Flachner Zsuzsanna –
MTA TAKI/RISSAC

Water for food and nature

Integrated landscape development for better adaptation
-vision development for
Tisza River Basin

- key methods and concepts applied in Tisza Basin
- key messages
How Need Fulfillment Is Perceived

Subjective – Well-Being
(happiness, utility, welfare, land-consciousness, Nature affection)

/for individuals and/or groups/

Scenarios, Envisioning, evolving social norms
Értékkrendek

Policy, Decisions
(community-individual level)

Opportunities:
To meet human Needs, now and in the future – sustainable
(Built, Human Social and Natural Capital and time)

Human needs:
Subsistence
Reproduction
Security
Affection
Understanding
Participation
Leisure
Spirituality
Creativy
Identity
Freedom

How Needs are Met

Accounting and budgeting ecosystem services

Participative planning and realization

Prefence measurement

Quality of Life after Costanza et al, 2008
Planetary boundaries (SEI, 2009)
Ecosystem services and scenarios

Maintenance and restoration costs in RBM plans

Biophysical structure or process
(e.g. woodland habitat or net primary productivity)

Limit pressures via policy action?

Function
(e.g. slow passage of water, or biomass)

Service
(e.g. flood protection, or harvestable products)

Benefit (Value)
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)

Σ Pressures

Economic and social values now and in different scenarios – Can we translate? How water related preferences are contradicting based on economic interest?

Scenario based pressure indication

Scenario based preference indication on expected services and benefits
Biodiversity and economic value

- OECD Baseline scenario
- International Policies
- Watergap scenarios
- Lower Danube scenarios

Change in Land use, Climate, Pollution, Water use

Change in Biodiversity

Change in Ecosystem functions

Change in Ecosystem Services

Change in Economic Value

Indicators, modelling and ES calculation

Based on - TEEB presentation, TEEBWEB-org, 2009
Conceptual model of water resource management (SCENES, IIASA, 2008)
Water quality, irrigated land, level of risk

Legal frame, governance, education, state budget, social security, safety, information management

Production-service-consumption; market, households, infrastructures, diff. Industries, transportation, tourism, waste, water, forest mngt., spatial utilization

History, value preference, philosophy, politics, knowledge, wisdom, consumption patterns

State
Pressure
Structural level
Institutional level
Cultural, social level
Excercise – define your own value pyramid!

Same groups for scenario development

Key questions:
- Basic values
- knowledge
- key institutions
- production structures
- consumption patterns
- environmental issues

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Tisza river basin
Historic land use change in the region

SZÖVET – UNDP/GEF Tisza biodiversity project
Key issues in the Tisza river basin - waterlogging, drought, flood risk

- yellow – low waterlog threat
- green – middle waterlog threat
- blue – high water log threat
- red – extreme water log threat

http://www.otk.hu/cd05/1szek/Nemcsik\%C3\%B6lles-Balla.htm
Ecological protection zone and enetic hotspots

- complex zones with oxbows, galery forests
- change of character in different sections
Supporting modelling for risk and retention potential assessment (ARES, Koncsos, 2007)
focus group meetings for describing sectoral needs
• conflict map – analysing the needs
• solution for common interest / property level
• developing scenarios
• community agreement on proposed land use
• needs for framework changes (regional national

Flachner, 2005, based on FAO
Participatory planning ....

- "Know-who"
- "Know-how"
- "know-what"

National processes

Local processes

Local initiatives

New knowledge

Tradition

Monitoring & research

Programmes policies
Who we have to talk to discuss with?

