



# **LAND4FLOOD Training course & Workshop**

**Technical aspects of Nature-Based Solutions  
allocation:**

**ECONOMIC ASPECTS**

**23 September 2020**

**András Kis**

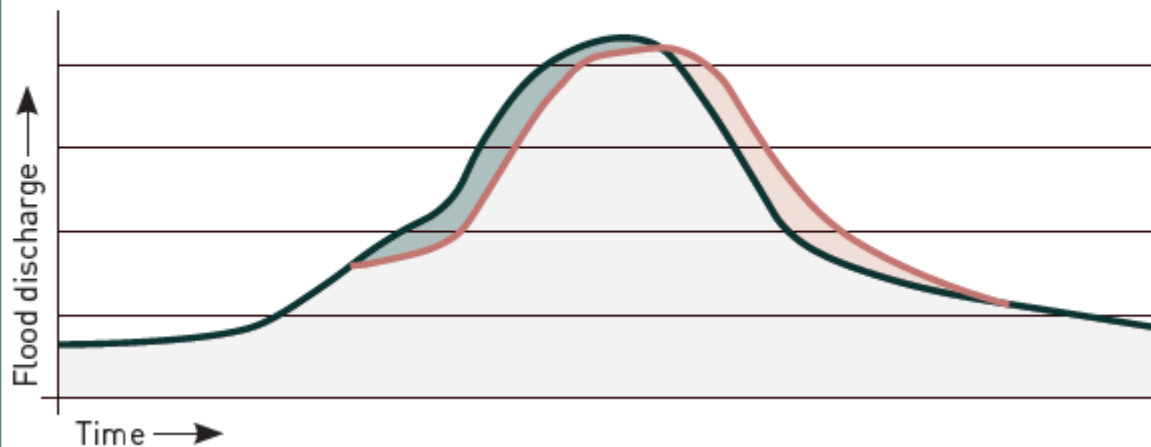
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- Cost benefit balance
- Compensation schemes
- Actual examples

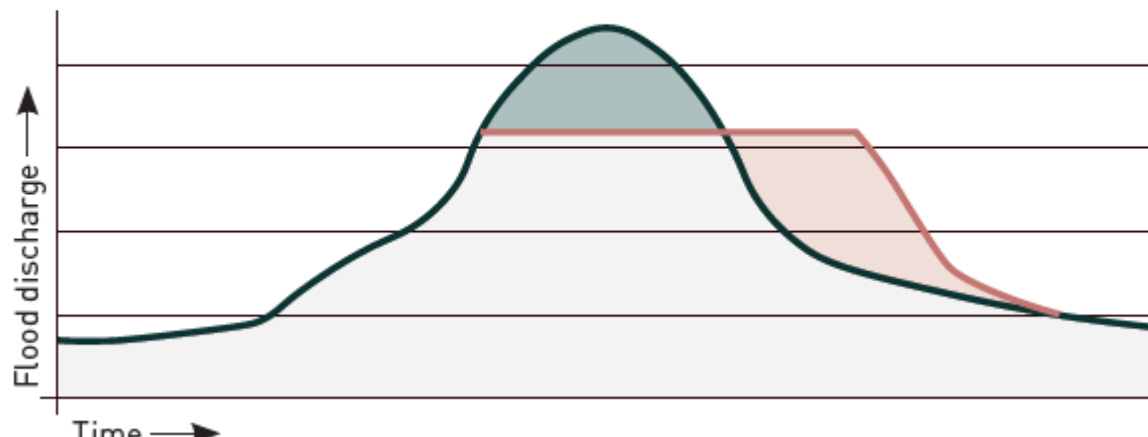


# Cutting the peak of the flood

Impact of uncontrolled retention



Impact of controlled retention



Source: IWRA Policy Brief Number 3, Lukas Löschner (BOKU Vienna) and Arthur Schindelegger (TU Wien), February 2019

| Benefits                                                                   | Costs                                                    |
|----------------------------------------------------------------------------|----------------------------------------------------------|
| Flood risk reduction (in case settlements or agricultural land is flooded) | Construction and relocation costs, related inconvenience |
| Reduced flood defense costs                                                | Maintenance costs of infrastructure                      |
| Improved ecosystem services                                                | Loss of crop yield (and other business activities)       |

