Global Water Partnership
Central and Eastern Europe

Integrated Drought Management

Programme in Central and Eastern Europe

Peer Review Group

Progress Report No. 3

Annexes –

PRG Assessment reports & replays

Content

Annex 1A Act. 1.3 Drought data exchange platform

Assessment Peer Review Group (PRG)	4 May 2015
Status	**FINAL/HvL/JK**
Activity	**1.3. Drought information exchange platform** - **Revised Final Activity Report** - **Revised Implementation Report (Milestone 3 / Output 2)** - **Reply to PRG Assessment (20.03.2015)**
Activity lead	Gregor Gregoric (SLO)
Nature	An important task of the IDMP CEE is the development of a drought management platform, understood as an information architecture and an intelligent infrastructure that enables exchange of data, relevant for drought analysis, as well as continuous automated sensing, monitoring, and decision support for drought risk management operations. Primary goal is to enable all IDMP CEE countries (activity partners) to participate in the exchange of data relevant to detect drought onset and analysing the development of the drought severity and eventually recovery. Partners were expected to have: ▪ access to relevant data (primary to meteorological measurements). ▪ capacity to prepare digital maps of drought-related parameters according to technical specifications (to apply agreed geostatistical method and to prepare output in agreed format) ▪ knowledge and expertise in national drought monitoring and are providing national institutions with relevant maps.
Received	PRG received the documents on 14 April 2015
General observations	**Accepted** (see some comments below) PRG has not further reviewed the updated version of Milestone 3 / Output 2 report. The Activity Team did not mark the revisions. The report has been extended (e.g. Chapters 3 and 4), as well as other changes (see under Comments on the Implementation Report, Reply to PRG Assessment (20.03.2015)). The PRG trusts that the revisions described mentioned in the reply (see above) have been implemented in the updated Milestone report. **Reply to PRG Assessment (20.03.2015)** PRG comments below, also include those on the Revised Final Activity Report. *General observations* - PRG understands that ideally the selected partners should have the three listed capacities (see above) at the start of the CEE IDMP. However, not all partners met these requirements. It was not intended to develop all these capacities during the project, although one technical workshop was held in 2014. To develop full capacity more efforts are required. - Input from missing countries (Bulgaria and Hungary) has been included and now all 10 countries contributed to the drought metadata catalogue. - PRG understands that MeteoAlarm cannot straightforwardly be used as role-model that can be copied step-by-step.

	Final Activity Report - PRG supports the view of the Activity Team (FAR) that the Drought Information Platform is meant for the operational mode (i.e. monitoring). - Memorandum of Understanding (MoU) between GWP CEE/IDMP CEE and JRC/EDO. It is a pity that such a MoU has not been signed, but PRG realizes that an informal institutional commitment with JRC to host and support IDMP project partners during and after the project is the maximum that could be achieved at the time. The positive news is that JRC-EDO is very active and integrated in worldwide initiative (GDIS). - PRG understands that that in addition to drought experts, partners should have staff with adequate GIS/IT skills, who were not available in all countries for CEE IDMP. Ownership of data is always an issue (3 countries). Likely, a follow-up project will be required to start using the EDO MapViewer. - PRG wonders if the Drought Information Platform will be mentioned in the Compendium of Good Practices (Act. 7.1). It seems that at least some reference to this effort should be made, stressing that it is not easy and usually it has to be done in few steps (time is required).
Detailed Comments	The PRG acknowledges text revisions according to our recommendations, and that the Activity Team carried out spelling checking and examining the text multiple times. We realize that text about drought products is partners' responsibility.

Annex 1B Act. 1.3 Drought data exchange platform

Reply to comments

First of all, we would like to thank reviewers for their comments.

Nature

The reviewers have listed 3 capacities that the partners should have by the end of the project (access to relevant data, capacity to prepare digital maps, knowledge and expertise in national drought monitoring). In fact, these were requirements for selection of partners, written in the Activity list which contains description of activity. Ideally, partners were supposed to start collaboration with these capacities, which would made progress much smoother. However, degree to which various partners met these requirements was variable. It was however not foreseen to build these capacities from scratch in frame of IDMP. We have conducted one technical workshop in 2014 where we introduced content of this activity to partners. To build the capacity, more efforts were needed.

General observations

According to the Activity List, the final version of Implementation Report final version of this report was supposed to be prepared by all 10 national partners of IDMP CEE and edited by ARSO/DMCSEE. Unfortunately, for some reasons unknown to PRG, 2 detailed-national reports from Bulgaria and Hungary are missing.
Unfortunately input from Bulgaria and Hungary was received with great delay in February 2015; it has been added in revised version of the report.

The report was planned to be accompanied by maps „prepared according to technical specifications" by 10 national partners, with ARSO/DMCSEE responsible for acquisition of these maps and preparation of their regional composite (see Activity List, pages 5 and 6). The maps were not attached to the Implementation Report.
Description of available data for exchange was extended and examples of maps were added to the report.

The PRG assessed Milestone 2 of this activity on 23 May 2014, concerned with development of the Implementation Guide. Several comments and suggestions were made at that time by PRG which are not fully reflected in the reports made now under Milestone 3.
We have tried to follow recommendations as closely as possible and explained our reaction in Reply to comments. Please note that Implementation guide (which is referenced in Implementation report, also with internet link) contains large part of improvements (following suggestions from PRG); Implementation Guide was considered as final already at previous reporting.

If the Output 2 report is meant for publication on the IDMP CEE public website, the Implementation Report should be substantially revised and it must reflect all work that was done by the Activity Team jointly with the national activity partners towards development of the drought information exchange platform. It is clear that not all that was planned could be done in the 1.5 year duration of the IDM CEE project (see expectations above under-e „Nature", you anticipated „By the end of the project, partners are expected to have:") , but it must be made clear where you are now by the end of the project (e.g. the Implementation Guide is ready, the Drought Metadata Catalogue is ready, i.e. indicators for most countries were identified, although a wide variety is mentioned without one common indicator, but implementation of existing national products/maps into web mapping service EDO MapViewer could not be achieved due to insufficient resources and limited technical knowledge of some partners). The general direction of further developments to reach the primary goal should be properly outlined, just to remind, the primary (ambitious) goal, which was to enable all IDMP CEE countries (activity partners) to participate in the exchange of data relevant to detect drought onset and analysing the development of the drought severity and eventual recovery. Some of the text of the Final Activity Report (e.g. item 8 proposals for follow-up) could be used.

We greatly expanded Chapter 3 (added subchapter Work Chronology etc.) and added Chapter 4 with conclusions. Both chapters contain description of level, to which the partners participate in the platform and to which degree they are ready to exchange data. All 10 countries contributed some information to drought metadata catalogue.

Furthermore MeteoAlarm is mentioned a number of times as a good example. This requires more elaboration.
MeteoAlarm was referenced in the report. This continental composite of weather related warnings is actually in its graphical form a kind of role-model for regional or continental exchange of drought information. However, the fact is that national forecasting offices have work flow that enables them to relatively simply achieve high degree of unification. That is not the case of drought, therefore MeteoAlarm as example-to-follow is probably not a role-model that can be copied step-by-step. The text in activity report was slightly modified in that respect.

Comments on the Final Activity Report

Under item 2 "Contribution to Challenges" it is stated that "this activity belongs to operational mode (next year drought)" - it should be rather "... (possible upcoming droughts)".
Yes, we agree, however only these options are available:

- Operational mode (next year drought, ongoing multiple-year drought)
- Strategic mode (future drought, prepared for global change)

Next sentence under this item is confusing: "Partners were expected to collect existing national data ... and make them available through EDO" - were they only "expected' or they really did it?
They, of course, really did it – we have changed the text to “Partners collected existing national data …”.

Was there any Memorandum of Understanding (MoU) signed between GWP CEE/IDMP CEE and JRC/EDO on the use of their platform and on mutual obligations? This was recommended by PRG in Milestone 2 assessment of May 23, 2014.
Several discussions were conducted with JRC representatives between both milestones (among others, during the GDIS workshop). Commitment of JRC to maintain drought platform (also in global data exchange) was assured. However, formal commitment (signed MoU or other) does not yet exist. Currently we only have an informal institutional commitment to host and support IDMP project partners during and after the project. JRC representative, responsible for EDO, was invited to the workshops in Budapest and Bucharest to also discuss this topic (participation in Budapest workshop was not possible, participation in Bucharest workshop is not yet confirmed).
We still believe that EDO will be maintained and will remain to work as continental drought information platform. Moreover developing of EDO was quite active during last few months (e.g. see News on their website: http://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1000), among other things they have prepared new, graphically nicer and easier to use map viewer, available on http://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1111.

Concerning "Contribution to Objectives" (item 3) the reply is positive because "18 products from 8 countries (why not 10?) have been received from national activity partners and imported in the Drought Metadata Catalogue".
As already explained, two partners have provided information about their products with great delay.

Because of the resources available and insufficient knowledge of the national partner organizations, integration of services to EDO MapViewer was not possible but it is listed as one of the follow-up proposals under item 8 of the Final Activity Report (FAR). "Description of the implementation process and methodology applied" reported under item 4 of FAR is clear, but the insufficient knowledge of the national activity partners is mentioned again - this raises some questions about the selection of some of the national activity partners for this activity or the Implementation might be too technical (see previous PRG comment).

Maybe we emphasized insufficient knowledge too much. Most of people from partners' institutions are drought experts, which is great for preparing overview of drought products available in some countries, however for integration purposes people with GIS/IT skills (including people from IT departments) should have been involved as well. Second issue we see is that some partners (from Czech Republic, Hungary, Lithuania) are not owners of described products, therefore additional efforts would have been needed to make the full integration possible.
Nevertheless we think integration into EDO MapViewer is possible, since most of countries already have public available maps on their webpages and only some additional effort will be needed to integrate them into EDO MapViewer.

Concerning the added value (item 6), it is mentioned that work on this activity builds on the experience and knowledge of the EuroGEOSS project, "which demonstrated the added value to the scientific community ...." Unfortunately this does not answer the question of the questionnaire which is quite straightforward: "what is the added value generated by your activity"? To summarize, the FAR should be revised by the Activity Team to answer all the questions posed in the FAR more accurately.
We have changed the text according to recommendations.

By the way can we expect the Activity 1.3 to generate any "good practice" proposal for the Compendium being produced by Activity 7.1?
Originally it was not foreseen.

Comments on the Implementation Report

Already earlier the PRG suggested, that all figures should be shown on full page each - they are not readable the way they are presented.
We have changed figure size according to recommendation.

Section (1) is 1.5 page long, including information that IDMP CEE will use the EDO of JRC (still no justification requested earlier by PRG; pros are given, but no cons and what about the remark in the Activity List (page 1) "In addition, an analysis will be conducted to explore a possibility to establishing a new platform under WMO"?).
The justification is not included in the Implementation report, however it is included and elaborated in Chapter 2 of Implementation Guide (which is referenced and linked also in Implementation report).

Furthermore a table lists the18 national products (SPI and others) that can be supplied by national activity partners (again no data from Bulgaria and Hungary). Section (2) of two pages, is an extremely brief information about EDO illustrated by three unreadable figures (printouts of computer program).
Figures size has been changed to achieve better readability. Missing data from Bulgaria and Hungary have been received (with delay) and included in revised version.

Figure 3 illustrates the use of the EDO MapViewer when using a DMCSEE product. This needs to be better explained in the text. We wonder, if there is second example from one of the national products (or was, so far, none of the other partners able to use the EDO MapViewer). Figure 4; here we would like to see more examples from other national products than the DMCSEE product.
Figure 3 and Figure 4 have been changed to "SPI maps for cadastral municipalities in Slovenia" which has been integrated into EDO MapViewer for this project. Other products still need some work to be fully integrated into EDO MapViewer.

To summarize, the PRG expected that the Implementation Report will provide more information on the importance and state-of-the-art of the Platform for further development of better and more integrated drought monitoring management in the countries of Central and Eastern Europe. At least some information on the contacts and discussions with the relevant national activity partners (data suppliers and platform users) should be added, how far the implementation (e.g. using the EDO MapViewer) was advanced. There is no clear vision on how to

proceed further with partners with insufficient resources and knowledge. If this report is meant for publication on the public website, it should be subject to major modification and improvement. Readers expect a Chapter 4 with an Outlook.
As already said we greatly expanded Chapter 3 (added subchapter Work Chronology etc.) and added Chapter 4 with conclusions.

Detailed comments

We changed text according to recommendations, done spelling checking and checked the text multiple times. We would like to emphasize that text about drought products is partners' responsibility.

