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REGIONE AUTONOMA
DELLA SARDEGNA



MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE



FLASH FLOODS AND PLUVIAL FLOODING

Working Group F Thematic Workshop

LOCAL WATER PLANNING

integrated approach towards flood risks reduction



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Association of Towns and Communities of Slovakia

26th-28th May 2010, Cagliari, Italy



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**May 2010 floods in
Slovakia**
50 – 200 mm / 4 days

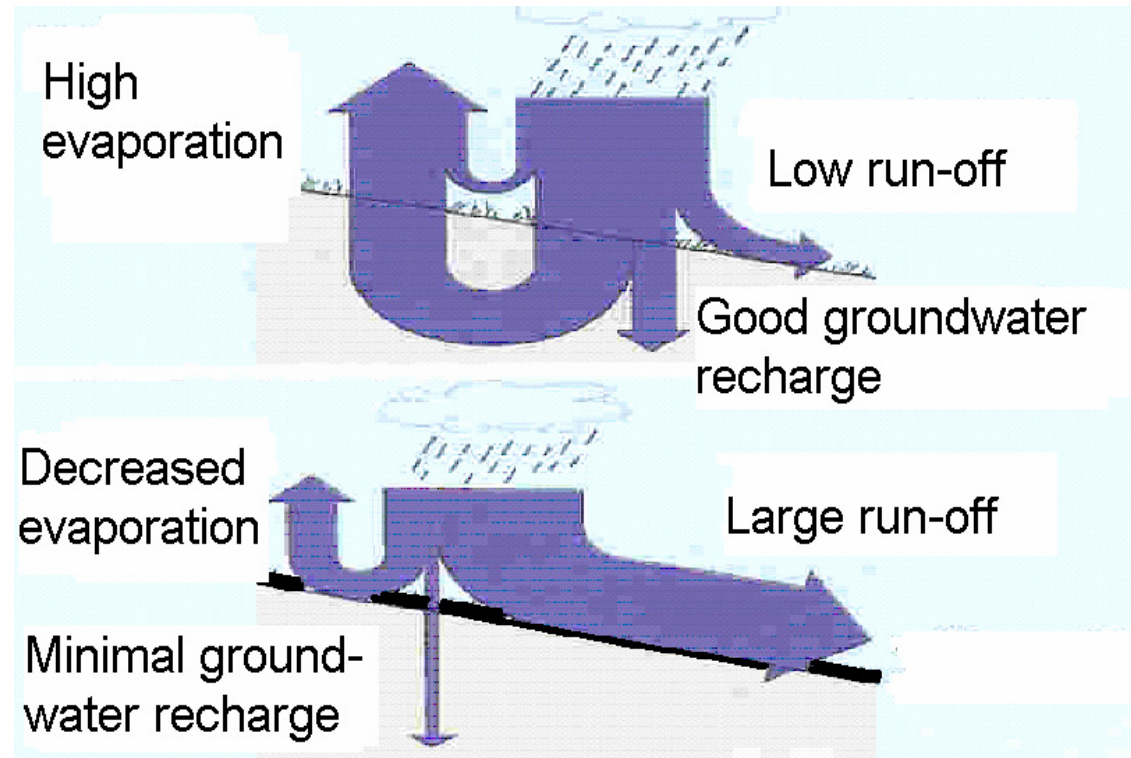




Functions of landscape in distribution of rainwater / land use - land alteration

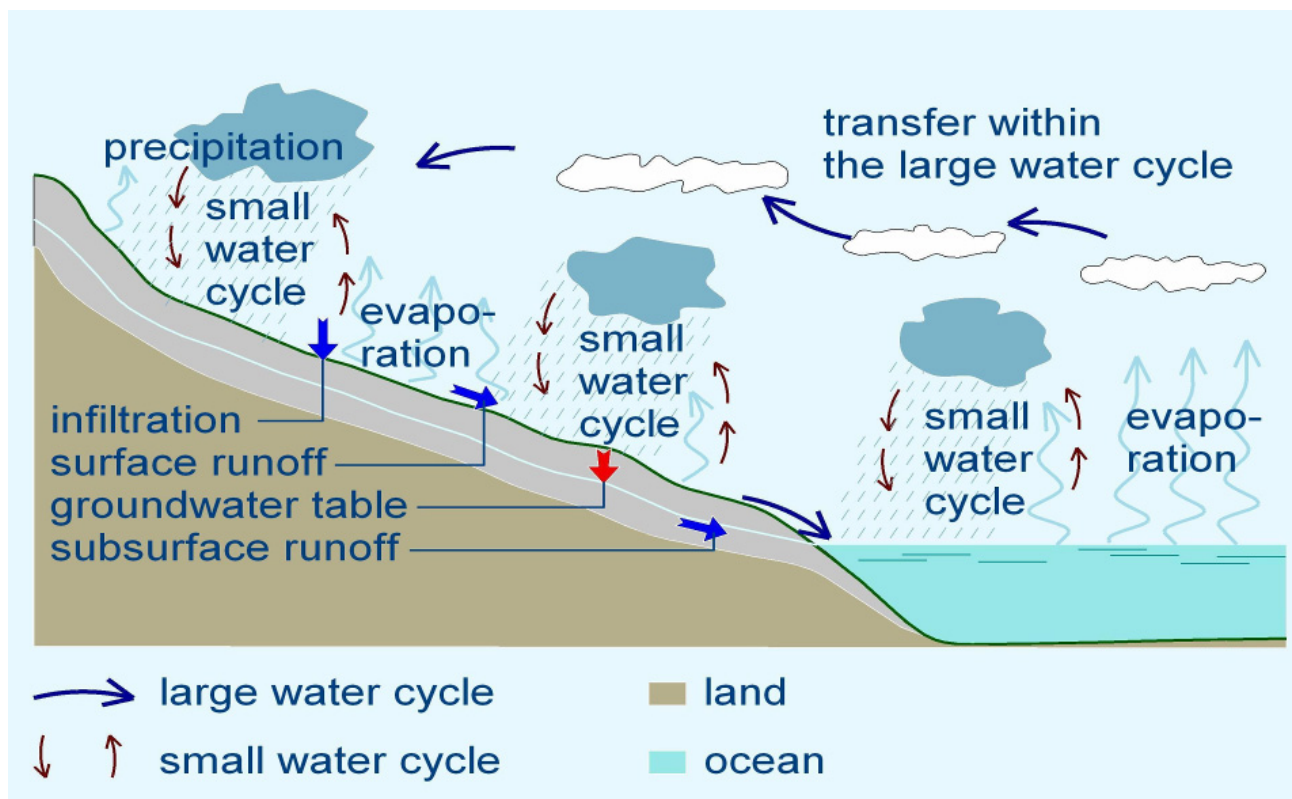
In distribution of rainwater, landscape has three basic functions:

- optimally infiltrate water to the soil profile and ground, based on their natural physical parameters
- create favourable conditions for water evaporation from soil, plants, water bodies and surfaces
- drain only natural surplus water from basin through the river basin network



