their territorial jurisdiction with long term disaster resiliency perspective.

Open the mind set of local stakeholders to build LGU alliances based watershed configuration.
• **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 **40 million US$**
Encourage local leader to exercise core commitment number 3.

- Leave No One Behind: “One of the most visible consequences of conflict, violence and disasters has been the mass displacement of people.”

Support efforts towards sustainable cities and communities (11) and promote climate action (13)

Sendai Framework for Disaster Risk Reduction

Re-enforce target number 4 of SFDRR: “Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.

Paris Agreement on Climate Change

Manifest the Governments agreement on Adaptation that states:
- Strengthen societies’ ability to deal with the impacts of climate change
- Provide continued and enhanced international support for adaptation to developing countries
THANK YOU FOR YOUR INTEREST

CONTACT INFORMATION

MR. STEPHAN HUPPERTZ
REGIONAL COORDINATOR ASIA
GLOBAL INITIATIVE ON DISASTER RISK MANAGEMENT
STEPHAN.HUPPERTZ@GIZ.DE
+66 (0) 2 288 15 75
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
I WILL FLASH WORDS IN THE SCREEN, ONCE YOU SEE IT, IMMEDIATELY SHOUT THE COLOR OF THE WORD.

I REPEAT SHOUT THE COLOR AND NOT THE WORD.

IT IS CLEAR?