

LANDSCAPE REVITALISATION AND INTEGRATED RIVER BASIN MANAGEMENT PROGRAMME FOR THE SLOVAK REPUBLIC

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LANDSCAPE REVITALISATION AND INTEGRATED RIVER BASIN MANAGEMENT PROGRAMME FOR THE SLOVAK REPUBLIC

1. SOCIAL REASONS NECESSITATING THE PROGRAMME

Flood protection measures and economic activities completed across Slovakia in the past decade have been conceptually focused on securing the fastest *drainage of rain water from river basins/areas/landscapes* and the design parameters of hydrological structures and the nature of landscape adjustments and changes reflect this focus. In spite of the fact that some of these measures have been formally named as "prevention" measures they are actually measures to protect specific areas during flooding and serve to transform flood water overflows. After floodwaters subside, increased amounts of water are drained from these areas during a majority of the year due to the landscaping measures completed. Individual areas show the signs of damage (monoculture in agricultural areas, erosion processes on forest roads and in forested areas, abnormally high rain water drainage from developed areas, etc.). Flood prevention measures that respect systematic erosion prevention and water retention landscaping work have been pushed into the background and have assumed a more formal role, which currently has been supplanted by economic activities, which themselves have come at the expense of highly useful and balanced care for such areas.

Economic planning and investment activities in the past have included significant water works, levees and polders that functionally transform flood waves and protect banks used during flooding to protect large urban settlements and the valley of the Váh River.¹ It is necessary to emphasise that flood protection in Slovakia exclusively takes the form of hydro-technical measures and these have their financial and capacity limits. With regards to mountain profiles, the composition of river branches and the concentration of settlements in river valleys there are no locations in Slovakia that would benefit from the construction of additional such water works as a component of flood prevention with higher than local significance.

In terms of complete flood protection for areas or landscapes, solutions based on water courses, therefore on draining water from landscape ecosystems, have been applied up until the present time. A majority of areas, representing more than 95% of the territory of the Slovak Republic (forests, agricultural areas and developed areas), are not included in the flood prevention and flood risk prevention reduction system. Such technical concepts have proven to be insufficiently effective from the long-term point of view if areas are only protected against floods using measures on water courses. The flood risk dramatically increases with increased rain intensity and large amounts of rain water. This has resulted in the task of focusing on the revitalisation of damaged landscape ecosystems and including the areas of Slovakia that have not had flood protection measures in the past in the complex system for decreasing flood risks. The potential of such a method for reducing risks is naturally very high. An *integrated approach* has come to the forefront in terms of hydrological and agricultural policies and this approach expands on the current economic

¹ *Efforts taken by Slovakia to resolve flood protection* reached a peak in the 1950s and 1960s with the construction of water works infrastructure on the Váh River. The construction of large water reservoirs in the upper sections of the waterways was only possible at the cost of massive resettlement. This solution secured protection for the main channel of the Váh River but not for its tributaries. Other water works projects that were constructed offer no effective protection abilities against extreme flooding.

approach in terms of the management of soils and water and expounds upon the current engineering approach towards securing protection during flooding as well as revitalisation and adaptation activities related to flood protection measures in the landscape itself.

Current technical measures included in flood protection measures in various areas of Slovakia and for river basins in nearly all large water courses have been shown to insufficiently consider ***the fundamentals and dynamics of the processes and activities that occur and take place in river basin areas***, in forest and agricultural areas, in urban zones, in developed areas of cities and villages, during the construction of transportation and industrial infrastructure and in the design of built up areas. In spite of measures completed over the past two decades the amount of rain water drained from areas and landscapes has increased and currently exceeds the capacity of constructed technical flood protection measures.

The solution is not an expansion of existing and the construction of new, larger capacity rain water drainage systems; rather it can be found in securing a balanced system that protects water in the environment and allows for the safe drainage of natural excess water using the river network. The basis of the solution must be found within ***complete and integrated river basin management***, integrated management of neighbouring areas, including urban and rural areas in cities in villages and in an ecosystem approach to water and to the landscape as a whole. This can only be achieved by applying the principles and processes contained within the integrated management of river basins/areas/landscapes.²

One of the basic steps for efficient flood protection is a renewal of the ecosystem functions of river basins and landscapes that retain rain water due to their natural characteristics, thereby allowing it to be absorbed into the subsurface and ensuring soil quality; through the ***spatial optimisation*** of function this also ensures that the landscape meets human needs and is useful while maintaining its ecological stability.

Forecasts confirm that a decisive factor for future economic, social and cultural development in the landscape itself and in regions will be ***a stable water cycle in river basins***, which themselves will then be better able to overcome extreme weather without destructive flooding with a lessening of the drying out process in landscapes without incurring any additional risks from other natural events. Such a desirable situation can only be achieved if ***an ecosystem-based approach*** that strengthens biodiversity and improves the water cycle is implemented within the execution of economic activities in river basins/areas/landscapes. Knowledge about the water cycle in water courses in Slovakia has confirmed the risk of extreme flooding, drought and other natural event risks that will increase in the coming years if no basic fundamental changes are taken in the approach taken towards the use of landscapes, methods used within urbanisation and within water management principles. Such problems will exponentially grow if the abnormally high, full-scale drainage of landscapes does not stop as this leads to overheating and drought. It is necessary to completely revitalise landscapes so as to restore natural water replenishment within natural structures. This will then recreate favourable conditions for preventing floods, drought and other risks posed by extreme natural events.

Current human activities within landscapes have negatively affected the water cycle to various degrees. For this reason it is necessary to systematically and completely analyse

² ***River basins/areas/landscapes*** – the use of this multi-word term in this text document is an expression of the application of a systematic, complex and integrated approach to the given territory of the Slovak Republic and at the same time considers the multi-sector and inter-departmental scope of the programme.

individual river basins and areas, identifying activities and taking action within management activities against elements that negatively affect the water cycle in river basins/areas/landscapes. At the same time it is necessary to define and specify those measures within landscape revitalisation efforts that allow for the elimination and/or significant reduction in the effects caused by the most significant negative interference with natural areas in landscapes.

