

### TAKING COOPERATION FORWARD

50<sup>th</sup> River Basin Management Expert Group Meeting, ICPDR Budapest, Hungary, October 29.-30., 2019

# Project FramWat - systematic use of natural water retention measures

Slovak Water Management Enterprise, state enterprise / Warsaw University of Life Sciences et all Supeková Monika, Dobias Jozef / Okruszko Tomasz, Kardel Ignacy, Pusłowska Tyszewska Dorota et all



### FramWat is

• Framework for improving Water balance and nutrient mitigation by applying small water retention measures

## Main objective

- to **strengthen** the **regional common framework** for floods, droughts and pollution mitigation by increasing the buffer capacity of the landscape using the N(S)WRM approach in a systematic way
- How? through systematic use of natural (small) water retention measures, N(S)WRM
- to develop methods, which translate existing knowledge about N(S)WRM features into river basin management practice
- methods will be tested in pilot areas and will contribute to improving water balance, decreasing sediment transport, enhancing nutrients re-circulation
- to provide decision makers with appropriate tools to incorporate N(S)WRM into the next cycle of River Basin Management Plans
- to **provide guidance and raise awareness** about the importance of horizontal integration of different planning frameworks



# Duration

• 07/2017 - 06/2020

## Partners

• 6 countries, 9 partners:

### Croatia

Croatian Waters, <u>www.voda.hr</u>
Slovenia

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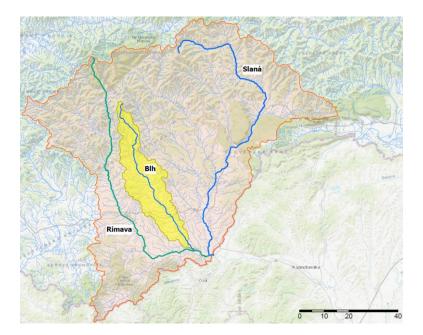
- University of Ljubljana, <u>www.uni-lj.si</u>
- LIMNOS Ltd., <u>www.limnos.si/eng/index.php</u>
- Poland (lead partner)
- Warsaw University of Life Sciences, <u>www.sggw.pl</u>
   Austria
- WasserCluster Lunz Biologische Station GmbH, <u>www.wcl.ac.at</u>
   Slovakia
- Slovak Water Management Enterprise, s. e., <u>www.svp.sk</u>
- Global Water Partnership Central and Eastern Europe, <u>www.gwpcee.org</u>
   Hungary
- The Regional Environmental Center for Central and Eastern Europe (REC), <u>www.rec.org</u>
- Middle Tisza district Water directorate, <u>www.kotivizig.hu</u>





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### Associated partners

• 6 countries, 6 associated partners:

ASSOCIATED PARTNERS

THE INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE DANUBE RIVER (ICPDR)

INTERNATIONAL SAVA RIVER BASIN COMMISSION

MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC

HUNGARIAN CHAMBER OF AGRICULTURE

SLOVENIAN WATER AGENCY

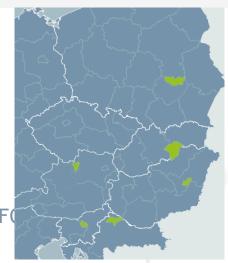
REGIONAL WATER BOARD WARSAW

### **Pilot** areas

- Croatia Bednja river catchment
- Slovenia Kamniška Bistrica river catchment
- Poland Kamienna river catchment
- Austria Aist river catchment
- Slovakia Slaná Blh river catchment
- Hungary Tisa river catchment



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### Work packages

- WP1 Identification of potential localities for N(S)WRM
- WP2 Effectiveness of N(S)WRM
- WP3 Policy integration and economic tools

WPC - Communication, WPM - Management

### Results

- 3 tools
- 5 pilot actions
- 6 action plans
- 8 trainings (national trainings, dialogues, workshops)