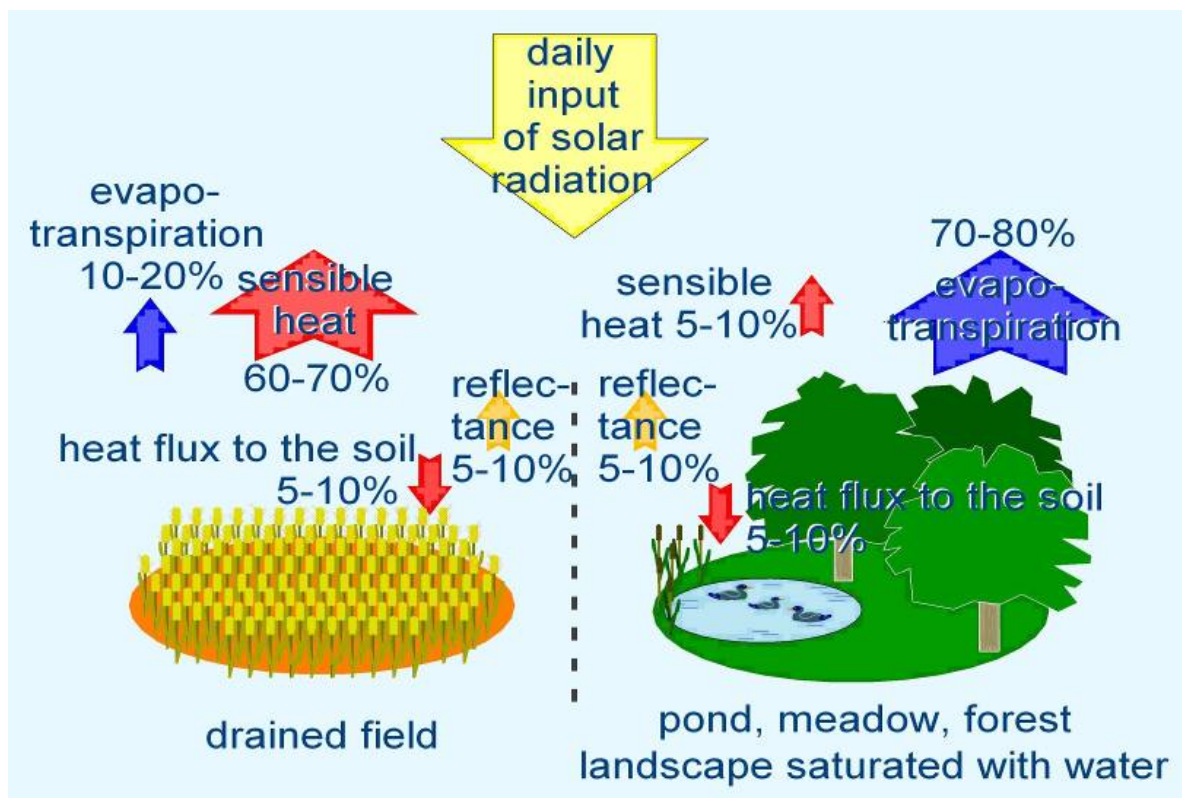


Hydrological aspect - water cycles



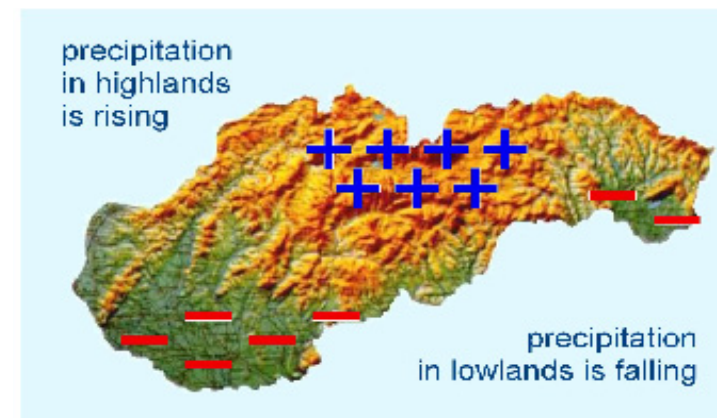
