

PROLINE-CE

WORKPACKAGE T2, ACTIVITY T2.1

SET-UP OF PILOT-SPECIFIC MANAGEMENT PRACTICES

D.T2.1.5 SET-UP REPORT ABOUT ADAPTATION OF THE TRANSNATIONAL CONCEPT TO PILOT ACTION LEVEL

PILOT ACTION: PA2.4-1 Prud-Klokun-Mandina

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Lead Institution	HGI-CGS
Contributor/s	Josip Terzić
Lead Author/s	Jasmina Lukač Reberski
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TABLE OF CONTENTS

1. Introduction	1
2. Climate Change	2
3. Implementation of best management practices.....	2
4. Modelling	3
5. Conclusions	4
6. References.....	4



1. Introduction

The Deliverable DT2.1.5 “Set-up report about adaptation of the transnational concept to pilot action level” presents scheme for implementation of transnational concept, developed in T1, on the level of Pilot Action **PA2.4-1 Prud-Klokun-Mandina**.

GAPs and best management practices (hereinafter BMPs) on national level are presented in *D.T1.1.1 - Country report about the implementation of sustainable land use in drinking water recharge areas* and *D.T1.2.1 - Country-specific best management practice report*. Transnational concept is presented in two main T1 deliverables:

- *D.T1.1.2 Transnational Synthesis status quo report*, where strengths and deficiencies regarding land use and water management in drinking water recharge areas are presented on regional and national level and enhanced with EU level;

and

- *D.T1.2.2 Transnational best management practice report*, a synthesis of BMPs is presented on regional and national level and enhanced with EU level. This report provides also a structure for sustainable land use regarding drinking water supply issues.

National and transnational reports regarding sustainable land use in drinking water recharge areas and BMPs were the basis for interactive workshop discussion at national stakeholder meetings (D.T1.3.2 and O.T1.1), performed in each country (Pilot Action area). Outcomes of the national stakeholder meeting set guidelines for further work in Pilot Action. On the other hand, outcomes from national workshops were gathered in transnational report *D.T1.3.3 Lessons learnt at the national stakeholder workshops*, which includes also derivation of measure groups in relation to land use types management and proposal of mitigation of the water-related natural risks.

BMPs and measures for drinking water protection and management, which are derived from T1, will be reviewed and tested in Pilot Actions.

Review of main land use conflicts and BMPs on Pilot Action level has already been done in Pilot Action BMPs reports, which were a basis for *D.T2.1.2 Transnational case review of best management practices in pilot actions*.

Description of natural characteristics of Pilot Site is presented in *D.T.1.4 Descriptive documentation of pilot actions and related issues*.

The goal of this deliverable is to set-up activities in particular Pilot Action. In this report a scheme for activities in Pilot Action is presented.



2. Climate Change

Climate changes will be projected using several regional climate models (RCM), namely Aladin (Bubnova et al., 1995), RegCM3 (Pal et al., 2007) and Promes (Castro et al., 1993), which results contained in the DRINKADRIA project. The RCMs were forced by the observed concentrations of the greenhouse gases (GHGs) from 1951 to 2000; from 2001 onwards the IPCC A1B scenario of the GHGs emissions is applied. The initial and boundary data for each RCM were provided from different global climate models (GCMs): the ECHAM5 GCM data were used to force RegCM3, Aladin was forced by the Arpege GCM and Promes was forced by the HadCM3Q GCM. For the present climate, models are compared with the local DHMZ observations and with the EOBS gridded temperature and precipitation data (Haylock et al. 2008).

Climate and climate change issues in Pilot Actions will be described in detail and discussed in the deliverable D.T2.3.3 - PA reports about climate change issues in pilots.