### **FramWat** Act. 1.1. Valorization method using the tools Act. 1.3. Method and GIS tool development Testing of FroGIS Τ1 to identification Workshop application in pilot Act. 1.2. locations (feedback) Final conference and regional strategic dialogue (part Act. 3.5.) catchments Prototype of online (part Act. 1.3.) application FroGIS 5 Act. 2.3. stakeholde Koncepčný plán for partners 7 Act. 2.2. Regional Ę Testing of static Act. 2.1. consultations **Consultations/dialogues with** Manual how to Search of existing method in pilot (part Act. 2.5.) **Regional trainings** catchments assess effectiveness parameters to assess of measures NSWRMs T2 Act. 2.4. combinations effectiveness Testing of dynamic model to assess cumulative effect of ÷ measures Concept plans Act. 2.2. for all 6 pilot Development of static Act. 2.5. catchments method to assess National consultations/trainings on assessing NSWRM effectiveness effectiveness 3.2. ÅĊ. Act. 3.3. Guideline how to **Decision Support System (online DSS)** plan, raelize and Act. 3.1. maintain NSWRM Act. 3.4. Stakeholder analyses Т3 Cost analyses and analyses of Action plans strategic documents National policy dialogues (part Act. 3.5.) for all 6 pilot catchments Act. 3.5. Guideline preparation 1st CE Seminar on 2st CE Seminar on Regional NSWRM's issues Regional NSWRM's multi round table and challenges round table benefits June 2017 – June 2018 June 2018 – June 2019 June 2019 – June 2020 TAKING COOPERATION FORWARD 6

### PROJECT FRAMWAT - SYSTEMATIC USE OF **NSWRM**

Global Water Partnership

Central and Eastern Europe

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### Main outputs

WPT1:

- O.T1.1 TOOL: Landscape Valorisation Method and GIS Tool for identifying locations where N(S)WRM are needed
- O.T1.2 TRAINING: Training course on how to use the GIS tool
- O.T1.3 PILOT ACTION: testing GIS tool in the pilot catchments

WPT2:

- O.T2.1 TOOL: Manual on how to asses effectiveness of the system of measures in the river basin
- O.T2.2 TRAINING: national trainings and regional workshop on how to assess effectiveness on the NSWRMs
- O.T2.3 PILOT ACTION Testing of static effectiveness analyses tool within pilot catchments
- O.T2.4 PILOT ACTION: Application of dynamic water quantity and/or quality models







### Main outputs

WPT3:

- O.T3.1 TOOL Guidelines to improve water balance and nutrient mitigation by applying system of N(S)WRMs
- O.T3.2 TRAINING: National and regional policy dialogues
- O.T3.3 PILOT ACTION: testing the method how to calculate and analyse N(S)WRM costs on river basin scale
- O.T3.4 PILOT ACTION: testing the Decision Support System for N(S)WRM planning
- O.T3.5 Action plans for implementing N(S)WRM into the RBMPs



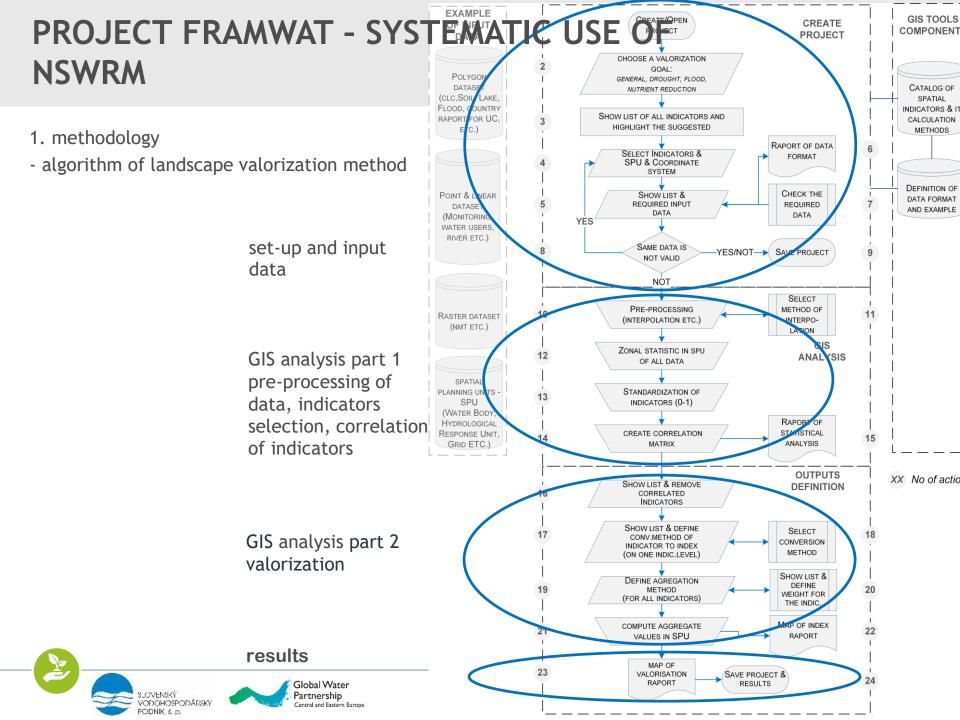


### **Project results**

T1 - Landscape valorization method, look-up table and GIS tool (FroGIS)