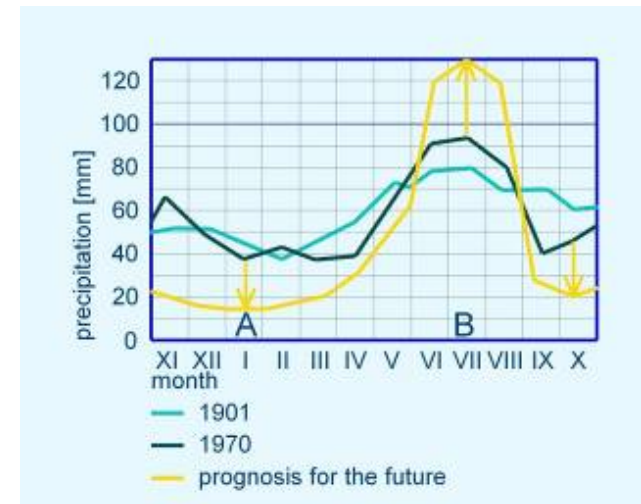
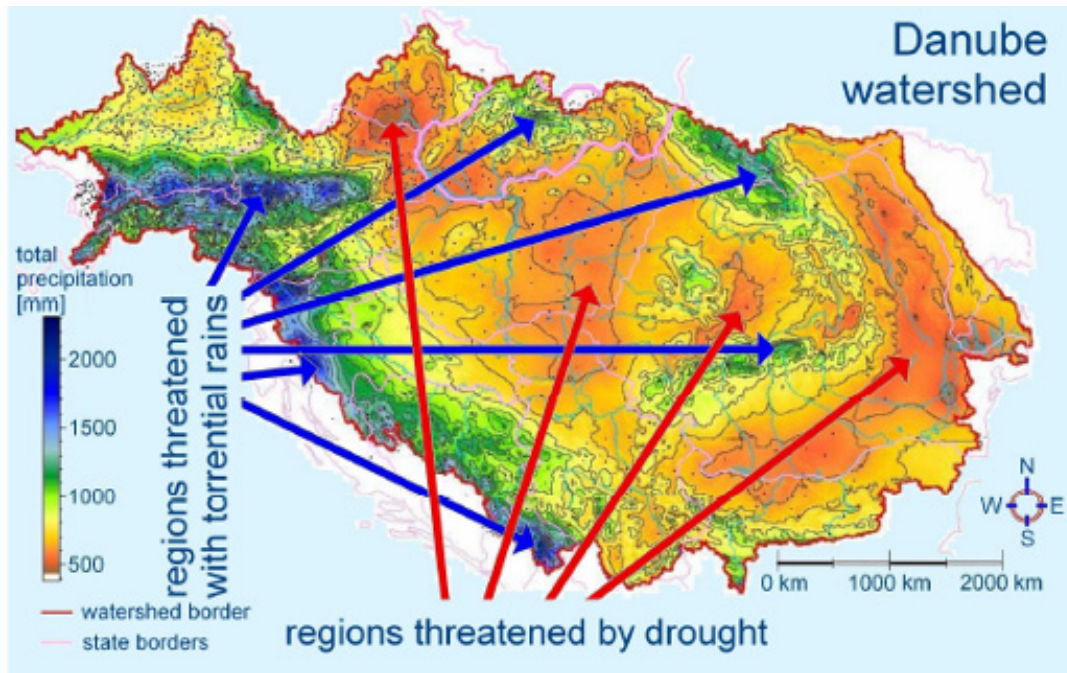