Using land for water retention / flood mitigation:

1. Is it worth for society? Is the overall balance positive?
2. Are there any losers that need to be compensated?

# A good CBA is costly, but not doing it could be even more expensive

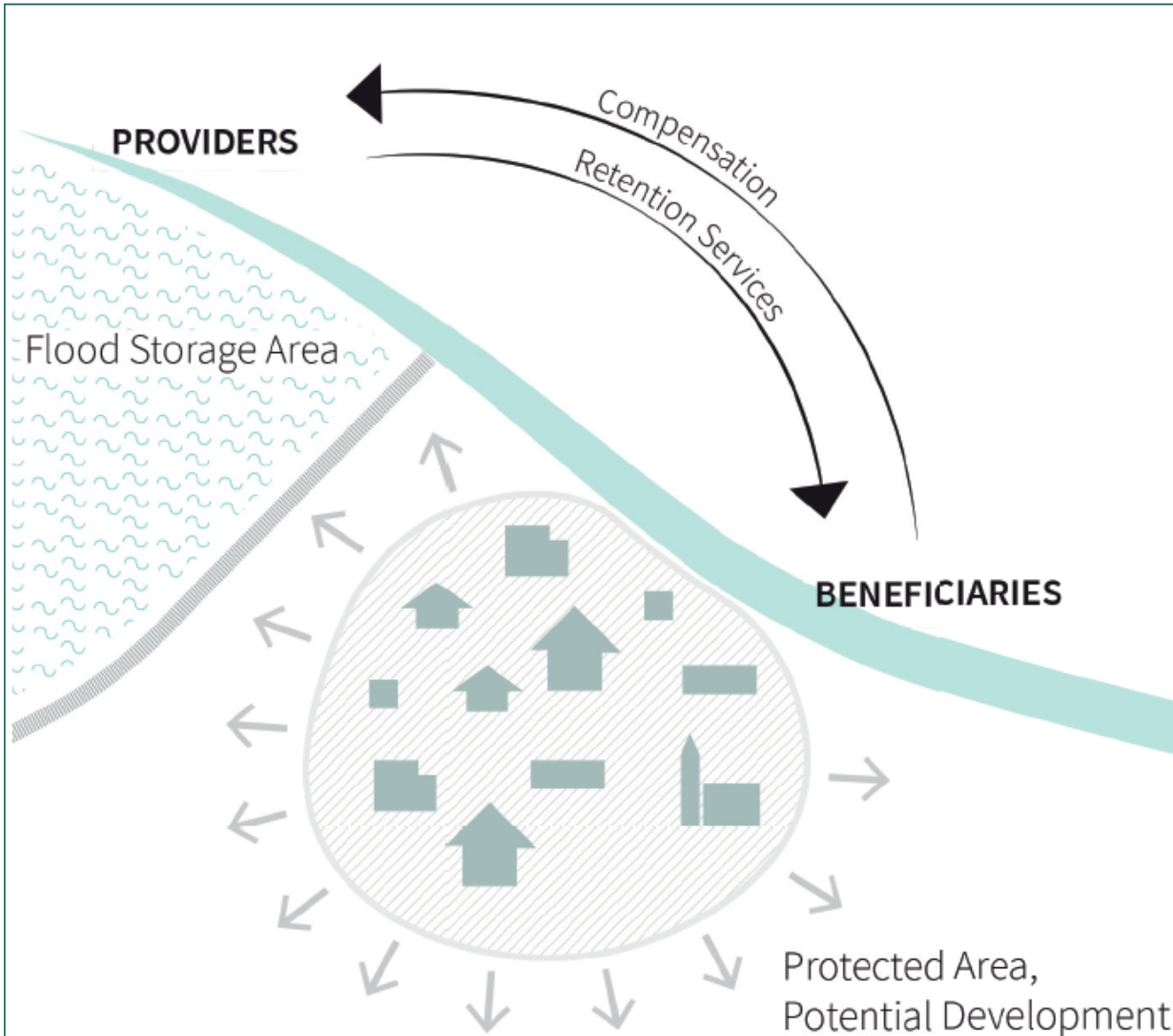
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| Reduced flood defense costs                                                | Loss of crop yield (and other activities)    |
| Improved ecosystem services                                                | Maintenance costs of infrastructure          |

