



Welcome to the 2nd webinar on climate risk assessments of the

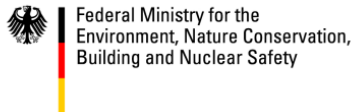
*International EbA Community of Practice* in collaboration with the *SNRD Asia*

# Climate Risk Assessments for Ecosystem-based Adaptation



Thursday, 2<sup>nd</sup> November 2017

On behalf of:



Federal Ministry for the  
Environment, Nature Conservation,  
Building and Nuclear Safety

of the Federal Republic of Germany

**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH



## Agenda

- **Community NEWS: 2<sup>nd</sup> international EbA Community of Practice Workshop**

Mathias Bertram (GIZ)

- **Expert input: Climate risk assessments for EbA**

Dr. Zita Sebesvari, Dr. Michael Hagenlocher (United Nations University)



Moderation: [Alexandra Köngeter](#) (GIZ, global project “Mainstreaming EbA”)

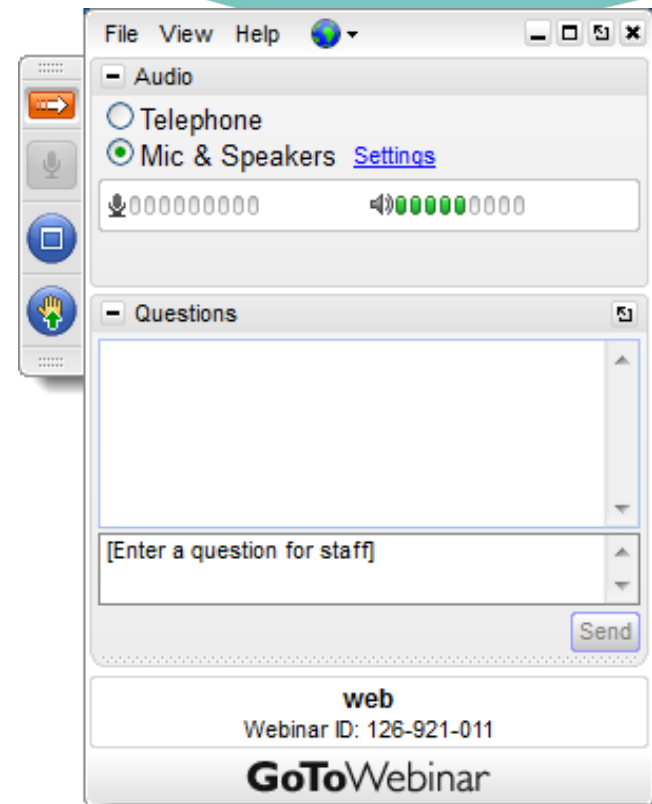
# Housekeeping

**Grab Tab:** From the Grab Tab, you can

- 1) hide the Control Panel,
- 2) mute yourself once unmuted by the organizer,
- 3) view the webinar in full screen and
- 4) raise your hand

**Questions or comments?** Use the chat function (5) or raise your hand (4) to be unmuted

**A recording of this webinar will be made available on [www.adaptationcommunity.net](http://www.adaptationcommunity.net)**





## 2<sup>nd</sup> international EbA Community of Practice Workshop



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# Climate-risk assessments in the context of Ecosystem-based Adaptation (EbA) Lessons from the EbA Guidebook

2<sup>nd</sup> Webinar on Risk Assessment | 02 November 2017

**Dr. Michael Hagenlocher, Dr. Zita Sebesvari & Dr. Fabrice Renaud**

United Nations University, Institute for Environment and Human Security (UNU-EHS)

Environmental Vulnerability & Ecosystem Services (EVES) section

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## Dr. Zita Sebesvari

- Associate Academic Officer, United Nations University (UNU-EHS), Environmental Vulnerability & Ecosystem Services (EVES) section
- **Research areas:** *ecosystem services, vulnerability of social-ecological systems, ecosystem-based disaster risk reduction (EcoDRR) & adaptation (EbA)*



## Dr. Michael Hagenlocher

- Associate Academic Officer, United Nations University (UNU-EHS), Environmental Vulnerability & Ecosystem Services (EVES) section
- **Research areas:** *vulnerability & risk assessment, social-ecological systems, climate change adaptation*

# Why to use climate risk assessments in adaptation planning?



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- Structured, standardized way to identify:
  - key drivers of vulnerability
  - potential adaptation measures
  - most appropriate locations (spatial approach)
- Guidance for adaptation and disaster risk reduction planning and prioritization
- Represent one way of monitoring and evaluation of adaptation measures

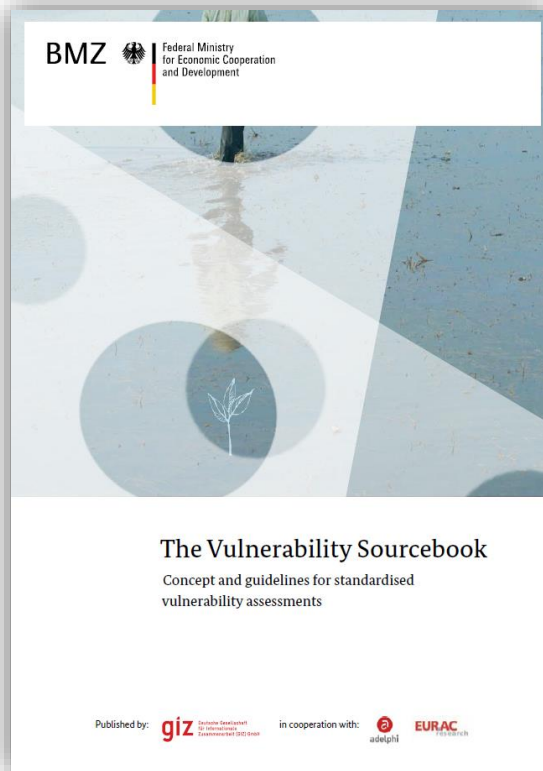
# Background 'EbA Guidebook'



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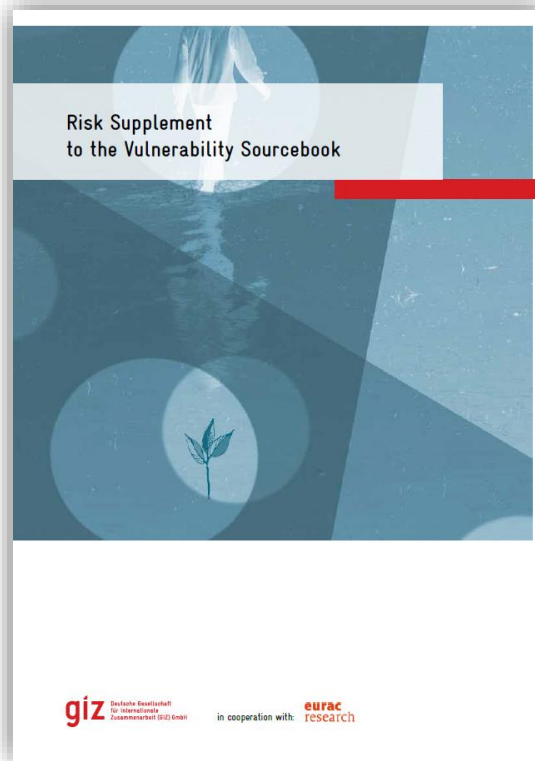
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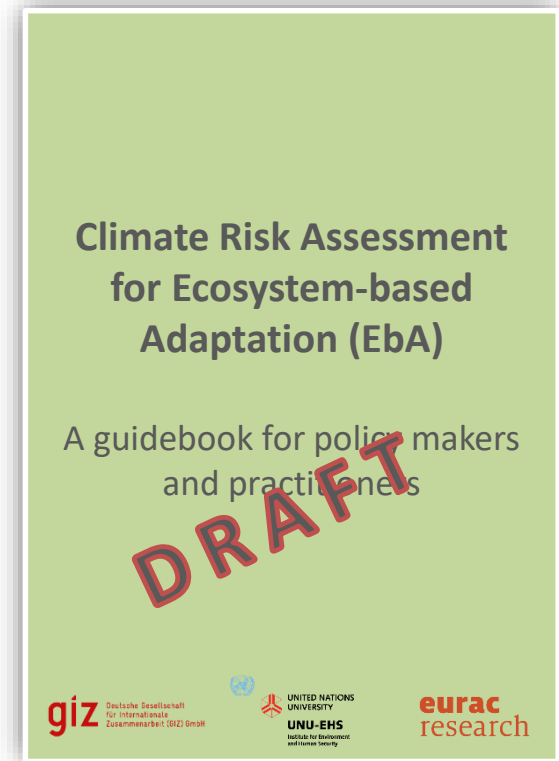
Fritzsche et al. (2014)

