SUMMARY

INTEGRATED LAND DEVELOPMENT (ILD) PROGRAM TO IMPROVE LAND USE AND WATER MANAGEMENT EFFICIENCY IN THE TISZA BASIN

A component of the UNDP/GEF Tisza MSP entitled
Integrating multiple benefits of wetlands and floodplains into improved transboundary management for the Tisza River Basin

PROJECT PERIOD:
25 March 2009 – 28 February 2011

Lead Partner:
Alliance for Living Tisza (ALT - SZÖVET)

Project outline and prospective outcomes

The ILD project was conceived to complement the integrated river management efforts on the Tisza coordinated by the Tisza group of the ICPDR. The project originally set three objectives, each specified by a specific outcome:

Objective 1: To develop a detailed description of the ILD methodology and a comprehensive assessment of the legal, administrative, political, economic, social and financial background of implementation for such a methodology on the large scale in each of the riparian countries along the Tisza. The key outcome of the first objective was assumed to be a report entitled the ILD manual (called ILD protocol at the time).

Objective 2: To select specific pilot demonstration sites seen most suitable for the practical implementation of the ILD approach in the Nagykörű area, Hungary with a possible extension to additional spin-off projects in two other riparian countries where partner organisations are active: Serbia and Romania.

The key outcome of the first objective was assumed to be a small site in the Nagykörű polder where the ILD is physically tested and two feasibility studies from Senta Municipality in Serbia and Agora, an NGO in County Udvarhely in Romania describing the potential of technology transfer to their respective sites.

Objective 3: To disseminate the information gathered, the experiences gained and the results obtained during the one-and a half year project to benefit the Tisza basin as a whole and the international organisations UNDP, ICPDR and the EU. The multiple outcomes of this activity were supposed to be presentations, media coverage, training materials, workshops, and a website.

The ILD manual

The ILD manual, completed by 30 September 2010 through the extensive efforts of all members of the project staff, is a practical guide to the integrated land development and management methods which are in the focus of the project as a whole. It also covered lessons learnt from the project. First it provided an overview of the system theoretical considerations which outlined the background to the ILD concept and described shortly the project history as well as the history of Tisza management from the ILD perspective. The reasons and consequences of the current problems with water management, flood control, water shortage, drought and water stagnation on agricultural land caused by excess surface water were all discussed in details. The study also dealt with the legal, institutional and social-economic factors which surround the activities related to the river and its wider plain. Additionally, it also covered some of the external drivers beyond the reasonable control of planners such as extreme weather patterns caused by global climate change, erratic events like the volcano eruption in Iceland or some of the global problems human society is facing such as fossil fuel depletion and energy crisis or the collapse of monetary markets.

The ILD concept is originated from the historical water management methods of the peoples living in the Tisza valley. A historical insight is provided to these conditions which prevailed during the Medieval and also the causes which led to the waterlogging of the Great Plain by the end of the 18th century. In the second part the manual deals with the natural features and the legal, institutional potentials which still allow for the large scale implementation of the ILD concept. It argues for an extensive land use change model supplemented with an adaptive water management model. The first attempt of this model is represented by the current official Hungarian approach to the complex management of the region, the further improvement of the Vásárhelyi Plan, the original river regulation concept of the 19th century. The current concept is referred to in shorthand as VTT. This methodology is followed by the description of the ILD concept, the method the project promotes. The ideal case scenario is followed by the condition precedents of such an approach in the fields of legal regulation and institutional setup as well as policy making and economic organisation. Finally, case studies are described which reflect both the potential and the current possibilities of the ILD implementation, and the adverse effects and misconceived design features of the VTT.

The theoretical and historical framework

What is ILD?

ILD, in short, is the integrated land management and development approach based on historical experiences and modern science which aims at taking advantage of the existing features of the landscape for the benefit of humans by fulfilling their needs. The goal is, therefore, to restore the original dynamic equilibrium of the landscape by

1. letting out just as much water from behind the dykes which is needed in order to attain safe flood control and the replenishment of the missing precipitation;
2. convert just as much cropland to grassland or other use which is necessary to accommodate this amount of water and which would be needed to put to other use for economic and ecological reasons anyway;
3. due to these changes in the land use pattern for reasons of flood control, replacement of missing rainfall and economic profitability consideration, just the type of land use will be formed which suits perfectly to maintain a healthy landscape and appropriate husbandry.

The multiple use of such a system includes various agricultural practices like horticulture, orchards, livestock management and cropland production supplemented with a variety of other activities related to land use, conventionally not qualified as part of modern agriculture. Such activities include fisheries, forest management, industrial crops like hemp or reed, hunting, apiculture, alternative transportation means (rafting), energy generation facilities (water mills) and direct water use for drinking, washing, watering, cooking, other domestic water needs, and so on. Needless to say, such a complex land use system would strive to self sufficiency as much as possible at least in terms of functions which can be met by local resources.

The strategy requires a serious 'paradigm shift' in current water and landscape management principles and practices. It has to be acknowledged that:

- flood is not a risk to get rid of, it is rather an opportunity to take advantage of

- the Tisza valley as a whole has no 'excess water'. On the contrary, it is a naturally arid landscape where missing water was supplemented under pristine conditions by periodic floods of its river.

- if you want to design a landscape management strategy which is sustainable on the long term and is able to provide high quality of human life it is necessary to design with nature and not against; therefore, you have to understand the landscape properly;

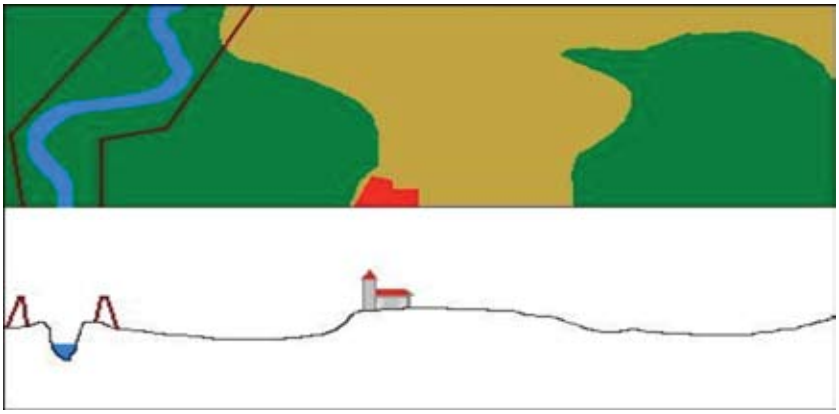
- the proper ground for design is to take the natural differences in elevations into consideration and to do your planning with the contours and various levels of the terrain according to the land relief; land use and hence, the water supply of the land should be adjusted to the relief and not the other way round;

- the flood control reservoir concept of the New Vásárhelyi Plan is very much in line with the strategy discussed here and the reservoir sites can be easily adapted to accommodate controlled discharge of the river. This would meet flood control, ecological and economic considerations alike. However, the implemented reservoirs so far do not meet the conditions for ILD as seen on the example of the newly opened Tiszaroff reservoir.

