





Ministry of the Environment of the Czech Republic



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of the Czech Republic

Ministry of the Environment
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NATURE FRIENDLY FLOOD PROTECTION MEASURES

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Hydrological characteristics of the CZ

The Amount of water in nature conditions of the Czech Republic depends mainly on rainfall.

The renewable water sources in the Czech Republic:

- Rainfall 57 730 mil. m³ (744 mm/year);
- Evapotranspiration 42 872 mil. m³;
- Water inflow/year 781 mil. m³;
- Water flow off/year 15 639 mil. m³;
- Groundwater sources 5 489 mil. m³;
- Useful groundwater sources 1 305 mil. m³.



Two rules in harmony

European legislation

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (WFD)
- Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (FD)



Basic principles of WFD

- Member States must prepare **River Basin Management Plan** for each river basin district lying in his territory.
- For each River Basin Management Plan is suggested **Program of measures**.
- River Basin Management Plans are prepared every 6 years
 1. 2009 – 2015
 2. 2015 – 2021
 3. 2021 – 2027



3 leading measures for achieving goal laid down by WFD = good water status



Measures for improving water quality.

Elimination of pollution from point sources



Measures in catchment area:

- Water recovery system
- Anti-erosion measures
- Measures laid down by GAP

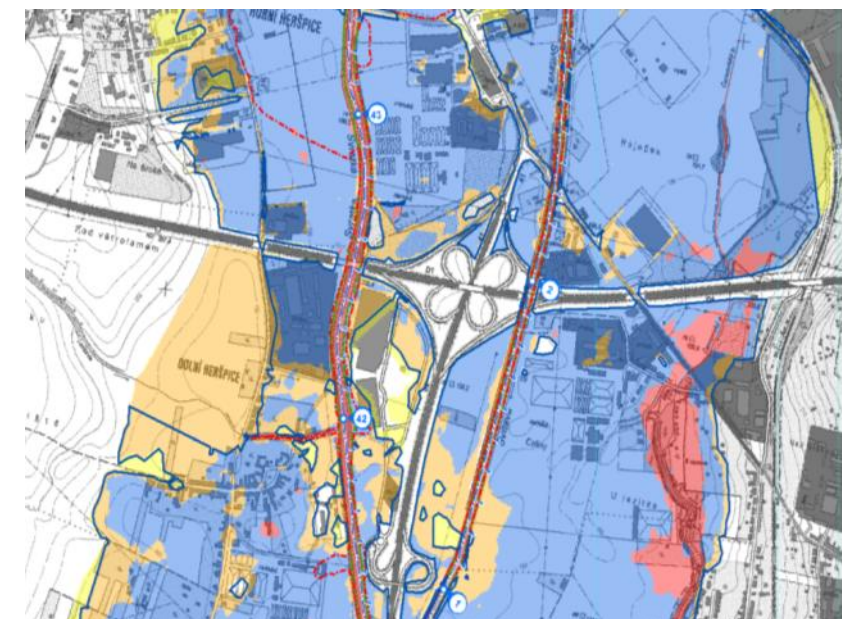
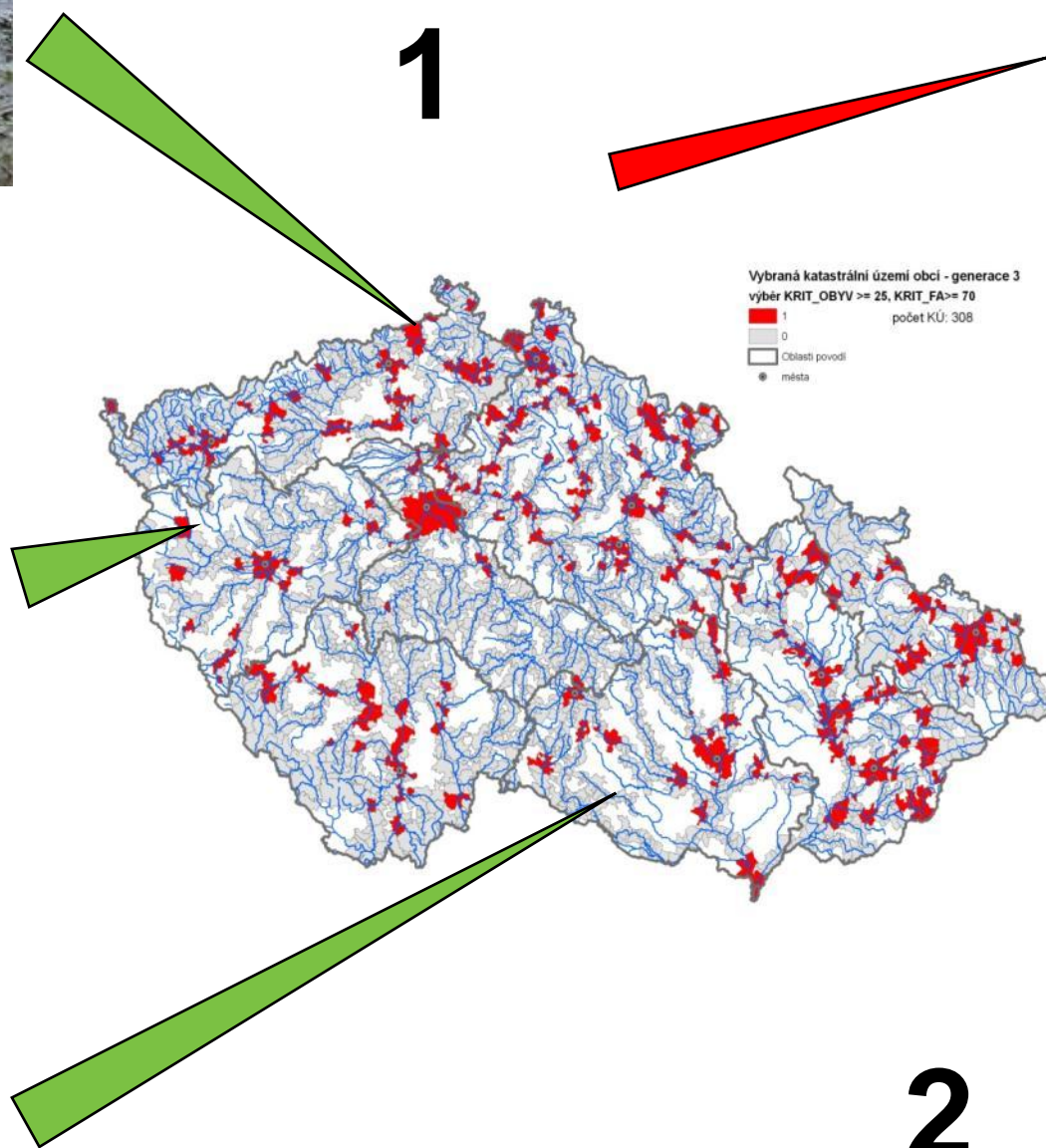