IPCC AR4  
vulnerability assessment  
for adaptation planning



GIZ & EURAC (2017)

IPCC AR5  
risk assessment  
for adaptation planning



- Draft currently under review
- Expected publication in 2018

IPCC AR5 risk assessment  
for EbA planning



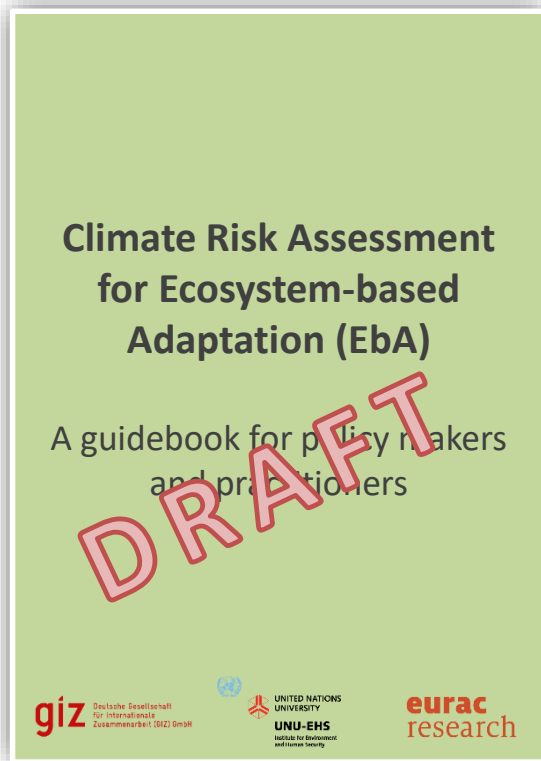
# Background 'EbA Guidebook'



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- Draft currently under review
- Expected publication in 2018

## The EbA Guidebook

- provides a standardised approach to climate risk assessments of **socio-ecological systems**
- improve adaptation planning by considering **both ecosystem-based and conventional options** in the form of integrated '**adaptation packages**'
- informs the selection and spatial planning of adaptation measures
- supports the monitoring and evaluation (M&E) of adaptation
- uses an **illustrative application example** embedded in the modular 'Sourcebook methodology'