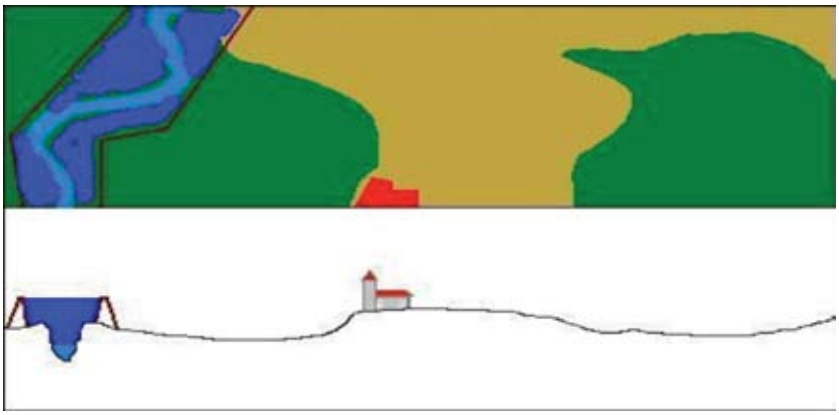
In a sustainable and functional landscape management and development system the water management system ensures replenishment of water bodies in the land and – in times of need – careful drainage of excess inland water and waterlogged fields. It should be set up as a complex whole of natural beds, bottoms and depressions, combined with man made system components – existing channels and road networks – as well as freshly built structures constructed for the purpose of water governance.

A key component is the outlet or discharge structure at the main flood control line, i.e. the lock closing the notch cutting through the embankments along the main river bed. Existing excess inland water drainage channel networks can be used but their slope has to be reversed so that they could transport water surplus as far inland as possible. Also, deeper lying areas currently used as emergency reservoirs for excess water can be converted into permanent ponds for a variety of use. An additional possibility would be to take advantage of natural depressions currently ploughed over. These land formations offer themselves readily for water retention purposes.

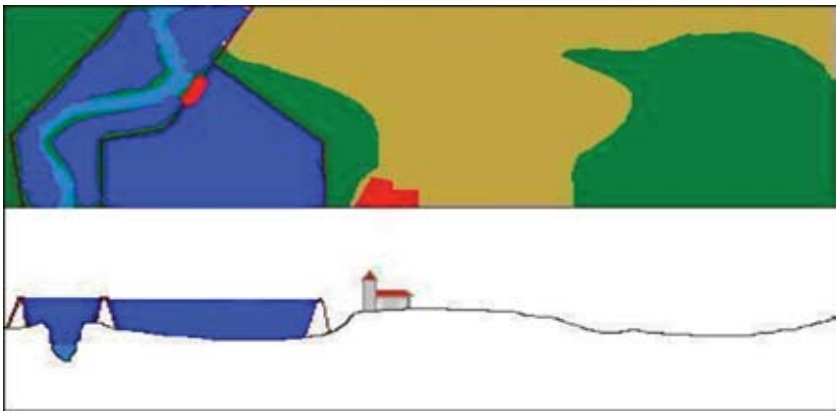
The dynamic system of the aforementioned ‘fok management’ based flood control solution compared to the conventional dykes and levees is illustrated on the following series of figures.



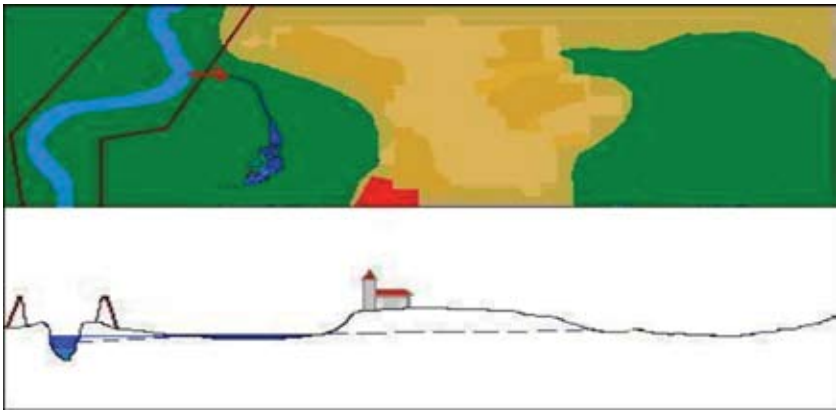
Trained river on the flood plains at low water stage



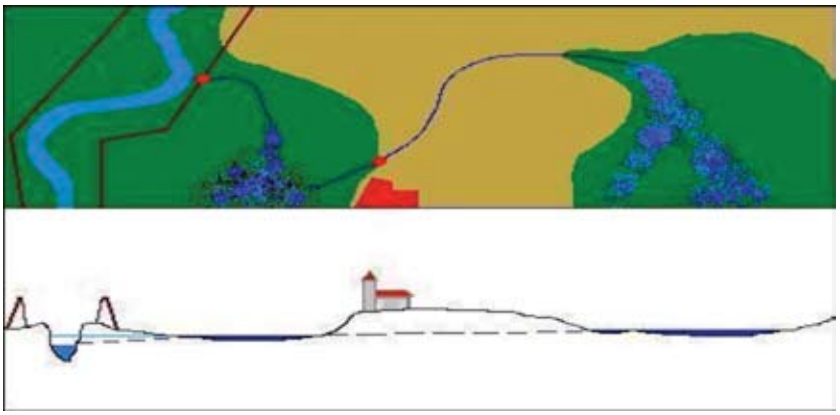
Trained river in the flood plains at high water stage



The theoretical concept of the VTT based on detention reservoirs to be used at high floods



The theoretical concept of ILD: controlled discharge of water starts at mean water level from the mean-stage river bed



The theoretical concept of ILD 2
Controlled discharge of water allows filling up of large areas in the deep flood plain and low flood plain before water level in the main river bed and the floodway could rise to high to threaten the surrounding settlements. It can be seen from the cross section view that water levels never rise too high and therefore the damage they can make is negligible

Systems theory

The current problems with rivers including the Tisza can best be understood from a system theoretical perspective.

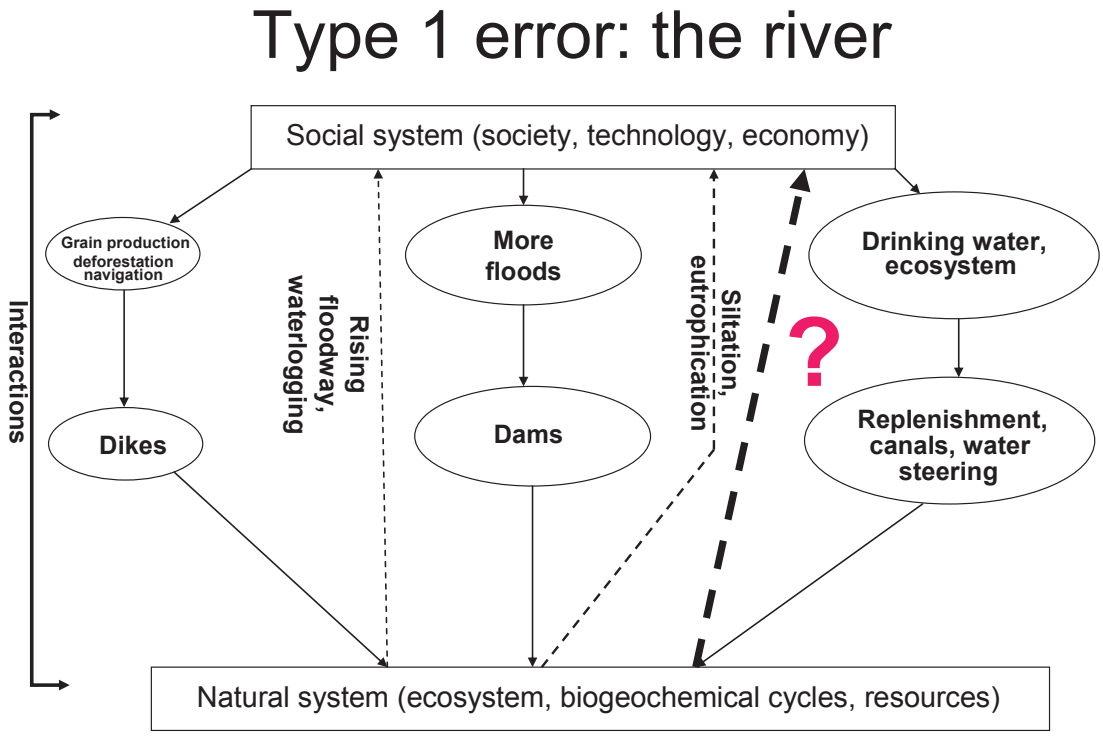
Shortly, it can be stated that natural systems maintain a dynamic equilibrium and are seen as an embedded hierarchy of supersystems and subsystems which are governed by a balanced set of negative and positive feedback loops. The main cause of discrepancies between human made and natural systems lies in the linear logic and the excessive use of external energy of the latter.