"Despite the fact that floods are a natural phenomenon, human activities and human interference into natural processes including changes to runoff via urbanisation, agricultural work and deforestation have significantly changed the situation in entire river basins. This represents an increased flood risk for areas which have become more vulnerable as a result.

If possible, all such negative human interference into natural processes must be halted, compensated for and prevented in the future. It is necessary to bring forth a water management policy that complies with the use of the landscape and that provides protection to the environment and the landscape.

*A basic component of solidarity is not to push water management problems from one region to another. A suitable strategy is composed of a three-step approach, specifically harvesting rain water, retaining it and draining it. This means taking all steps to harvest rain water where it falls and to keeping it that location. Releasing water to into water courses is the last and final step. Integrated water resource management measures for the entire river basin are to take precedence over isolated flood risk management steps.*³

This is the ***route we want to use to demarcate this programme***. After this programme is completed Slovakia will be able to safely continue without any fears that any roads in Slovakia would be destroyed due to a destructive flood or other causes directly linked to a flood.

2. PROGRAMME SOLUTION

The up-to-the-present conceptual and methodology procedures included in flood prevention measures in Slovakia will have to be amended to include additional systematic measures that meet current and future requirements for complex, integrated flood protection and flood prevention measures as well as drought protection measures and measures for other risks that are more and more commonly seen in extreme natural events.

It is possible to welcome the implementation of EU Floods Directive in the form of Act No. 7/2010 Coll. on Flood Protection and to welcome an integrated approach that requires EU Water Framework Directive; however, in the Slovak Republic, the implementation of such an integrated approach in practice remains stalled. In much the same way, the method in which stakeholders communicate and participate during the preparation of individual phases of planning documents arising from these directives has remained more formal in the past.

The critical need to resolve flood protection and flood prevention issues was confirmed by the Government of the Slovak Republic at its session on August 27, 2010 when it named a Representative of the Government of the Slovak Republic for Local Government and for

³ Cited from: *Najlepšia prax protipovodňovej prevencie, protipovodňovej ochrany a zmierňovania povodní* (Best Practices in Flood Prevention, Flood Protection and Flood Reduction), published in 2003 by Water Directors from countries of the European Union.

Integrated River Basin and Landscape Management (hereinafter also "representative") via Resolution No. 556/2010 which approved the Principles of sustainable flood protection, the principles for integrated water resources management and soil fund management and proposed the framework conditions for securing integrated river basin management (hereinafter only "principles"). At the same time the Government called for the elaboration of the inter-departmental economic Landscape Revitalisation and Integrated River Basin Management Programme for the Slovak Republic (hereinafter only "programme") pursuant to the approved principles as the systematic tool for flood prevention and for lowering flood risks, the risks of drought and other risks related to extreme natural events⁴.

This programme is based on the shared social responsibility to protect the territory and landscapes of the Slovak Republic from flooding, international trends and current EU requirements for an integrated approach to water management. The programme is based, in addition to other systematic knowledge and the document from Water Directors from the EU countries mentioned above and on the principles and knowledge contained in the following documents:

2.1. Water Framework Directive 2000/60/EC

The accepted Water Framework Directive, which entered into force in December 2000, changed the way water resource protection was viewed. It focused on the creation of the conditions necessary for sustainable use of water sources via *integrated river basin management*. Here emphasis is placed on preserving the water management and ecological needs of the given landscape. This requirement to form a new relationship between humans and water requires the introduction of new approaches by state bodies and institutions for understanding water systems and securing their protection. This is based on the requirement to secure the necessary quantity of water in a corresponding level of quality for its use under the condition that the natural function of water courses, natural ecosystems and the environment be preserved.

2.2. Directive 2007/60/EC on the Assessment and Management of Flood Risks

This European Community Directive defines an effective legal framework for evaluating and *managing flood risks* with the goal of decreasing the negative impacts of floods on human health, the environment, cultural heritage and economic activities. With regards to actual practice related to flood protection, the individual activities adopted by the European Parliament are important for assuring that these activities become a permanent obligation for every member state in the Community. This directive binds EU member states to elaborate a plan for managing flood risks for areas that currently have a significant flood risk or that are likely to be located in such an area in the future. The directive fundamentally requires *the coordination of plans at a minimum of the river basin area management level*.

2.3. White Paper on Adapting to Climate Change, No. 2009/2152

The White Paper from the European Commission on the Adapting to Climate Change from 2009 recommends the following for water management: "Landscape management and planning must be adapted to the requirements for the optimal saturation of the landscape with water. A stable water cycle is necessary. Basic ecological functions including returning water and plants to the natural environment must be restored. The ability of the natural environment

⁴ The term *risk* hereinafter if not otherwise stated includes the risk of floods, drought and other risks of extreme natural events.

to retain water must be improved. This can be achieved via the restoration of wetlands. A priority is to be *the retention of rain water* where it falls, in particular in areas affected by human activities. An improvement in water infiltration into soils and its saturation contributes to the restoration of surface and ground water. This contributes in turn to the development of permanent vegetation securing a moderation of temperatures. All of these efforts must be taken in all places but in particular in overheated locations, including those marked to a significant degree by human activities and heavily inhabited places. It is necessary to take technical measures to improve surface infiltration, to take anti-erosion measures, to restore green spaces, to prevent clear cutting and to secure high quality and well-structured forests. Land use planning must be altered so as to allow for the effective application of these measures. A number of participants bear responsibility within this process: from public representatives charged with executing land use planning, developers and construction companies on up through to banks and insurance companies."