# EbA Guidebook

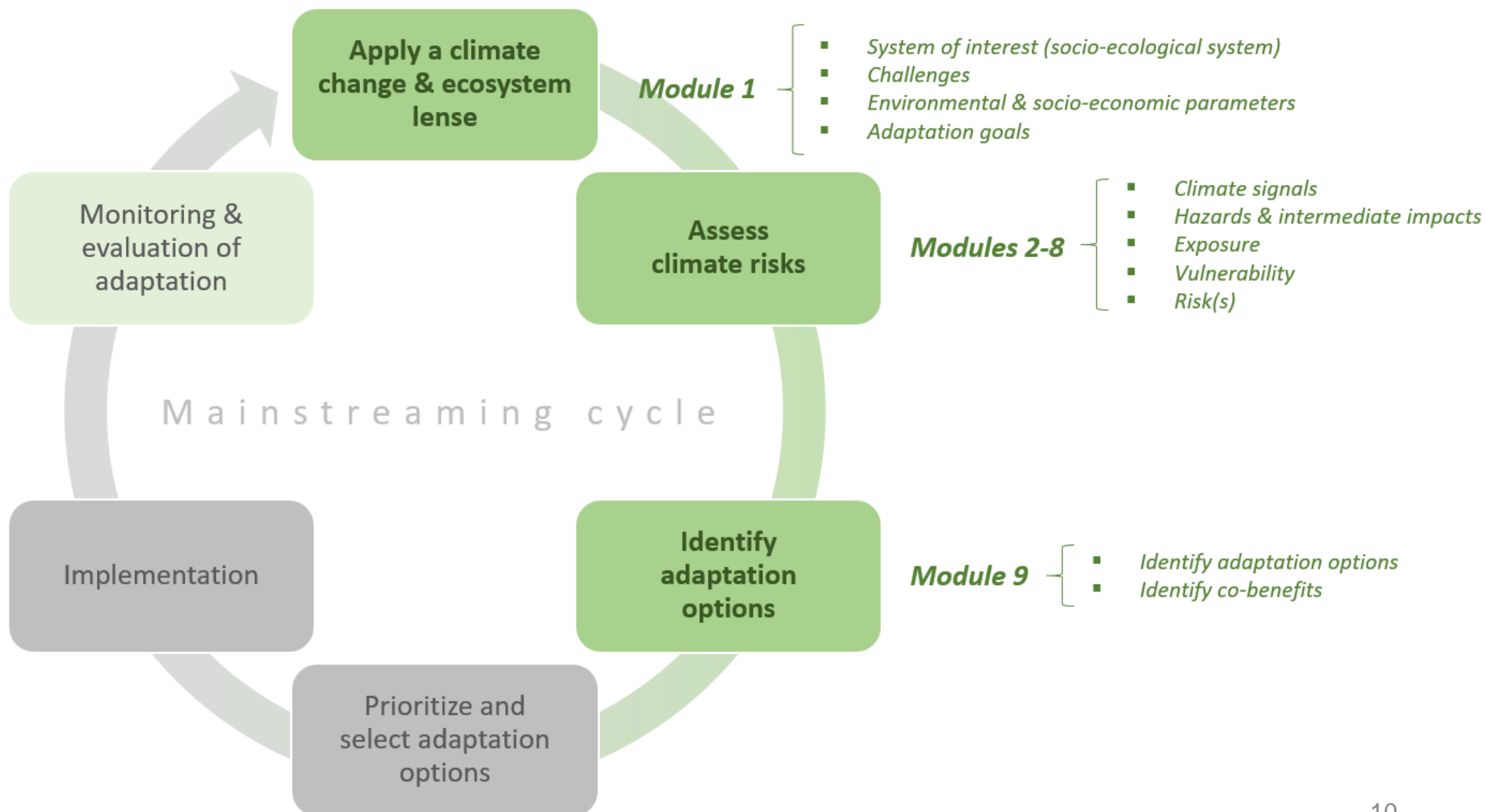
## Modular approach



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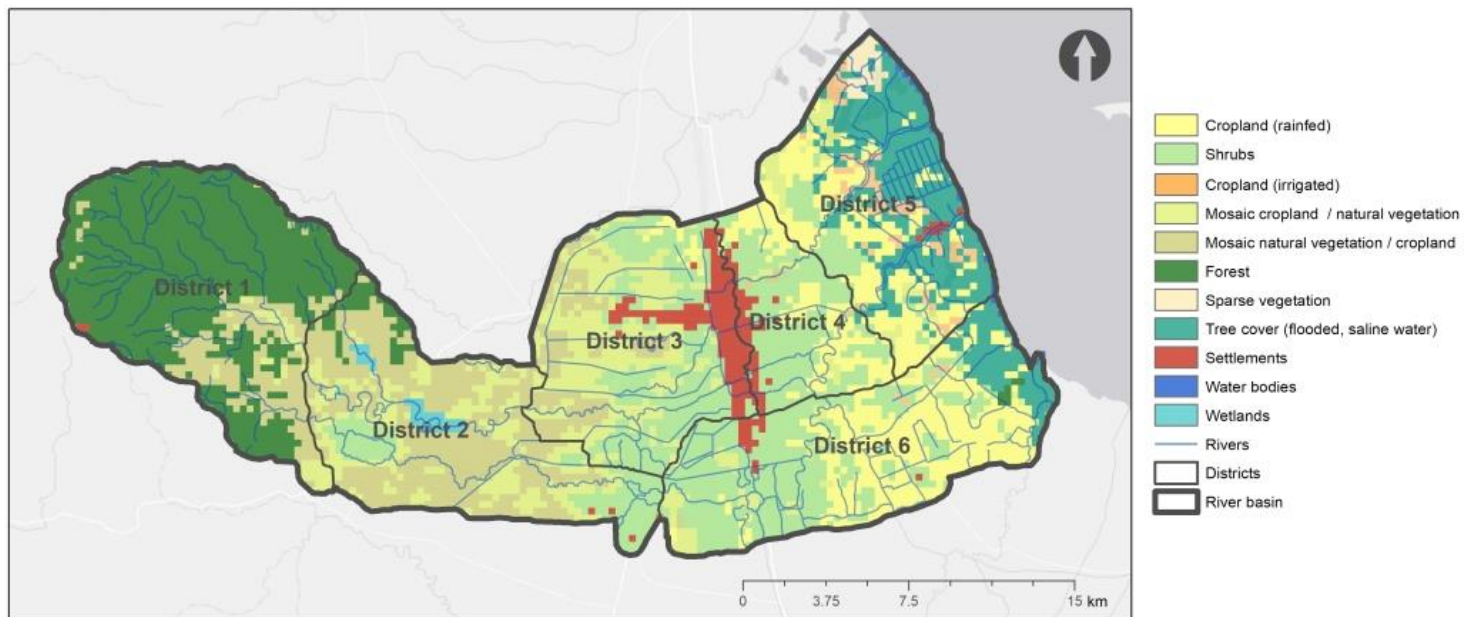
- Step 1: **Understanding the context** of a risk assessment for ecosystem-based adaptation
- Step 2: Identifying **objectives** and expected **outcomes**
- Step 3: Determining the **scope**
- Step 4: Preparing an **implementation plan**

# EbA Guidebook

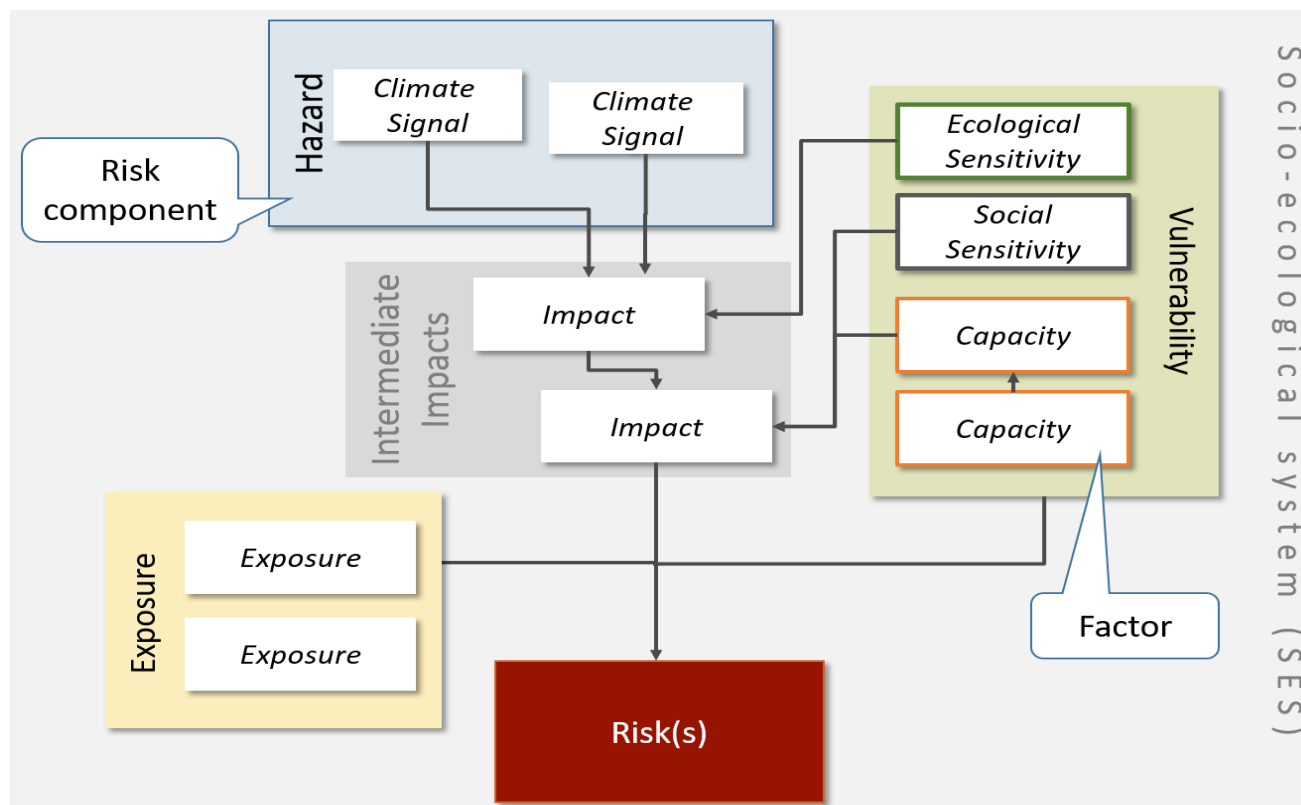
## Module 1: Application example



- **River basin** with six districts, high-risk for loss of lives and damage of property due to flooding
- **Aim:** to determine the risk of damage of property and loss of lives due to flooding including EbA measures, their co-benefits and drawbacks