The conflict of logic between the two systems results in Type one error, a fundamental concept in human ecology. Type one error is a kind of positive feedback loop, which follows an impeccable logic known from cybernetics and forms a vicious circle. Positive feedback loops without the tempering effect of negative ones create a runaway effect bursting the boundary conditions of the system in the end. Having completed such a crash course and collapse, the system will emerge under new boundary conditions which may be quite different from the previous ones.

During interactions between the social-technological system and the natural systems human needs and population growth usually create a problem which is solved by a technical fix: a linear, technical method, such as river training. The „solution" has an impact on the natural system which in turn feeds back to the social system, creating an even more complex and comprehensive problem. The new, more advanced solution has an even more detrimental impact on the natural systems, which again feeds back to the social system, and so on, in a positive feedback loop of ever growing dimensions and ever more complex consequences.

Human technical inventions made up to overcome the problem take almost always – and not only since the industrial revolution – simplistic and reductionist approaches without ever considering a holistic system view.

They focus only on a single component of the various natural systems which have inherently complex interactions, modify, omit the component or add a new one in a single minded insistence to "solve" the problem. However, natural systems, including eco-systems behave in a complex manner and react to any intervention in a system-like manner. The whole system will be rearranged and new boundary conditions created. Being completely inflexible, technical solutions can not be adapted to the new conditions and become unfit for the purpose. This triggers more and more intervention into the natural systems at the cost of both natural and human made system integrity called the ecological and environmental crisis. In the process, many ecosystem services originally provided by the natural systems free of charge are lost and have to be supplemented artificially, at high cost and – not surprisingly – with the inevitable consequence of creating further problems. Coevolution and co-adaptation of human social systems and ecosystems – a prerequisite to phase out Type one errors – is no more possible. The logical sequence of events can be seen on the figure below:



River regulations

Historical river management bears all the characteristic features of Type one errors.

A possibility to break the circle and arrive at a long term, adaptable strategy to live with and not against the processes taking place in a river valley is suggested under the UNDP/ICPDR project by the method called integrated land development (ILD). Current river regulation practices control floods by draining the water between artificial embankments which need to be raised every know and then due to siltation problems in the floodway. Thus, the water flows several metres above the surrounding terrain. This is a structural trap because in times of floods the river is unable to carry surplus water volumes without making problems, while riparian zones become more and more arid due to the missing water replenishment. Flood control works themselves create a risk to the surrounding settlements because high water may get stuck in the floodway and burst the dykes or find a way to 'protected' land.

Traditional multi purpose land use methods customary in the Tisza valley before the Ottoman conquer of the country may be applied again. The practice is called 'fok' management by researchers for the partly artificial, partly natural formations on the river banks which were used to spread excess water of floods in the entire Holocene floodplain so that it could be drained again once it was not necessary any more. ILD intends to follow the same principle assisted with modern design and implementation tools such as GIS, remote sensing, topographical and aerial surveys and photographs, sluices, locks, drainage canal systems and a structured change of land use patterns. According to the model experiments there are still 36 deep lying floodplain areas along the Hungarian reach of the Tisza which could accommodate 2 billion cubic metres of flood water quite easily and inexpensively from the technical point of view.

A logical conclusion is that the landscape should be managed and developed in line with the functional needs of the land and not according to whimsical market trends.

Practical implementation: lessons learnt

One of the main concerns of the project was how to transfer the theoretical concept into practical terms, how to do something on the ground which can be used as an exemplary achievement demonstrating the viability of the theory.

The model site was envisaged in the administrative area of Nagykörű community, a pioneering settlement with an impressive track record of such experiments. Nagykörű is a special place in terms of forward looking projects and self-organising power, it has a nationwide network of useful connections, the community is engaged in creating marketing opportunities for small scale local producers and has a very intensive local development programme in place.

In a previous project in 2009 a similar attempt like the ILD was made in the floodway in the outskirts of the village, where former cropland was turned to pasture for Hungarian grey cattle. Therefore, it was thought that a somewhat larger scale attempt may bear fruits in the inactive, protected side of the floodplain as well.

Running into troubles

A demonstration site was identified and negotiations with owners and users are afloat to implement a small scale structure capable of regulating water cover on that site.

Unfortunately, the difficulty of the situation was revealed quite soon. While the preparatory works and setting up the theoretical background was smoothly completed, troubles started to emerge as soon as the actual proposed land use change operations were scheduled. It turned out that locals are not willing to sacrifice their land, that even though water officials are very supportive, the official constraints they have to obey are very strict and the agricultural ministry is not interested in the concept at all. The agricultural support schemes are conceived in a manner which favours cropland as opposed to anything else, therefore farmers insist on producing grain even if it is burnt out in odd years and flooded in even years.

During the project, two levels of problems were outlined.

1. Theoretical level: Farmers and land users are not really interested in changing their land use patterns. There are no incentives for them to do so. On the contrary, in the past twenty years since the political transition all their assets, technology and know-how have been directed towards intensive cash crop production, using huge bank loans and setting up a structure which causes the formation of a structural trap. Authorities and state administration on the other hand are unresponsive to complex problems, are very rigid and bound by unnecessarily detailed regulations.

2. Practical level: Whoever wants to implement a flexible, mosaic like land use pattern, will run into troubles. Rationalisation of the land parcels is difficult, ownership relations complex, subsidies geared up to specific purposes, any attempt to make changes may easily entail payment obligations, controversies or even lawsuits.

Legal review: obstacles to be overcome

Due to the difficulties foreseen, efforts were made on behalf of the project management to organise and execute a comprehensive survey in all the five riparian countries on the legal framework applicable on the interventions and activities envisaged by the ILD approach. The Hungarian part of the survey also covered the institutional, governmental, financial, social aspects.