This programme fully respects in all regards and in all details the material and time schedule for the implementation of the Water Framework Directive 2000/60/EC, inclusive of all outputs of this process including for example the Water Plan for Slovakia, river basin management plans and the implementation of the **Directive 2007/60/EC on the Assessment and Management of Flood Risks**.

The implementation of the programme will not change the competencies of individual departments *but expands upon current environmental policy tools* to include *flood prevention, adaptation of landscape structures to climate change and places emphasis* on environmental revitalisation. In this respect the programme supports the goals and aims of all international conventions and valid obligations with regards to landscape planning and protection including the framework aims of the European Landscape Convention with regards to the protection and restoration of biodiversity while respecting the concepts and the systems used within state environmental and landscape protection, forestry, water management and other environmental protection systems including their legal and institutional framework valid in the Slovak Republic.

3. PROGRAMME GOALS AND THE ROAD TO THEIR ACHIEVEMENT

Flood prevention

The content of the programme is to create, activate and develop the long-term prerequisites necessary for the social utility and the effective macroeconomic function of a complex and integrated system of measures to assure *flood prevention* along with a decrease in flood risks, the risk of drought and other risks of extreme natural events.

International best practices for flood prevention pursuant to European experts are based on a three-level approach with the following progression:

- (i) *First harvesting* rain water at the site or place where it falls – *retaining*
- (ii) *Then retention and accumulation* of the rain water in the landscape – *storing*
- (iii) *Finally draining off* the portion of the rain water that the river basin/area/landscape did not absorb in the previous step – *draining*

This approach also defines the main aims and priorities of the programme: *storing rain water in the landscape, slowing its drainage and allowing it to be absorbed as well as revitalisation and restoration of damaged landscapes/areas/river basins.*

Preventative measures will be proposed so as to increase the effectiveness of current direct technical flood prevention equipment and facilities used to protect citizens, health, lives, private and public property, cultural heritage items and other valuables of a tangible or intangible nature from direct damage caused by torrential water and damaging floods.

One of the basic steps within effective flood prevention will be ***the restoration of the ecosystem functions of river basins/areas/landscapes*** to help to store rain water, allow it to be absorbed into the subsurface, thereby increasing the quality of soils and securing ecological stability within the spatial optimisation of functionality, needs and the use of landscapes by humans due to their natural characteristics.

Harvesting rain water in the landscape

The goal of the programme is to revitalise the ability of the landscape to capture rain water. The speed of drainage in current conditions for river basins/areas/landscapes is artificially increased. Rain water in a landscape cannot fulfil its useful function, which to a significant degree contributes to the worsening condition of the river basin/area and then leads to a drying up process in the landscape. This cyclically worsens the retention abilities of the soil/area and again leads to an increased risk of destructive floods and other risks.

A specific goal is to create and build water holding landscapes and natural segments within forested, agricultural and urban landscapes across the Slovak Republic as well as within developed areas in cities and villages ***in order to build up water harvesting systems***, facilities and technical solutions ***with a total cyclical rain water retention capacity of 250 million m³***. Afterwards such water retention systems and facilities will be responsibly operated in order to maintain their functionality and regular maintenance and service will be undertaken as well. This is a continuous and cyclical process. *The defined cyclical water retention capacity* is based on analysis of rain water drainage ratios for the river basins on the territory of the Slovak Republic⁵.

An important fact for increasing the effectiveness of the programme as well as the effectiveness of the multiplicative effects created by it is the *maximum time to execute the programme* necessary for building *the defined cyclical water retention capacity* anticipated by the programme for the mid-term (2016) to the long-term (2020) future depending on the funds available to the programme.

Revitalisation and restoration of damaged landscapes

Landscape revitalisation is a complex goal of the programme and is one of the main conditions and dominant preventative measures against flooding and other risks. Landscape revitalisation, suitable landscape measures and adjustments and a change in the approach towards the efficient use of landscapes within the programme will ensure that generated flood

⁵ **Ing. Michal Kravčík, CSc.** et al.: *Voda pre tretie tisícročie (Water for the Third Millennium)* – „Neubližujme vode, aby ona neubližovala nám“ (*We do not harm water so that it does not harm us*), Typopress 2000.

waters will be kept to a minimum and isolated to their source locations. At the same time the restoration of ecosystem functionality to landscapes that naturally retain rain water will allow such water to be absorbed, thereby ensuring soil quality and the restoration of ecological stability for such areas within the spatial optimisation of functionality, needs and the use of landscapes by humans.

The programme will include the execution of measures to slow surface drainage, allowing rain water to be absorbed and eliminating soil erosion processes for the entire areas of river basins and areas that drain into water courses. This will decrease flood flows and flatten flood waves so as to lead to a lower risk of destructive flash floods. *A synergetic effect of the programme* during its full-scale execution will be a decrease in the impact of extreme rains on river basins/areas/landscapes, thereby lowering the risks of landslides, which are accelerated by concentrations of rain water formed by excessive and high levels of precipitation.

The retention of rain water in the landscape/areas/river basins and the slowdown in the rates at which it is drained from the surface of river basins/areas/landscapes will create more suitable conditions for it to be absorbed into the soil. This will allow ***rain water to enter into the landscape and to perform its utility functions***, which from a long-term point of view is necessary in order to revitalise and restore landscapes and for the safety and overall stability of the social environment.

In order to secure this slowdown in the rates of rain water runoff from the surface of river basins/areas/landscapes, the programme will allow for the introduction, performance and subsequent perfection of techniques used to retain rain water in (i) forest landscapes and nature, (ii) in agricultural landscapes and (iii) in urban landscapes. *The programme* also allows for the harmonisation of water retention in landscapes with the revitalisation of water courses and the harmonisation of executed measures with effective protection for areas and the transformation of flood waves will occur during flooding.