- business
- banks
- investors
- SMEs
- management
- policy
- media
- Resource Owners
- Science
- Public

Questions:
- §
- §
- §
- §
- §
- §, no €
Role of scenarios in the process

- Policy
- Science
- Civic society
- Lobby

Strategy setting:
- Participative planning
- Assessment tools
- Modelling

Achieved goals:
- Achieved goals
- Reframing threats
- Vulnerability

Sterk et al, 2008
### Process: Assessment of agents (SHs) cooperation patterns in the case studies

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- **Civil mandate**
  - Science
  - Policy / Public

- **Trickle out**
  - Science
  - Policy / Public
  - Science
  - Policy / Public

- **Janus face**
  - Science
  - Policy / public

- **Critical participant**
  - Science
  - Policy / public
  - Science
  - Policy / public

- **Knowledge broker**
  - Science
  - Interest groups
  - Policy / public

- **Management/Agencies/private enterprizes**
  - After Sterk et al., 2008
### Assessment example for participative planning in different regions

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<th>National and EU level</th>
<th>Regional level</th>
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**Science**
- Policy
- Public

**Interest groups**
- Public

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**Legend**
- Science
- Policy
- Public
- Interest Groups
Elements of local decision making ...

- Bodrog – revitalization - polder
  - National and EU level
  - Regional level
  - Local level

- Bereg – revitalization - polder
  - National and EU level
  - Regional level
  - Local level

- Nagykőrű – Integrated land and water mgt.
  - National and EU level
  - Regional level
  - Local level

- TÁJ-KÉP – Scenario development
  - National and EU level
  - Regional level
  - Local level

- Science
  - Policy/public

- Interest groups
  - Policy/public

- Public
  - Science/policy

- Science
  - Public
Key element – participative planning

Common understanding of processes, drivers, cause-effect relationships – „iceberg- martix”

Desing future – rich picture development, spidergrams, conceptual models
Key elements – main drives identified
Tisza ideal world
Floodplain revitalization concept
(Flachner- Kahner-Molnar, 2005)

**Controlled water outflow - backflow to the main river channel**
- Technical criteria set both for
  - flood risk management
  - floodplain retention
  - ecological thresholds

**Internal water steering**
- Secondary notch-system for irrigation
- Revitalization of old creeks, wetlands
- Economic utilization (fishponds)
- Harmonized water distribution among stakeholders

**Landscape management at floodplain**
- Diverse landuse, fit to the elevation, natural conditions
- Proper agrotechnology (small/medium size machinery, permaculture)
- Payments for (ecological) services (e.g. flood protection, agri-environmental payments, Natura 2000, WFD)
- Additional income possibilities (e.g. rural tourism, biomass production)

**Institutional system**
- Monitoring, laboratory, expert systems, GIS-based assessment and water steering support
- Education, trainings, information dissemination, increased public participation
- Lobby, representation of local, regional interest
- Maintenance of water steering system, coordination of water related activities
  - Flood-protection, irrigation, drainage, ecological water supply, water storage

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Theoretical base of floodplain revitalization

### Floodplain Social-Ecological System

- **Water in Landscape**
  - Water Stage in River
  - Precipitation
  - River - Landscape Flow
  - Water Infrastructure (Dikes, Channels, Sluices, Drainage Tiles etc.)

- **Landscape**
  - Soil Quality
  - Landscape Productivity
  - Pollution
  - Biodiversity

- **Land Use**
  - Cultural Identity, Local Knowledge
  - Water Management Goals

- **Profitability**
  - Agricultural Technology and Use of External Inputs
  - Economic and Political Conditions (Legislation, Regulations, Markets, Prices, Subsidies etc.)

- **Community Well-Being**
  - Investors Well-Being

- **Land Ownership Structure**
  - Information about the System State
  - Pressures of Different Interest Groups
  - Strategy (Employed by Governing Bodies)
Key external drivers identified by Tisza SHs (TÁJ-KÉP)

- CC, fossil fuel limitations, financial chaos, population No.
- Increased importance of water (and other natural) resources
- Social degradation and its impacts on rural areas and market
- Biodiversity (genetic diversity) loss
- Demand to change hydro-morphology – energy, navigation
Key lessons learned in the SCENES process

• External drivers:
  – Global processes: economics, capital market, depreciation of natural resources (no value)
  – EU: financial subsidies; legislation and institutional settings
  – National: legal, structural traps – and opportunities??