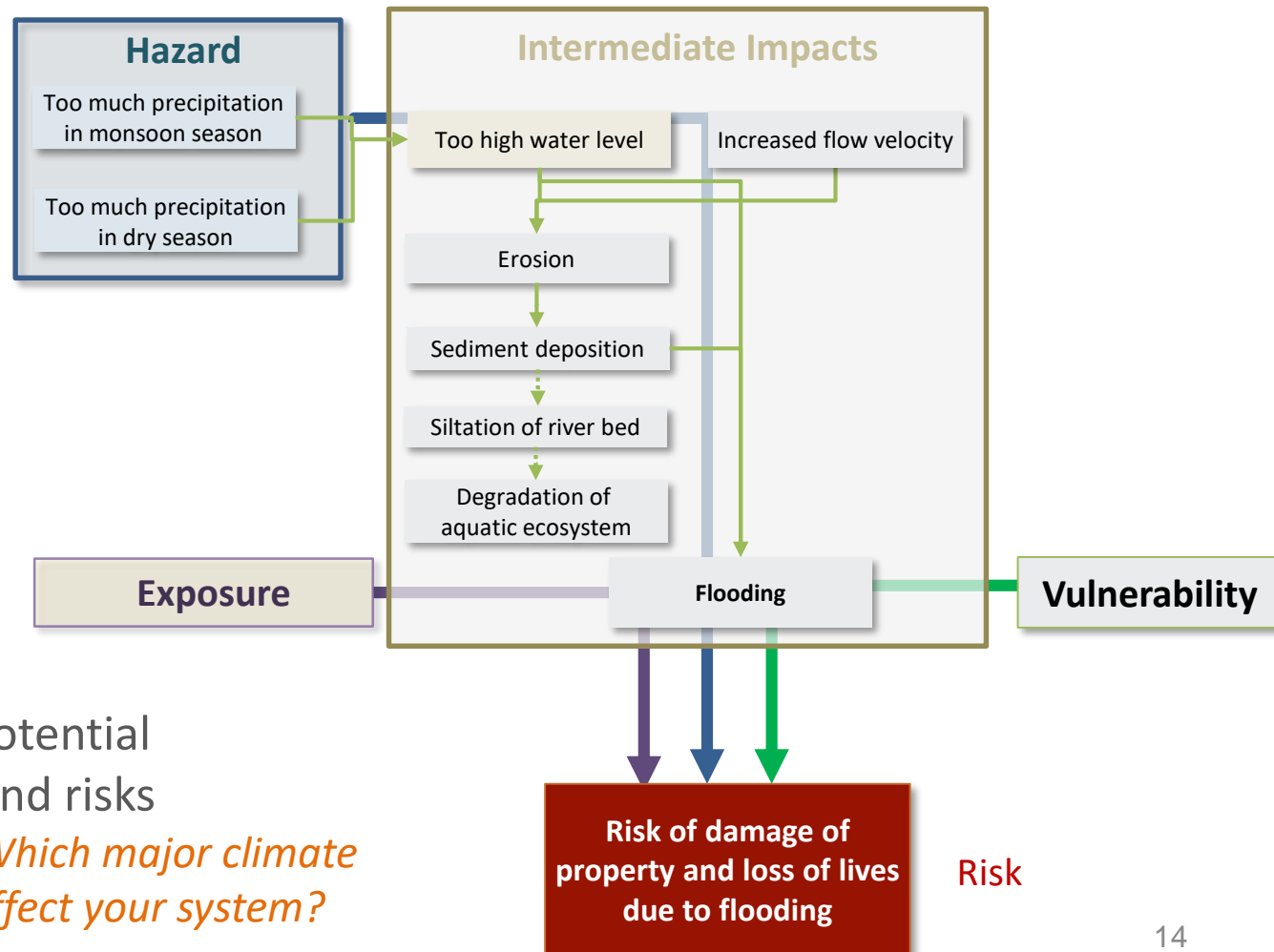


**Impact chain:** analytical tool that helps better understand, systemise and prioritise the factors that drive risk in the socio-ecological system



**Step 2:** Determine hazard(s) and intermediate impacts

*Guiding question:*  
*Which climate related hazards pose a risk to your system?*



**Step 1:** Identify potential climate impacts and risks

*Guiding question:* Which major climate impacts and risks effect your system?