This will be connected to the introduction and the subsequent use, dissemination, performance and perfection of various techniques: from (i) ecological revitalisation of areas/landscapes, to (ii) techniques for absorbing rain water in soil structures and (iii) small technical measures taken on landscapes and the application of suitable combinations with the goal of harvesting rain water in the scope necessary so as to lead to the useful and necessary revitalisation of the river basins/areas/landscapes and to prevent flooding, drought and other risks connected to extreme natural events.

Changes to the approach taken by society

The philosophy of the programme will above all be a change in society's approach to water and the landscape, the understanding of their mutual interaction and their complex interconnectivity. The programme will be a tool for recognising the multiplicative functionality of rain water in landscapes and for understanding its efficient and strategic potential use.

One goal of the programme with respect to its philosophy will therefore be social understanding of the necessity to lower the drainage rates of rain water, which otherwise leads to damage as it travels to water courses, thereby losing its potential contributions to the revitalisation of landscapes/river basins/areas during periods with increased precipitation and torrential rains, which causes inundation and destructive flooding.

A component of the philosophy of the *programme* will also be a change to the approach used within the management and use of landscapes/areas/land registry areas from the current, mainly utilitarian (exploitative) approach with priority given to the removal of resources and production activities to a more ecologically balanced approach with emphasis on the revitalisation and restoration of river basins/areas/landscapes, decreased flood risks, drought risks and lowered damages as the result of natural events and extreme weather. The execution of the programme will expand the opportunities for sustainable management of the soil fund and lead to better and more efficient management of rain water.

A change in the approach to landscapes will be fulfilled by the programme through emphasis on the revitalisation of developed areas in cities and villages that in many cases contain neglected cultural, historical and construction structures that, with additional and suitable adjustments, could create the conditions for other uses of such spaces.

The programme will efficiently support the optimisation of the spatial organisation of such management activities in landscapes, in particular within agricultural and forest management and land use planning with respect to this change towards society's approach. The programme will support the restoration, revitalisation and creation of renewable natural resources (water, soil, vegetation, forest fund, biodiversity, etc) and meet the demanding requirements placed on sustainable development formulated in Agenda 21.

4. PRINCIPLES AND TOOLS TO ENSURE PROGRAMME EFFECTIVENESS

4.1. Process management

The programme with respect to the number of individual sectors involved will be based on the principle of cyclical activation and the management of cross-sectional system processes with the goal of dynamic, interactive and time-unlimited creation of conditions for the execution of individual activities and projects within the programme (*multi-sector process management*). Integrated components of the management of these processes will include the following:

- *The participation* of individual departments, sectors in the economy⁶ and public administration *with the efficient use and sharing of their institutional capacities*, human resources and technical resources as well as the participation of other entities participating in programme execution (*integrated multi-sector participation*)

4.2. Macroeconomic effectiveness

Pursuant to the principle that funds dedicated for the programme are significant and unique with regards to the long-term for individual areas/river basins/landscapes, one of the most important criteria and at the same time economic goals of the programme is the *maximisation of macroeconomic effectiveness* of the programme; the main tools will be:

- The maximisation of the effectiveness of funds allocated and available to the programme secured via the elaboration, submission, approval and audit process for the execution of Landscape Revitalisation and Integrated River Basin Management projects (*execution projects for the programme*)

⁶ The term *economy* within the programme pursuant to the integrated system approach expresses a complex identified for all sectors of the economy including the educational sector (more closely the department of education) as well as institutions that support business activities and create jobs (including the departments of labour, social affairs and economics) and sectors in the "real" economy (production, trade and services).

- The targeted use of the multiplicative effects from the execution of the programme as a economic impulse for innovation, production, services and employment (*programme economic impulses*)

5. PROGRAMME TIMEFRAME

In terms of a schedule the programme will be completed in two content-connected phases: Programme Activation and Complex Programme Execution

5.1. Programme Activation

In this phase of the programme all system processes necessary for creating a new and high quality legislative environment, organisational assurance for the programme and subsequent efficient execution of the programme to the full extent of its utility will take be activated.

Legislative changes

Primary establishment of legislation in the *Programme Activation* phase will create the legislative environment for the *Complex Programme Execution* phase and will include the creation of interactive mechanisms for its later perfection (*interactive legislative change processes*). The scope of legislative changes in the Programme Activation phase is more clearly specified in *Chapter 6*.

Start-up projects

In order to reduce flood risks and take preventative measures against floods in 2011 a component of the Programme Activation phase will also include the assurance of a specific *execution project for the programme* for selected landscapes and areas (*start-up projects*).

Start-up projects in the Programme Activation phase will be executed under the conditions of existing and valid legislation and following the current conditions of departmental state-owned companies, institutions and other sectors of the economy. Such an environment will be a useful resource and provide effective feedback necessary for *interactive legislative change processes* and for other important *restructuring processes* for companies and institutions within the interested departments and sectors of the economy.

Management of start-up projects

The preparation and elaboration of *start-up projects* will be secured by the Representative of the Government of the Slovak Republic for Local Government and for Integrated River Basin and Landscape Management in cooperation with the Ministry of Finance of the Slovak Republic. The execution of *start-up projects* including resources and the manner of their financing will be approved by the Government of the Slovak Republic at one of its sessions.

The management and coordination of start-up projects until their approval by the Government of the Slovak Republic will be secured by *the executive director of the programme and his office*. In organisational and budgetary terms, the office of the executive director of the programme is a component of the Government Office of the Slovak Republic.

The activities of the *executive director of the programme* and his office will be terminated via the establishing of a legal form of professional management for the *programme* with the establishment of a long-term *system of programme organisation and management* in the

Complex Programme Execution phase as the result of the legislative process shown in Section 6.3 of this programme. The representative will secure these activities until the nomination of an executive director for the project.