Measures for improving ecological status

Especially improving hydromorphological conditions

Flood directive- principles

- 1) Flood risks assessment maps
- 2) Measures proposals



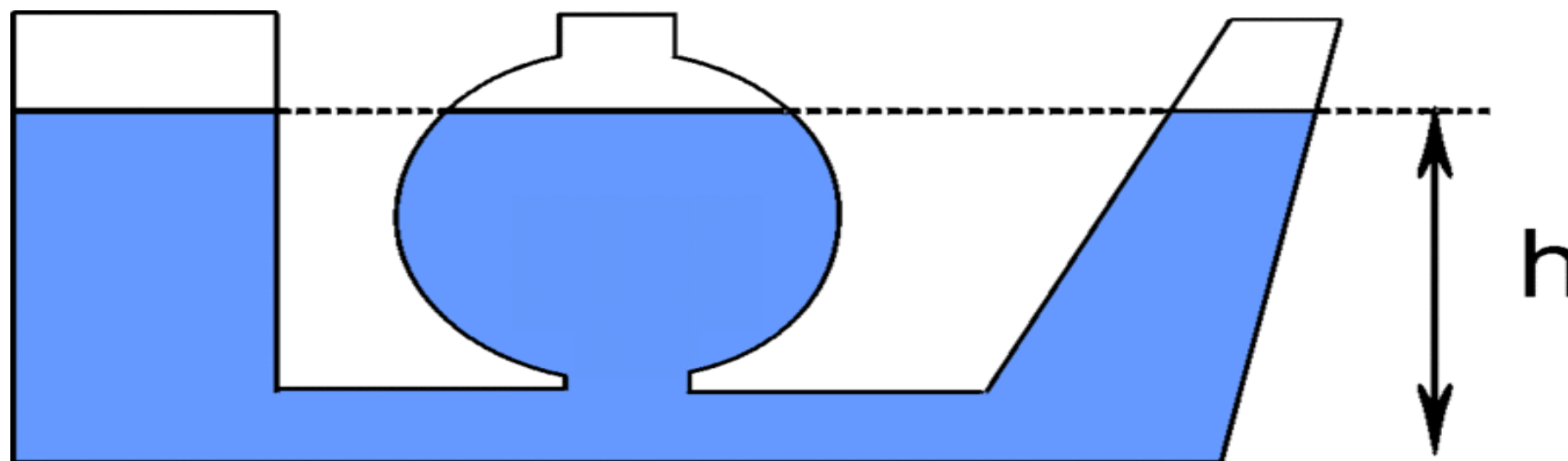
Related issues

Very important

**Ecological
status**

**Flood
protection**

**Land use –
agriculture, etc.**



Current state



← Bank reinforcement
Embankment building →



← Building of dam reservoir
Weir level control →



← Mining of sediments
Urbanization of stream →



Recent status of river basin

Nonconforming

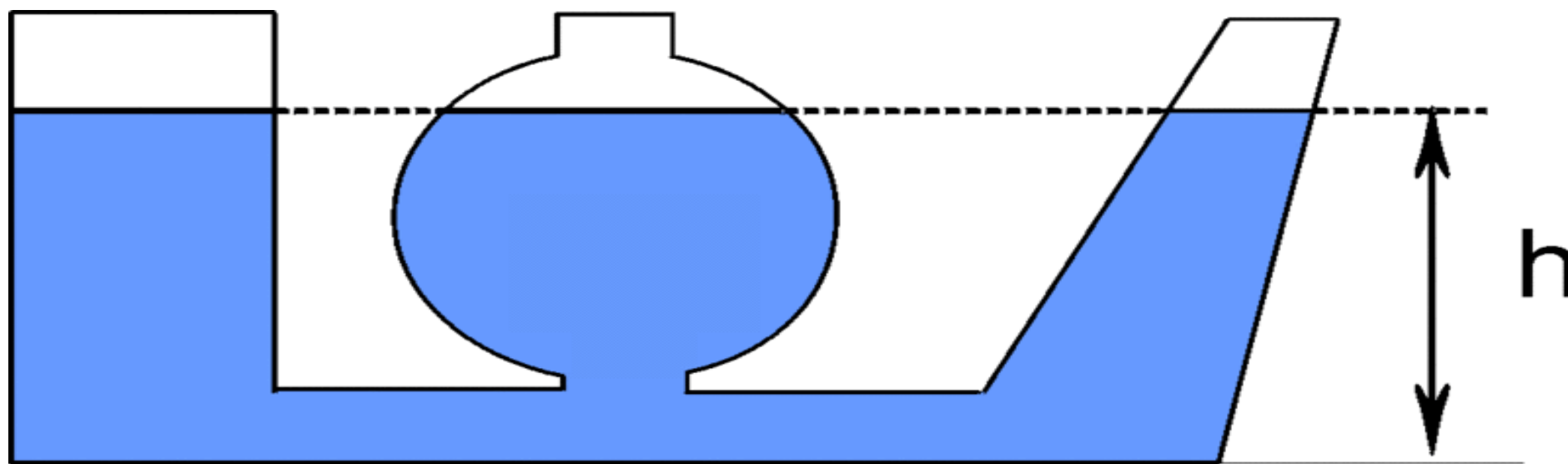
Main causes – agriculture and forestry