The lack of integration in the institutional and legal setup emerged from the study as a key problem, both internationally and domestically. The relevant legislation is fragmented, takes a very narrow-minded view focusing on a single problem and leaves no room for movements. Rural development is not seen as a complex, interrelated set of problems and potentials. Fortunately, the institutional setup in Hungary was changed radically during the lifetime of the project and this had a beneficial effect on the outcomes in the form of a cooperation with the Ministry of Rural Development.

However, there are still several barriers in the way of the ILD approach: the ownership structure, the land users and the type of cultivation. If an area is to be submerged on a larger scale deliberately, the following preconditions need to be met first:

- Undivided common tenure has to be eliminated by surveying and dividing up common parcels and each land owner should have physically delineated plots;
- Proprietary relations have to be consolidated and pooled in a land consolidation procedure so that appropriately sized convenient pieces of

land could be surveyed, which offer themselves for land management through their geomorphologic properties;
• Surveyed pieces need to be subdivided so that a new land parcel (or sub-parcel) could be delineated according to the most suitable contours;
• Type of cultivation need to be changed on the newly formed parcels to a type which does not contradict to seasonal flooding and is not prone to stagnant excess surface water or waterlogging.

However, such a change is hopeless due to a heavy heritage of the so called "compensation" process which was concluded in Hungary half heartedly and conserved an unhealthy and biased structure of land tenure. Land consolidation, one of the most important ways out of this situation, is still not regulated and therefore can not be implemented. Land ownership also suffers from strange relations and rules, for instance no legal entity can own agriculturally productive land, including charities and civil organisations. Land has to be cultivated in a rigid system of cultivation types or categories, making switches from one category to the other tricky. The EU CAP is geared up towards a support scheme based on industrial high intensity cash crop agriculture and this approach in this case means that any land available is put under plough even when ecological conditions do not allow. The result is a distorted agricultural production pattern and market.

Water management is similarly wriggling in the ties of a rigid and inapt legislative framework. Water related legislation is divided up according to flood control, surface water and excess inland water. The resulting organisational setup is also utterly unsuitable to fulfil its mission. The result is constant damages, compensation claims and a helpless population. Additionally, fishing is also regulated as if it was an agricultural activity and not something related to waters. The resulting maze of laws and regulations makes it absolutely impossible to take timely and efficient measures.

There is a lot of trouble in the social and financial relations as well. Traditional local communities have been disrupted by market oriented modern industrial development, and a whole segment of the population along the river suffers from chronic unemployment, deprivation of resources, lack of self-governance and aggravating poverty. Cultural changes caused the potential for self-sufficient husbandry to vanish. Flood has become a menace for them, because in recent years more and more housing projects were endorsed on low lying land which is submerged in times of floods. Therefore, there is a deeply rooted stakeholder resistance against the proposed measures of ILD.

The following key issues need to be tackled and solved with a view to the implementation of the ILD concept:

In terms of land use

− Flexibility in land uses: Allow land users to leave some of their land to other uses, water retention canals, forest patches, woodlots, grassland, permanent ponds or any other type of use which could boost biodiversity and improve the water regime on the lower lying areas. According to the pilot experiments some 5 to 7% of the fields could be put to such uses with sufficient results;

− Land use categories: Cultivation type categories currently used are focused on cash crop production and not on the agro-ecological potential of the fields. In Hungary, a nation-wide survey of agro-ecological potential of all agriculturally productive land has been completed years ago. This database could be used to re-define land use categories and cultivation types;

− The regulatory framework is both non-transparent, unnecessarily complicated and market oriented in both the European Union and domestically. Large farmers and agribusinesses are subsidised by unequal opportunities;

− Modern agriculture is based on purpose-built special machinery with huge price tags and – consequently – a strong pressure to be used in the most time efficient manner. Such an approach is completely unjustified in areas with extreme water regime and times of drought or excess water;

− The rigid system of obligation to cultivation prevents any flexible land use methods both in terms of space and time. It should be left to the discretion of the land owner or user what kind of benefit he or she may draw from his or her land and by which method – within certain limits, of course;

− Land management and land development does not seem to be an issue in modern agriculture. More thought should be given to long term visions of agricultural operations, not only in terms of production and subsidies but also in terms of biodiversity, ecological systems services, natural resilience and prospective diverse uses.

In terms of land consolidation:

− As revealed by the assessment of the legal environment, land ownership and tenure in Hungary needs to be consolidated and put to new footing. One of the first and most important step in this process should be the elimination of the undivided common ownership of parcels;

− In the next step, parcels and blocks need to be consolidated to eliminate partial ownership, strip-holding (shoe-lace patches of ground) and unreasonably positioned parcels, but not only with a view to more efficient market operations, also with a view to accommodate the agro-ecological potential of the fields as well as geomorphologic features of the landscape;

− Land consolidation should also focus on a more sound and reasonable distribution of agribusiness undertakings and farmer holdings. Too big farms tend not to take into account the special features of a locality and represent unevenly positioned lobbying power in face of agricultural subsidies.

Livestock husbandry

− In Hungary, prior to the accession to the European Union, an organised deterioration of the livestock farming took place in the 1990s. Politically the move was seen as meeting the unjust requirements of the EU to secure markets to large agricultural producer countries but on the social level a necessary spin-off development was the disintegration of rural communities, soaring unemployment and social backwardness. In the course of this process, and reinforced by other ‘developments’ and ‘progress’, the following trends made the implementation of any diverse rural development approach very difficult:

o deterioration and collapse of local markets, primary producers and handicrafts;

o processing of local goods made more and more difficult, mostly by unnecessary rules and obligations.

Water management

− Although organised on a regional basis, water management administration is still not area based. Responsibilities are shared by many organisations and officers, making the enforcement of liabilities difficult. Sources available for the operation of the sector were repeatedly cut as the country under bad governance got more and more indebted and the deficit of the state budget grew;

− There are theoretical problems in the policies as well. Instead of a comprehensive approach to deal with the water regime of a specific area, the main objective is to fight extreme water management situations like floods or water stagnation. Renewable and non-renewable water reserves can not be separated with appropriate certainty. As a result, underground water extraction taps non-renewable sources in much of the Great Plain, while renewable surface waters are let to run off quickly;

− More recently, slackening regulation brought the danger of irresponsible use of thermal water. Up to date, any thermal water brought to the surface for energy generation reasons had to be re-injected under the surface.

Now it is allowed to be discharged into living waters, causing much harm to the wildlife and the natural biogeochemical processes in the system, while depleting the underground reservoirs of thermal water.

At the time being, there is only limited possibility to effectuate land use changes in the riparian countries. The comparative legal review arrived to the conclusion that the most feasible way for administrative implementation of land use changes is to establish sub-parcels, that is a method of land use based on administrative foundations which does not affect the current ownership and holding structure. It is possible to set up a single uniform land use pattern from the chain consisting of distinct sub-parcels – and put it to grassland or meadow cultivation type – which is properly adapted to former river bed sections, depressions and other deeper lying, interdependent areas, which are typically prone to periodical inundation by stagnating excess surface water rendering current land use methods conducted in the fields impossible. Of the countries investigated, only in Serbia seems to be possible to carry out partial change of cultivation types in a similar manner as in Hungary. In the other countries, similar outcome could be produced by a procedure which is mostly like the parcelling process in Hungary, whereby the fragmentation of the holdings which is all too typical in all the countries reviewed anyway would be further aggravated.

However, the main conclusion is that without substantial changes in the institutional setup, the political interests and the legal framework any large scale implementation of the ILD concept is illusory.