All execution projects for the programme will be assured and executed under the conditions of valid legislation and with sufficient adherence to all legal regulations valid in the Slovak Republic while fully respecting valid private property rights and other private rights. Valid legislation within state environmental and landscape protection will also be responsibly followed and considered; their execution will be assured and performed in cooperation with appropriate state environmental and landscape protection authorities.

The execution project for the Landscape Revitalisation and Integrated River Basin Management Programme for the Slovak Republic for 2010 pursuant to Government of the Slovak Republic Resolution No. 556 dated August 27, 2010 is shown in the attachment.

5.2. Complex Programme Execution

The content of this phase of the programme is connected to the Programme Activation phase at the time at which the legislative conditions for the full functionality of all *basic programme mechanisms* is secured: (i) primary establishment of legislation for starting activities towards lowering risks, (ii) efficient and effective management of river basins/areas/landscapes and (iii) a system for financing, organising and managing the programme.

Multi-sector-nature of the programme

The full functionality of basic programme mechanisms allows for both its spatial dissemination (*full-scale execution of the programme*) as well as for the performance of multi-sector activities within the programme. Their results will include innovation in terms of the products and services considered to be the necessary prerequisites for effective economic growth and for long-term increases in employment (*programme economic impulses*).

The scope of the complexity of the programme and the multiplication of economic effects is explained in detail in Chapter 7.

6. PROGRAMME ACTIVATION

Content and scope of legislative changes

The primary establishment of legislation will be the result of professional and legal analysis and other supporting materials with particular focus on the following areas:

6.1. Identification and specification of activities for lowering risks

Activities for lowering flood risks, the risk of landscapes drying up and the risk of extreme natural events defined within the legislative process will result in the identification, specification and establishment of legal rules, tools and mechanisms that will enable:

- 6.1.1. A halt (*elimination*) or decrease in the impacts of activities and actions taken by society that increase risks,
- 6.1.2. A start (*activation*) or increase in the impacts of activities and actions that decrease risks,
- 6.1.3. *The elimination* of existing loads created in the past from previous economic and other activities taken by society that increase risks,
- 6.1.4. Subsequent *application of mechanisms using positive and negative motivation* for eliminating the results of a negligence of responsibility or a breach of obligations arising from quality and effective legal standards introduced *within interactive legislative change processes*,

For all areas within river basins/areas/landscapes:

- Forest landscapes • Agricultural landscapes • Areas and surfaces with water works • Areas and surfaces with developed transportation and industrial infrastructure • Urban landscapes (developed areas of cities and villages).

6.2. Efficient and effective management of river basins/areas/landscapes

The legislative processes will create the prerequisites for creating efficient, effective and useful management of river basins/areas/landscapes that will be used a framework for evaluating all professional and legal aspects including those in particular from the following areas:

(1) ***Decentralisation and/or de-monopolisation of the administration of small water courses and other improvements*** with anticipated transformation over to (i) a village and city or (ii) to other, new administrators.

- Necessary legislative changes prepared on the basis of appropriate professional and legal analysis and supporting materials will also include the elaboration of legal conditions necessary for such a transformation in particular with regards to the professional competencies of the new administrator and the scope of acquired powers and responsibilities.

(2) ***Integrated river basin/area/landscape management*** via the creation of contractual relationships between existing interested parties and partners in the given river basin/area/landscape⁷.

- In appropriate legal standards, the rules for the contents of contracts and the form in which contracts with interested parties and partners are concluded will be defined in order to create both a shared approach and participation towards the execution of the contents of the programme within the specific river basins/areas/landscapes (***contractual partnership for river basins/areas/landscapes***). The given integration will not be based on the creation of new institutions; rather the legislative process will be used to established legal rules and/or conditions for integrating interested parties and partners on the basis of a contract.

⁷ ***Interested parties and partners (ZSP)*** for the given river basin/area/landscape pursuant to the contents of the programme is every owner, tenant or administrator in the river basin/land/landscape: (i) from individuals and legal entities, (ii) cities and villages, (iii) large state and private institutions, companies or legal entities with ownership right and/or the rights to manage forest landscapes, agricultural landscapes, areas with water works, transportation and industrial infrastructure and/or in the developed areas of cities and villages.

(3) ***Decentralisation and/or de-monopolisation of the administration of new water sources*** created via execution projects for the programme with the transformation over to owners, administrators and/or tenants within the given land/landscape:

- Professional and legal analysis will be the basis for creating the legislative conditions to allow for the transformation of the administration of new water sources created during the execution of the programme including the establishment of legal rules for the economic and business use of such resources as long as established conditions and criteria for macroeconomic effectiveness are followed.

6.3. System for financing, organising and managing the programme

The legislative process will secure the conditions for the long-term financing, organisation and management of the programme in the Complex Project Execution phase by creating:

(1) ***The programme financing system*** in which basic professional economic, financial and legal analysis will be incorporated and elaborated including the evaluation and definition of:

- *The source of programme financing*, the manner in which such funding is secured and the legal form of administration of such funds wherein the ***framework for funding the programme*** will include among others (i) EU funds defined for the Slovak Republic (ERDF, EARDF, ESF, Cohesion Fund) and those provided for the National Strategic Reference Framework for flood prevention measures and (ii) funds from the state budget of the Slovak Republic as well as (iii) other funds defined for the programme within the legislative process shown in this point of the programme.
- *Tools and conditions for efficient allocation* of the funds for executing the programme.

(2) ***The system for organising and managing the programme*** will define the procedures, rules and criteria used for submitting, approving and auditing the execution projects for the programme:

- *Organisational administration and management* of the process of approval and audits of execution projects for the programme,
- *Establishment of evaluation criteria* for execution projects of the programme and for decisions to provide programme funds,
- *Definition of legal rules for the efficient and professional management* of the programme including (i) executive management (*executive body*) and (ii) effective monitoring and audit mechanisms (*supervisory body*).