Solar energy aspect – latent/sensible heat





Precipitation trends





Some basic facts

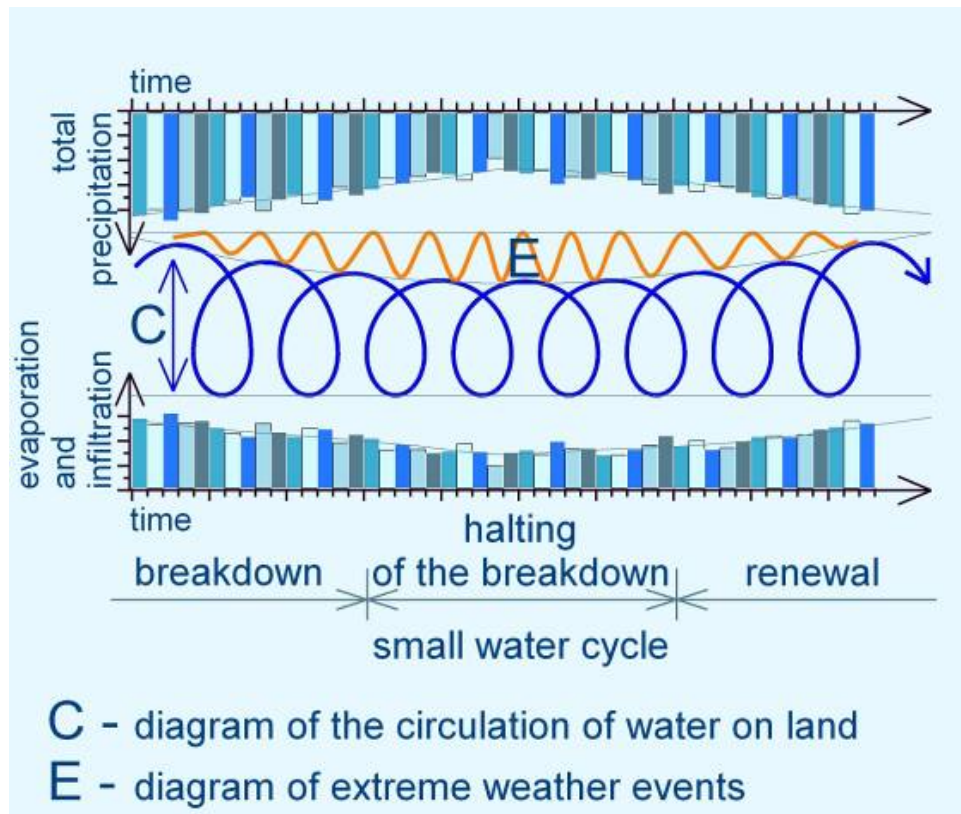
- 2/3 of the rainwater comes from the evaporation of the water in the water basin
- Decrease of evaporation in landscape decreases amount of rain and change precipitation patterns
- Desertification of continents increase sea level rise
- Agriculture - responsible for flood risks up to 70 %
- Today way of urbanization, woodland and river management creates another 30 to 40 % of risks
- Too much political and scientific attention paid to CO2 reduction instead of water, soil and vegetation cover renewal
- Instead of focus on water on the outcome we have to focus on conditions created for water on its input to the ecosystems