Pilot projects

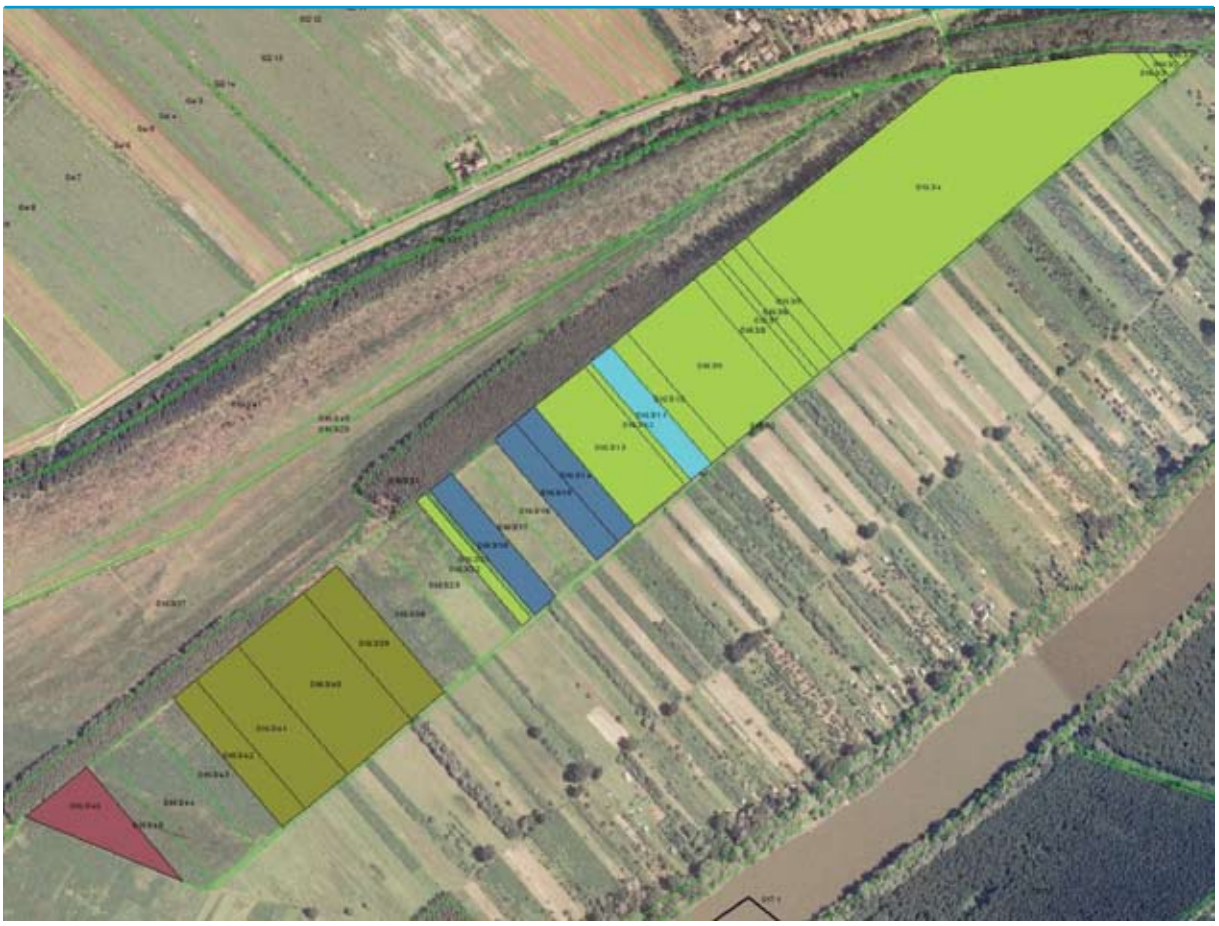
Anyita – Tóalja

The project aimed at two kinds of demonstration sites, one within the floodway, that is on the active floodplain, and one outside the levees on the 'protected side', on the inactive floodway.

The site in the active floodplain was an area formerly known as Lake Anyita (the name speaks for itself) and the surrounding fields known as Tóalja (currently agricultural land). The number of parcels coloured on the aerial photograph below show the proposed demonstration site. Current type of cultivation for all the plots is officially ploughland. In reality however, most plots are farmed as wooded pastures. There is only one farmer (marked light blue) who stubbornly puts his land to till each year. The point in this case would be land consolidation and a request from the owner to the land registry concerning the change of the land use type. Unfortunately, the farmer in the middle refused to swap his land with another parcel on the protected side and insisted on ploughing.

The concept was somewhat supported by nature itself, as during the Summer 1999 flood the so called summer dyke protecting the area from the lesser floods was burst and the land inundated.

Summer dykes are structures built in the floodway close to the low and middle stage river bed to control lesser floods from entering the high stage river bed, that is the surface between the two primary levees constituting the floodway proper. In fact, in most cases the floodway is put to plough just as intensively as any other areas in the river valley and hence the need for the summer dykes. However, the new water management concept – supported by the administration – does not intend to retain summer dykes in order to increase the flood absorption capacity of the floodway and in this case the intention met with the endorsement of the project and part of the local land users. The ILD project capitalised namely on the outcomes of the former Tisza biodiversity project by putting grey cattle onto these areas to create the wooded pasture and to squeeze out invasive weeds. Therefore, it was a welcomed decision not to restore the burst summer dyke: pastures in an arid land need seasonal inundation, as opposed to cropland.



Tóalja, the project's pilot demonstration site on the active floodplain in the floodway

Classification of farmers according to their willingness to participate or cooperate with the ILD project in the example of the Tóalja site

Farmer 'types'	Characteristics	Solution
Rational	can be convinced by rational arguments	land swap agreement
	money dominates	compensation (single or long term)
		purchase
Emotional	emotional drivers behind decisions	swap land associated with the region (Nagykörű, Tisza-valley)
	string ties to Nagykörű	land use change by retaining the original owner
	strong ties to the Tisza	
Irrational	faith, strong imprinting	difficult to handle
	'it has always been family land'	
	'tidy, more appropriate'	

Negotiations with the last farmer – influenced by his mother – proved to be an insurmountable task. The counter argument against land swap was that the exchange land offered was not 'tidy and appropriately cleared'. Cleared land is understood by locals as a barren ploughland. However, being on the floodway, exposed to annual floods, 1-40 cm sediment is deposited on these lands each year, bringing weed seeds.

Any ploughland here has to be cleared each year. Desert false indigo is the most aggressive invasive species and farmers mostly struggle against it in vain. Grazing is an excellent habitat management tool because cattle clear the land without any herbicides and after a number of years a typical wooded pasture can be grown on the plot concerned.

N-plum orchard

Nevertheless, the ILD project still intended to realise the proposed land use changes on the ground.

Therefore, of the four sites which were found to be suitable for retaining water from the physical geographic point of view in the inactive plain, the smallest was selected where the least number of owners and land users had to be contacted. Even then, after tremendous efforts put into it by all team members and a series of futile negotiations not even the four owners and five users could arrive at a conclusion as to the setting up of a common area where the water could be stored. The agreement was further frustrated by the legal obstacles mentioned in the former section.