Lots of uncertainty regarding

- Frequency of events
- Risk of a catastrophe
- Value of damage in case of flooding
- Loss of crop yield in the retention area
- Value of ecosystem services

Need a common denominator:  
Present value or annualized value

# Who benefits? Who suffers?



## CONTROLLED FLOOD RETENTION...

### ...changes flood risk



- » lowers risk for protected downstream areas
- » creates land development options

### ...influences land values



- » increases land values in protected areas
- » decreases land values in flood storage areas

### ...requires compensation



determined by

- » legal regulations
- » cost-benefit calculations
- » negotiations

Source: IWRA Policy Brief Number 3,  
Lukas Löschner (BOKU Vienna) and  
Arthur Schindelegger (TU Wien),  
February 2019

# What are the costs for providers that need to be compensated?

When flooded:

- crop yield loss
- reduced future profitability
- recultivation, reconstruction costs



Due to the risk of flooding:

- adjustment of activities (e.g. different crop mix, grazing instead of crop production)
- loss of some income (e.g. impossible to continue contract based high yield production)

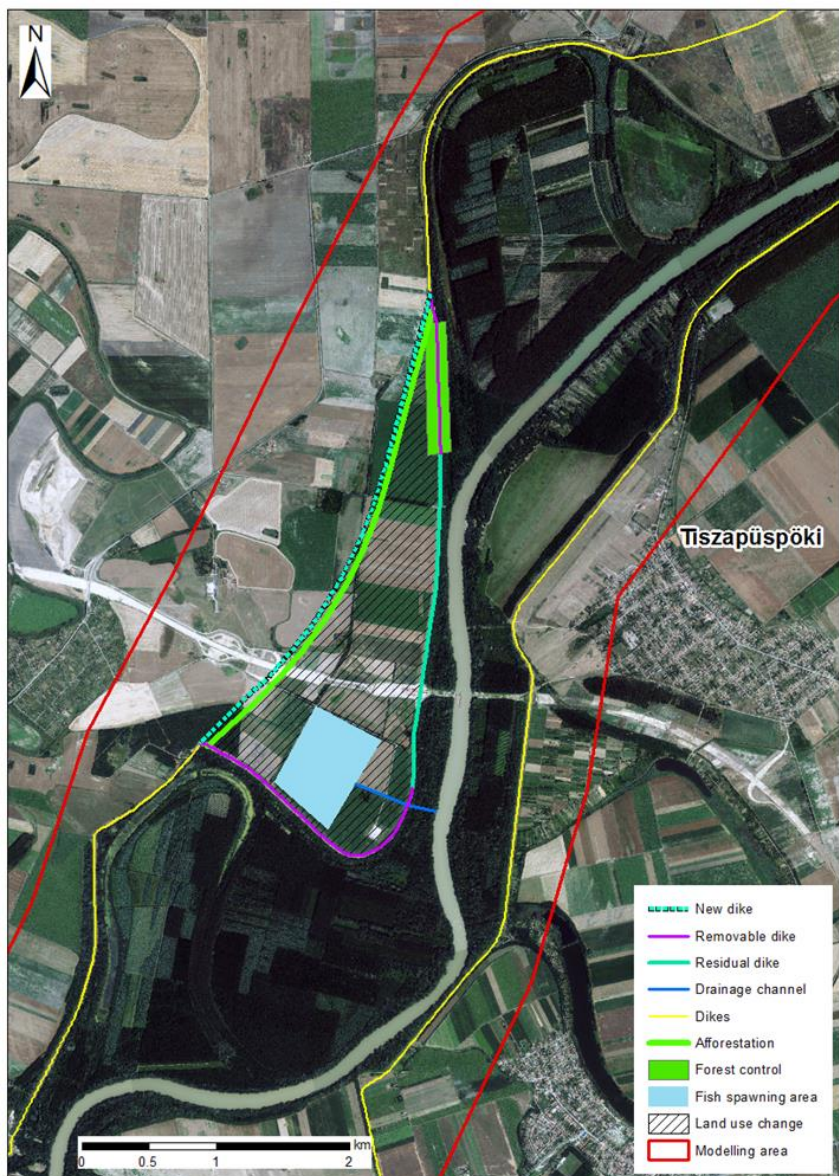
# Types of compensation

- (Purchase of land, expropriation)
- Land replacement
- Up-front compensation for all future damage = buying the right to flood the land
- Annual fixed payment
- Event based compensation
- Combination of the above



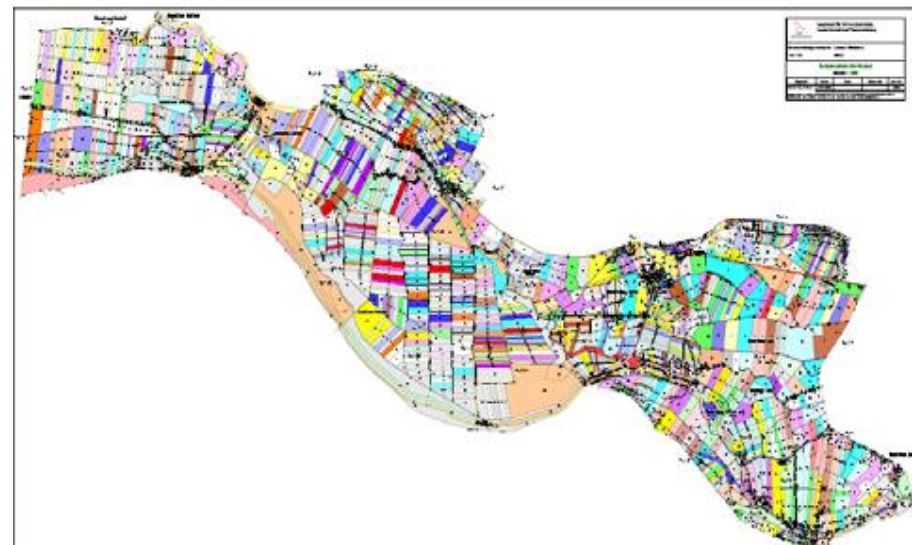
# Purchase of land, expropriation

- Economic principle: the market price equals the discounted sum of all future profits
- Negotiated price generally includes a modest premium to market prices