Annex 1C Act. 1.3 Drought data exchange platform

Assessment Peer Review Group (PRG)	20 March 2015
Status	**FINAL/JK/HvL**
Activity	**1.3. Drought information exchange platform**
	Milestone 3 (Output 2) Implementation report
Activity lead	Gregor Gregoric (SLO)
Nature	An important task of the IDMP CEE is the development of a drought management platform, understood as an information architecture and an intelligent infrastructure that enables exchange of data, relevant for drought analysis, as well as continuous automated sensing, monitoring, and decision support for drought risk management operations. Primary goal is to enable all IDMP CEE countries (activity partners) to anticipate in the exchange of data relevant to detect drought onset and analysing the development of the drought severity and eventually recovery. By the end of the project, partners are expected to have: ▪ access to relevant data (primary to meteorological measurements). ▪ capacity to prepare digital maps of drought-related parameters according to technical specifications (to apply agreed geostatistical method and to prepare output in agreed format) ▪ knowledge and expertise in national drought monitoring and are providing national institutions with relevant maps.
Received	January 28, 2015
General observations	**Accepted with major revision** (if reports are meant to be published at the public website) The package that was sent to the PRG contained the Milestone 3 (=Output 2) Drought information exchange platform – implementation report together with the Final Activity Report. According to the Activity List the final version of Implementation Report final version of this report was supposed to be prepared by all 10 national partners of IDMP CEE and edited by ARSO/DMCSEE. Unfortunately, for some reasons unknown to PRG, 2 detailed-national reports from Bulgaria and Hungary are missing. The report was planned to be accompanied by maps „prepared according to technical specifications" by 10 national partners, with ARSO/DMCSEE responsible for acquisition of these maps and preparation of their regional composite (see Activity List, pages 5 and 6). The maps were not attached to the Implementation Report. The PRG assessed Milestone 2 of this activity (23 May 2014), concerned with development of the Implementation Guide. Several comments and suggestions were made at that time by PRG which are not fully reflected in the reports made now under Milestone 3. If the Output 2 report is meant for publication on the IDMP CEE public website, the Implementation Report should be substantially revised and it must reflect all work that was done by the Activity Team jointly with the national activity partners towards development of the drought information exchange platform. It is clear that not all that was planned could be done in the 1.5 year duration of the IDM CEE project (see expectations above under-e „Nature", you anticipated „By the end of the project, partners are expected to have:") , but it must be made

	clear where you are now by the end of the project (e.g. the Implementation Guide is ready, the Drought Metadata Catalogue is ready, i.e. indicators for most countries were identified, although a wide variety is mentioned without one common indicator, but implementation of existing national products/maps into web mapping service EDO MapViewer could not be achieved due to insufficient resources and limited technical knowledge of some partners). The general direction of further developments to reach the primary goal should be properly outlined, just to remind, the primary (ambitious) goal, which was to enable all IDMP CEE countries (activity partners) to participate in the exchange of data relevant to detect drought onset and analysing the development of the drought severity and eventual recovery. Some of the text of the the Final Activity Report (e.g. item 8 proposals for follow-up) could be used.Furthermore MeteoAlarm is mentioned a number of times as a good example. This requires more elaboration. **Comments on the Final Activity Report** Under item 2 "Contribution to Challenges" it is stated that "this activity belongs to operational mode (next year drought)" – it should be rather "… (possible upcoming droughts)". Next sentence under this item is confusing: "Partners were expected to collect existing national data … and make them available through EDO" – were they only "expected' or they really did it? Was there any Memorandum of Understanding (MoU) signed between GWP CEE/IDMP CEE and JRC/EDO on the use of their platform and on mutual obligations? This was recommended by PRG in Milestone 2 assessment of May 23, 2014. Concerning "Contribution to Objectives" (item 3) the reply is positive because "18 products from 8 countries (why not 10?) have been received from national activity partners and imported in the Drought Metadata Catalogue". Because of the resources available and insufficient knowledge of the national partner organizations, integration of services to EDO MapViewer was not possible but it is listed as one of the follow-up proposals under item 8 of the Final Activity Report (FAR). "Description of the implementation process and methodology applied" reported under item 4 of FAR is clear, but the insufficient knowledge of the national activity partners is mentioned again – this raises some questions about the selection of some of the national activity partners for this activity or the Implementation might be too technical (see previous PRG comment). Under item 5 concerning the activity outputs, Implementation Guide developed under Milestone 2, and 18 products already mentioned under item3 of FAR are listed. Concerning the added value (item 6), it is mentioned that work on this activity builds on the experience and knowledge of the EuroGEOSS project, "which demonstrated the added value to the scientific community …." Unfortunately this does not answer the question of the questionnaire which is quite straightforward: "what is the added value generated by **your** activity"? Concerning item 7 of the questionnaire, the key conclusion is that although some work has already been done, a major effort is needed for unification of drought monitoring systems across the region. The same conclusion is made under item 8 of the questionnaire. To summarize, the FAR should be revised by the Activity Team to answer all the questions posed in the FAR more accurately. By the way can we expect the Activity 1.3 to generate any "good practice" proposal for the Compendium being produced by Activity 7.1? **Comments on the Implementation Report** The Implementation Report is 12 pages long and it consists of 3 Sections: (1). Introduction and overview, (2). European Drought Observatory, and (3). Detailed report. Already earlier the PRG suggested, that all figures should be shown on full page each – they are not readable the way they are presented. Section (1) is 1.5 page long, including information that IDMP CEE will use the EDO of JRC (still no justification requested earlier by PRG; pros are given, but no cons and what about the remark in the Activity List (page 1) "In addition, an analysis will be conducted to explore a possibility to establishing a new platform under WMO"?). Furthermore a table lists the18 national products (SPI and others) that can be supplied by national activity partners (again

	no data from Bulgaria and Hungary). Section (2) of two pages, is an extremely brief information about EDO illustrated by three unreadable figures (printouts of computer program). Figure 3 illustrates the use of the EDO MapViewer when using a DMCSEE product. This needs to be better explained in the text. We wonder, if there is second example from one of the national products (or was, so far, none of the other partners able to use the EDO MapViewer). Figure 4; here we would like to see more examples from other national products than the DMCSEE product. Section (3) is 6 pages long with nation by nation brief description of each of the 18 products received from 8 CEE countries imported into EDO Drought Metadata Catalogue. We notice: (1) the products are very diverse, (2) only few are drought indicators, (3) not one common indicator (e.g. SPI) exists, and (4) not all are available to share already. To summarize, the PRG expected that the Implementation Report will provide more information on the importance and state-of-the-art of the Platform for further development of better and more integrated drought monitoring management in the countries of Central and Eastern Europe. At least some information on the contacts and discussions with the relevant national activity partners (data suppliers and platform users) should be added, how far the implementation (e.g. using the EDO MapViewer) was advanced. There is no clear vision on how to proceed further with partners with insufficient resources and knowledge. If this report is meant for publication on the public website, it should be subject to major modification and improvement. Readers expect a Chapter 4 with an Outlook.
Detailed comments[1]	- The English language is quite good and not much more than a normal computer checking is needed. Clearly, if a native speaker would be available, it would the readability of the report. - FAR, page 3, item 6: "As many continental and global monitoring platforms European Drought Observatory (EDO) also intensely...." replace with: "As many continental and global monitoring platforms, the European Drought Observatory (EDO) also intensely..." - Implementation Report, page 4, caption Figure 2: bit strange to mention this –"current" drought, whereas the map is for the last 10 days of August 2013. - Implementation Report, page 5, Figure 4 (text in top of figure): "Standardize" revise in " Standardized". - Implementation Report, Chapter 3, page 6, 1st line: "Partners were expected to collect existing national data (SPI and any other indicators that are used in partner's countries..." revise "Partners were expected to collect existing national data (e.g. SPI or any other indicators that are used in partner's countries...". - Implementation Report, Section 3.1, page 6, 1st line: "In Czech Republic two products are dedicated...". Four products are described (page 6 and 7). - Implementation Report, Section 3.1, under Basic water balance of grasslands in the Czech Republic, page 6: ".....weekly step(Tuesday) from....", revise "....weekly step (Tuesday) from ....". - Implementation Report, Section 3.1, under Basic water balance of grasslands in the Czech Republic, page 6: "....since 1.3 as of any given Sunday....". Better to use since 01 March. - Implementation Report: In some places references should be given (e.g. HTC, page 7). - Implementation Report, Section 3.4: maps with SPI are based on how many stations? - Implementation Report, Section 3.7 under Drought Bulletin for SE Europe (page 10): strange that "Remote Sending" there is mentioned as a product. It is a method. - Implementation Report, Section 3.7 under SPI maps for cadastral municipalities in Slovenia (page 11): "Cca. 80 stations" has to be "Ca. 80 stations". - Implementation Report, Section 3.7 under SPI maps for cadastral municipalities in Slovenia (page 11): ".....(example on Figure 3)....." revise in ".....(example in Figure 3).....".

[1] The list with detailed comments is any way not supposed to be complete. Just the comments we found when we quickly reading the text.

Annex 2 Act. 2.1 Guidelines for Drought Management Plans (DMPs)

Assessment Peer Review Group (PRG)	11 May 2015
Status	**FINAL/JK/HvL**
Activity	**2.1. Guidelines for Drought Management Plans (DMPs)**
	Final Activity
Activity lead	Dr. Elena Fatulova (SK)
Nature	In recent years drought planning has been changing from a crisis management approach (based on national or regional drought emergency programmes) to a risk management approach based on the development of comprehensive, long-term drought policies and plans for actions intended to reduce the risks and vulnerabilities to extreme drought events. Drought management plans (DMPs) should be seen as important instrument to achieve this. The main objective of DMPs is to minimize the adverse impacts on the economy, social life and environment when drought appears. DMPs are directly linked to the criteria and objectives of the EU Water Framework Directive (WFD) and the River Basin Management Plans (RBMPs). DMPs should be prepared well in advance before they are needed, based on the relevant country specific conditions and after careful studies focused on characterization of the droughts in the country, their effects and possible mitigation measures. Development of the IDMP CEE Guidelines is in line with the current EU drought policy as expressed in the relevant official documents (e.g. A Blueprint to Safeguard Europe's Water Resources, UNCCD Convention, WMO/GWP National Drought Management Policy Guidelines: A Template for Action). Development of the Guidelines was planned to last through almost the entire duration of IDMP CEE and was divided into two phases: (1) Execution of the Slovak Case study, and (2) Development of the draft of the Guidelines. The main objective of the Slovak Case Study was to provide an example of procedure how to develop the key items of DMP, taking into account relevant documents developed by WWF a well as within the framework of the Common Implementation Strategy for WFD (CIS), in coordination with the European Commission (e.g. Report 2007). During the second phase of the project, the content of the Guidelines was discussed, commented, corrected and amended by all GWP CEE countries involved through national and regional consultations. The consultation dialogues have taken place at the national level within Activity 2.2 of the IDMP CEE (National Consultation Dialogues).
Received	The PRG was in close contact with the Activity Leader throughout the whole duration of the activity, which lasted from the beginning of 2014 till April 2015.
General observations	**Accepted** The PRG accepts the work done by the Activity Team without any reservation. Activity 2.1 was an innovative task carried out smoothly in collaboration with drought experts from the 10 participating CEE countries. The Milestone reports and reviews of the consecutive drafts of the Guidelines have been carried out according to the Activity List. The work progress was satisfactory during the whole duration of the activity. The Activity team did a great job by synthesizing recent knowledge and information of word-

	leading EU, UNCCD and WMO/GWP documents on Drought Management. The proposed seven steps that outline the development and implementation of a national drought management policy and associated drought management plans are very clear and extremely useful for the CEE countries. The guidance also includes an important note that drought management and the compilation of the Drought Management Plan is a dynamic and iterative process that needs to be regularly revised and updated according to an appropriate post-drought evaluation process, which preferably will be linked to the 6 years cycle of RBMPs planning process. The Activity Team also included definitions in the Guidelines to be used in IDMP CEE, which were developed and agreed by experts within IDMP and the CIS process on EU level. These definitions were leading for IDMP CEE activities. CEE countries need to realize that in addition to the cyclic revision of the drought management policy and management plans, the current version of the IDMP CEE guidelines also needs to be updated. Relevant outcome from very recently-concluded drought research (e.g. EU FP7 DROUGHT-R&SPI) or still ongoing Horizon2020 projects should be included. This is a continuous challenge for people responsible for drought management and policy.
Detailed comments.	None

Annex 3A Act. 5.1 Drought management by agricultural practices and measures increasing soil water holding capacity