- 1. methodology (Kardel, I., Okruszko T., Puslowska-Tyszewska D.)
- 2. manual on data preparation User input data preparation for FroGIS
- 3. webapplication FroGIS (opensource)
- 4. testing of the developed method in pilot areas
- evaluation of needs and possibilities to design/realize N(S)WRM in the particular landscape (spatial planning units, SPUs)





# Indicator Short Data Short Indicator Short Indic

1. methodology

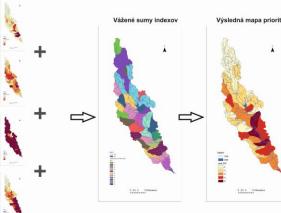
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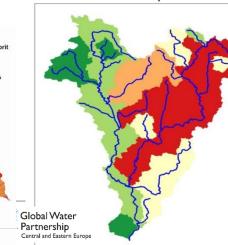
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- relevant indicators

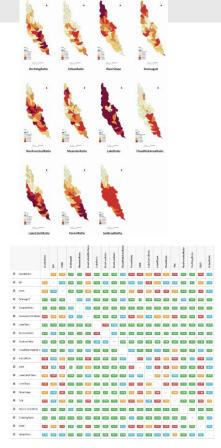
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ArableRatio	SPU.Area	atio	SPU.Area		PrecWeg.pMinWeg	
bfi	bfi.bfi		swFlow.swMHQ	Pre_Var_m	SPU.Area	
bfi	SPU.Area	FlowMaxAvgRati	swFlow.swMMQ		PrecWegF50.pFreqLow5 0	
	cwb.Value	0	SPU.Area	PrecFreqLow50	SPU.Area	
cwb	SPU.Area		swFlow.swMLQ		MeadPastur.Area	
	cwb_Var_a.Value	FlowMinAvgRati	swFlow.swMMQ		Ditches.Length	
cwb_Var_a	SPU.Area	0	SPU.Area	ReclamedRatio	SPU.Area	
	cwb.Value	FlowMinMaxRati	swFlow.swMLQ		PrecAnn.pAvgAnn	
	cwbMin.Value	0	swFlow.swMHQ		swFlow.swMMQ	
cwb_Var_m	SPU.Area		swFlow.swLMQ	sri	SPU.Area	
	River.Length		swFlow.swHMQ		swr.Value	
DrainageD	SPU.Area	FlowVarRatio_m	SPU.Area	swr	SPU.Area	
	River.Length		Forest.Area		DEM.Value	
	Ditches.Length	ForestRatio	SPU.Area		River500.Length	
	Lake.Area		grr.Value		SubCatch.Area	
	Arable.Area	grr	SPU.Area	TaySLO	SPU.Area	
EcoAraBuf20mRatio	SPU.Area		LakeCatch.Area		DEM.Value	
	SemiNatural.Area	LakeCatchRatio	SPU.Area	twi	SPU.Area	
EcoAreaRatio	SPU.Area		Lake.Area		Urban.Area	
	BadRHS.Length	LakeRatio	SPU.Area	UrbanRatio	SPU.Area	
EcoBadRHS	SPU.Area		DEM.Value	WaterYieldAvgF	swFlow.swMMQ	
	SemiNatural.Area	NonForestedRat	NonForest.Area	low	SPU.Area	
	LandUse.Area	io	SPU.Area	WaterYieldMinF	swFlow.swLMQ	
EcoCombined	SPU.Area		Orchard.Area	low	SPU.Area	
	SemiNatural.Area	OrchVegRatio	SPU.Area		Wetland.Area	
	LandUse.Area		PrecWeg.preVar_a	WetladRatio	SPU.Area	
EcoNumRatio	SPU.Area	Pre_Var_a	SPU.Area			