The following figure shows the relative position of the demonstration sites within the Nagykörű polder. The axis of the site is a branching off river bed remain in the middle of the flood plain polder, cut into four pieces by the public road and Inland Water Canal No 19. The area features all the characteristic properties of flood plain parts in the protected side, in particular with regard to husbandry methods and ownership relations. Particularly interesting is the fact that the morphologically identical area belongs to the administrative boundaries of four different settlements, and hence, local councils.

The former river bend is still a river bed: excess surface water cover shown on an aerial photograph of the project demonstration site

Sustainability in this respect would mean the increase of the water buffer capacity in the landscape, including the mosaic like structure of geological, biological and utilisation diversity in line with the opportunities offered by the landscape.
The following land use methods can be suggested:

Relative height	Water cover	Land utilisation scheme
flood free area	definitely free	settlements, autumn grain, forest
high flood plain	seldom, short term	orchards, gardens, cropland, forest, grazing
low flood plain	regularly, seasonal	meadow, pasture, forest, grazing land
deep flood plain	permanent (with water refreshment)	fisheries, reed, other aquatic species, birds

Unfortunately, consolidation of arable land and forest parcels even on a relatively small scale like the pilot demonstration site of the project at Nagykörű proved to be a tremendous task.
The following table summarises the pros and cons of the selection process.

Summary table of the four sites assessed

Site No	Location	Current state	Benefits	Barriers
1	Hunyadfalva	97 ha, 27 to be flooded currently ploughland undivided common with 26 proprietary ratios	one of the users is willing to cooperate and divide up the area he intends to put grass on higher parts to graze goats large area could be flooded predictable, long term increase in biomass production	the other user tills the deeper parts land consolidation ILD project only as an advisor
2	Kőtelek	75 ha, 9 ha to be flooded currently ploughland	excellent river bed formation with a depression included, relatively large area can be flooded predictable, long term increase in biomass production	too many owners suspended proprietorship litigation
3	Nagykörű	22 ha, 11 to be flooded currently ploughland and orchard	least number of owners clear ownership known owners predictable, long term increase in biomass production	not identified in the selection process
4	Csataszög	195 ha, 75 to be flooded currently ploughland undivided common with 62 proprietary ratios	excellent river bed formation with a depression included, relatively large area can be flooded a single user, willing to cooperate ecologically valuable wetland habitat could be created predictable, long term increase in biomass production	land consolidation difficulties

The proposed site with contour map and topographical numbers of title deeds (N-plum orchard)

The main objective of the practical work was to change the subdivisions and sub-parcels of the parcels concerned as well as their respective types of cultivation along the red line to convert plough-land and orchards into another type of land use which allows the application of a semi-naturally operated land management method. First it was seen as grassland, then a gallery forest, finally due to the owners' objections in the last stage (Summer 2010) it was intended to be converted into a fish pond with riparian buffer areas, together a wetland-woodlot habitat which has to be established in compliance with the current legal requirements.

The use of the newly formed site was thought to be two fold: to retain locally generated/collected waters in the area and land use accommodated water cover, and to fill it up from the canal to supplement local water supply.

When designing the water supply structure, it should be taken into account that it was more important to operate the sluice gravitationally than to provide water supply any time and under any conditions. Low cost execution and operation, least interference into the landscape and the use of natural materials and solutions were all high priority considerations.

A seven step process was developed to obtain the desired goal:

Step 1: Description of the area, schematic diagram
Step 2: Identification of the owners
Step 3: Information dissemination and negotiations
Step 4: Surveying and administration
Step 5: Changing the type of cultivation
Step 6: Design, licensing and construction of the water steering structure
Step 7: Operation and maintenance

Of the seven steps, only the four first could be completed due to stakeholder resistance. In order to facilitate the negotiation process, the project designed four versions of land use change with the involvement of landscape architects. The fours versions were, respectively:

1. Current pattern with the intensive cropping of all the fields, except the failed plum orchard in the middle.

2. Grassland and pasture, where most of the lower lying land was converted into grass as the cultivation type and covered by water seasonally.

3. Semi-natural land use patterns, where various different uses comprise a mosaic like diverse structure including different types of cultivation with woodlots, wetland areas and grassland, leaving some of the cropland intact on the higher elevations.

4. Intensive use adapted to the geomorphologic conditions. In fact, this version contains a state-of-the-art fish pond.

Version three of the landscape architect proposed for the N-plum orchard

Finally, no conclusion of the process could be achieved by the end of the project period, although the surveying of the new sub-parcels was completed and thus the conversion of the registered type of land use can be done any time when the owners feel like it.

Case studies

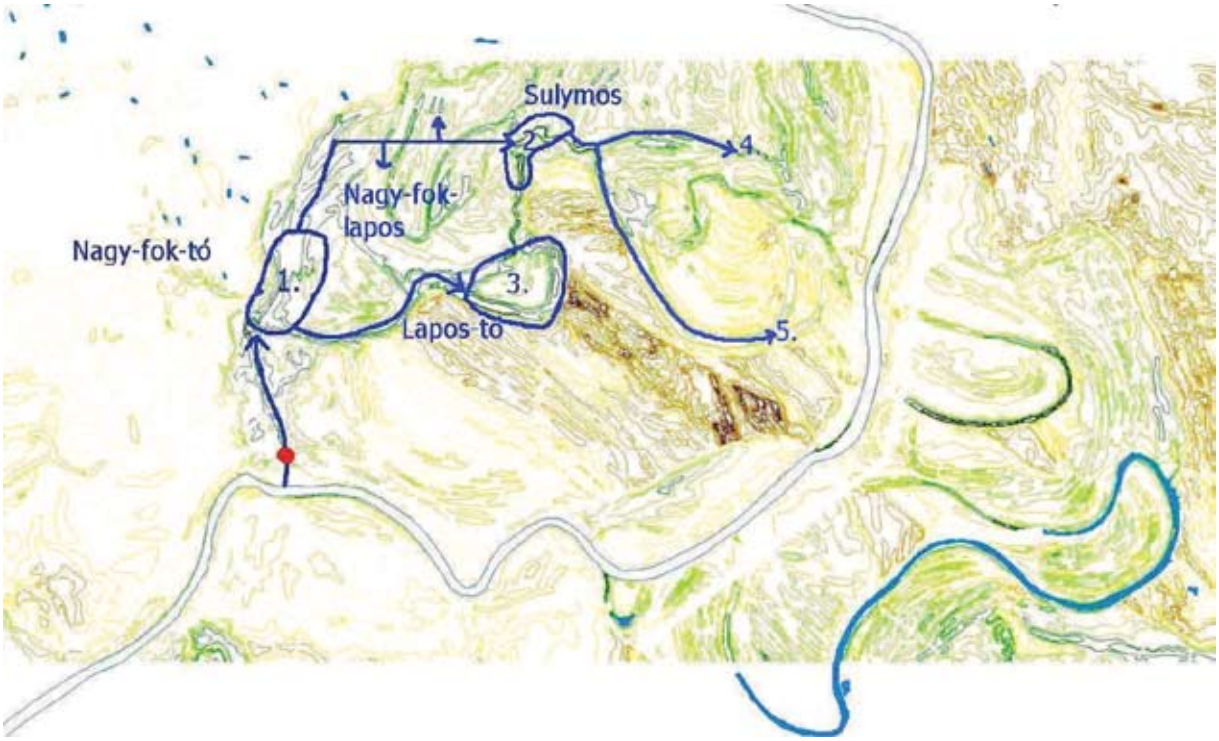
The case studies covered by the ILD manual and investigated or sponsored by the project activities clearly demonstrated both the potential, the threats and the obstacles of the ILD concept implementation. The most extensive case study studied by the project was that of the Nagykörű polder, the part of the floodplain in the natural river section at the Nagykörű community.