Assessment Peer Review Group (PRG)	27.04.2015
Status	**FINAL/JK/HvL**
Activity	**5.1. Drought Management by Agricultural Practices and Measures Increasing Soil Water Holding Capacity**
	Final Activity Report – Drought Management by Agricultural Practices and Measures Increasing Soil Water Holding Capacity **Joint Final Report - Drought Management by Agricultural Practices and Measures Increasing Soil Water Holding Capacity**
Activity lead	**Prof. Pavol Bielek (Slovak Republic)**
Nature	The main target of this experimental project is to demonstrate concrete measures to increase the soil water holding capacity. Several well-known methods are being assessed including their implementation in farming practices to improve water infiltration into the soil profile. The project includes field experiments with currently available machineries and technologies for sub-soiling and respective farming practices. The project consists of two parts: theoretical and practical. The inventory and identification of the soil water retention capacity is further being developed. The first phase has been finalized, which included an identification of pilot areas in Slovakia, Poland, Czech Republic and Slovenia with compacted soils. The second part consisted of field experiments. The Milestone 3 included the evaluation of the second year of field experiments with sub-soiling technology and other farming measures (deep root plants cultivation, organic fertilizers use, carbonized biomass use, and others), which were carried out in the pilot areas in four participating countries. The outcome of Act. 5.1 (i.e. effective measures to increase soil water holding capacity) will be documented into the Compendium of Good Practices (Act. 7.1). It is anticipated that these can be utilized on very large areas, which needs, of course, broad support by national ministries.
Received	The PRG received: - Final Activity Report on 23 March 2015 - Joint Final Report on 09 January 2015 - 4 National Final Reports (Czech Republic, Poland, Slovak Republic, Slovenia)
General Observations	**Accepted with minor remarks** **Joint Final Report** Following a brief „Introduction", the report consists of six following chapters:Ch. 2 – Theory to Problems, Ch.3 – Description of experimental methods and procedures, Ch.4 – Results, Ch.5 – Conclusions, Ch.6 – Proposals for Practical Use of Results, and References. Introductory comments provide several interesting information on the importance of water stored in the soil profile and how easily some agricultural practices reduce water infiltration capacity. As mentioned in previous PRG assessments, a number of statements are made in the first paragraph about the importance of soils as store of water without referring to literature (this also applies to some other Chapters, e.g. Ch. 2). Following a short history of people's interest in the soil water, Chapter 2 begins with some comments on soil droughts and on soil water holding capacity as a limiting water storage factor of land. The defintions of drought has to be revised. It does not follow the generally accepted defintion, which are also given in the Guidelines for Drought Management (Act. 2.1). Moreover, you cannot say that soil water drought starts at

	wilting point (plant water stress starts earlier). Please provide literature, if you would like to claim this. Increasing awareness of the problems associated with soil and subsoil compaction has generated an interest in the possible benefits that could be obtained from a deep tillage, such as subsoiling. There is an overview of many quite recent studies which have shown the value of several new water saving farming systems like no-till, mulch-till, ridge till, low input, precision and eco-farming and others. Section 2.2.4 provides a good overview and discussion of the principal farming systems like the conventional tillage, excessive tillage, conservation tillage, no-till farming, organic farming and others – all from the point of view of their soil and water regime characteristics. Next, Chapter 3 reports on field experimental methods and procedures carried out in years 2013-2014 in the selected farming systems located in the Czech Republic, Poland, Slovakia and Slovenia. All together, 8 different soil-ecological conditions and 5 verified farming systems (conventional farming, subsoiling, no-till farming, 10 cm deep cultivation and composting tillage) were studied in these four countries, using 18 field plots. The main technical and technological equipment of field tillage system (not conventional operations) was described and presented on photographs. Performed observations included the penetrometric study, experiments on water infiltration into the soil profile, saturated hydraulic conductivity analysis, water retention of the soil by tensiometric method and crop yields under different farming systems. Results of experiments have been collected separately in participating countries and next they were subject to joint evaluation at the regional workshops attended by all team members. Results of investigations are described in considerable detail in Chapter 4 of the report and final conclusions are presented in Chapter 5. Some conclusions point out several advantages of subsoiling, which increase both water infiltration into the soil profile and yields of some crop. Farmyard manure proves to be the best organic soil amendment. Water infiltraton and soil water holding capacity have been significantly increased in no-tillage fields in comparison to traditional farming system. Although several of these conclusions are of importance for water resources management, especially in agricultural regions, there should be more direct attention paid to the significance of the appropriate management of soil water for reduction of the risk of droughts. In other words, the report should more directly refer to its title „Drought management by Agricultural Practices and Measures Increasing Soil Water Holding Capacity” These aspects show up better in the last Chapter 6 „Proposals for practical use of results”. Higher water holding capacity of subsoiled water reduce a risk of water deficiency in agriculture, reduces irrigation water needs, and decrease flood risk by better infiltration of water into soil profile. Links to other related activities of IDMP CEE should also be pointed out, at least in the Introduction (e.g. Activities 2.1; 5.3; 5.6). On the whole the PRG accepts the Joint Final Report of Act. 5.1 . **Final Activity Report** Contribution to Challenges the Activity (Item 2): Team did not understand the differences between the operational mode (managing an on-going drought) and the strategic mode (better prepared for future drought). Clearly, soil tillage belongs to the strategic mode (in WFD under measures to reduce drought risk). It is a bit strange that only two keywords are provided under the question: ”What is your activity addressing (Which of the seven steps described in the Guidelines for Drought Management Plans (act. 2.1, and where to you associate with monitoring, forecasting / prediction, impacts, vulnerability, measures, management, risk management”. Activity Team should have been better embedded in the whole project to understand the context of their work. Description of the implementation process and methodologies applied (Item 4); has been

	interpreted as outreach / dissemination rather as looking back (implementation). The PRG accepts the Final Activity Report of Act. 5.1 . The four National Reports have not been assessed.
Detailed comments	English language of some parts needs improvement (e.g. Introduction Ch.1). Detailed comments (Track/Change has been used) are included in the Joint Final Activity Report and the Joint Final Report. PRG certainly does not claim to be inclusive; proof-reading is necessary for the documents that will appear in the public domain.

Annex 3B Act. 5.1 Drought management by agricultural practices and measures increasing soil water holding capacity

Assessment Peer Review Group (PRG)	09.02.2015
Status	**FINAL/JK/HvL**
Activity	**5.1. Drought management by agricultural practices and measures increasing soil water holding capacity**
	Milestone 3 **Evaluation of the second year of experiments**
Activity lead	Pavel Bielek (Slovak Republic)
Nature	The main target of this experimental project is to demonstrate concrete measures to increase soil water holding capacity. Several well-known methods are being assessed including their employment in farming technologies to improve better water infiltration into the soil profile. The project includes field experiments with currently available machineries and technologies for sub-soiling and respective farming practices. The project consists of two parts: theoretical and practical. The inventory of soil ability for identification of water retention capacity is being developed. The first phase has been finalized, which included an identification of pilot areas in Slovakia, Poland, Czech Republic and Slovenia with compacted soils. The second part consists of field experiments. The Milestone 3 is evaluation of the second year of field experiments with sub-soiling technology and other farming measures (deep root plants cultivation, organic fertilizers use, carbonized biomass use, and others) being carried out in the pilot areas in Slovakia, Poland, Czech Republic and Slovenia. The outcome of Act. 5.1 (i.e. effective principles to increase soil water holding capacity) will be documented and transferred into the Compendium of Good Practices (Act. 7.1). It is anticipated that these can be utilized on very large areas, which needs, of course, broad support by national ministries.
Received	09.01.2015
General observations	**Accepted**, but PRG has some specific comments on the Polish and Slovenian Annexes (see below). The package that was sent to the PRG contained the Milestone 3 progress report for Activity 5.1 and four annexes: Annex 1_Slovak Milestone 3 report, Annex 2_Czech Milestone 3 report, Annex 3_Polish Milestone 3 report and Annex 4_Slovenian Milestone 3 report Good experimental work is being done, which is relevant for drought management planning as part of Programme of Measures (pro-active risk management). **Comments on Milestone 3 (progress report)** Under item 2.1, the report summarize (nation by nation) what has been done in partner countries in the period November 2013 - November 2014 (the second year of field experiments). The work progress is satisfactory and all is done in accordance with the Activity List (Milestone 3 progress report, incl. Annexes was submitted to the Programme Manager slightly later than planned (mid December instead of end of November 2014. Although still there is no synthesis across the whole activity (was not planned yet), the PRG noted that under item 2.3 of the progress report it is noted that „all results, studies and

	recommendations related to this activity will be summarized in a final joint report (March 2015), Milestone 4 (final Output, which consists of „Analysis and proposals of preventive measures as a tools for drought management in agricultural practices and technologies"). We appreciate that explicitly is mentioned that the four final National Reports will be synthesized in one single, consistent report. The final joint report for the „Compendium of good agricultural practices" (Activity 7.1) focusing on soil water holding capacity will be drafted by the four partners under the coordination of the Activity Lead. We appreciate that the Activity Team in addition to Act. 7.1, also noticed (under item 2.5) links with Act 2.1 (i.e. the compilation of the Drought Mananagement Plan, e.g. Program of Measures for preventing and mitigating droughts). All annexes to the Milestone 3 progress report begin with the national progress reports structured in the same way as the milestone progress report, which makes it easier to assess. Length of 2nd year reports are rather different (Slovakia: 50 pages, whereas the other three reports are substantially thinner, 6-13 pages). **Comments on Annex 1_Slovak Milestone 3 report** The Slovak report is comprehensive (50 pages) and it is clearly drafted having in mind the final joint activity report – by PRG it is very positive that some work on the final joint report is initiated. Following a brief introduction (page 4) there is one brief chapter on "Motivations" behind the work done – it is suggested that these two parts are joined under the title "Introduction". Next there are the two main chapters of the report, first theoretical (Ch. 3, 29 pages) and the other one describing field experiments carried out in Slovakia (Ch. 4, 12 pages). Check the use of definitions with CEE IDMP accepted ones. For instance, drought is not defined as lack of water in nature (Section 3.1, line 1). That description could also include aridity (permanent dry climate). Drought is due to climate variability. You may also argue if a farmer experiences dry conditions not earlier than wilting point. We believe that farmer would like to react when soil moisture drops below the level that the potential evapotranspiration cannot be reached anymore. The next two chapters are on "Growth and yields of plants" (Ch. 5, 1 page, in fact, it is still concerned with field experiments) and "Practical use of the results" (Ch. 6, 2 pages). In the final joint report the Chapter on Practical Use should be generic and include information relevant for all CEE countries. The next chapter (Ch. 7, ½ page) is extremely important, referring to the policy aspects of the experiments carried out. Could be a bit more elaborated (and do not forget to include references the relevant EU policy documents). The policy aspects of the work done should be stressed in all final reports of IDMP CEE – these aspects are by definition always of special importance to both WMO and GWP. Chapter 8 (½ page) provides conclusions. As said before, we trust that general conclusions are given that are valid for all/most CEE countries. If, conclusions are only valid for one or a few countries then this needs to be made very clear. <u>It would be very positive if the Activity Leader would now approach all partners introducing them to proposed structure of the final joint report. It is expected that they will contribute to both the theoretical and the experimental parts of that report.</u> The Slovak activity report describes under item 1.1 additional field experiments carried out in 2014 and their significance for the activity. Item 1.2 summarizes 6 preliminary conclusions of the experiments concluded in 2013 and 2014. The expected final outputs are listed under item 1.3. Section 1.2 (page 2) good summary of preliminary conclusions. The PRG trust that experiments from the other three countries will support or extend these. In Section 1.3 (page 2) the first three points are generic (i.e. are valid in other countries) and will fit well in the joint final Act. 5.1 report. Points 4 and 5 are specific for Slovakia. We recommend to be short on these in the main