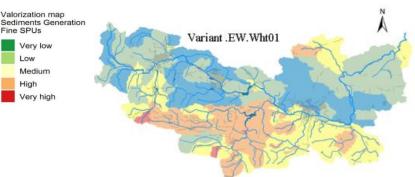
- 1. methodology workflow:
- Input SPUs
- choose goal
- choose indicator (indicators relevant for particular goals floods, drought, general, water quality, sediments; acting as stimulant/destimulant; defined significance of each indicator to reach the goal)
- insert input data (.shp, .tiff)
- calculate correlation matrix, remove high correlated indicators
- division of indicators into classes (classification method) indexing
- aggregation of indicators/indexes
- classification of aggregation results (calculate valorization maps for different weights (constant, variable) and class divisions)
- choosing the most appropriate valorization map in comparison to real needs verified in the field









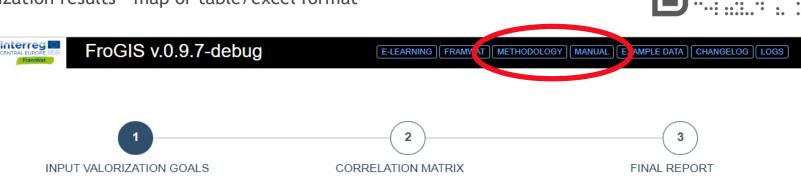




FroGIS

- 3. webapplication FroGIS (opensource)
- open source code
- e-learning section, methodology, manuals, example data
- valorization results map or table/excel format





### > INDICATOR VALUES

	·							
~	✓ SPACIAL PLANNING UNITS							
	SPU •							
	Custom border Browse No file selected							
>	GOALS AND INDICATORS							
>	DATA INPUT							
>	INDICATORS CORRELATION MATRIX							
>	CONVERSION AND FINAL AGGREGATION METHOD							
>	GOAL VALORIZATION RESULT							



### **Project results**

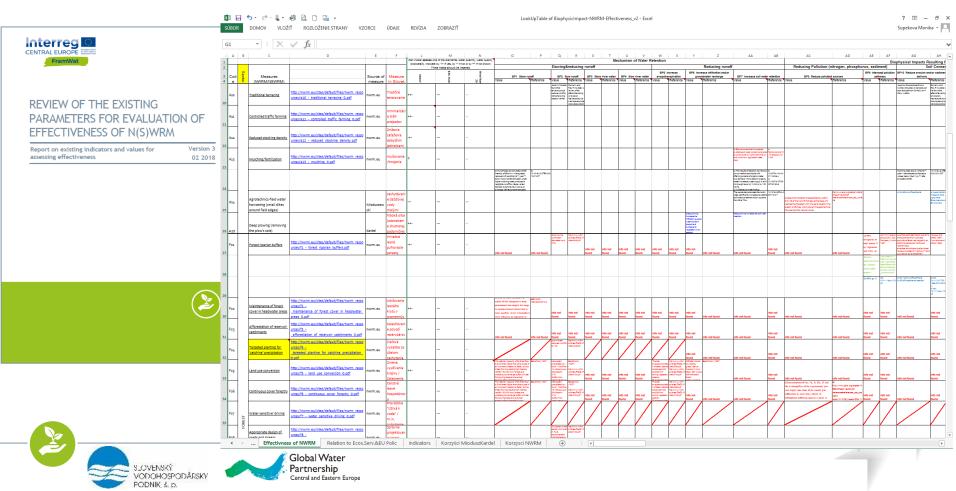
- T2 Effectiveness assessment of N(S)WRM
  - 1. report on available indicators and their effectiveness values (literature search), look-up table
  - 2. developed static method to assess effectiveness and GIS tool
  - 3. concept plans for pilot areas
  - 4. dynamic method (dynamic modelling) to assess effectiveness of measures, to test results of static method
- input results of landscape valorization method (goal maps for particular SPUs)





### **Project result**

1. report on available indicators and their effectiveness values (literature search), look-up table D.T2.1.1 - Report on existing indicators and values for assessing effectiveness