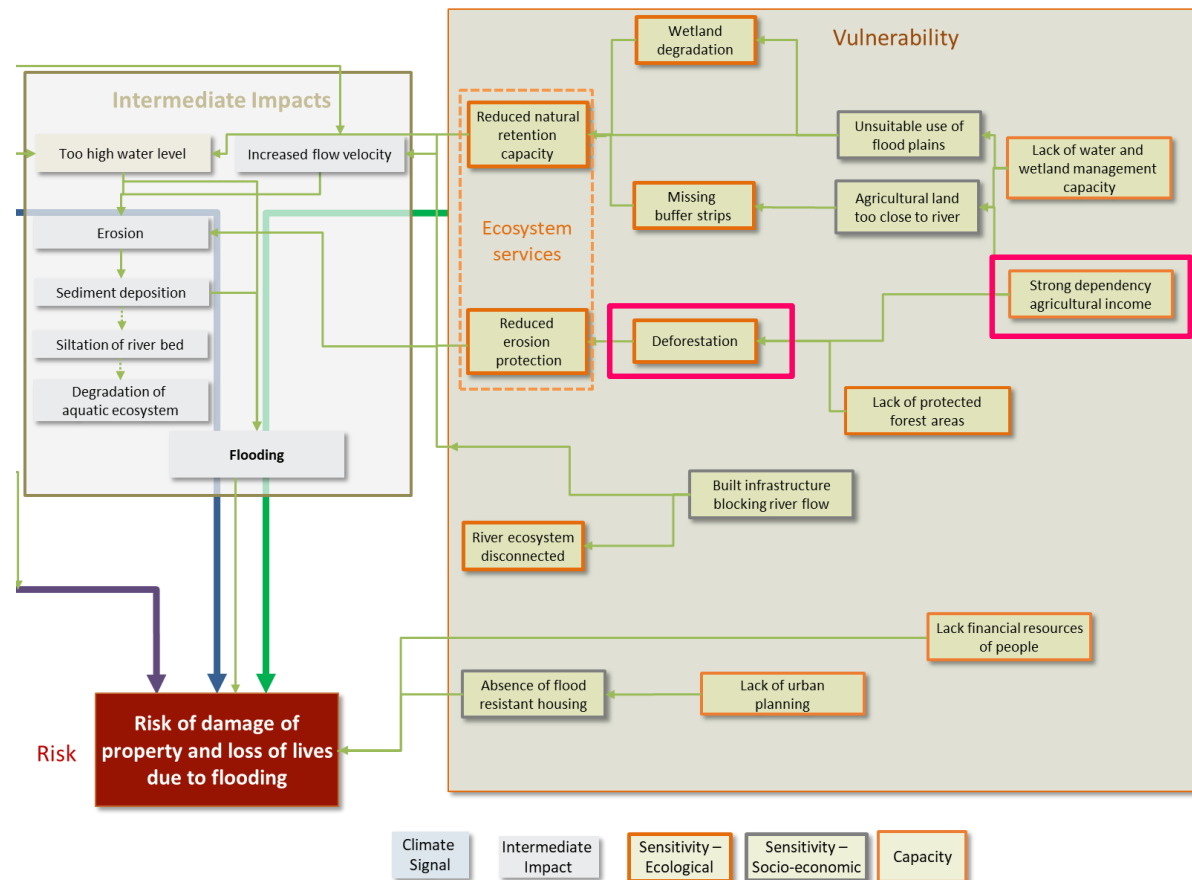
# EbA Guidebook

## Module 2: Application example



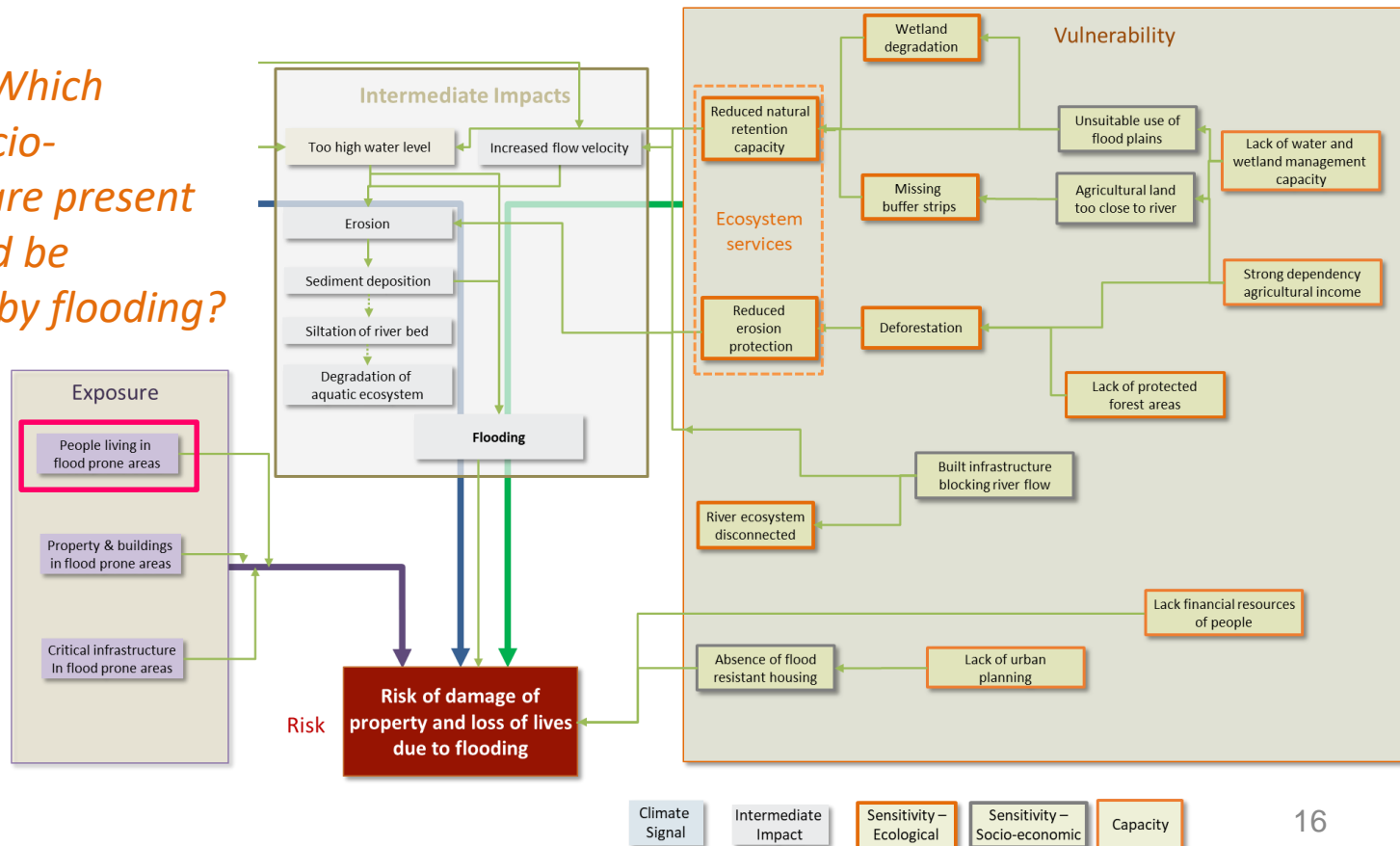
### Step 3: Determine the vulnerability of the socio-ecological system

*Guiding question: What are the main societal and ecological drivers of vulnerability of the socio-ecological system?*



### Step 4: Determine exposed elements of the socio-ecological system

*Guiding question: Which elements of the socio-ecological system are present at places that could be adversely effected by flooding?*





# Module 3

## Identifying and selecting indicators



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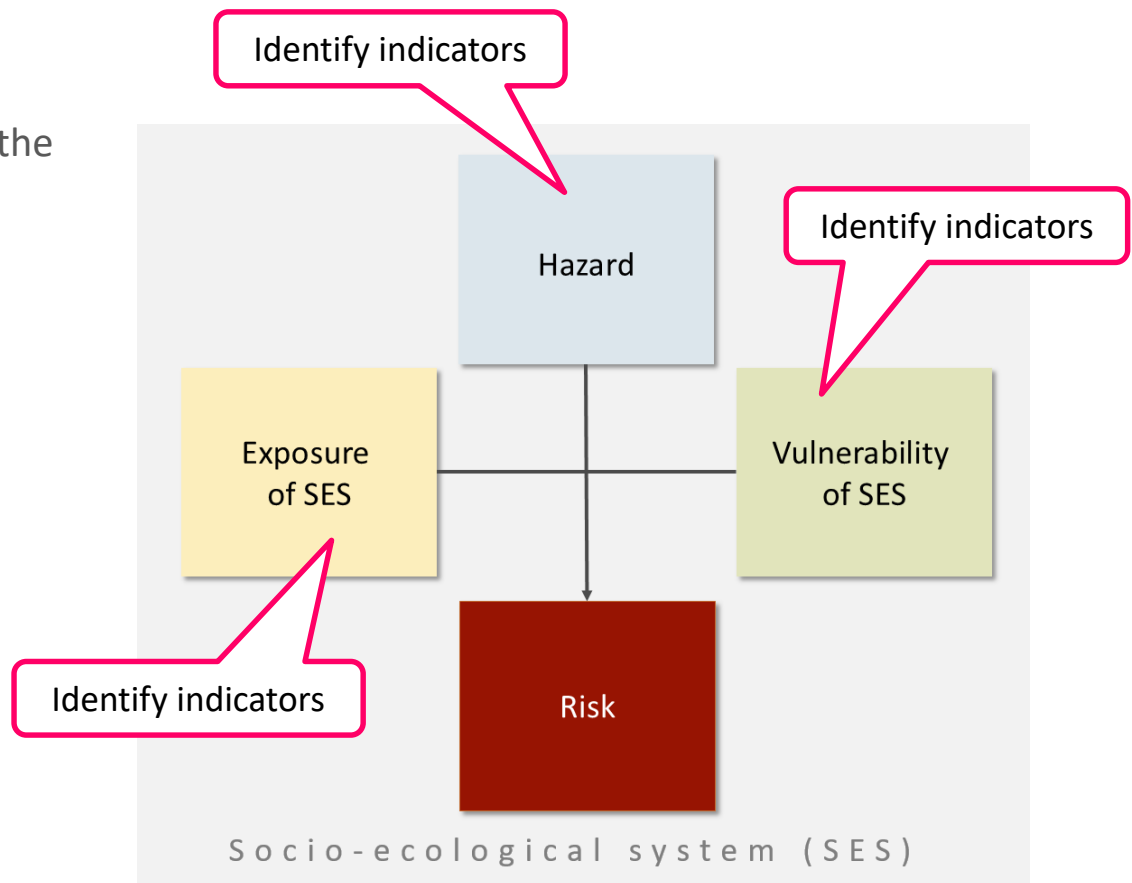
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Guiding question: How do we assess the various factors that lead to risk?

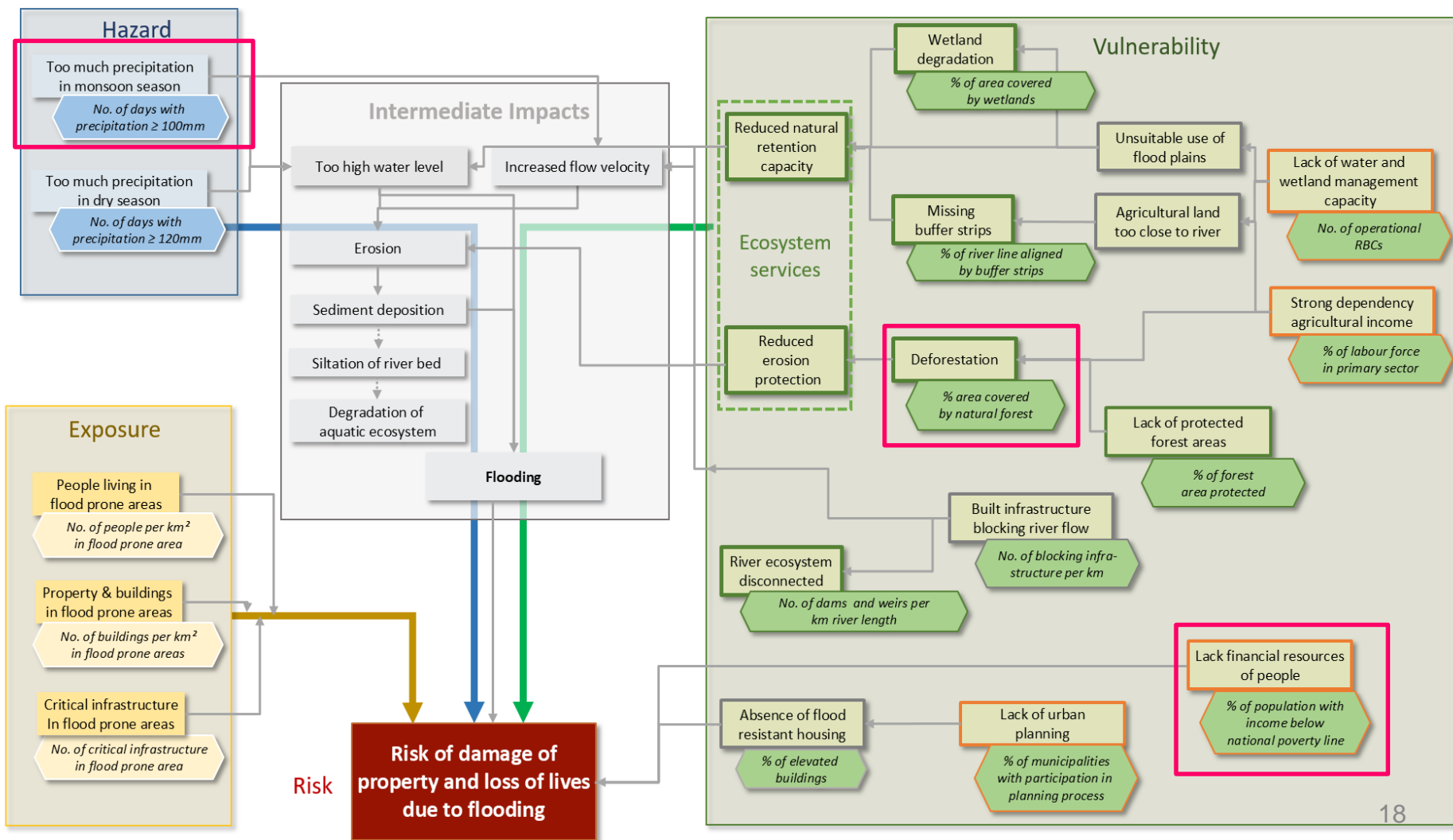
### Key steps:

- Step 1: Selecting indicators for the **hazard** component
- Step 2: Selecting indicators for **vulnerability & exposure**



# Module 3

## Identifying and selecting indicators



# Module 3

## Identifying and selecting indicators



Component	Indicator	Direction*
Hazard	No. of days with precipitation $\geq$ 100mm	+
	No. of days with precipitation $\geq$ 120mm	+
Vulnerability	% of area covered by wetlands	-
	% of river line aligned by buffer strips	-
	<b>% area covered by natural forest</b>	<b>-</b>
	% of forest area protected	-
	No. of dams and weirs per km river length	+
	% of elevated buildings	-
	No. of operational River basin committees (RBCs)	-
	% of labour force in primary sector	+
	% of municipalities with participation in planning process	-
<b>% of population with income below national poverty line</b>	<b>+</b>	
Exposure	No. of people per km <sup>2</sup> in flood prone area	+
	No. of buildings per km <sup>2</sup> in flood prone areas	+
	No. of critical infrastructure in flood prone area	+

High percentages  
**decrease** vulnerability

High percentages  
**increase** vulnerability

\* High indicator scores increase [+] or decrease [-] vulnerability or risk

# Module 4

## Data acquisition & management

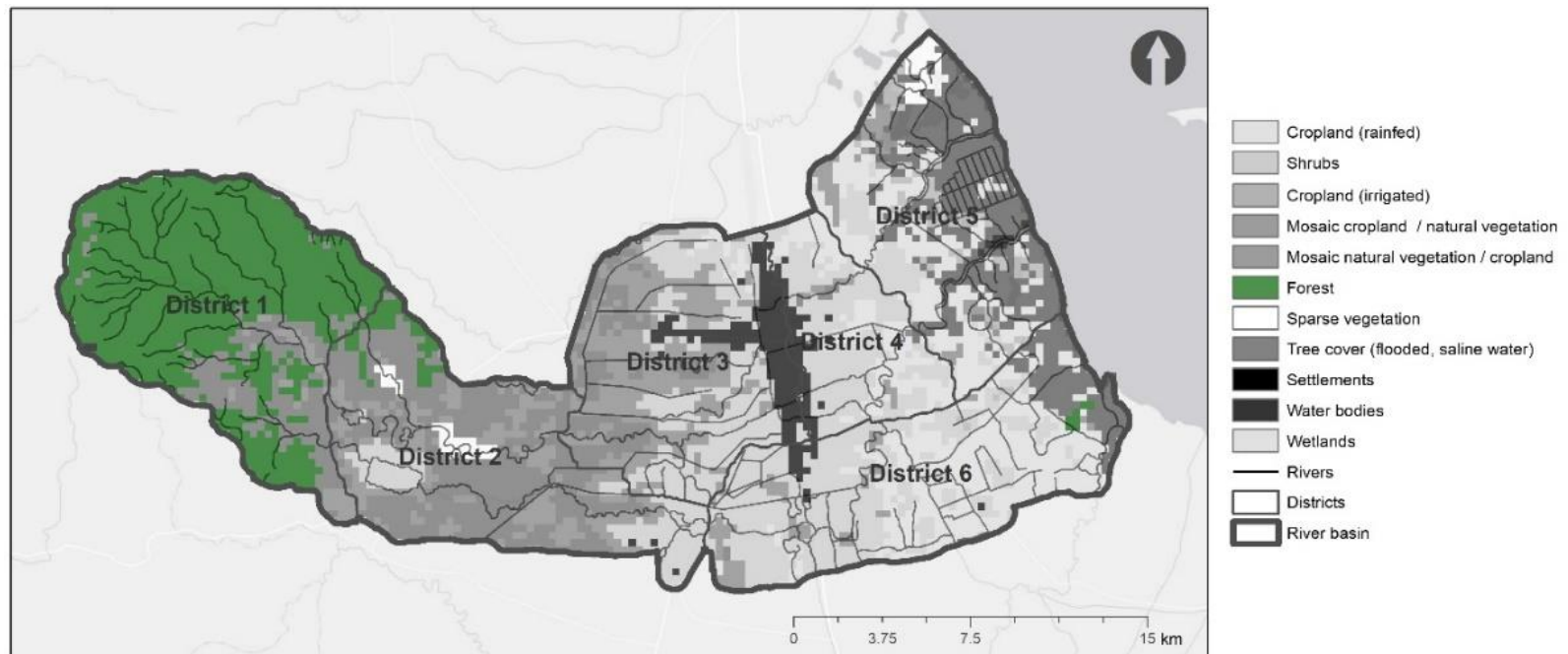


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- EbA is a **landscape approach**
- Assessments should apply a **spatial perspective**
- **Data** needs to be collected **for all indicators**



# Module 5-7

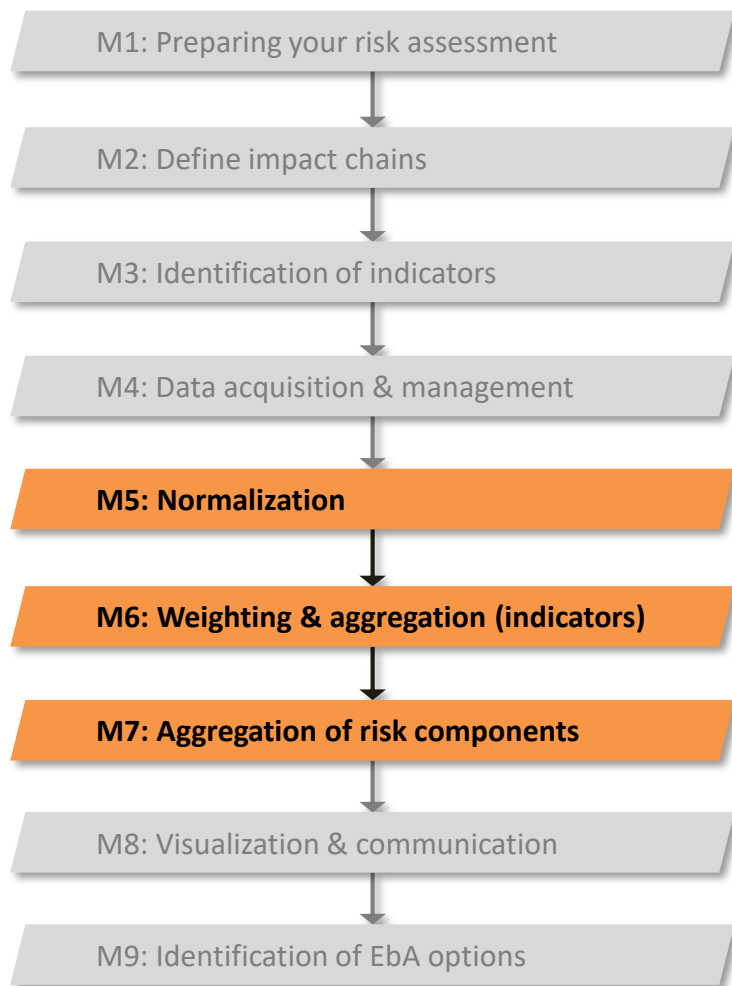
## Normalization, weighting, aggregation