	text of the joint report and to include details in country-specific Annexes (other CEE countries could read these examples, which might partly relevant for their country setting). Chapter 4 (½ page) provides conclusions. As said before, we trust that general conclusions are given that are valid for all/most CEE countries (see comments on Slovak report). On the whole, the PRG accepts the Milestone 3 work of the Slovak Team. **Comments on Annex 2_Czech Milestone 3 report** The national Czech progress report (12 pages) indicates under items 1.1 and 1.2 (page 1) that in the reporting period they concentrated on the assessment of the differences between water infiltration on diversely cultivated and conventional agricultural land. The different soil management options included ecological farming, sub-soiling, conventional tillage with manure and conventional tillage with green manure. Item 1.2 refers more to higher flooding risk (e.g. accelerated surface runoff). The drought management aspects should not be forgotten (e.g. less water infiltration leads to lower stored soil moisture). Their expected final output needs be combined and synthesized with other contributions into the final joint activity report. It is understood that the Czech team also will produce also a special report "Analysis and proposals of preventive measures as tools for drought management in agricultural practices and technologies". This report is also seen (item 1.3) as a basic input into the "Compendium of good agricultural practices" (activity 7.1) and "Guidelines for Drought Management Plans (activity 2.1), which puts the output well in the framework of the CEE IDMP. The introduction (Ch. 1, ½ page, page 4) needs to be integrated in the final Act. 5.1 joint report with the similar chapter of the Slovak team. Chapter 2 Materials and Methodology (3 pages) and Chapter 3 (2 pages) can be integrated with Ch. 4 and 5 of the Slovak report. The work presented by the Czech team in the Milestone 3 report is accepted. **Comments on Annex 3_Polish Milestone 3 report** The national Polish progress report (6 pages) is very brief (!) and it provides some information on the results of the second year of experiments carried out on two adjacent fields, one of which was under traditional tillage while the second was under no-tillage system (item 1.1 of the report, page 1). The expected final report on this and the earlier (first year) experiments should be summarized with other national reports into a final joint activity report. This summary report will be produced under Milestone 4. Under item 1.2 (page 1) there is a note that "the confidence in drawn conclusions should be extended because the type of crops may also affect the results obtained". This is certainly true that type of crops affect the results obtained, but it requires some additional explanation by the Polish team. At least it must be made clear that the results are valid for which crops. It is a shortcoming that the PL team does not describe (item 1.5) which are the links with other CEE IDMP activities (lack of overview?). The report, as far as the information will be included in the joint final report, should also be edited with more care, e.g. there is no conclusion, photographs are given without any description, tables are not properly numbered, and there is no Fig. 1. Polish results have to be integrated in the joint report with the results from the other countries. Conclusions need to formulated and integrated in a generic set applicable to all/most CEE countries. The work presented by the Polish team in the Milestone 3 report is accepted with minor revisions. The PRG, however, does not expect a revised annex, because this is not at the public website. If this information will be included in the joint final activity report, then edits are required. **Comments on Annex 4_Slovenian Milestone 3 report** The Slovenia Report 2014 (13 pages) provides information on the experimental work done in the reporting period which concentrated on evaluation of different tillage types on soil water characteristics at three different sites. Materials and methods (Ch. 2, ½ page, page 2) used are

	briefly reported. Results for oilseed rape yield are reported for different soil tillage types. It was shown that for the different types of soil tillage conducted for three years, soil water holding capacity (both in the light and heavy soil) does not significantly change. This is very much in contrast with the results obtained for different tillage types reported by the Polish team, what should be explained in the joint final report (i.e. when/where is soil tillage successful). Results of water infiltration tests and sub-soiling experiments also call for some additional comments (they do not agree with the results obtained elsewhere). Slovenian results have to be integrated in the joint report with the results from the other countries. Conclusions need to formulated and integrated in a generic set applicable to all/most CEE countries. A good point raised in the Slovenian report is that best available agricultural practices, incl. tillage for the various particular pedo-climatic regions across CEE countries will be described. The PRG trust that this refers to the final joint Act. 5.1 report. It is a shortcoming that the Slovenian team does not describe (item 1.5) which are the links with other CEE IDMP activities (lack of overview?). The work presented by the Slovenian team in the Milestone 3 report is accepted with minor revisions. The PRG, however, does not expect a revised annex, because this is not at the public website. If this information will be included in the joint final activity report, then edits are required.
Detailed comments	The English language of the reports is better than before but in the final joint activity report it should be still improved. Progress report, page 2, line7: “In Slovenia in the 2014, at the experiments ‘Mamino’ and ‘Kumrovo’, was measured important parameters” should be rephrased, it could be replaced with “In Slovenia in 2014, important parameters were measured at the experiments ‘Mamino’ and ‘Kumrovo’.” Slovak report, page 2, 1.1 line 1: “The new additional field experiments have been set up.”. This is a strange start. It suppose some information before. Slovak report, page 2, 1.1 line 3: “This was necessary for possibilities to receive information not only on residual effect....”. Sentence could be shorter: “This was necessary to receive information not only on residual effect....”. Slovak report, page 2, 1.1 line 5: “....and about sensitivity of another different plants on soil subsoiling....”. “another different plants” reads strange. Slovak report, page 2, 1.1 line 9: “Moreover as new theoretical product focused on theory of water content and water movement in soil have been collected...”. This reads strange. Czech report, page 2, 1.1 line 2: “The Czech Republic assessed whithin the field experiments the difference between infiltrations on...”. “infiltrations” (plural) reads strange. Czech report, page 2, 1.1 line 6: “...in a form of ecological farming. (ii) It was Simultaneously, measurements...”. Check the full stops and capital characters. Czech report, page 2, 1.1 line 2 bottom: “...other soil characteristics of soil sampling...”. This reads strange.

Annex 4A Act. 5.2 Assessment of drought impact on forest ecosystems

Assessment Peer Review Group (PRG)	04.05.2015
Status	**FINAL/JK/HvL**
Activity	**5.2. Assessment of drought impact on forests**
	Final Activity Report (FAR)
Activity lead	Dr. Galia Bardarska (GWP Bulgaria)
Nature	The main objective of this demonstration project is identification of measures for the forests to adapt to negative effects of drought, based on the expert investigations in four GWP CEE countries: i.e. Bulgaria, Lithuania, Slovenia and Ukraine. The total forested area in those countries is about 35% of total forest areas in the GWP CEE region. The vulnerability zones of the forest vegetation have been defined for the present climate (1961-1990), as well as for the years 2050 and 2070 (different RCPs, incl. optimistic, realistic and pessimistic climate scenarios). The project is to define good drought management measures for application in forested areas vulnerable to drought in the GWP CEE region under the present climate, as well as projected climates in 2050 and 2070. In the first reporting period the following has been achieved (Activity List updated in October 2014): (i) Milestone 1 – Joint report on Topic [a] Kick-off-meeting, topic [b] Forest policy at UN, EU and national level, and (ii) Milestone 2 – Topic [c], Establishment of methodology for assessment of drought impact on forest ecosystems in 2050 and 2070 **(Output 1)**. In the next reporting period the following work has been accomplished: **Output 2**: Milestone Report 3 (first part) – Elaboration of maps for current climate (1950-2000), and future (2050-2070) climate conditions according to IPCC AR5 in Bulgaria, Lithuania, Slovenia and a pilot area in Ukraine; (part two) – Determination of drought vulnerability forest zones in current climate (1950-2000), and future (2050-2070) climate conditions in Bulgaria, Lithuania, Slovenia and Ukraine. Finally, in the last reporting period, the work accomplished was: **Output 3**: Milestone 4 – Adaptation measures for the forests to mitigate negative effects of the drought, and **Output 4**: Milestone 5 – Report on the forest case study and dissemination of the results.
Received	Final Activity Report (FAR) of 15.04.2015 summarizing briefly (4 pages) all work done under Act. 5.4 (Outputs 1, 2 and 3) was received by PRG on 15.04.2015. End of March 2015, PRG received: - updated version of the Milestone 3 / Output 2 report - updated version of the Milestone 4 / Output 3 report - reply to PRG assessment Milestone 4/Output 3 (22.01.2015) - reply to PRG assessment Milestone 3 / Output 2 (09.12.2014) Milestone 5 report was attached (annex) to the Final Activity Report, received 15.0.2015.
General Observations	**Accepted with few minor comments (Final Activity Report).** PRG has not reviewed the updated version of Milestone 3 / Output 2 report and the Milestone 4 / Output 3. The Activity Team had not marked the revisions, although they were reminded. We hope that the revisions described in both replies (see above) have been implemented in the

	updated both Milestone reports. In general Act. 5.2 was quite confusing, e.g. during the lifetime the scope was limited (no forest ecology), titles of milestones changed, milestone reports "hidden" in other documents (too brief Milestone 5 report as Annex to FAR). 1. The PRG agrees with the opinion that Act. 5.2 belongs to the strategic mode (see item 2 of FAR) because it proposes adaptation measures to mitigate negative effects of droughts projected over 7 vulnerability zones for the current and future (2050 and 2070) climate conditions in Bulgaria, Lithuania, Slovenia and the pilot area in Ukraine. This activity refers above all to Step 4 of the Guidelines for DMP developed in Act. 2.1. The planned steps proposed by the forest demonstration project (Act. 5.2) agree with the planning procedure by the Guidelines. Main challenges addressed by Act. 5.2 correspond to the forestry related challenges of UN and EU. The PRG notes that the main challenges addressed are described in a general way. Although monitoring is important in drought management, Act. 5.2 was not about monitoring (was not intended), but nevertheless it is mentioned in the FAR (item 2, page 2). As described Act. 5.2 was dealing with adaptation measures, which are very relevant. 2. The achievements related to the first 5 bullets of Item 3 of FAR include: (i) number of maps produced with different climate indices, (ii) number of tables with drought vulnerability data for different climate conditions, and (iii) number of adaptation measures identified to mitigate negative effects of drought in 4 countries under study. The PRG concludes that the main Activity objectives have more or less been achieved, although PRG had serious comments on some of the products (see earlier PRG assessments, e.g. the Act. 5.2 is more about climate change, which clearly is important in the region, than drought specifically). In addition, Output 4 (Milestone 5) – see Activity List of October 2014 – includes the "Report of the forest case study and dissemination of the results". Unfortunately, the report is not submitted and Table 1 "Dissemination of the results" presented in FAR (annex) is not the adequate way of presenting this information (in addition, the number of publications and presentations given in Table 1 is different than those given in item 3 of FAR). 3. Information given in Item 4 of FAR is in principle the same as given in the earlier items of this document. It is strange that no problems are reported here; at least it should have been mentioned that the impact of forest ecology was left out and why. 4. Item 5 of FAR on "Outputs" do not correspond with the Activity List of October 2015 (only Outputs 2 and 3 are presented; Outputs 4 and 5 are forgotten). 5. Item 6 of FAR is on added values of the activity. The PRG agrees that Activity 5.2 provides new information in terms of methodology and output concerning assessment of climate change impacts on forests. However, results should be used with some reserve (see earlier PRG assessments). 6. Most important lesson learnt from Activity 5.2 is that for implementation of such international projects not only good foresters and GIS specialists are necessary, but also specialists in meteorology, hydrology, biology, ecology, water resources. However, it is important that the Activity has drawn the interest of ministries, decision makers and stakeholders and that likely will be used for the National Strategy on Adaptation to Climate Change.
Detailed comments	The Final Activity Report is written in a fairly good English what is important considering the possibility of editing and joining three outputs into one integrated paper.