Professional teams for legislative processes

In order to assure the execution of legislative processes specified in Sections 6.1, 6.2 and 6.3 herein and to assure the performance of activities, actions and work creating such content, the representative will name ***a professional work team*** for each of these legislative processes. During the nomination of these members the representative will consider the professional issues related to the legislative processes and *multi-sector representation*. ***The dynamics of the programme*** have led to the expectation that the processes for necessary legislative changes will be completed by ***September 2011***.

7. COMPLEX PROGRAMME EXECUTION

Multi-sector aspects and economic impulses

The complexity of the programme (*multi-sector aspects and integration*) in this phase will be reflected in terms of content within its execution on two levels:

- (1) Execution of the programme via the complex execution of projects for integrating river basins and landscape areas (*complex programme projects*)
- (2) The implementation of programme activities within economic processes in the public and private business sector (*multiplication of the economic impulses from the programme*)

7.1. Complex projects integrated with specific areas

Contractual partnership

The subject of the activities and the content of the work within *contractual partnership for river basins/areas/landscapes* will mainly be the preparation, elaboration and execution of a **complex programme project** to integrate river basins/areas/landscapes, participation in project financing as well as securing long-term operations and maintenance⁸ of all technical measures, water and landscaping works, small and large construction projects and other adjustments to river basins/areas/landscapes created via the *complex programme project* as declared in their shared will; partnership will also help partners assume responsibility for the condition of river basins/areas/landscapes with the goal of lowering risks.

Motivation of the interested parties in the river basin/area/landscape within such contractual integration along with decisive **stimuli** for *contractual partnership* for the preparation, elaboration and execution of *integrated and complex programme projects* will arise from:

- (i) **Specific responsibilities** arising from requirements stipulated by legal standards established in *integrated legislative change processes*
- (ii) And will be supported by **criteria and rules for providing programme funds**, where the submission of a shared *complex programme project* by interested parties in the river basin/area/landscape in the form of *contractual partnership* will be established as one of the necessary conditions for its approval and for the provision of funds to finance such a project.

Restructuring processes

Multi-sector participation in start-up projects in the Programme Activation phase, in particular during the execution of *complex programme projects* during its *complex execution*, will not be possible without the active participation of interested departments and their departmental, state-owned companies and institutions and other sectors of the economy. This will require significant amendments and/or changes to priorities that will lead to their **restructuring**, *increasing the efficiency of their activities* and the creation of subsequent necessary and desirable *increases in their social utility*. The programme as an inter-departmental and economic tool for revitalisation of landscapes and integrated river basin management in the Slovak Republic will become one of the most significant contributors to

⁸ The **long-term operation and maintaining the functionality** of all landscaping works and technical structures created via the given complex programme project to lower risks will be an integral component and will include expenses for these activities; these are a mandatory component to be included into the total budgeted costs for the project.

government efforts to *consolidate public finances* and to increase the *macroeconomic effectiveness of landscape management*.

7.2. Programme economic impulses

Interactive legislative processes

This phase of the *programme* will continue with the *interactive legislative change process* as resulting from reflection activities to insure that the programme is up-to-date and flexible and to secure its full-scale execution, dissemination to developed areas of cities and villages and, last but not least, within *innovation processes*, for strategically important and targeted support for the implementation of programme impulses into economic processes *via the introduction of new products* and the provision of new services.

Multiplication of economic effects

As a result of the execution of the *programme*, *rain water retained in the landscape* will not only be a preventative measure for lowering the risk of floods but in a number of cases may also become an important and valuable resource for additional economic use. It will provide opportunities that can be taken by other interested state-owned companies, public institutions and the private business sector. Depending on the environment in which the specific projects included within the *programme* are executed, *retained rain water* in the revitalised landscape will lead to *more accessible, effective and renewable multi-function natural resources*.

7.2.1. *In forest landscapes* this will be reflected in:

- *Quality sources of drinking water*⁹ as a strategic and valuable natural product that defines both current and future limits of economic development across areas, landscapes and the entire economy.
- *Increased yields from water springs* and subsequent *increases in the energy potential* from water courses in the landscape
- *Increased natural biodiversity and the diversity of the ecosystems in the forest landscape*

7.2.2. *In agricultural and rural landscapes* this will be reflected in:

- *Increased production potential in agricultural soils* due to halting their degradation and drying out, decreasing erosion processes and increasing their biodiversity.
- *More efficient sources of non-potable water* for agriculture (*available water*)
- *Strengthened diversity of economic activities* via the creation of a natural environment for locally common and characteristic flora and fauna (*ponds and water farms*)
- An irreplaceable source for creating an attractive environment for rural economic development (*agro-tourism, relaxation and educational gardens*)

7.2.3. *In the urban environment* there will be more accessible and efficient sources for:

⁹ *Running pure*, an analytical study from the World Bank (November 2002), stated that the production from infinitely more pure springs of drinking water from forest ecosystems is up to 7-times more effective than the currently applied systems, which is mainly based on the construction of large water reservoirs.

- *Economic projects for reviving the climate* in city agglomeration zones, in intensive urban and dry areas and in areas in developed parts of villages and cities suitable for the use of new innovative technologies including *bioclimatic gardens, rooftop climate control/water retention systems, rain gardens, retention tanks for recycling rain water* and other new progressive technologies and technical solutions for water retaining systems
- Necessary municipal service activities (*fire water tanks, non-potable water tanks for roadway maintenance and cleaning*)
- The application of other innovative methods towards integrated water resources management in river basins/areas/landscapes (the use of sophisticated and highly effective *bio-technical treatment of municipal wastewater*)

Impulses for innovation

The practical execution, revitalisation and retention of rain water in the landscape will allow the *programme* to both directly fulfil its contents - the construction preventative flood protection measures and a decrease in other risks - and will also create *secondary economic effects, impulses for innovation* and create ***demand for new and innovative technologies***, technical equipment, new products and also services in a targeted manner. This will create long-term opportunities for *higher employment and economic growth*.