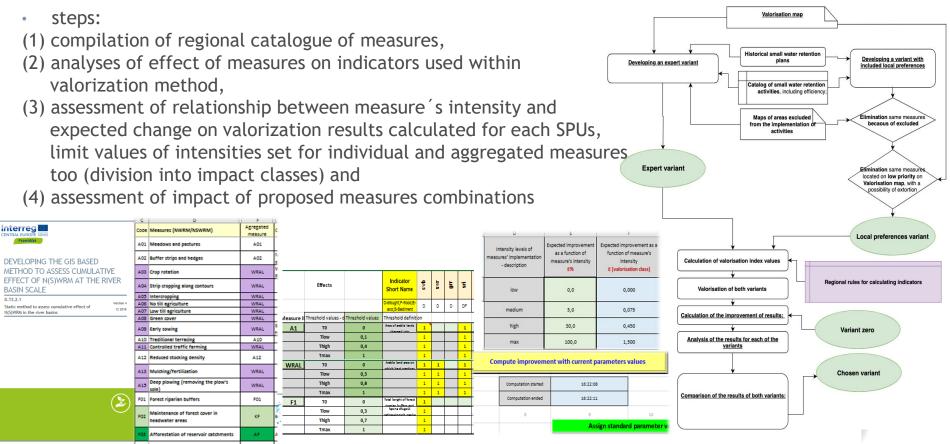


### **Project results**

2. developed static method to assess effectiveness and GIS tool

D.T2.2.1 - Static method to assess cumulative effect of N(S)WRM in the river basins

 core element of static/GIS tool is a set of relationships between measures' intensity and expected change in water retention properties of a catchment/SPUs; ! cooperation with experts in particular fields required





Individual or

Best Practices of River Channel maintenance

aggregated measures

0.750

1.500



### **Project results**

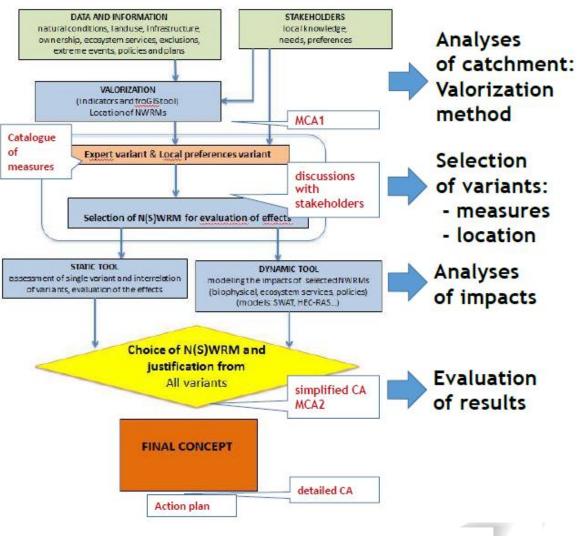
### 3. concept plans

- expert variant, local preferences variant
- variant/combination of measures to mitigate or eliminate negative impacts of pressures identified in pilot area for each SPU (mitigation of flood risk, drought impacts, nutrient pollution, ...)

Action plans - consisting of:

- (1) steps necessary to be taken in each of project countries
- (2) activities necessary to be taken
- (3) timeframes
- (4) financial resources and
- (5) responsible parties identification



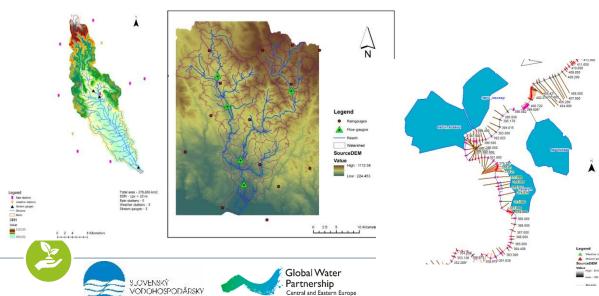




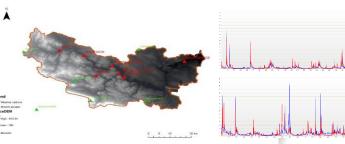
### **Project results**

4. dynamic method (dynamic modelling) to assess effectiveness of measures, to test results of static method O.T2.4 - PILOT ACTION: Application of dynamic water quantity and/or quality models

- ! cooperation with stakeholders and experts in hydrology, hydrogeology, landscape planning, ...
- steps:
- (1) pre-processing of input data
- (2) model calibration and
- (3) model validation
- models hydrological modelling SWAT, HEC-HMS,
   hydraulic modelling HEC-RAS 1D, 1D/2D, MIKE21, RiverFlow 2D