Annex 4B Act. 5.2 Assessment of drought impact on forest ecosystems

Act. 5.2; Milestone 4 / Output 3
Reply to comments of PRG assessment from January 22, 2015

15 March, 2015

1. Comments on Milestone 4 Progress Report

Remarks	Answers
The Milestone 4/Output 3 is rejected because in the national lists with the remedial measures for the forests to mitigate negative effects of the drought (comprehensive tables), except for Lithuania, no reference is given to the current, 2050 and 2070 climate scenarios. The progress report mentions that Output 3 is the main outcome of Act. 5.2, which means that it will be made publicly available through the CEE IDMP website. This requires a well-structured, consistent report written in correct English. The current Output 3 needs substantial improvement. If manuscripts for scientific journals or conference proceedings (mentioned under item 2.3 in progress report) are already drafted, these texts might be useful for a revised Output 3.	The M4 is about adaptation measures for different forest vulnerability zones regarding the drought projections to 2050-2070, done in M3. „Remedial measures“ is a mistake, we will use »adaptation measures«. The main objective of the local programmes with adaptation measures is much more oriented to decision makers and stakeholders. The format of the tables corresponds to the national forest/climate change strategies and RBMPs.
The PRG received a progress report on Milestone 4/Output 3 (2 pages) and as an Annex 1 to this report the actual Milestone 4/Output 3 report (38 pages). The PRG appreciates that the guidelines agreed in Ljubljana were followed (i.e. use of template for milestone progress). It would be helpful if a date also would have been put on the annex. Titles used are still confusing.	The content of M4 was up-dated.
The titles of Milestone 4/Output 3 are different (see progress report under 1. Basic Information, “name of the milestone report”; copy on the top of this page), whereas these should have been identical. Both should have got the title: “Remedial measures for the forests to mitigate negative effects of the drought” (see Activity List).	The title of M4 was changed into „Adaptation measures for the forests to mitigate negative effects of the drought”. Milestone 4 was just a step toward this Output.
By omission, in item 2.1 information on investigations concerning climate change scenarios, the current climate is not mentioned. The principal concern, however, is that output results are 2 given for each of the four partner countries in form of comprehensive tables only, with hardly any description of the source of that information. The references are from Ukraine (1 study), Slovenia (9 studies), Bulgaria (1 study by Raev et al.) and 1	The adaptation measures are not for current climate (1950-2000) but for the period 2050 and 2070 - it is mentioned in the title of M4. It is not necessary to divide the adaptation measures for 2050 and 2070 , as the approach is the same one for the forest sector in the future. The forest life of some sustainable tree species to drought is over 100 years.The EC guidelines on developing of national

international study (Wilhite). No references from Lithuania. The title of Section 1 (Annex 1) suggests that a methodology will be described how forest adaptation measures to drought have been obtained. Literature research, expert consultation are the most obvious ones, on the basis of which the comprehensive tables could have been made. Item 2.1 also indicates that methodology development has been important. Methodology used, however, is not given.	adaptation strategies to climate change (2013) recommend the adaptation measures for mitigation the climate change effect to start now. The methodology and programme of forest adaptation measures to climate change in 2050 and 2080 was determined by enlarged group of experts and stakeholders and approved by Executive Forest Agency-Bulgaria. This methodology is part of EU project FUTUREforest,Interreg IV C, 2011. The difference in this demonstration project is that the measures are not related with climate change but with drought only. Also, the measures correspond to IPCC AR5 projections in 2050 and 2070, defined in M3. The drought indices (T, P, and IDM) and forest conditions are different in 4 GWP CEE. This is the reason that the number of measures would be different. Measures in up-dated version are for future period 2050-2070 which have to start now. Sources and references are added.
Concerning item 2.4, it should be reminded that in the PRG assessment of Output 2: Milestone Report 3, the Activity 5.2 team was requested to provide justification and evaluation of the consequences (if any), of the change of the project title from "Assessment of drought impact on forest ecosystems" to "Assessment of drought impact on forests". This question should be answered in a special reply referring to Milestone 3 and the one given under item 2.4 of the Milestone 4 progress report is not sufficient to PRG (especially in respect to the scope of the project originally planned).	First, the experts of this demonstration project proposed the title „Assessment of drought impact on forest ecosystmes" but after receiving some recommendations at IDMP workshop they changed „forest ecosystems" with „forests". Second, in the references of Act. 5.2 is given the article: Lindner et al. 2010. **Climate change impacts, adaptive capacity, and vulnerability of European forest ecosystems**. Elesevier, Forest Ecology and Management 259, 698–709, i.e. the right name is „forest ecosystems". Third, the experts of Act.5.2 agreed to change with „forests" only after IDMP workshop.
The two sentences under item 2.5 still show that the Activity Team has not well investigated how their activity fits in the whole CEE IDMP, for instance with Act. 5.4 on vulnerability (are identical definitions used?), as said in the final PRG assessment of Milestone Report 3/Output 2 (9 December 2014). A better link with Act. 2.1 would also improve consistency among activities of CEE IDMP.	At IDMP workshops other activity leaders have been informed about our investigation. Forest demonstration project was mentioned in Guidelines by Mrs Elena Fatulova. The Output 4 of Act. 5.2 could be part of compendium also.

2. Comments on Milestone4 /Output 3 Report

The readability of the report would improve if at several places a specific back-reference would have been given to Output 1 (Methodology) or Output 2 (impact climate change, vulnerability zones). This also would improve coherence among outputs of Act. 5.2. For instance, on page 2, Section 2.1, 2nd line, a back reference to Table 1.1 in Milestone 3 (page 1) would ease reading.	It was changed.

In the too short Section 1 of the Report (Methodology – half page), it is announced that concrete measures for adaptation to drought in (1) scenario 2050, and (2) scenario 2070, are specified in 6 categories for specific zones of forest vulnerability zones (A, B, C, D, E and F) in four countries under study. These categories are: water, soils, biodiversity, forest bioproductivity, carbon sequestration, and natural risks. These categories are important and the PRG recommends to describe them in some detail. Three types of mitigation measures are introduced (N, O, I) and specific institutions responsible for their implementation are listed. It is assumed that all that information should assist stakeholders in preparation of the 2nd cycle of the EU WFD RBMPs (to be completed by the end of 2015). One of the PRG' major comments (see above) is that all tables presented in the report should be accompanied with some, at least short description of the source of the information (e.g. literature, experiment, expert consultation).	It is explained in up-dated version.
Many mitigation measures are rather generic and do not apply to drought only, but more to water and climate (change). We realize that it is hard to give these specifically for drought, but this should be mentioned in the beginning of the report under the Methodology.	Mitigation measures correspond to meteorological, hydrological and socioeconomic drought.
A strong point the report is that all tables have the same structure. However, subdivision of tables per country is different. For instance, for Bulgaria subdivision is according vulnerability zones, whereas for Lithuania the subdivision makes a difference between current climate and predicted climates. In the final Output report the subdivision (i.e. structure) should be equal for all four countries.	It was done.
In Section 2.1 of the report concerned with Bulgaria, Table 2.1.1 identifies 88 adaptation measures. The title of the table is "The measures for adaptation of the forests in Bulgaria to drought in the vulnerability zones", but no distinction is made for which climate scenario these adaptation measures are recommended. In column "Terms of implementation" it is marked for these measures "short-term" or "permanent". Three times there are terms marked as "Next 15 years", "Every 5 years" and "Long-term to 2030". The PRG has a basic question what are the climate scenarios for which these measures are recommended.	Bulgaria: measures correspond to country projections of temperature and precipitation and vulnerability zones in 2050-2070 according to IPCC AR5 (RCPs) in M3 report. It will be added. Terms of implementation correspond to forest practice against projected drought damages in 2050-2070. Some adaptation measures have to start immediately, others later or periodically. It depends on local conditions and socioeconomic possibility also.
The list with adaptation measures for Bulgaria (and most other countries) is long. We wonder if a priority ranking could be made.	We did with showing the follow up forest projects.
For Bulgaria, a subdivision has been made according the vulnerability zones, but some measures seems to apply to all vulnerability zones (e.g. Measure 1.4). For other	Subdivision of the measures depends on local conditions which are different in 4 GWP CEE countries. For Bulgaria, there are common measures

countries more vulnerability zones are combined for these measures (see Ukraine). As said before, in the final Output report the subdivision (structure) should be equal for all four countries.	for more vulnerability zones , shown by indexes.
The term "Indicator" does not cover the content of the last column in the tables. The term "Indicator" is used for other purposes in drought studies. It is confusing to use it in this context. Probably the term "Action" would be better. It also makes the information in the tables more consistent with the description in the Activity List, where you speak about "Action Plans" (pg. 5).	„Indicator" was changed with „Activity" in tables.
In Section 2.2 on Slovenia there is the same situation. Table 2.2.1 "Mitigation measures to drought in the forests according to vulnerability zones in Slovenia" identifies 15 adaptation measures, but there is no reference to the relevant climate scenarios. The literature gives 9 references for the Slovenian data.	The table of measures is the same as other countries.
There is an interesting remark in Section 2.2 (page 16): "Since the use of the vulnerability zone thresholds from this analysis may not be suitable to assess the climate changes....". Does it mean that the thresholds that were derived for the current climate do not apply to the future climate? If so, then the change of the area of vulnerability zones (as reported in Milestone 3/Output 2) is unsecure, because the same IDM thresholds (Table 1.1, Milestone 3) are identical for the current climate and projected climates (2050 and 2070).	Additional experts knowledge was given but the adaptation measures are over forest vulnerability zones on the base of IPCC AR5.
Seven bullet points are mentioned in Section 2.2 Slovenia (pg. 16). We believe that the first six points are generic. So, these apply to all four countries. Bullet points need to be mentioned earlier.	These are local measures over local vulnerability zones. They could be regional after regional pilot project implementation.
The limited number of measures for Slovenia (relative to other three countries) are not subdivided like for the others. Is Slovenia the only country where expert knowledge (part of the Methodology) has been used?	Expert knowledge was used in other 3 countries also. See the references.
The Lithuanian data (Section 2.3) are the only table in the Output 3 report, with reference to climate scenarios. Table 2.3.1 specifies "The concrete approved measures of adaptation of the forests in Lithuania to drought in the zones of vulnerability (current situation)". The title of the next table 2.3.2 is "The proposed measures for adaptation of the forests in Lithuania to drought in the zones of vulnerability according to predicted forest vulnerability zones for 2050 and 2070 years (climate scenarios …)". In these two tables respectively, 9 and 26 adaptation measures are listed (in Section 3, page 37, of the report only 26 measures are mentioned. This also applies to the progress report). It should also be mentioned that in the Report no references are given for the Lithuanian data. The text on page 20 is too short.	The measures are for the future period in up-dated version. Additional references are added.

Finally Section 2.4 presents table 2.4.1 "Measures for adaptation of the forests on the pilot territory of Ukraine to drought in the zones of vulnerability". All together 70 (not 80 as given in Section 3 and in the progress report) adaptation measures are identified without any reference to the climate scenarios. In terms of implementation, only "short-time", "permanent", "every 3 years" and "next 15 years" are indicated. The table has 6 parts under the titles "Zones A, B, C", "Zone A", "Zone A and B", "Zone B and C", "Zone B" and "Zone C" – the structure of this table (and tables for other countries, see above) has to be explained.	The main measures of Ukraine are 30 in up-dated version over vulnerability zones.
The Report closes with a too short Section 3 (14 lines). This section underlines that "the adaptation forest measures are based on Milestone 3 investigations of climate change scenarios in 2050 and 2070 …" what, except for Lithuania, is not shown in the tables 4 presented in Section 2. The too short Section 3 still reflects lack of overview of the Activity Team. You would expect a more comprehensive follow up. The final outcome of Act. 5.2 should be better synthesized and more coherence is required.	The follow up projects proposal was done on the base of adaptation/mitigation measures.

3. Detailed comments

Progress report: Pg. 1, 2.1, 2nd line: "permanent" has to be replaced with "long" Pg. 1, 2.3, last line: "... drought sre oriented..."? Pg. 2, 2.4, last line: "out" has to be replaced with "our"	"... drought sre oriented..." and "out" are changed with „Short term".
Annex 1: Milestone 4/Output 3 Pg. 4, Table 2.1.1: Abbreviations in columns 4 and 5 (like MAF) are explained on pg. 15. You need to make a reference earlier. For instance, use a footnote here that refers to pg. 15 Pg. 15, what do you mean with the note below the table: "With indexes are pointed the vulnerability zones (A, B, C, D, E, F, G) for which are relevant the measures"?	List of acronyms was shown at the beginning of the M4 report. "With indexes are pointed the vulnerability zones (A, B, C, D, E, F, G) for which are relevant the measures" was deleted because it is evident.

Annex 4C Act. 5.2 Assessment of drought impact on forest ecosystems

Assessment Peer Review Group (PRG)	22.01.2015
Status	**FINAL/JK/HvL**
	Act. 5.2. Assessment of drought impact on forests (originally: ...on forest ecosystems)
	Milestone 4/Output 3 Milestone 4: Development and approval of adaptation measures of the forests according to the vulnerability zones of the years 2050 and 2070 and establishment of a programme for forest adaptation measures and mitigation of negative effect of drought on them. Output 3: Remedial measures for the forests to mitigate negative effects of the drought.
Activity lead	Galia Bardarska (Bulgaria)
Nature	The main objective of this demonstration project is identification of measures for the forests to adapt to negative effects of drought, based on the expert investigations in four GWP CEE countries: Bulgaria, Lithuania, Slovenia and Ukraine. The total forested area in those countries is about 35% of forest areas in the GWP CEE region. The vulnerability zones of the forest vegetation have been defined for the present climate (1961-1990), as well as for the years 2050 and 2070 (different RCPs, incl. optimistic, realistic and pessimistic climate scenarios). The project is to define good drought management measures for application in forested areas vulnerable to drought in the GWP CEE region under the present climate, as well as projected climates in 2050 and 2070. In the first reporting period the following has been achieved: (i) Milestone 1 – Joint report on Topic [a] Kick-off-meeting and topic [b] Forest policy at UN, EU and national level, and (ii) Milestone 2 –Establishment of methodology for assessment of drought impact on forest ecosystems in 2050 and 2070 (Output 1). In the previous reporting period the following work has been accomplished: Output 2: Milestone Report 3 – Elaboration of maps for the current climate, and projected climatic conditions in 2050 and 2070 in Bulgaria, Lithuania, Slovenia and Ukraine (pilot area) and of forest vulnerability zones.
Received	12 December 2014
General observations	**Rejected** The Milestone 4/Output 3 is rejected because in the national lists with the remedial measures for the forests to mitigate negative effects of the drought (comprehensive tables), except for Lithuania, no reference is given to the current, 2050 and 2070 climate scenarios. The progress report mentions that Output 3 is the main outcome of Act. 5.2, which means that it will be made publicly available through the CEE IDMP website. This requires a well-structured, consistent report written in correct English. The current Output 3 needs substantial improvement. If manuscripts for scientific journals or conference proceedings (mentioned under item 2.3 in progress report) are already drafted, these texts might be useful for a revised Output 3. The PRG received a progress report on Milestone 4/Output 3 (2 pages) and as an Annex 1 to this report the actual Milestone 4/Output 3 report (38 pages). The PRG appreciates that the guidelines agreed in Ljubljana were followed (i.e. use of template for milestone progress). It would be helpful if a date also would have been put on the annex. Titles used are still confusing. The titles of Milestone 4/Output 3 are different (see progress report under 1. Basic Information, “name of the milestone report”; copy on the top of this page), whereas these should have been identical. Both should have got the title: “Remedial measures for the forests to mitigate negative effects of the drought” (see Activity List).