Main effects

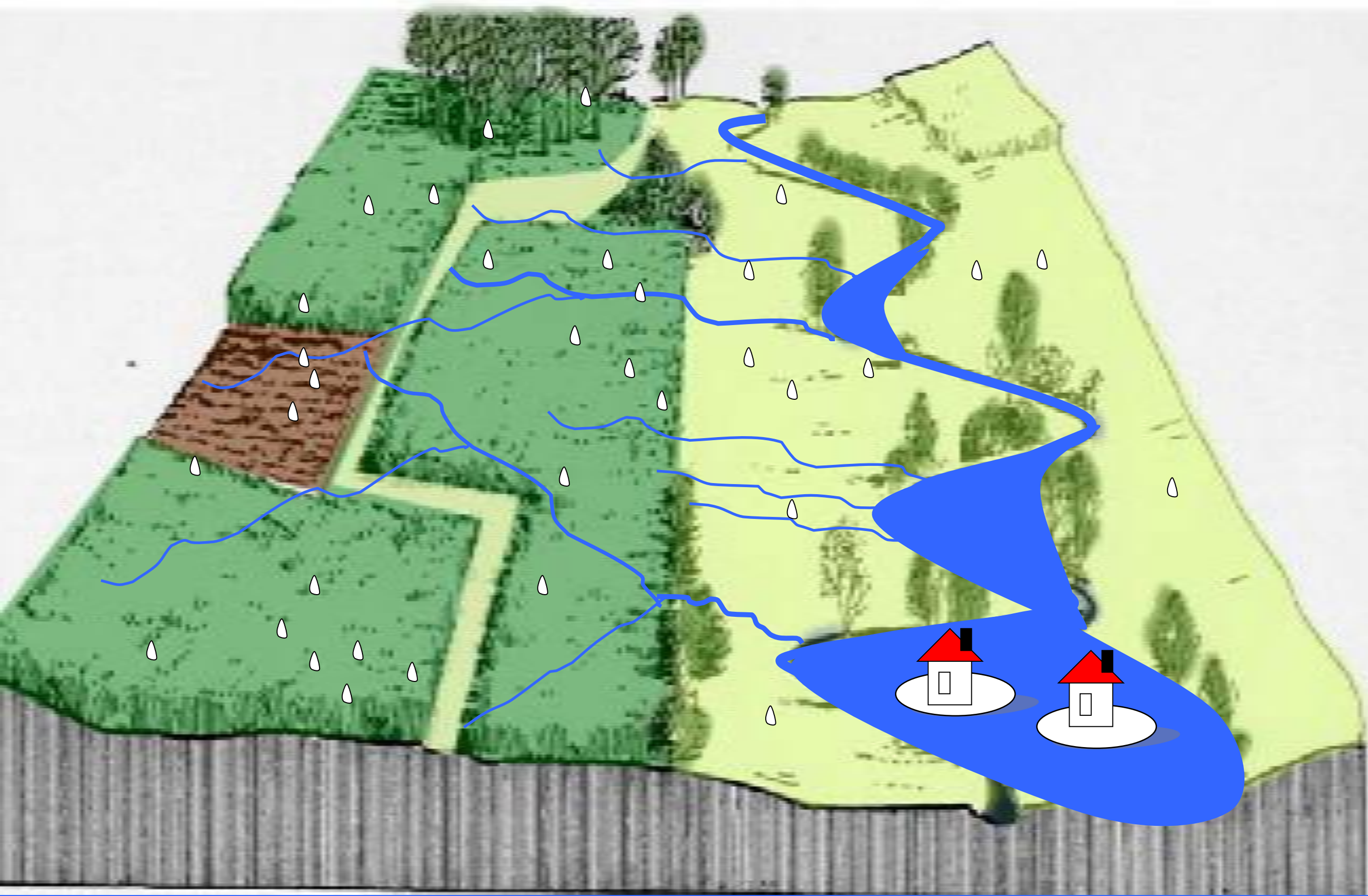
- faster runoff
- fertilization - increased nutrient-loss from soil to water (eutrophication)
- Soil erosion - caused by unsuitable tree felling

3 BASIC principles of nature friendly flood protection measures

- Retention of rainwater in the landscape
- Enable the development of natural channel morphology
- Improving river hydromorphology



Retention of rainwater in the landscape - principle



Principle of nature friendly measures

Complex of measures in the River basin

Stream and alluvium measures

Modification
of stream
and alluvium

Support of
overflow
(natural or guided)