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Decrease of floods and droughts risks





Need for

- **Integrated approach** instead of isolated public policies and funding in areas like: soil, water, climate - IWRM
- **Complex impact measures:** not only for 5 days of flood but for the rest 360 days of the year as well – from floods to droughts and back
- Soil, water, vegetation, nutrients and climate holistic approach – possible if **local level of water planning** is involved, communication and co-operation with stakeholders and landowners
- **Physical reconstruction – adaptation** of the landscape profile
- **Water** is key asset that we can measure, store and renew. CO₂ is basic component of the **photosynthesis process**. Vegetation and soil well saturated by water are able to absorb huge amount of CO₂ and water **and cool the landscape effectively**
- **New roles of landowners** – rainwater retention and soil protection



Local water planning

- Relates to national water planning, WFD and Flood Directive
- Key outcome – **Community plan of integrated water resources management** – base for communication, negotiation and action
- Consists of:
 - Preliminary assessment of water and soil status in cadastral area of community
 - Quantity analyses and measures proposals
 - Quality analyses and measures proposals
 - Setting up and implementation of the monitoring
- Methodology developed by Association of Towns and Community of Slovakia – fully supports WFD, FD and adaptation to Clim. Change

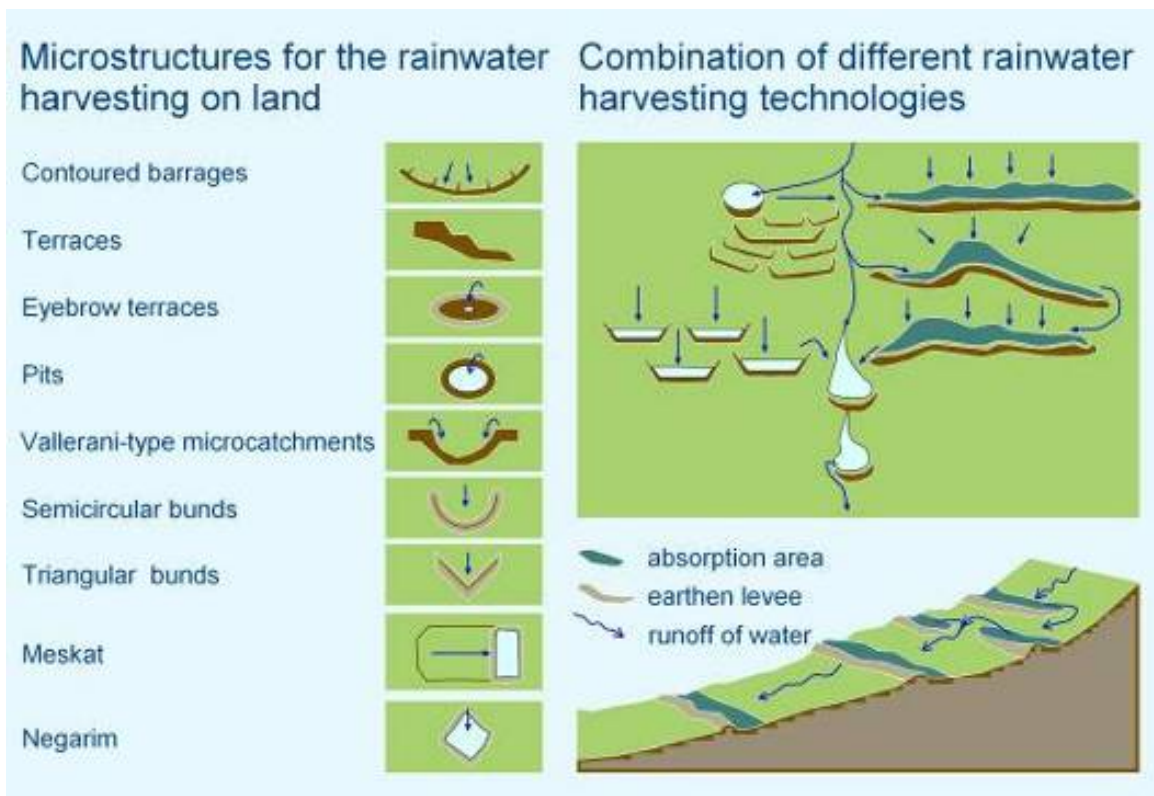


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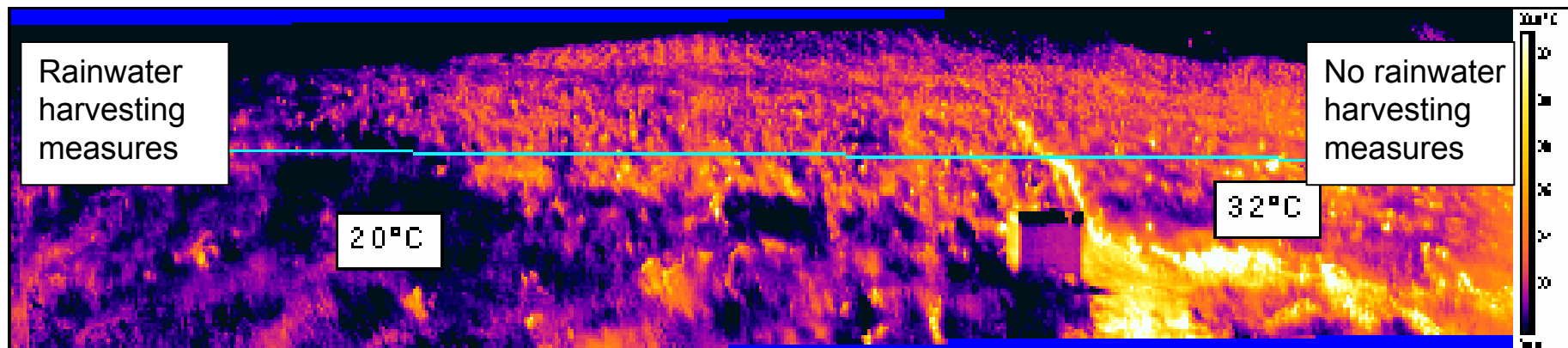
Adaptation of the landscape structure





Tools developed for local communities

- Infrared monitoring
- Small meteorological radar – www.meteoradar.eu
- Catalogue of the measures, solutions and best practices – www.zmos.sk

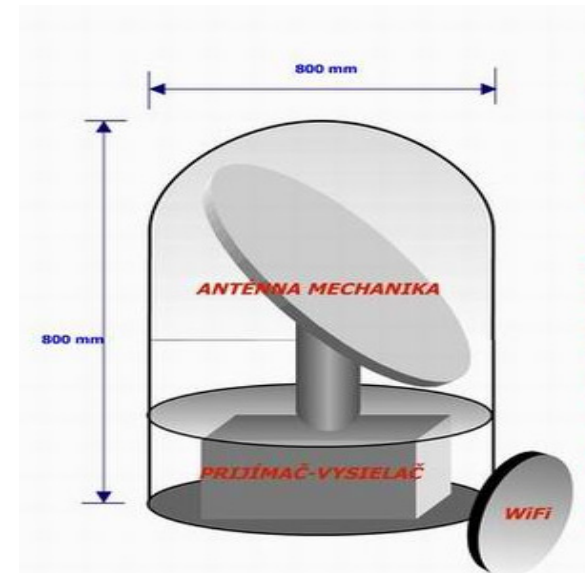
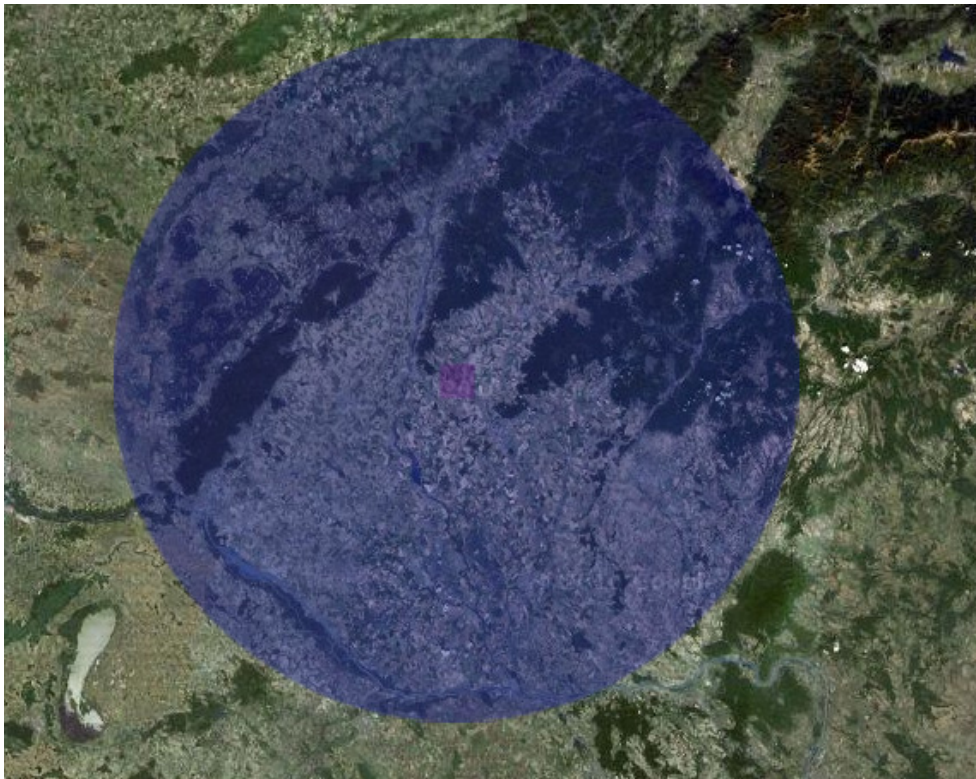