3. Implementation of best management practices

The main conflicts between management and operation of water supply (drinking water protection and management) and land use (LU) management

- Agricultural activity in this area is one of the largest in Croatia, but awareness of the local population dealing with agriculture is still very low.
- The drinking water protection zones (DWPZ) have not been declared for all springs used in water supply, while hydrogeological research has determined that significant parts of intensively cultivated land belongs to 2nd DWPZ, which requires ecological agriculture according to Croatian regulations.
- Although proclamation of drinking water protection zones is mandatory according Croatian regulations for all water resources used in water supply, there are no sanctions in case this is not respected.
- In general, the biggest problem arises from the fact that controls (inspections) and sanctions for non-compliance with the rules in Croatia are not sufficient.
- Local population involved in agricultural activities has very little knowledge of ecological agriculture and there are very great resistance to such a method of land cultivation.
- Controls on the use of artificial fertilizers and plant protection products are unsatisfactory.

The main conflicts between management and operation of water supply (drinking water protection and management) and flood protection

Despite the numerous flood control measures, which are at high level structural measures, at a period of high water level karst poljes are occasionally flooded. Since these karst poljes are the most intensively cultivated areas, the greatest threats are the flushing of harmful chemical substances used in plant protection and fertilizing. Due to complex nature of this karst terrain,



further hydrogeological researches are needed in the future to determine whether this has a harmful or positive impact on groundwater quality.

Application of BMPs in PA to solve these conflicts for the purpose of assuring safe drinking water supply

- Enhanced groundwater quality monitoring
- Improving of sanctions in case of non-compliance with the water protection regulations
- Strengthen control of the implementation of prescribed measures
- Transition from a conventional to ecological agriculture
- Planning of non-structural flood protection measures

Implementation strategies (stakeholder involvement - local round tables etc.)

- Organizing workshop with local stakeholders.
- Informing the local population through media and brochures.

Testing of BMPs

The project duration is too short for measures to be implemented and tested, but measures can be proposed and tested after their implementation. Also, our institution is not competent to implement measures; we can only suggest and warn about the noticed gaps.

We expect that the research we will carry out under the PROLINE-CE project in this pilot area will get new insight into the impact of climate change on the quantity and quality of groundwater in this area which will help the future planning of water management.

4. Modelling

Hydrological modelling of possible impacts of climate change on water resources will be carried out on the basis of hydrogeological assumptions about the size of the catchment area and hydrological analysis of the results of historical hydrological observations of discharge, precipitation and air temperature. The hydrological model also uses the climatic prediction of air temperature and rainfall for the period up to 2050. Based on the established correlations between the precipitation and the air temperature during the historical period and their correlative discharges, for the so-predicted climate characteristics in the future / by 2050, the hydrological model provides prediction of average annual discharges in terms of expected climatic conditions in the future.



5. Conclusions

In this report a scheme for Pilot Action activities, which will be performed in Pilot area, is presented.

Description of performance of pilot activities and first outlining of foreseeable solutions will be described more in detail in *D.T2.2.4. - Partner-specific interim pilot action progress report*. This preliminary report will be discussed and presented during TM4 and Project First Review in April 2018 (D.M.2.5).

Outcomes from the management actions examined in Pilot Actions, description of conducted activities and identified solutions for case-specific adaptations of management concepts will be described in *D.T2.2.2. - Partner-specific pilot action documentation*. In this report, also gaps between the revised best management practices and actual management practice will be outlined.

6. References

Bubnova,R.,G. Hello, P. Bénard and J.-F. Geleyn, 1995: Integration of the fully-elastic equations cast in the hydrostatic pressure terrain-following coordinate in the framework of the ARPEGE/ALADIN NWP system. *Mon. Wea. Rev.*, 123, pp. 515 - 535. <http://www.ametsoc.org>

Castro M, Fernandez C, Gaertner MA. 1993. Description of a mesoscale atmospheric numerical model. Diaz JI, Lions JL (eds). In *Mathematics, Climate and Environment*. *Rech.Math. Appl. Ser. Mason* 230-253 pp.

IPCC (Intergovernmental Panel on Climate Change) <http://www.ipcc.ch/>

Pal JS, Giorgi F, Bi XQ, Elguindi N and others (2007) Regional climate modeling for the developing world:the ICTP RegCM3 and RegCNET. *Bull Am Meteorol Soc* 88: 1395–1409