	Comments on Milestone 4/Output 3 (progress) report By omission, in item 2.1 information on investigations concerning climate change scenarios, the current climate is not mentioned. The principal concern, however, is that output results are given for each of the four partner countries in form of comprehensive tables only, with hardly any description of the source of that information. The references are from Ukraine (1 study), Slovenia (9 studies), Bulgaria (1 study by Raev et al.) and 1 international study (Wilhite). No references from Lithuania. The title of Section 1 (Annex 1) suggests that a methodology will be described how forest adaptation measures to drought have been obtained. Literature research, expert consultation are the most obvious ones, on the basis of which the comprehensive tables could have been made. Item 2.1 also indicates that methodology development has been important. Methodology used, however, is not given. Concerning item 2.4, it should be reminded that in the PRG assessment of Output 2: Milestone Report 3, the Activity 5.2 team was requested to provide justification and evaluation of the consequences (if any), of the change of the project title from "Assessment of drought impact on forest ecosystems" to "Assessment of drought impact on forests". This question should be answered in a **special reply** referring to Milestone 3 and the one given under item 2.4 of the Milestone 4 progress report is not sufficient to PRG (especially in respect to the scope of the project originally planned). The two sentences under item 2.5 still show that the Activity Team has not well investigated how their activity fits in the whole CEE IDMP, for instance with Act. 5.4 on vulnerability (are identical definitions used?), as said in the final PRG assessment of Milestone Report 3/Output 2 (9 December 2014). A better link with Act. 2.1 would also improve consistency among activities of CEE IDMP. **Comments on ANNEX 1: Milestone 4/Output 3 Report** • The readability of the report would improve if at several places a specific back-reference would have been given to Output 1 (Methodology) or Output 2 (impact climate change, vulnerability zones). This also would improve coherence among outputs of Act. 5.2. For instance, on page 2, Section 2.1, 2nd line, a back reference to Table 1.1 in Milestone 3 (page 1) would ease reading. • In the too short Section 1 of the Report (Methodology – half page), it is announced that concrete measures for adaptation to drought in (1) scenario 2050, and (2) scenario 2070, are specified in 6 categories for specific zones of forest vulnerability zones (A, B, C, D, E and F) in four countries under study. These categories are: water, soils, biodiversity, forest bio-productivity, carbon sequestration, and natural risks. These categories are important and the PRG recommends to describe them in some detail. Three types of mitigation measures are introduced (N, O, I) and specific institutions responsible for their implementation are listed. It is assumed that all that information should assist stakeholders in preparation of the 2nd cycle of the EU WFD RBMPs (to be completed by the end of 2015). One of the PRG' major comments (see above) is that all tables presented in the report should be accompanied with some, at least short description of the source of the information (e.g. literature, experiment, expert consultation). • Many mitigation measures are rather generic and do not apply to drought only, but more to water and climate (change). We realize that it is hard to give these specifically for drought, but this should be mentioned in the beginning of the report under the Methodology. • A strong point the report is that all tables have the same structure. However, subdivision of tables per country is different. For instance, for Bulgaria subdivision is according vulnerability zones, whereas for Lithuania the subdivision makes a difference between current climate and predicted climates. In the final Output report the subdivision (i.e. structure) should be equal

	for all four countries. • In Section 2.1 of the report concerned with Bulgaria, Table 2.1.1 identifies 88 adaptation measures. The title of the table is "The measures for adaptation of the forests in Bulgaria to drought in the vulnerability zones", but no distinction is made for which climate scenario these adaptation measures are recommended. In column "Terms of implementation" it is marked for these measures "short-term" or "permanent". Three times there are terms marked as "Next 15 years", "Every 5 years" and "Long-term to 2030". The PRG has a basic question what are the climate scenarios for which these measures are recommended. • The list with adaptation measures for Bulgaria (and most other countries) is long. We wonder if a priority ranking could be made. • For Bulgaria, a subdivision has been made according the vulnerability zones, but some measures seems to apply to all vulnerability zones (e.g. Measure 1.4). For other countries more vulnerability zones are combined for these measures (see Ukraine). As said before, in the final Output report the subdivision (structure) should be equal for all four countries. • The term "Indicator" does not cover the content of the last column in the tables. The term "Indicator" is used for other purposes in drought studies. It is confusing to use it in this context. Probably the term "Action" would be better. It also makes the information in the tables more consistent with the description in the Activity List, where you speak about "Action Plans" (pg. 5). • In Section 2.2 on Slovenia there is the same situation. Table 2.2.1 "Mitigation measures to drought in the forests according to vulnerability zones in Slovenia" identifies 15 adaptation measures, but there is no reference to the relevant climate scenarios. The literature gives 9 references for the Slovenian data. • There is an interesting remark in Section 2.2 (page 16): "Since the use of the vulnerability zone thresholds from this analysis may not be suitable to assess the climate changes....". Does it mean that the thresholds that were derived for the current climate do not apply to the future climate? If so, then the change of the area of vulnerability zones (as reported in Milestone 3/Output 2) is unsecure, because the same IDM thresholds (Table 1.1, Milestone 3) are identical for the current climate and projected climates (2050 and 2070). • Seven bullet points are mentioned in Section 2.2 Slovenia (pg. 16). We believe that the first six points are generic. So, these apply to all four countries. Bullet points need to be mentioned earlier. • The limited number of measures for Slovenia (relative to other three countries) are not subdivided like for the others. Is Slovenia the only country where expert knowledge (part of the Methodology) has been used? • The Lithuanian data (Section 2.3) are the only table in the Output 3 report, with reference to climate scenarios. Table 2.3.1 specifies "The concrete approved measures of adaptation of the forests in Lithuania to drought in the zones of vulnerability (current situation)". The title of the next table 2.3.2 is "The proposed measures for adaptation of the forests in Lithuania to drought in the zones of vulnerability according to predicted forest vulnerability zones for 2050 and 2070 years (climate scenarios …)". In these two tables respectively, 9 and 26 adaptation measures are listed (in Section 3, page 37, of the report only 26 measures are mentioned. This also applies to the progress report). It should also be mentioned that in the Report no references are given for the Lithuanian data. The text on page 20 is too short. • Finally Section 2.4 presents table 2.4.1 "Measures for adaptation of the forests on the pilot territory of Ukraine to drought in the zones of vulnerability". All together 70 (not 80 as given in Section 3 and in the progress report) adaptation measures are identified without any reference to the climate scenarios. In terms of implementation, only "short-time", "permanent", "every 3 years" and "next 15 years" are indicated. The table has 6 parts under the titles "Zones A, B, C", "Zone A", "Zone A and B", "Zone B and C", "Zone B" and "Zone C" – the structure of this table (and tables for other countries, see above) has to be explained.

	• The Report closes with a too short Section 3 (14 lines). This section underlines that "the adaptation forest measures are based on Milestone 3 investigations of climate change scenarios in 2050 and 2070 …" what, except for Lithuania, is not shown in the tables presented in Section 2. • The too short Section 3 still reflects lack of overview of the Activity Team. You would expect a more comprehensive follow up. The final outcome of Act. 5.2 should be better synthesized and more coherence is required.
Detailed comments[2]	Progress report: Pg. 1, 2.1, 2nd line: "permanent" has to be replaced with "long" Pg. 1, 2.3, last line: "... drought sre oriented..."? Pg. 2, 2.4, last line: "out" has to be replaced with "our" Annex 1: Milestone 4/Output 3 Pg. 4, Table 2.1.1: Abbreviations in columns 4 and 5 (like MAF) are explained on pg. 15. You need to make a reference earlier. For instance, use a footnote here that refers to pg. 15 Pg. 15, what do you mean with the note below the table: "With indexes are pointed the vulnerability zones (A, B, C, D, E, F, G) for which are relevant the measures"?

[2] We did not read all the details. Hence, the list with detailed comments is not supposed to be complete.

Annex 5A Act. 5.3 Natural small water retention measures

Assessment Peer Review Group (PRG)	15 May 2015
Status	**FINAL/JK/HvL**
Activity	**5.3. Natural small water retention measures (NSWRMs)** - **Final Activity Report** - **Natural Small Water Retention Measures_Guidelines (Milestone 6)** - **Act. 5.3 REPLY TO PRG COMMENTS Milestone 5**
Activity lead	Prof . Tomasz Okruszko (Poland)
Nature	Activity 5.3 is undertaken by four partners from Poland, Slovenia, Slovakia and Hungary, and will deliver practical Guidelines on natural landscape retention – combining drought mitigation, flood protection and biodiversity conservation. The structure of the Guidelines and tentative titles of its chapters are listed in the Activity List. Among others there is a chapter on experiences and critical analysis from the already implemented projects in participating countries, including best examples on combined effects and involvement of stakeholders (Milestone 4). These projects are focusing on small scale retention as an adaptive measure mitigating impacts of extreme climate variability. On one hand, these projects conserve water in the landscape as it slows down flood waves during wet period. On the other hand, they increase the buffering capacity of the landscape, which is beneficial during a drought period due to increased water retention. Such projects preserve ecosystems that are sensitive to water losses. Nature and landscape values are addressed in cooperation with stakeholders, especially farmers, seeing a potential flood not only as a threat but also as an opportunity for rural development, nature restoration, recreation, enrichment of the habitat – all together these projects demonstrate a new approach to water resources management. The small water retention measures include both small hydraulic structures as well as non-technical activities, such as reforestation, restoration of wetlands, re-meandering of rivers, and soil structure improvement.
Received	The PRG was in close contact with the Activity Leader throughout the whole duration of the activity which lasted from the beginning of 2014 till April 2015. The milestone reports and reviews of the consecutive drafts of the Guidelines have been carried out by according to the Activity List. - Final Activity Report (FAR): 01 April 2015 - Natural Small Water Retention Measures_Guidelines (Milestone 6): 23 March 2015 - Act. 5.3 REPLY TO PRG COMMENTS Milestone 5: 31 March 2015.
General observations	**Accepted** The PRG compliments the Activity Team with the good set of Guidelines for Natural Small Water Retention Measures. The work progress was satisfactory during the whole duration of the activity. This was an innovative task carried out smoothly in collaboration with experts from four participating GWP CEE countries. It contributes to Step 4 of the Drought Management Guidelines, i.e. development of the programme of measures as part of Production/Update of the Drought Management Plan (Act. 2.1). This is confirmed in the FAR, i.e. relevant for the strategic mode (item 2) The work on NSWRMs under Activity 5.3 is very much in line with the EU Water Framework Directive, which has already taken the first steps towards an ecosystem-based

	approach to water policy. For water ecosystems, the establishment of Natural Water Retention Measures (NWRMs) is one of the most important elements of "green" infrastructure that can help establish "good status". NWRMs should also have a prominent place in the implementation of both the future CAP and the EU's cohesion policy. The PRG appreciates that the Activity Team tried to improve the language when integrating Milestone 5 in Milestone 6, as suggested by the PRG (PRG Final Assessment Act. 5.3_Milestone 5 _ 04Feb2015). Anyhow, the Guidelines will be proofread by an external expert. In the final document also possible negative effects of Small Natural Water Retention Measures are mentioned now (too wet conditions may happen, if water conservation is followed by above-normal rainfall), although positive impacts dominate. References are also added, although the Activity Team suggests that many Natural Water Retention Measures only are reported in Polish. The bias in previous documents to flood in an IDMP project has been removed to some extent (e.g. in cases more drought aspects), some unclear phrasing have been revised. The PRG realizes that knowledge about Small Natural Water Retention Measures is different (experiences and term) among CEE countries.
Detailed comments	The PRG has added comments in the file "Natural Small Water Retention Measures_Guidelines_19032015" (see attached document). We used Track/Change.