Area measures

Balk creating

Stabilization
of runoff

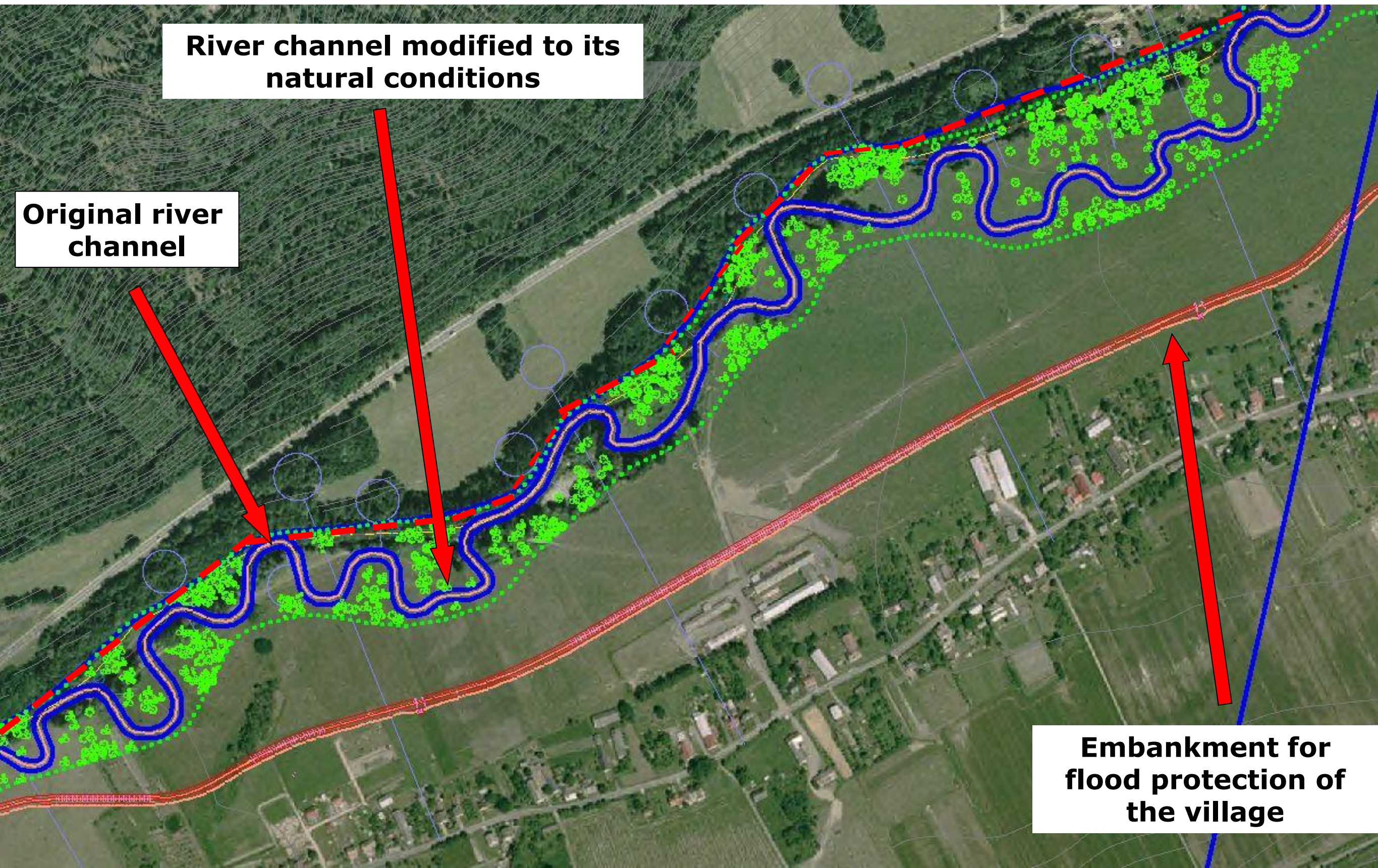
Grassing

GAP (GAEC+CC)