Szövet developed a design scheme for the natural water governance of the polder – the former native floodplain area – taking advantage of the existing drainage and irrigation canal network. A very similar concept was developed by the regionally competent water management authority, KÖTIV-IZIG (Middle Tisza Region Water Management Directorate).

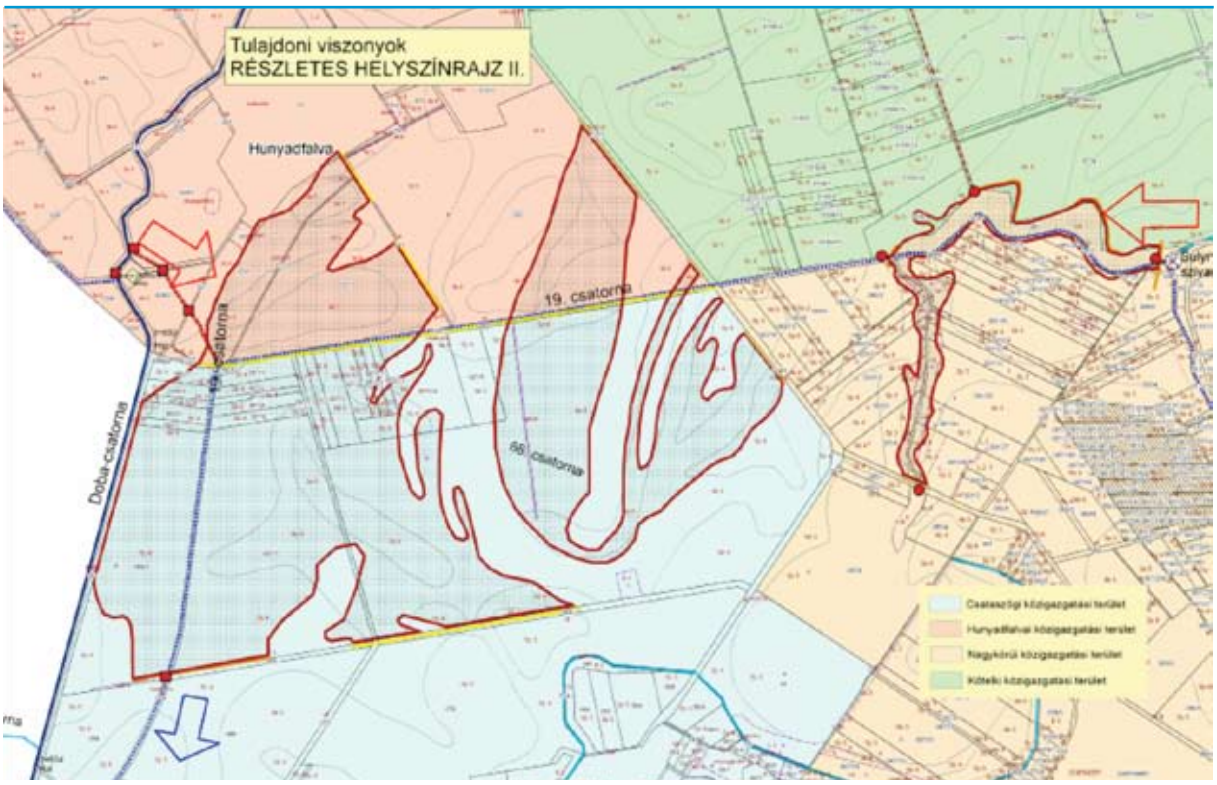
The only difference between the two is that KÖTIVIZIG apparently focused on the water management issues and identified an area where surplus water skimmed from the river and collected from the fields in time of high water could be stored until further use during the dry summer season, while the concept developed by the ILD team integrated land use changes and agricultural activities into the scheme as well. The ILD pilot project started with the identification of four eligible sites for controlled discharge of water, two of which coincided with the reservoir area identified by the water experts.

ILD in action, initial state

ILD in action, stage 1

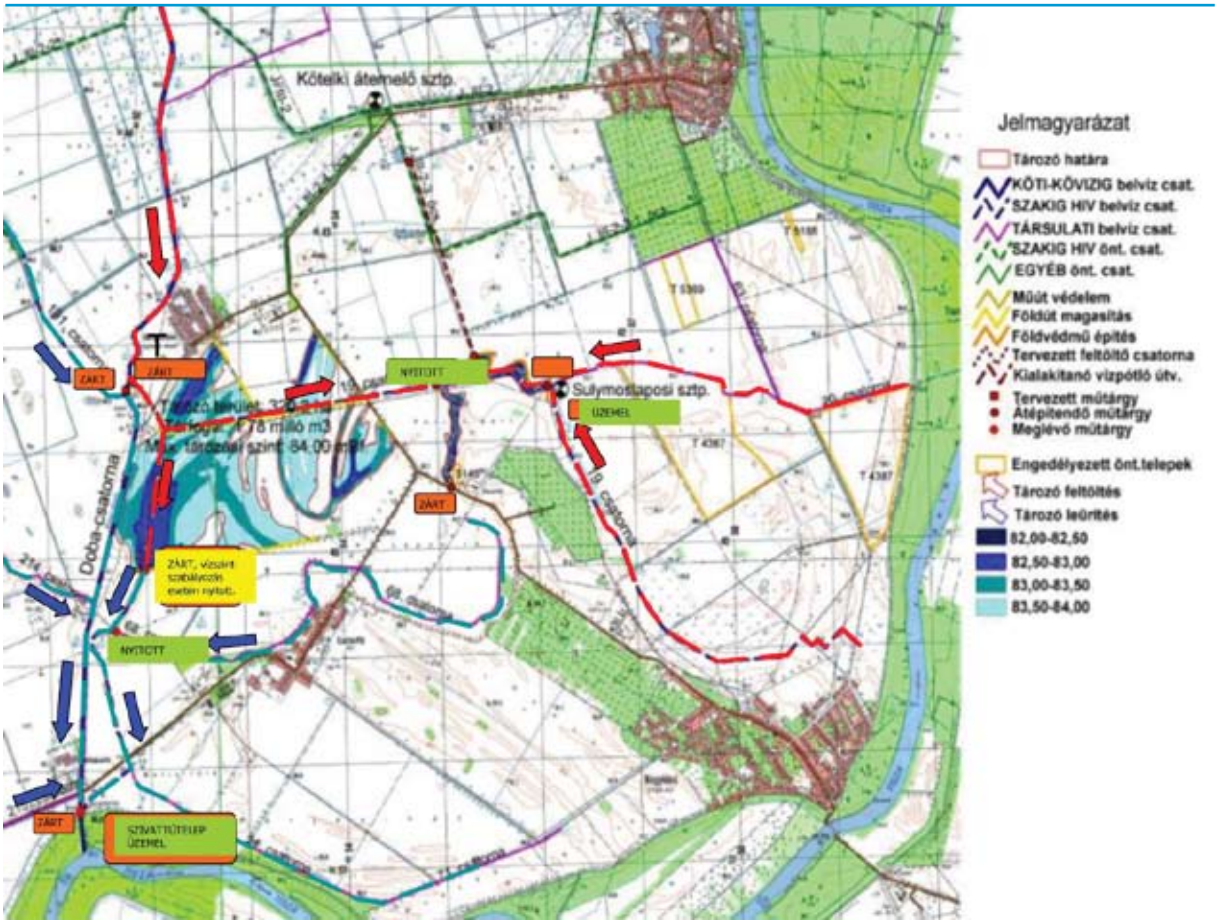


ILD in action, stage 2



The reservoir site selected by the KÖTIVIZIG team in the Doba polder project
Legend: Deep purple contour: the Csataszög excess surface water reservoir, red circles: Site No 1 and Site No 2 of the ILD project, white area: the proposed LUC site in the N-plum orchard (Site No 3)