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www.meteoradar.eu

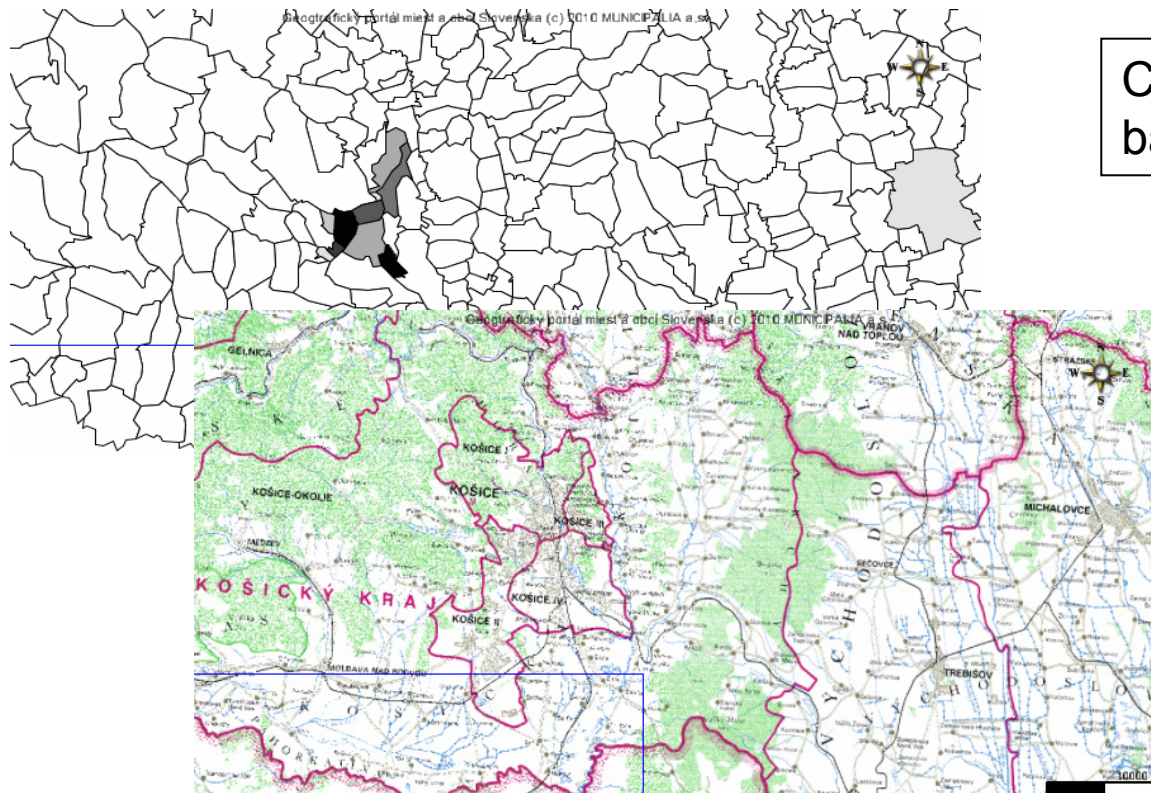


Small meteorological radar
– 40 or 80 km range;
network of 12 planned; 200
meters grid; 10, 30, 60
minutes prediction