Farsighted ***strategic thinking*** and targeted support for innovation, the introduction of new products and goods in the field of the effective use of the potential of rain water and the integrated management of river basins/areas/landscapes can be an unmatched opportunity for domestic companies to establish themselves in a sector that is growing dynamically in a global context¹⁰.

The establishment of domestic companies in this sector in the coming years could be a significant competitive advantage for the Slovak economy at a time when knowledge, expertise, technology, technical solutions, mechanical and production equipment and services related to this sector will be highly sought after and well compensated ***on the markets of advanced economies*** with high concentrations of intensively-urban areas (*Germany, France, Great Britain, Spain, Italy, Greece and Japan*) as well as on *markets in countries that are currently growing with a high level of industrialisation* (*China, Russia, India, Romania and Bulgaria*). Currently there is very high demand for products from this sector in the ***countries of the Middle East*** (*Saudi Arabia, Israel and Turkey*), ***northern and southern Africa*** (*Algeria, Morocco, Egypt, Libya and South Africa*) and in **Australia**. Sufficient commercial and investment opportunities in the medium-term will also be offered on the ***markets of neighbouring countries*** (the Czech Republic, Hungary, Poland and the Ukraine) due to their intensive urbanisation and insensitive construction of industrial and transportation infrastructure in the recent past.

Programme technological projects

¹⁰ ***In the USA*** a number of companies are already established that offer products and services connected to ecosystem innovations, in particular for urban areas (*green roofs, rain gardens* etc.).

A critical component of the *programme* for this reason will be projects that activate innovative thinking and the use of professional human resources from schools, universities and academic worksites, public sector scientific institutions and the professional capacities of the public sector. The goal will be to support the formation of *productive technical teams* and use multi-sector partnership contracts to leverage their synergies in order to create effective *programme technical centres* as an effective tool for forming *domestic technical companies* in the **Rain Water Management (RWM)**¹¹ sector followed by their successful establishment in the competitive environment of the international market.

Programme technological projects in the field of *rain water management* represent an unrepeatable opportunity for the creative potential for university and scientific worksites in the field of *applied research*, to apply the abilities of technical development teams from the private sector from a number of industry sectors and activate such activities *for students and RWM innovation centres*.

The participation of students in construction and development teams within the process of innovating and introducing new products and implementing new technologies that use both a technical background and an academic base will allow the *programme* to create opportunities for the effective use of professional knowledge, expertise and undisputed creative potential; the submission of work from *graduates of programme projects* will also support this.

7.3. Human resources and their activation

Human resources and the use of *professional potential* are decisive for the success of every human endeavour. They take on even more significance with content intensive and time demanding projects, such as the inter-departmental economic *Landscape Revitalisation and Integrated River Basin Management Programme for the Slovak Republic*.

The programme will, due to its focus in the complex execution phase, *activate human resources* in a targeted manner via specific motivational aspects and the creation of opportunities for the effective use of *professional knowledge, expertise and abilities*.

The activation of human resources and proper motivational settings will without a doubt be one of the most important and *most demanding tasks within programme management*.

Motivational system settings

In order to further elaborate and secure the effective use of the water, energy, production and commercial potential created by the *programme* in forest, agricultural and urban areas and for the critical activation and application of professional human resources it is necessary that legal rules be created for the following areas *so long as the ecosystem approach to water and landscape protection is sufficiently applied*:

(i) *A system of economic stimuli* for the complex/full-scale retention of rain water in river basins/areas/landscapes,

¹¹ *Rain Water Management (RWM)* – this is necessary to revitalise landscapes, for flood prevention measures, for lowering the risks of dried out areas and for other risks.

(ii) *A specific and effective allocation* of these economic stimuli for investors, water retention system operators and for the manufacturers of sophisticated innovative technologies and technical solutions that allow for the necessary retention of rain water.

(iii) *A motivational and an efficient macroeconomic method for spreading the allocated stimuli over time* during the period in which rain water is retained or during the operation of a rain water retention system.

Expert team for the legislative process related to economic stimuli

The representative will name *a professional expert work team* in order to assure the execution of the legislative process specified in Section 7.3 and for assuring the executive activities, actions and work that form a part of its contents as well as for completing necessary legal and professional analysis. When nominating the members of this expert work team the representative will consider the demands of the given professional issue and respect required *multi-sector representation*. *The dynamics of the programme* anticipate that the legislative process related to the economic stimuli stated above will be completed by *12/2011*.

The process map for programme management, emphasising the overall organisation and management of the programme, its basic processes, connections, bonds and interactivity is shown in the annex.

8. MACROECONOMIC GAINS FROM THE PROGRAMME

The landscape rain water retention programme, the execution of other ecosystem water protection measures and the overall revitalisation of the landscape will directly create financial and non-financial macroeconomic gains.

The goal of the programme is to create cyclical rain water retention capacity of *250 million m³* between 2011 and 2016/2020 depending on available funds; therefore the maximum term for completing the programme is "10" years.

Programme expenses for the construction of *1 m³* of water retention capacity is restricted to a maximum of *€4* and the total expenses for the programme for constructing the *defined cyclical water retention capacity* during programme execution will reach a total of *€1 billion*¹²

The execution of the programme and its multiplicative economic effects will create and/or allow the creation of a total macroeconomic gain that with certainty will exceed the expenses for executing the project a number of times over.

8.1. Financial gains from the programme

¹² *The figures for macroeconomic gains and expenses* for the programme shown in this section are based on known and conservative technical and economic calculations. These values are not discounted over time. The detailed calculations of macroeconomic effectiveness will have to be a component of every Complex Execution Project.