Initial state of the Doba inland water drainage system (courtesy by Béla Horváth)
All structures but one are open (green) and the water collected is drained towards the transfer station at the mouth of the canal system gravitationally. In case of high water stages it is pumped actively into the Tisza. The supplementary transfer pump station at the place called Sulymos is not operated. Water flows in a single direction



Proposed operation of the same system under the 'inland water reform' (courtesy by Béla Horváth)
Some of the structures are closed off (orange) and direct water into the reservoir (red arrows). The sluice at the bottom side of the reservoir is operated in accordance with the control needs in the storage (yellow). The drainage lock at the transfer station (red dot) is closed, but the station itself is operated to lift water which comes from other directions and not from the reservoir. Shades of blue in the reservoir indicate the depth of storage water

A third case study was presented in the ILD manual from then Director of the Hortobágy National Park, an extensive area within the larger Tisza floodplain demonstrating the potential for restoring the water retaining capacity of the land in the now dry and alkaline salt steppe (the "puszta"). Here again, a site called Nagyiván with natural water reservoir potential was identified. It would not take much investment efforts to convert it into an active water storage facility of the Tisza.

The project also assessed the reasonability of the VTT in its current state and found that the Tiszaroff reservoir, which had to be opened on 14 June 2010 because the Summer flood threatened the city of Szolnok, was ill designed, destroyed crops when used and could only take a part of the water which was actively pumped by other water directorates into the river bed further upstream in an effort to protect farmers' fields from excessive water stagnation there. In other words, first the administration added more water to the flood and discharged it later onto actively cultivated other fields. Also, the facility is poorly designed, observing irrational legal requirements and aiming at capital intensive investment schemes instead of taking advantage of natural features in the land.

Open locks of the Tiszaroff inlet structure on 14th June, 2010

Finally, the activities proposed by the partner organisations were evaluated in a case study. Senta municipality mapped their respective community with a view to implement the ILD concept there and suggested an area called Csésztó on the a local catchment area of the Becke. With their feasibility study they wanted to call the attention of the decision makers in the national and local governments, politics and the economic sector on the importance of the water and land management methods and perspectives in their respective Tisza section. However, they ran into the same difficulties as the Hungarian project because the current legislation on water management does not recognise wetland areas. The complete re-arrangement of the related legislation and organisation structure would be needed in order to implement the concept. Changes in the water administration including its legal framework are currently underway.

A completely different approach was taken by the other partner, AGORA. This team lives in the upper catchment of the river and therefore they are facing the challenges of a rapid and unbridled water course, a tributary called Nyikó. In 2005 a death toll of nearly 20 people marked the significance of the unpredictable and fierce floods of the area. The solution proposed was to retain water in small reservoirs built at several locations within the tributary area so that less water could get into the main river during high floods and water could be stored for the dry Summer season. Although the local initiative was successful in retaining the water, it filled up within a year. Therefore a silt trap was proposed upstream to relieve the main dam from the pressure. At any rate, the Romanian team did not have to struggle with the legal obstacles.

MARD proposal

Having regard to the aforementioned several and severe obstacles in the legal and institutional environment which prevent the successful implementation of the ILD concept, the project management initiated a cooperation with the new government after the general elections in 2010.

In a letter the project team presented the project concept and results in a nutshell and offered their assistance in the policy making efforts of the administration. The response of Parliamentary State Secretary of the freshly formed combined Ministry of Rural Development was very supportive. Dr. Ángyán shared the view of the ILD team members with regard to the importance of an integrated land and landscape utilisation scheme adapted to the natural endowments of the landscape and invited the project team to present their materials to the staff of the Ministry and to participate in a task force dealing with the complex rural development concept of the Tisza region.

An outlook for the future

Dissemination of the results

Right from the very beginning, the dissemination and transfer of project results was in the focus of the management.

Several members of the team held presentations at various meetings on the specific stages the project found itself over time, including internal workshops for the foreign project partners, international conferences and ICPDR Tisza group meetings. The idea was also promoted on the national and local level by holding presentations at various conferences and organising information meetings for stakeholders such as farmers, mayors, water management specialists and agricultural extension workers.

Serious efforts were made to appear in the press and in a number of other media, including the Hungarian television which aired an interview in prime time with Project Manager Mr. Péter Balogh on two occasions. The widest circulation and most influential weekly economic magazine, Heti Világgazdaság (HVG) ran a full feature article on the ILD concept in Summer 2010 where several project team members could share their views with the public.

ILD toolkit: a training material

Project management considered that the accumulated knowledge and the lessons learnt over the – including the applicable extensions – almost two years' long research and the struggle for practical implementation can be best capitalised on by the compilation of a comprehensive training material which is called the "ILD toolkit".

This material, available upon request on CD-ROM in Hungarian is aimed at decision makers, public administration officials, authorities, designers and basically any of the stakeholders in the complex ILD scheme. It contains a methodological section and four additional units concerning the Tisza basin management issues: one on the concept of sustainability and the various interpretations of the notion, a second on the geography of the Tisza with a view to sustainability connections.

The third unit deals with the relationship of man and the river, including the impact and consequences of the river regulations both in terms of the natural and the social environment. The fourth unit discusses the emerging solutions, the one proposed by the water management sector, the further development of the so-called Vásárhelyi plan and the other, promoted by the expert team behind the ILD project, the approach based on the natural characteristics of the river.

Website

Dissemination of the project results was facilitated to a great extent by the setting up and running of a specific project web site managed by Project Manager Péter Balogh and containing information in both Hungarian and English. For getting access to project documents, interviews and other materials please visit http://www.ild.eoldal.hu/oldal/english.

The project awaits continuation. As long as the legal and institutional framework including the financial and organisational consequences is not set up to accommodate the special needs of an ILD approach, there is not much hope to implement controlled discharge of high waters onto the native floodplain of the Tisza and thus to restore the former balance of the water regime. It is up to political decision makers and policy makers to adopt the ILD philosophy and up to water management specialists, agricultural extension workers and government bodies to organise a social system able and willing to accept a radically different approach from that deeply embedded in the public mind so far.

The project team and partners included the following organisations and individuals: Zsuzsa Flachner (†), Péter Balogh, Béla Borsos, Gergő Nagy, Lóránt Fehér, Andrea Szabadkai, Kriszta Matúz, Árpád Rimóczi, SZÖVET, RISSAC, Izabella Suhajda and Lívia Király (Senta Municipality, Serbia), Pál Péter (AGORA, Romania).