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Analyse of surface runoff



CN values of micro-water
basins of cadastre

Potential for
rainwater retention

**Adaptation
measures proposal**
for particular part of
the land / micro-
waterbasin



Catalogue of the measures, solutions and best practices

1.1.5. ADAPTÁCIA RIGOLOV PRI CESTÁCH A CHODNÍKOKH

Popis: V mnohých prípadoch je voda z ciest a chodníkov odvádzaná kanálmi preč, čím sa prostredie ochudobňuje o množstvo dažďovej vody, ktorá často prispieva k



Je sú široké plytké kanály, ktoré slúžia na spomalenie máhajú jej infiltrácii do pôdy. Sú prospešné aj pri filtrovaní počas odvádzania odtokov zo zastavaných plôch. Bývajú s vegetáciou (stromami, kríkmi alebo trávnatým okou schopnosťou odstraňovať znečisťujúce látky a getačné priehlbne sú výbornou environmentálnu alternatívou klasických níkami a cestnými priekopami, pričom zabezpečujú aj čiastočnú úpravu vody systémom na zbieranie a odvádzanie dažďovej vody.

ate klasické odvodňovacie (kanálové) priekopy, ideálne vo veľmi miernom obvykle menej nákladné ako priehlbne s vyššou a hustejšou vegetáciou. j možnosť pre infiltráciu a odstraňovanie kontaminantov. Trávnaté na predúpravu ďalších štruktúrnych riešení. one sú obvykle navrhnuté pre odtokové územia menšie než dva hektáre.

Ak sú použité pre odvodnenie väčšej oblasti, prietoková rýchlosť vo vnútri priehlbne sa stáva príliš veľkou pre zachytenie odtoku, vzniká riziko erózie v priehlbni. Tu je možné využiť rozčlenenie svahu pomocou malých vodoholdingov.

Zodpovedný subjekt za realizáciu:

Uplatnenie opatrenia v praxi (limity obmedzenia a podmienky)

Druh pozemku: plochy pri cestách a chodníkoch

Výmera pozemku: bez obmedzenia

- 1. **Adaptačné opatrenia v krajine**
 - 1.1. **Opatrenia v zastavanom území**
 - 1.1.1. **Zmena nepriepustných povrchov na priepustné povrchy**
 - 1.1.2. **Vsakovacie jamy, drény, tunely a studne**
 - 1.1.3. **Akumulácia dažďovej vody - čiastočná alebo úplná**
 - 1.1.4. **Adaptácia zaústení zvodov dažďovej vody pri budovách**
 - 1.1.5. **Adaptácia rigolov pri cestách a chodníkoch**
 - 1.1.6. **Zelené strechy**
 - 1.1.7. **Zelené fasády**
 - 1.1.8. **Zelené siete**
 - 1.1.9. **Čistenie dažďovej vody od mechanických nečistôt a ropných látok**
 - 1.2. **Opatrenia na poľnohospodárskej pôde**
 - 1.2.1. **Obnova mokradi a rybníkov**
 - 1.2.2. **Priečne brázdy - zasakávacie pásy (po vrstevniciach)**
 - 1.2.3. **Vegetačné pásy po vrstevniciach**
 - 1.2.4. **Obnova a budovanie pôdných terás a stupňov**
 - 1.2.5. **Sanácia strží - ich zaceľovanie a vyplňanie**
 - 1.2.6. **Vsakovacie jamy a depresné plochy**
 - 1.2.7. **Budovanie živých plotov, vetrolamov a ostrovov trvalej vegetácie**
 - 1.2.8. **Zatrávenie poľnohospodárskej pôdy - čiastočné alebo úplné**





Summary

- All atmospheric processes are created in 10 km thin layer.
- Alteration of the original land during decades and centuries without compensation measures changes precipitation patterns and regional climate, increase flood and drought risks
- Need for application of no till farming methods, rainwater harvesting in urban zones, restructuring agricultural land and revitalisation of rivers
- Need for radical reform of common agricultural policy and related policies that have impact on water, soil and vegetation cover – new tasks and roles for farmers and landowners – water retention and soil protection – first
- Significant opportunity to reduce flood and drought risks



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Thank you for your attention

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