Annex 5B Act. 5.3 Natural small water retention measures

REPLAY RO PRG COMMENTS (in red)

04.02.2015 Assessment Peer Review Group (PRG)	
Status	**FINAL/JK/HvL**
Activity	**5.3. Natural small water retention measures**
	Milestone 5 Draft of remaining chapters of the Guidelines
General observations	**Comments on Milestone 5/Annex 1 (progress report)** Under item 2.1 important information is given, i.e. the current version of the Guidelines (all chapters) include corrections and improvements proposed to the writing team (PL) by all three other activity partners (HU, SK and SLO). To produce the final version of the Guidelines (text plus case studies), two more rounds of comments by the partners are planned (item 2.3). In addition to the described connection with Act. 5.1, links with other activities of IDMP CEE are recommended by PRG. Act. 5.3 should analyse at least build links with Act. 2.1 (Drought Planning guideline, e.g. Programme of measures), Act. 5.1 (Drought management by agricultural practices and measures increasing soil water holding capacity) and Act. 5.2 (Drought impact on forests). YES, we wrote a few sentences concerning that subject. **Comments on Annex 1: Guidelines (version of 22.12.2014)** • The PRG noted with satisfaction considerable improvement of the language and the same should also be done with the Appendix, Case Studies. However there are still quite a few and easy to correct mistakes (e.g. water management instead of „water economy"). The proposal to involve external readers made in the Milestone 5 progress report has full support of PRG. These external readers should include experts familiar not only with the English language, but also with the English technical terminology used in the Guidelines. All chapter titles should carefully be checked, just to make them fully corresponding to their contents. We try to do our best. We do not know if Guidelines are going to be published, how many copies and how it will be distributed. Maybe GUIDELINES will be distributed only among CEE countries. If so, we are believe that our English will be more understandable than the Cambridge one to people whose English is not their mother tongue. Don't you think?(It is only some philosophical remark) • At several places the term Guideline (single) is used. We propose to revise into Guidelines (plural). The latter term is more common and has also been used at several places in the Annex 1 (e.g. page 6). OK, you are right • The Activity team could increase credibility of the guidelines when more references were included. In particular where bold statements are made, references are required. Examples of these statements are: (i) "Human economic activities as well as the expected global climate changes cause an increase of the frequency of extreme climate events, including the risk of floods and droughts" (page 6). IPCC is not so pronounced in their conclusions for all regions,Yes we changed that (ii) "The positive role of the forest in limiting floods caused by heavy rains and snow melting on the areas with significant denivelations of the terrain and poorly permeable soils is unquestionable" (page 29). This might be correct, but add reference(s), we add references(iii) "In many cases, it is possible and required to increase and restore the groundwater table level without any

	harm to agriculture" (page 21)We explained that sentences. We do not believe that this is supported by the agricultural sector.it is some misunderstanding, because of our poor English. We will try to explain that. The sector has to accept that the groundwater tables will be more shallow, but in most cases this will lead to a negative impact. However, if you have references claiming the opposite and supporting your statement, you need to add these, (iv) "All the small retention measures aiming at the increasing of the water storage capacity of a catchment have positive social, economic and environmental effects"(page 35). Ok, we agree that sometime they can have the negative effect as well. This certainly does not apply to agriculture in all places (see comment under item iii). There are only a few sentences that address the difficulty to find a balance between agriculture and nature/environment. For example: "However, in the areas used for agricultural purposes water conditions can be influenced in a negative way from the crops point of view" (page 33). • Although the PRG is not specifically familiar with natural small water retention measures, we have the feeling that for some sections more recent literature is available. There is not much more literature concerning the Small Water Retention, There are a lot of publications concerning soil retention, restoration of wetlands, water management for agriculture etc. The idea of small retention was developed in Poland (prof Dziewoński in 1960`s), and after that in Agricultural Universities (especially in Wroclaw) and in the Institute of Land Reclamation. It is pity, but most papers are in Polish. However, we add more than 30 new positions that have some links to the "small water retention" For instance, the InterReg project "Water Scarcity and Droughts - Coordinated actions in European Regions" (WaterCoRe) compiled a Handbook of Good Practice (published after 2010). There must be relevant measures in this handbook. Another example is Figure 2. The map refers to a publication in 2005. Since then we had important new reports from IPCC and likely from EEA, e.g. IPCC-SREX report in 2012 and what about AR5 that was published in 2014/15. Under the detailed comments (see below) we refer at specific points where references clearly are missing. • In general there is still a strong bias to floods in the guidelines. Please reconsider text in some places to let the light shine on the drought. Yes, we did it. The guidelines are for IDMP and the wet part should not be forgotten, but it should not be emphasized. For example, bullet points, page 20. OK • The Guidelines begin with introductory Chapter 1. In Section 1.2 some short text on droughts and drought management should be added, just to emphasize that the Guidelines are developed within the IDMP CEE and to emphasize that the guidelines are about drought. It was done • In Chapter 2 (page 13), where planning methods are mentioned, some reference could be made to the Guidelines produced in Activity 2.1. The last paragraph in page 15 raises doubts about the need of elaborate discussion on differences between NSWRM, NWRM, SWRM, etc. Sections on landscape and technical retention are rather basic, but in Chapter 1 it should be added and made clear to whom these Guidelines are addressed (target group). The text was changed a little • In Chapter 3, Section 3.2, it should be made clear that this particular methodology is being used in Poland and it is given in the Guidelines as an example only. Section(but we think that it is more general work, and the methodology can be used in all countries in CEE) 3.1 General Remarks also is rather specific with the example of "Small Retention

	Program developed for the Mazovian Voivoidship" (page 23). It must be remembered throughout the Guidelines, that in accordance with page 2 there are 9 authors from 4 different countries and the Guidelines are addressed to the whole CEE region. Yes we try to remember that. The method was described in a very general manner, we just wanted to give some idea of the methodology which can be used in CEE countries. By the way, what is it: „Patency of the water course", mentioned in page 30 at the end of Chapter 3? We do not know as well, It has been changed • The title of Chapter 4 raises some doubts – results of what? Could it be that it is „How can we evaluate the potential of small water retention in terms of flood protection, drought mitigation and biodiversity increase"The names of chapters are exactly as in the plan of implementation of the acivity 5.3. – anyway, it is not clear. Similar to Chapter 3, detailed specific examples are introduced (i.e. fish ponds) after half a page (page 31). Readers expect to get first some more generic information. (same changes were done to clarify the text) • Chapter 5 provides a good overview of the policy context. The abbreviations concerning different plans should carefully be checked (e.g. FPMP). Small retention in four CEE countries is described. The part for Poland is much more elaborated than for the other three countries. The part of Slovenia is very brief and generic. We suggest to elaborate this a bit more. It is a problem for us as well. Maybe in Poland we have not done so much in the subject of small retention, but we discussed this problem a lot. In other countries the phrase "small" as well as "natural retention" has not been known before (the name, not the problem) • Chapter 6 is an introduction and summary of case studies from the four partner countries, dividing them into national, regional and special purpose. Its title is too long and too elaborate. It is from the plan of the Act. 5.3. It is too much biased to other impacts than drought (especially floods). More focus on drought is required (we are dealing with IDMP).we added some sentences with "drought" in that chapter in others as well) The term drought appears only once in the chapter (page 49). Chapter 7 (not 6) contains conclusions. Assessment of impact of small retention measures upon water resources and environment should be referred to Table 6. Pros of small water retention are mentioned followed then by cons. This is balanced. It considers that small water retention also could lead to negative impacts. On several places in the Guidelines these negative impacts are forgotten. In some places we add the negative impacts, but there are not many in our opinion. The final paragraph on page 55 with the statement „it should be noted that the financial support is not sufficient" is not appropriate closure of the Guidelines.OK will we changed it) Probably Authors wanted to convey the message that usually financial support for the natural small water retention measures is limited.
Detailed comment[3]	The Guidelines still need to be edited by the English language professional editor, aided by the expert familiar with the technical contents of this work. (yes, we agree with that, anyway see our remarks above) - Page 3, 9. Annexes: usually, the annexes have no chapter number. The same applies to Bibliography. OK it was done - Page 6: Chapter 1 Introduction in report starts with page 1 and not with page 6. The previous pages usually get roman numbers, e.g. i, ii etc.OK

[3] We did not proved all details, because of the proposed English proofreading. Hence, the list with detailed comments is not supposed to be complete.

	- Page 7, 2nd line: "ECC" has to be replaced with "CEE".YES - Page 7, Section 1.2, line 6: "significant loss in economy"; not always. A detailed analysis of the economic impact of drought in the Po led also to winners. Be more careful with phrasing. OK, we will try - Page 5, Figure 4: "ground water", should be one word.YES - Page 7: Gutry-Korycka 2003; not in list with References. We added it, and a lot others - Page 7: ".....intensification of agriculture and unification of natural habitats, including .... All these factors contribute to the increase of droughts` and floods` hazard (". "Frequencies is not consistent with the definition of drought used by CEE IDMP. =Droughts are natural hazards not caused by human activities. We changed that - Page 8, line 3: "The influence of expected increase of temperature and variations of the precipitation regime will be particularly noticeable in agriculture"; does this not also apply to ecosystems, production forests and other sectors? Many sectors also face the impact of climate change. We think that agriculture (crop, plants) is especially sensitive to the climate change, that's all. - Page 8, line 7: "Changes in surface infiltration capacity not only decrease the risk of floods but..."; should rather be "Increase of infiltration capacity not only decrease the risk of floods but also augment soil water holding capacity, which is one of the very positive measures for drought management" (see Activity 5.1 of the IDMP CEE). Yes, we changed that sentences. - Page 8, line below Fig. 2: "Nowadays, the meteorologists have statistically confirmed reference period (time series of discharge, sun intensity have natural changes every about 60 years)". We are sure that not everywhere in the world meteorologist have such long time series. Add "Nowadays, the meteorologists in the region have...". Furthermore, we do not fully understand this sentence. Please add Reference(s). Prof Lorenc said that. We gave some references. - Page 9, line 3 above fig. 3; add reference. Who has done the calculation. In general page 9 misses references. Yes, we added this information - Page, line 1 above Fig. 3 should be: "Currently, water deficit influences mostly developing countries with low HDI)"; OK, it has been changed - Fig. 4c: What does it mean that Finland is on top? It is the original picture, We gave some references to that figure - Fig. 4: "own drawings"; you should say "Derived from own calculations based on the data from : Natural water ???...". There are two references beginning with "Natural water l..." of 2013 and 2014. Nothing of 2012. Please clarify. OK - Page 11, line 3-4: "It should be emphasized that water retention does not generate any additional costs, while ..."; reads quite strange. It is about the non-technical measures. Small-scale technical measures are cheap, but not without costs. It is some misunderstanding because of the translation.. We changed it - Fig. 5 caption: I miss year of the Rain Water Harvesting publication. It is poster only, not a publication - Page 12, line 2-3: should rather be "....retardation of the water runoff from the catchment area after occurrence of the intensive rainfall"..OK - Page 12, Section 2.1 line 1: You expect references here, to prove that it has already a long history. Yes, we did it - Page 12, lines 1 and 2 from the bottom: distinction is made here between technical and nontechnical measures, consequently two bottom paragraphs in page 13 should also be Technical … and Non-technical (not Planning)… measures. Planning is just one of the nontechnical measures. Some other measures of this type are listed in lines 1 and 3 of Table 1 – among them agrotechnical and agricultural measures, forests, etc. The