Measures in forest



Enable the development of natural channel morphology - 2 Principles



River channel modified to its natural conditions

Original river channel

Embankment for flood protection of the village


Improving river hydromorphology

Before



After



- 
1. Slowdown of runoff
 2. Increased self-cleaning
 3. Improved ecological status

Schedules of measures in the Czech Republic

Improvement of the stream function and esthetic value

-

Revitalization in urban area (Chrudim, Czech Republic)

1996



2008

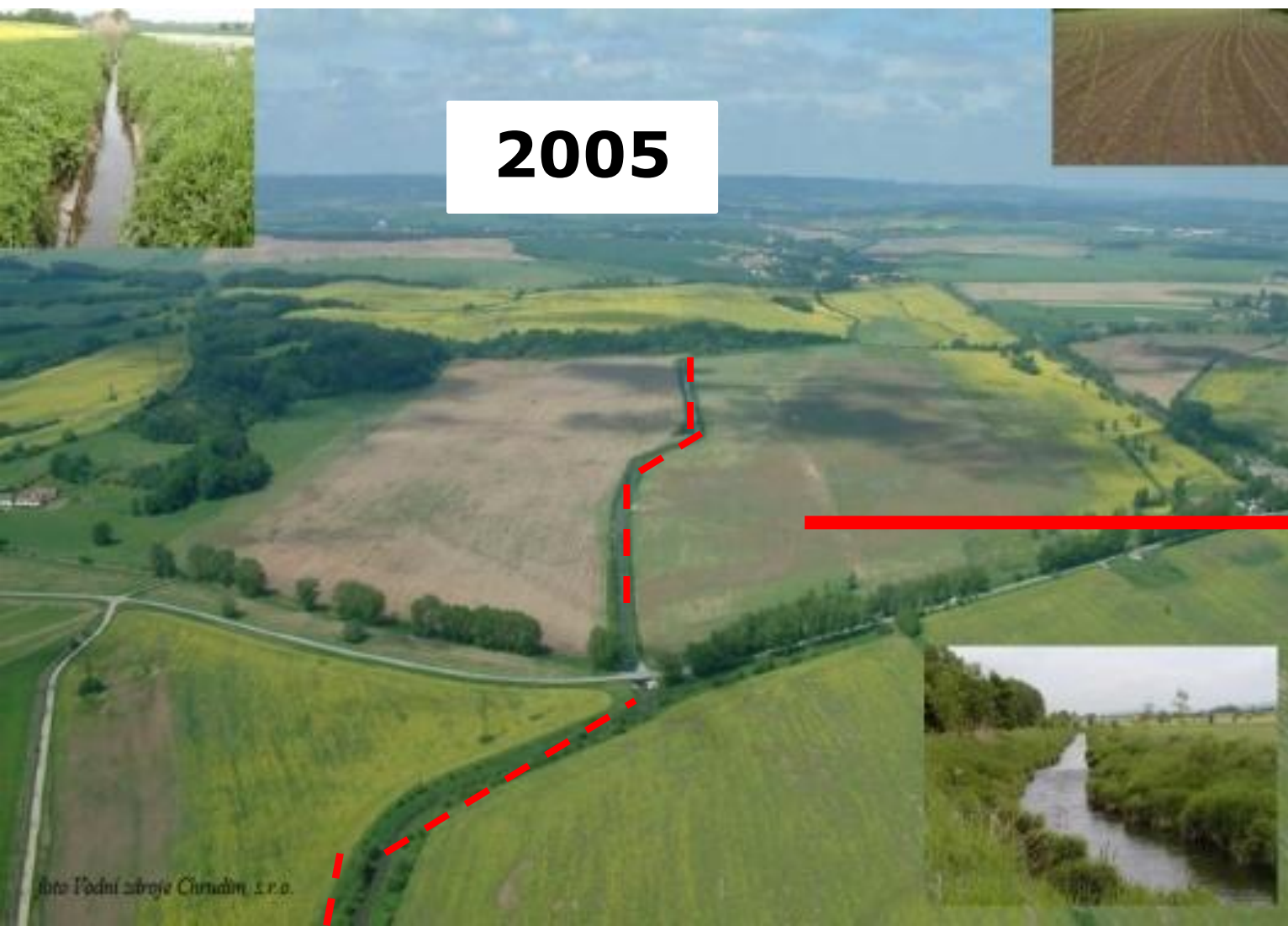


Schedules of measures in the Czech Republic

Connect to inundation area

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Revitalization in the landscape
Polder Žichlínek - river Moravská Sázava