	Pilot study	Model name				
Partner	catchment	Hydrolo gical	Hydraulic			
Austria - WCL	Aist	SWAT	HEC-RAS 1D			
Croatia - HV	Bednja	HEC- HMS	MIKE21			
Hungary - MTDWD	Nagykunsagi		HEC-RAS 1D			
Poland - WULS	Kamienna	SWAT	HEC-RAS 1D/2D			
Slovenia - UL	Kamniška Bistrica		RiverFlow 2D			





### **Project results**

- T3 Policy integration and economic tools
  - 1. plan for stakeholder involvement updated on regular basis
  - 2. policy review document on national and regional level
  - 3. cost-effectiveness analyses to be tested within 3 pilot areas
  - 4. Decision Support System (DSS)
  - 5. national consultations

sted within 5 pilot areas	FramWat
	NATIONAL OVERVIEW OF THE EXISTING POLICY DOCUMENT (SLOVAKIA)
	D.T3.1.2 Version Template March 2018
PLAN FOR STAKEHOLDER INVOLVEMENT	
D.T3.2.1 Version 2 November 2017	
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### **Project results**

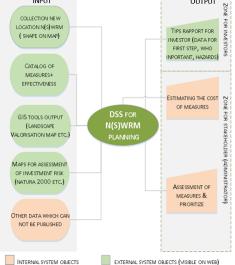


- developed tools available via DSS, online and opensource codes (to be further developed by potential users, to test own indicators values, to test own weights and indicator indices
- for stakeholders/users involved in water retention measures planning
- sections:
- (1) Education (information on water retention needs, planning process, investment process, tools, dictionary, link to PDF manual),
- (2) Catalogue of Measures (description, picture examples for around 50 N(S)WRMs) and guery system to select a right measures
- (3) Tools (links to developed tools as valorization method and its static tool, static method to assess effectiveness of measures, dynamic method to assess effectiveness of measures

			Home Country Has	nog allaran ina secol									disrupt the
Catalog of measurements The application is created for people involved in planning water retention actions to mitigate the effects of drought, floods and surface contamination by biogenes.			Catalog of measu							http://nwrm.eu/sites/default/files/nwr m ressources/a6 -		bezorbové	capacity, r pores. No growing pl
								A06	WRAL	no fill agriculture.pdf		poľnahospadárstvo	through pl
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Sector 3		Buffer strips and hedges	C) bowcas	C) SUDZA	C Ogoriy	C matter quarty	- actancia						provide pr
		403											The period
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Sector 3		Intercropping											line of the terrain, By
impact	600	A06	Land use										erosion an
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Sector 2		Low till apriculture	greenhouses	heterogen agric	ulta homogen agrio	ultute meadows	orchards	pas				Ì	to the sma
Sector 3		A08	roads	standing water	🗌 urban	wasteland	wetlands	vine					track marl



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Ethrough plowing. No-till is an agricultural technique that increases the amount of

agricultural inputs, such as green cover / cover plants, mulching, permaner

ess distortion of the site than modern terracing (significant leveling or cutting, to the smallest possible area of fixed tramlines. The CTF system can reduce track marks from 75% to 15% of the surface. Fixed route paths can be used

mer or autumn, usually on arable land, to protect soil th uld otherwise be fallow in winter - soil protection against erosion, over tine. Ground cover plants also improve the soil stru erentiate the growing system and reduce the loss of soluble nutrien arly sowing applies to sowing up to six weeks before the normal sowin son. This allows for earlier and faster setting up of winter crops that ca ide protection during the winter period (root network that protects the so in which the soil is exposed is shorter, therefore erosion and run ts significant and water infiltration is better. Early sowing may also na the effects of surr



### PROJECT FRAMWAT - SYSTEMATIC USE OF NSWRM Small retention -

### **Project results**

- C Communication
- leaflet, newsletter, up-to-date information on project webpage, facebook, twitter
- regional seminars
- regional round tables with high policy representatives







**Big deal!** 



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# THANK YOU FOR YOUR ATTENTION!



Name: Framework for improving water balance and nutrient mitigation by applying small water retention measures



Project Acronym: FramWat Project Code: CE983



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https://www.interreg-central.eu/Content.Node/FramWat

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