- Expropriation: if negotiations are not successful
- Land use change (e.g. from arable land to meadow or forest)
- Example from Fokorúpuszta dyke relocation, Hungary



# Land replacement

- Land outside the polder / retention basin is offered in exchange for land inside.
- Livelihood is not hurt
- Some compensation may still be necessary to balance inconvenience, change in quality of soil etc.
- Land use change will follow
- Last resort: purchase or expropriation of land
- Example: Lenzen dyke relocation, Germany



## Up-front compensation for all future damage

- Buying the right to flood the land
- Land ownership does not change, but the risk of flood damage shifts to the land owner
- Land use is likely to change to reflect this risk: lower value crops, grazing, afforestation

## Annual fixed payment

- Similar, but instead of a one-time up-front payment, a fee is paid every year
- It's like buying flood reduction service each and every year
- Spreads the burden across many years

# Event based compensation

- Compensation of all damage when flooding occurs
- All accumulated expenditures of the year + lost profit
- Risk primarily stays with the beneficiary
- The value of compensation depends on
  - crop choice
  - month of the year
- Example: emergency polders along the river Tisza in Hungary



- Individual beneficiaries and/or their association

- reduced flood risk
- rezoning possibility



Alpine towns  
in Austria

- Municipality

- (Federal) government

- NGO

- reduced flood risk + wetland restoration



RSPB, UK

- Frequently a mix of the above

# THANK YOU!

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