A main factor decisive for macroeconomic effectiveness of the programme is the fact that the programme is to construct *a defined cyclical rain water retention capacity of 250 million m³* that includes:

- (1) ***Efficient and full-scale preventative protection for the Slovak Republic from floods, drought and other risks with a cyclical surface capacity for collected water equal to 250 million m³,***
- (2) ***New, high quality water sources*** and/or increased water quality and yields with a total annual contribution to the creation of water sources that is equal to at least the *volume of the constructed cyclical water retention capacity.*¹³

Other important sources of macroeconomic gains from the programme include ***financial gains from the multiplication of programme effects.***

8.1.1. Financial gains from the direct execution of the programme

The shown programme synergy, i.e. the concurrent construction of flood protection measures and protection from other risks along with the construction of new high quality water sources using innovative technology from the RWM sector, allows for the following to be achieved:

- (i) A minimum of ***3.5-times more efficient*** use of funds measures and protective levees and
- (ii) A minimum of ***2-times more efficient*** use of funds in comparison with the construction of large scale water reservoirs in order to obtain new water sources,

After considering the social need for the immediate assurance of necessary protection against floods and other risks and increasing demands from the economy to construct new water sources, the savings to the state budget of the Slovak Republic over the long-term represent a minimum amount of ***€3.75 billion.***¹⁴

8.1.2. Financial gains from the multiplicative effects of the programme

A strength of the programme is the creation of multiplicative economic effects that are explained in more detail in Section 7.2 and within which the macroeconomic gains are largely composed of *the creation of permanent new jobs and tax incomes* from turnover generated in the *RWM technology sector* and from turnover from other *economic activities generated by the programme.*

Starting with its activation and the first phase of its execution the programme will immediately create jobs for the long-term unemployed and for those workers with lower qualifications that are mainly seeking physical labour in forestry, agriculture and rural areas.

Depending on the scope and area of execution and other dynamics, the *programme* will enable the temporary creation of up to ***30 000 jobs*** during the intensive construction process and the start up of water retention systems (2012 to 2016/2020) for work on areas that feature the construction of water retention elements, the creation of technical solutions related to rain

¹³ ***The technical calculation*** is based on the minimum level of efficient transformation of the volume of retained water into water sources on the basis of the actually completed projects, wherein the efficiency of water retention systems in creating water sources will be carefully monitored in specific complex programme projects.

¹⁴ This total does not include the amount of damage to property and cultural valuables protected by the programme via measures constructed against floods and other risks.

water harvesting and the establishment of systems for increasing the retention ability of river basins/areas/landscapes directly in forested and agricultural landscapes and in developed areas of cities and villages.

Macroeconomic gains from employment

The *programme* will create a minimum of **4 500 permanent jobs** via the construction of the rain water harvesting system and the necessity to operate, maintain, repair and service this system in order to maintain its functionality.

The most significant employers, following the increased dynamics and the full-scale and complex execution of the *programme*, could become technical, manufacturing, sales and service **companies in the RWM sector** for which the programme creates opportunities for employment and business for specific professional professions, highly-qualified workers and managers in the area of innovation, the introduction of new technologies, their implementation, operation and the subsequent provision of additional services with a total expected capacity of up to **3 750 new jobs**.

Macroeconomic gains from the programme in terms of permanent job creation are **8 250 new jobs** and the construction of water retention systems over the medium term of the project lifespan can be achieved at the minimum expense figure of **€465 million**.

Financial gains from the RWM sector

The RWM technology sector and other programme-generated economic activities will, in particular during the period of their dynamic growth and after long-term establishment of technical companies in market segments, generate tax income based on turnover in addition to providing increased employment.

When considering expected total turnover in the RWM sector over the mid-term of the lifespan of this sector it reaches a total equal to 2.5-times the programme expenses; tax income from the RWM sector will reach **€645 million**.

8.1.3. Overall financial evaluation of macroeconomic effectiveness

As follows from the economic calculations shown in the previous sections **the total macroeconomic financial gains** from the programme at a maximum timeframe of up to 10 years from the construction of the *defined cyclical water retention capacity* safely cover all *programme expenses*.

It is also clear that the execution of the programme from the long-term point of view will also create **macroeconomic effects in a minimum scope of €3.75 billion**. This figure represents the *funds saved by the Slovak Republic* that otherwise would have to be used for traditional methods and technology for constructing flood protection capacity and for obtaining new water sources and additional funds that would have to be expenses so that water retention volumes and the volume of new water sources comparable to the programme could be achieved.

Traditional methods and technology cannot of course *achieve the level of technical efficiency and macroeconomic effectiveness for water retention systems* found with the use innovative

technology and other technical solutions for taking preventative measures against floods and other risks that would be created or constructed in this programme.

8.2. Non-financial gains from the programme

Creation of an environment for economic growth

Slovakia has two valuable and strategic natural resources: *water and forests* and only one talented but dormant intangible resource: *professional human resources*. This programme creates opportunities to improve human resources via *innovation* through the introduction of new technologies, the introduction of new goods, products and services and the creation of opportunities for more efficient, ecologically-sensitive and cautious use of the strategic potential of Slovakia.

The programme cultivates, supports and multiplies the economic potential of Slovakia through synergies in the form of its strategic natural resources, professional human resources and opportunities for innovation in the RWM sector; this will be a source of welcome and structured **economic growth** and make significant contributions to a long-term **increase in employment**.

Total programme gains will be much higher and impossible to exactly quantify. It will also create an environment where it will be possible *to safely work, do business and live in a quality environment*. Gains that are reflected by statisticians into GDP growth are not included but are valued by those who live in this country, by investors and business people alike who wish to invest in such a country and do business in such a country and by tourists who are happy to return to such a country.

The programme will allow Slovakia to become just that kind of country. The programme creates the conditions for improving the quality of the lives of those people who will continue to select the Slovak Republic as *a better place to live*.