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Guiding question: *How to combine your indicators into an index?*

- Normalization to **render your data comparable**  
→ e.g. to a scale between zero and one [0, 1]

$$x' = \frac{x_i - x_{min}}{x_{max} - x_{min}}$$

Raw data value

Normalized score

- **Different weighting and aggregation methods exist** (c.f. Vulnerability Sourcebook & Risk Supplement)

$$CI = \frac{(I_1 * w_1 + I_2 * w_2 + \dots I_n * w_n)}{\sum_1^n w}$$

# Module 8

## Presenting & interpreting the results



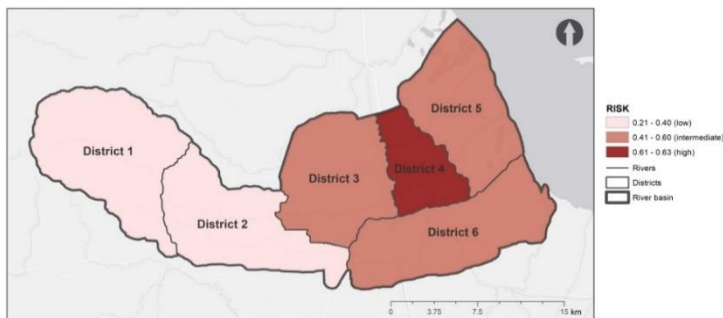
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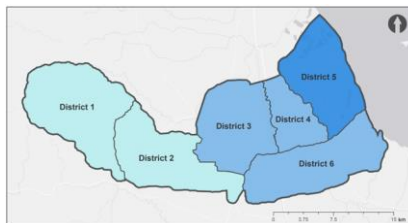
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- Illustrate your findings (maps, diagrams/graphs)
  - Risk index
  - Risk components (hazard, exposure & vulnerability)
  - Indicators (underlying indicators → 'risk profiles')

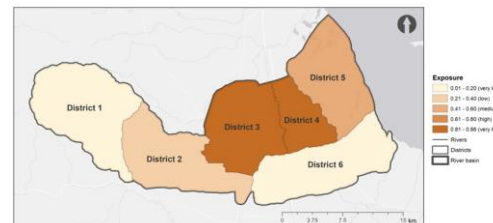
### Risk index



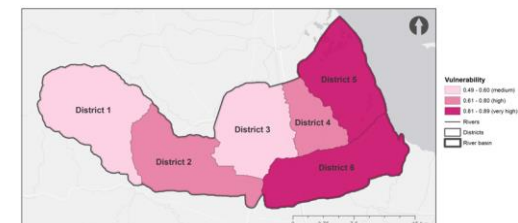
### Risk components



Hazard



Exposure



Vulnerability

# Module 9

## Identification of EbA options



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- **Adaptation goals** and **decision context** need to be clear (**module 1**)
- **Impact chains** as **first guidance** to identify key drivers of vulnerability and entry points for adaptation including EbA (**module 2**)
- **Spatial information** (e.g. vulnerability and risk hotspot maps, maps of key ecosystems and their services) to facilitate the discussion on the spatial **planning & prioritization** of EbA measures (**module 8**)
- **Two basic options:**
  - High risk areas as target regions for EbA measures → *restoration*
  - Low vulnerability areas as target regions for EbA → *conservation*
- Priority should be given to **measures** that have **effects at the local & landscape scale** (e.g. by protecting downstream areas)

# Module 9

## Identification of EbA options



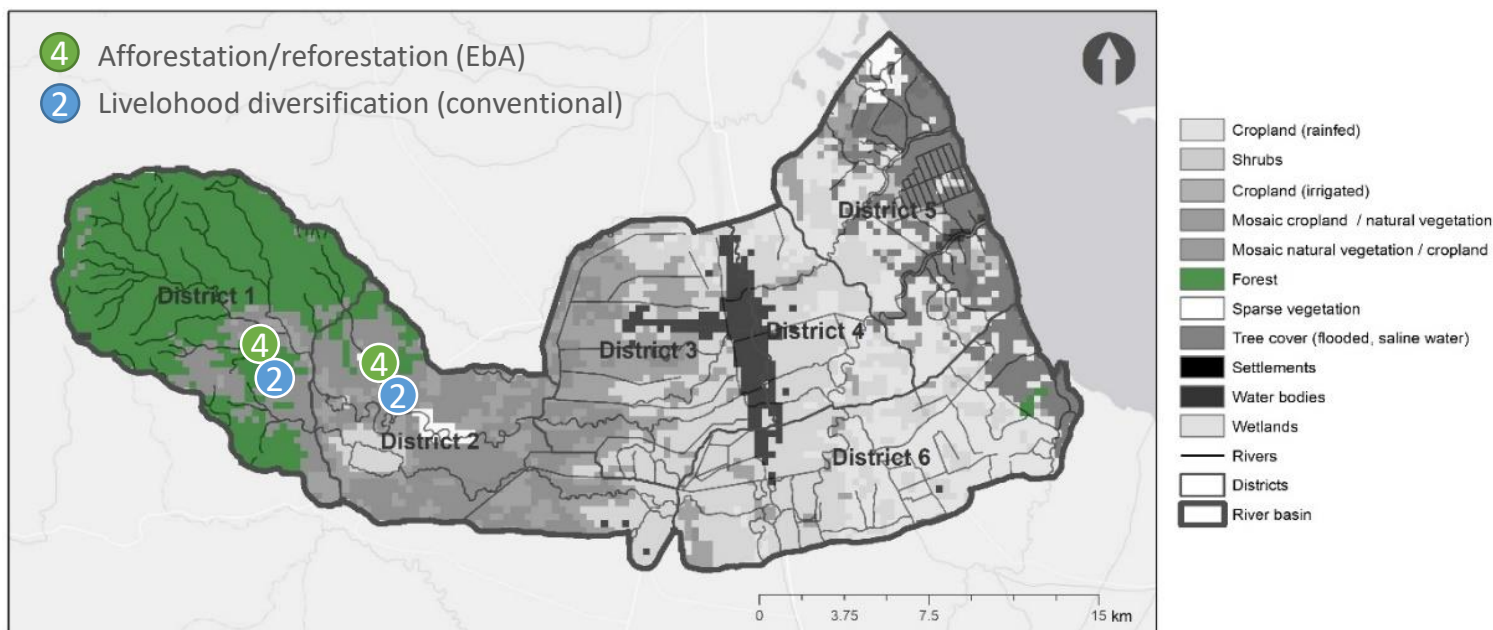
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### Adaptation packages

- EbA is part of an overall adaptation strategy (FEBA 2017)
- Need for ‘adaptation packages’ comprising (1) conventional and (2) ecosystem-based adaptation (EbA) measures to ensure sustainability of measures