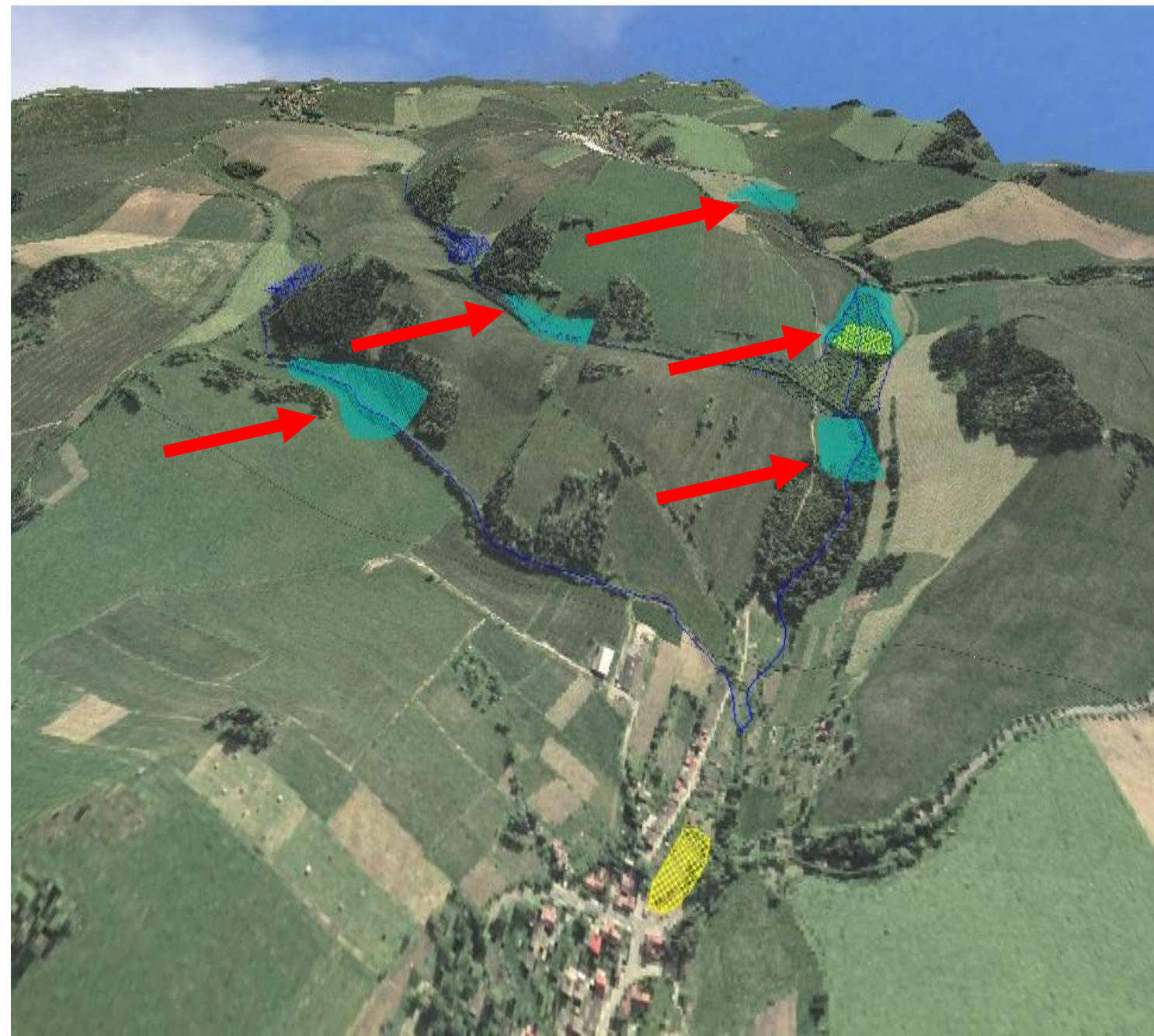


Schedules of measures in the Czech Republic

Flood protection by nature friendly measures

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Realization of the dry rentence polder