• Structural trap:
  – „Is is possible to escape from structures which we have built in the hope to have higher life quality from monetary benefits?”

• Development is to improve our capacity to adapt to changes of our global/local environment
  – Specialization in adaptation reduce the capacity to establish new architectures
Structural traps in the Tisza region

The bottlenecks to be able to adapt to challenges:

1. Landuse and genetic diversity
2. Water management structures (dykes, knowledge, etc.)
3. Agriculture (technology, mass production, knowledge)
4. Trading and transportation
5. Settlements and infrastructures connecting settlements
6. Social structures

In all cases the basis of actions:
cheep fossil fuels and natural resources; stabil climate
Landuse and biodiversity

- Objectives:
  - Present: to maintain and protect the areas we have
  - SF: to develop natural system up to 20-25%
  - MF: to increase activities to explore the space and nature for economic development
- Adaptation capacity and ecological networks neglected
- Low genetic diversity in food production
- Green budgeting and ES delayed
- Small signals – bee population collapse - neglected
Water management

- Objectives:
  - Present: to keep the structures as they are
  - SF: to harmonize with the natural structures
  - MF: to increase activities to explore the landscape

- Dams, other water steering infrastructures
- Institutional settings
- Financial mechanisms – such as ‘vis-major’ fund
Agriculture

- Objectives:
  - Present: intensive agriculture (with large subsidies)
  - SF: to adopt to natural variations and diversify
  - MF: to increase intensification, irrigation and market outreach

- Mono-structures
- Subsidy and negative impacts on environment
- Machinery based, low human power
- Dependence on external market/global processes
- Low capacity to adapt to CC and other risks (e.g. pest)
Trading and transportation

- Objectives:
  - Present: long distance transportation to international markets
  - SF: to focus on regional local markets, diversify products and services
  - MF: to increase specialization, special products to introduce, mass production

- Negative env. Impacts
  - of infrastructure development of transportation is not counted
  - total economic value is neglected
  - Rational decisions disappear
  - Damage on local and regional market
Settlements and rural-city polarization

- Objectives:
  - Present: development of efficient cities and labour sources in cities
  - SF: healthy balance between Rural and urban areas – with focus on cooperative structures
  - MF: to maximize the efficiency and empty the countryside – up to 85% in urban areas

- Systems are destroying each other
- City-village battle
- The purchase power of urban areas destroy the markets of rural areas and development potential as well
- Increased vulnerability and segregation
Social structures

• Objectives:
  – Present: get people to vote for specific parties (by votes); avoid revolutions
  – SF: healthy society with knowledge based groups cooperation and capacity to subsidiarity
  – MF: to have mass product and mass media consumer society – educated enough to be effective in certain positions (non thinkers)

• Contra selected society in the rural areas
• Huge income polarization
• More and more barriers to have access to natural resources (forest, water, clean air, etc.)
• Social inequity, minority issues and migration
Key messages from PP - main dilemma

To try to manage the problems in the present structures and generate new (larger) ones

Try to find key drivers and find solutions to change them in other structures

• Our future depends on our capacity to be able to recognize the wronge structures and the way to change them.

• It is not a matter of financial resources – more the ability to see, recognize and develop social capacity to change.
Water retention area in Bereg

- Area A: 90 million m³ storage capacity, protected by 2.4 m high dykes. Main inflow point with 300 m³/s capacity. Channel to steer water to the lower parts for ecological restoration.

- Area B: 90 million m³ storage capacity, protected by 2.4 m high dykes. Permanent lake in the polder. Main inflow point with 300 m³/s capacity.

- Area C: 60 million m³ storage capacity, protected by 1.2 m high dykes, following natural elevations. 1.5 times bigger area with 300 m³/s capacity.
„A” alternative for retention area in Bereg
“C” alternative for retention area in Bereg
Thanks for your attention!
Flachner@rissac.hu

Acknowledgements:
FAO TCP Bereg, Newater Project, SCENES Project, Living Tisza UNDP-GEF, TÁJ-KEP pogram