# Module 9

## Adaptation benefits, co-benefits, draw backs



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Climate

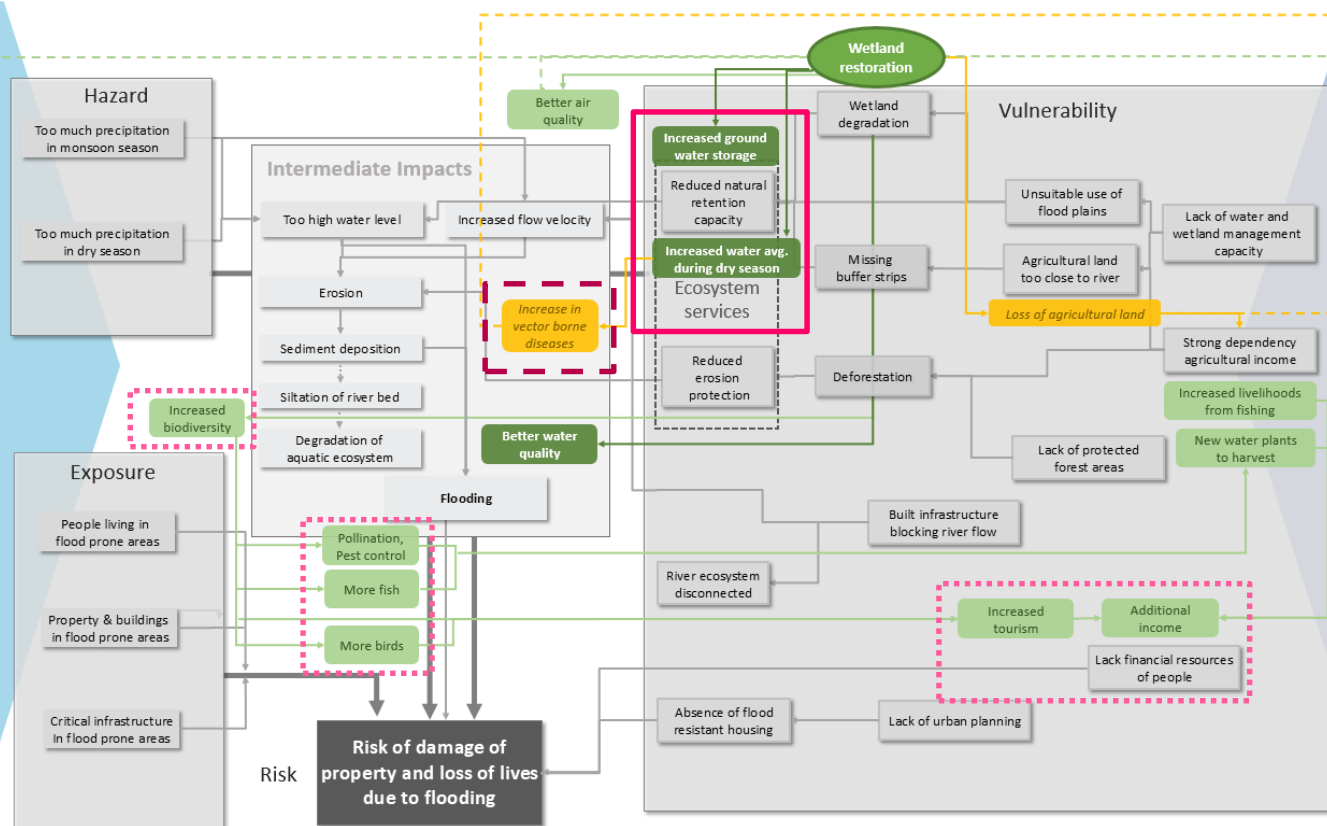
Climate risk

Health &  
well-being

Increased carbon sequestration /  
climate change mitigation

Good health & well-being (SDG 3)

Zero Hunger (SDG 2)



EbA  
measure

Direct effects

Co-benefits

Drawbacks

# How to use the risk assessment for monitoring and evaluation?

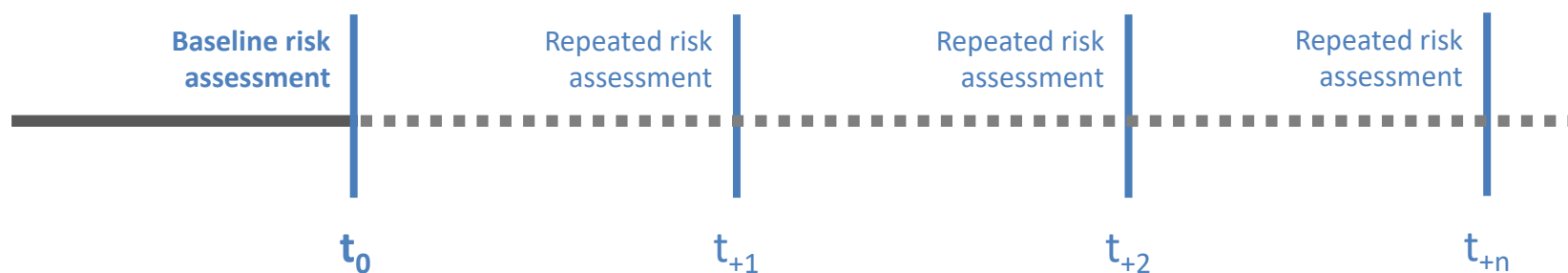


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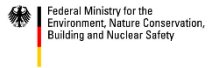
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- Initial risk assessments provide **baselines**
- **Repeated risk assessment and an adaptive management approach** can inform necessary adjustments or further implementation needs



- **Attribution** of trends or outcomes to particular measures is **difficult**

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# Thank you for the attention!

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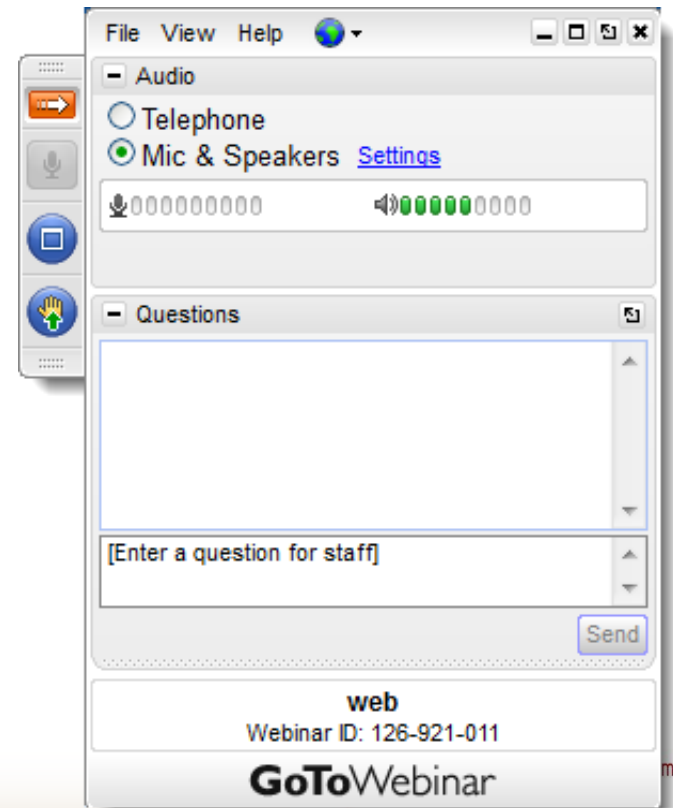
[alexandra.koengeter@giz.de](mailto:alexandra.koengeter@giz.de)



## Questions or comments?

2) To be unmuted, please raise your hand →

1) Use the chat function →

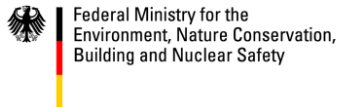




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