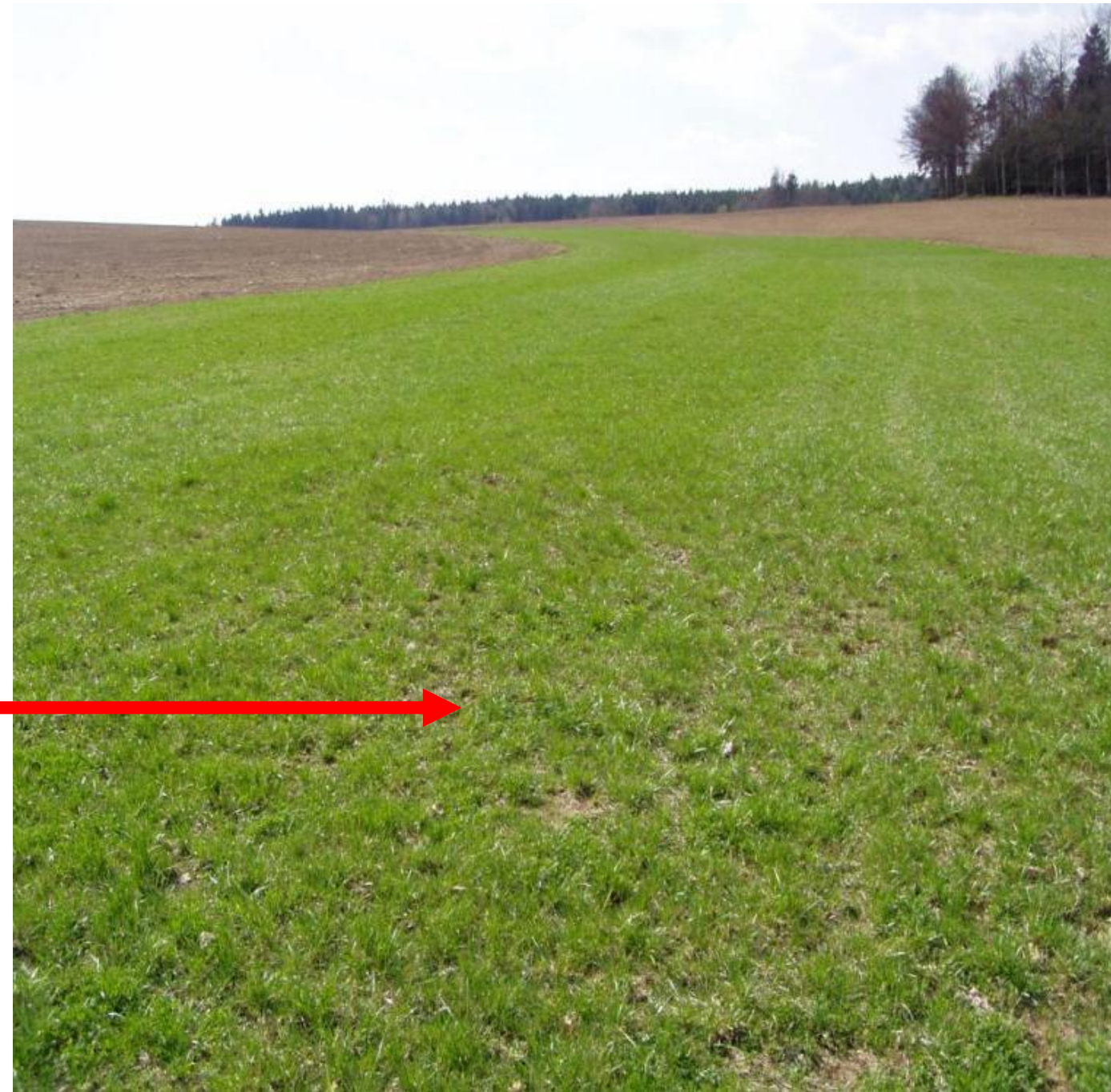


Schedules of measures in the Czech Republic

Realization of area measure in river basin

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Stabilization of nutrients runoff



Thank you for your attention



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