	correction was made - Page 14, line 7: "All measures..."; it is quite a claim to say that everything is included… Are you so confident? Of course, you are right - Table 2: Has "Natural" been defined? In Table 2 the NSWRM are divided into "natural" and "technical" measures, but before all NSWRM were divided into "technical" and "nontechnical" measures. Please be more careful with definitions! Yes, we try. It is rather a new subject that's why sometimes we have to use our own definitions. - Page 15: Following Table 3. "Substantial differences between Tables 1 and 3 are small..."; reads a bit strange. Yes, we know. One table is from 2014 (NWRM, table 3), but the other one (table 2) was published in 2003. The authors of the table 3 didn't know about the older one despite it was published in English. That is a problem that nobody wants to read our Journal of Water and Land Development. - Page 16: at least strange subdivision; does agricultural land (Sect. 2.2) not belong to the landscape (Sect. 2.3)? In section 2.2 we are talking mostly about agricultural activity. - Page 17: Paragraph starting with: "Rain water can be retained in soil pores in the aeration zone (a zone between ground level and ground water table level)..." can be deleted because it is very basic for guidelines .OK, but we are not sure that everybody knows that. - Page 18: What do you mean with an aquifer outcrop? We think that it is a spring. Does an aquifer outcrop delay flow out of the aquifer? It was not good translation, we changed it. Without an outcrop the groundwater would experience more resistance and that would slow down (delay outflow). - Page 18: line 2 bottom: "There are many scientific publications dedicated to the role of the impact of forest on the water balance structure in the catchment"; in that case we would expect to see some references. OK, we add some. - Page 18 (and other places): What do you mean with "the structure of the water balance"? It is uncommon to use it .Some hydrologists persuade me that it is wrong to say, for example "we are improving (changing etc) water balance. They stated that it is not possible. We can improve only "structure of water balance", not a "balance". Anyway we changed that phrase in same places. We suggest that you discuss somewhere much earlier what is the water balance in the catchment (Runoff = Precipitation – Evapotranspiration – Groundwater outflow). OK - Page 19, line 4: "The positive role of the forest in limiting floods caused by heavy rains..." Add reference. OK, we added - Page 20, line 3: "It is recommended to use the classification of the reservoirs as presented in Figure 8". This is a bold statement. Is this a recommendation to all CEE countries? It is difficult question. There is no classification of water reservoirs suitable for our theme. According ICOLD the small water reservoirs have the height of the dam less than 15 meters. We are not talking about such reservoirs. The classification of the reservoirs given in fig 8 is only a proposal. According to me, it is a very good classification (since there is no other classification) and can be used not only in the ECC, but in the Europe as a whole. - Page 20, 4 bullet points ("Water reservoirs play an important role in human economy as well as in the environment. Considering the role they play, they can be divided into the following categories:": "drought" is missing. (Yes, we changed that)The last bullet could be changed: water reservoirs used to improve relevant terms of the water balance: drought management, alimentation of groundwater aquifer, protection against flood,…etc. Yes - Page 21, line 2: "They are usually constructed to fulfil the economic needs and only occasionally – to fulfil the environmental needs". This is an important statement, because it applies to many cases. Ok, we agree

	- Page 21, line 8: "Groundwater table level has been decreased on vast areas of wetlands. In many cases, it is possible and required to increase and restore the groundwater table level without any harm to agriculture". This is a bold statement. You certainly need to add References. Not all will agree (see above). The same applies to line 2, bottom. We added some literature, and tried to show~~n~~ the circumstances when our statement is right. - Page 21, line above Fig. 9: "Damming devices with the established (permanent) threshold are constructed on ditches. The level of the threshold is usually situated ca. 40 – 60cm below the ground level" (this level also must be dependent on climate, crop, and soil). We changed that - Page 22, line 3 bottom: "Measures within small retention can result in slowdown or limitation of surface and rain water outflow". You need to add "subsurface flow". "Measures within small retention can result in slowdown or limitation of surface and subsurface flow as well as rain water outflow". OK, we made corrections - Page 23, line above bullet points: "The analysis of the realization of small retention included 12 factors characterizing:". It needs to be made clear that this is not generic, but that these factors apply to Mazovian Voivoidship (PL). We think that the methodology is general and can be used in all ECC countries. The Mazovian voivodeship is only an example. The factors and data for calculation can be similar but of course the data(numbers) will be different in other areas.. - Page 23, 3rd bullet point: what do you mean with: "module of ground water renewable resources)"? It was changed - Page 24, line 14 bottom: "water gauge" is general; better to use the term streamflow gauge. OK, we do not like the term "streamflow gauge", but You are right. - Page 24, line 8 bottom: "number and total amount of high water flow (available resources)". We do not directly see the link ("number"of what?) OK It was changed - Page 24, line 6 bottom: "Hydrological drought caused by lack of precipitation can periodically occur quite often in the CEE countries; OK, it was changed - Page 24, line 3 bottom: "However, if shortage of water occurs on the analysed ...caused by anthropogenic factors....". Is this according the definition of drought? Drought is only due to natural climate variability. OK, we changed it - Page 25, line 10 bottom and following (page 26): "The detailed characteristic of this kind of analysis (Table 4) should be given as a case study from Poland, Masovian Voivoidship....". There is duplication with page 23. Move some of the text. OK - Page 26, line 14 bottom: "...oil"? Do you mean "soil"? YES - Page 27, Table 4: I suggest to align left the following headings in the table: Climate indicators, Yes, we did it - Hydrological indicators, and Indicators related to land use. OK - Page 28, Figure 10: what do the classes 4 to 17 mean in the legend. OK, We explained it. - Page 30: "Use of mathematical model with spatially distributed parameters". We believe that it is a good idea as a final tool, but it likely is too demanding (i.e. data requirements) in a first phase for all natural retention measures. OK, we changed the description - Page 30 line 6: "Soil and Water Assessment Tool (SWAT) can be used (Arnold et al. 1998). We are not sure which model version exactly is meant, but we believe that eventually a spatially distributed saturated groundwater flow model is needed that allow simulation of lateral groundwater flow from cell to cell (like the SIMGRO model, Querner et al, 2012). OK, we added that. It is pity that we forgot about SIMGRO – we were using that program for a lot of calculations. - Page 31, line 8: Figure 10 should be Figure 12. OK - Page 35, line 5 and following bullet points: "The most important benefits of small retention measures are:". This is an important list, but is a bit hidden among other

	information. YES, we made an additional chapter(4.3) - Page 35, line 8 bottom: "Direct assessment can be performed by covering of the selected SRM by a monitoring network before and after its occurrence". Monitoring/field observations are is important as stressed in these Guidelines. PRG appreciates this very much. The monitoring AFTER the implementation is often forgotten/not done. This is really important because you can learn a lot about reality, which is very valuable for following measures. YES, we wrote more on that subject. - Page 36, line 13: "The most frequent scenarios that can be found in the literature are:". You have to give references, e.g. using examples – case studies presented in the Annex. OK, we added some references - Page 36, line 11 bottom: "A number of publications connected to the SWAT present the results of modeling that aim at evaluation of SRM..". Add references. YES, We added it - Page 36 lines 4-6 bottom: remove initials in references (only family name). OK - Page 36, last 4 lines: SRM is context/location specific by definition. Hence, local prior monitoring and modeling are a prerequisite, as stressed by the Guidelines. Yes we wrote more' - Page 37, start Chapter 5, first 4 lines: are too generic at this place. More focus is required here. OK - Page 37, caption Fig. 13: "Source: Natural Water 2014" not in list with References ,We add that publication. -Page 37 bottom, page 38 top: "The fundamental document that directs the EU water policy is the Water Framework Directive. Among others, it has been implemented by the development of River Basin management Plans (RBMP), Flood Protection Management Plans (FPMP) and Drought Management Plans (DMP)". We believe that the chapter should start with this. It also links directly to the Chapter title. Yes, we did it - Page 40 line 13 bottom: a sentence is needed that says that small retention will be described in the four countries (PL, SK, SL and HU) that have compiled the Guidelines. OK, we did it - Page 43 line 5 bottom "It looks that in all Europeans countries the problem with the implementation of the idea of natural small water retention measures is similar". Please add references that prove this statement. We took that idea from the report of UK on implementation of EWD. - Page 49: first paragraph of Ch. 6 "It is widely ... water balance" are strong sentences. OK, We make it not so strong. - Page 49 line 10 bottom: "of water management should increasing of natural retention capacity of river basins,.." "increasing" should be "increase". YES - Page 50 1st half: first pros of small water retention are mentioned followed then by cons. This is balanced. It considers that small water retention also could lead to negative impacts. On several places in the Guidelines these negative impacts are forgotten. We showed some negative effects, but we believed that most of the effects are positive. The problem is that human being is sometime (maybe even very often) so "clever", that he can change very good idea to the very bad one. For example he can construct dug ponds on peatlands area. It is a good excuse to have a peat mine. We do not think that it is as "small water retention". It is rather a ….criminal story?? - Pages 52-53 Table 6: "Surface waters", "Groundwaters" should be Surface water, Groundwater (single instead of plural). Yes, You are right - Page 54: "Master plan" and "master plan"; capital or small, but not both. Rather capital. OK - Pages 56-59: not all references are complete. Readers should be able to find the reference. In particular reports and books need to be checked. Publisher and place need

	to be added. For example, “Natural Water Retention Measures (NWRM) and the WFD and other daughter directives. Concept Note NWRM. 2013” is hard to find. Where is it published and by whom? Has it a number? We try to do our best.

Annex 5C Act. 5.3 Natural small water retention measures

Assessment Peer Review Group (PRG)	04.02.2015
Status	**FINAL/JK/HvL**
Activity	**5.3. Natural small water retention measures**
	Milestone 5 Draft of remaining chapters of the Guidelines
Activity lead	Tomasz Okruszko (Poland)
Nature	Activity 5.3 is undertaken by four partners from Poland, Slovenia, Slovakia and Hungary, and will deliver practical Guidelines on natural landscape retention – combining drought mitigation, flood protection and biodiversity conservation. The structure of the Guidelines and tentative titles of its chapters are listed in the Activity List. Among others there is a chapter on experiences and critical analysis from the already implemented projects in participating countries, including best examples on combined effects and involvement of stakeholders (Milestone 4). These projects are focusing on small scale retention as an adaptive measure mitigating impacts of extreme climate variability. On one hand, these projects conserve water in the landscape as it slows down flood waves during wet period. On the other hand, they increase the buffering capacity of the landscape, which is beneficial during drought period due to increased water retention. Such projects preserve ecosystems that are sensitive to water losses. Nature and landscape values are addressed in cooperation with stakeholders, especially farmers, seeing flood not only as a threat but also as an opportunity for rural development, nature restoration, recreation, enrichment of the habitat – all together these projects demonstrate a new approach to water resources management. The small water retention measures include both small hydraulic structures as well as non-technical activities, such as reforestation, restoration of wetlands, re-meandering of rivers, and soil structure improvement.
Received by PRG	9.01.2015
General observations	**Accepted,** but the milestone requires substantial revision (concerning the substance and linguistic in particular) because it is the draft, single output of this Activity. In many places the writing needs to be more precise (see detailed comments). The PRG, however, advices NOT to produce a revised Milestone 5 report, but to include revisions in the final report (i.e. Milestone 6/Output Act. 5.3). Revision of Milestone 5 would duplicate with work meant to be done for Milestone 6. The PRG appreciates that a lot of relevant information that has been collected. After revision the Act. 5.3 output shall be a valuable contribution to the CEE IDMP. According to the Activity List, Milestone 5 was intended to be a draft of remaining chapters of the Guidelines (Chapters 1, 6 and 7). However, in the last period the Activity 5.3 team made significant progress and completed the draft of all chapters of the Guidelines - version of 22.12.2014 - under the title “Natural small water retention measures; combining drought mitigation, flood protection and biodiversity conservation”. The package that was sent to the PRG contained the Milestone 5 progress report, together with the above mentioned draft of the Guidelines as Annex 1. This draft, together with the draft case studies delivered under Milestone 4, will be completed under Milestone 6 as a final Output of this activity.

	Comments on Milestone 5/Annex 1 (progress report) Under item 2.1 important information is given, i.e. the current version of the Guidelines (all chapters) include corrections and improvements proposed to the writing team (PL) by all three other activity partners (HU, SK and SLO). To produce the final version of the Guidelines (text plus case studies), two more rounds of comments by the partners are planned (item 2.3). In addition to the described connection with Act. 5.1, links with other activities of IDMP CEE are recommended by PRG. Act. 5.3 should analyse at least build links with Act. 2.1 (Drought Planning guideline, e.g. Programme of measures), Act. 5.1 (Drought management by agricultural practices and measures increasing soil water holding capacity) and Act. 5.2 (Drought impact on forests). **Comments on Annex 1: Guidelines (version of 22.12.2014)** • The PRG noted with satisfaction considerable improvement of the language and the same should also be done with the Appendix, Case Studies. However there are still quite a few and easy to correct mistakes (e.g. water management instead of „water economy"). The proposal to involve external readers made in the Milestone 5 progress report has full support of PRG. These external readers should include experts familiar not only with the English language, but also with the English technical terminology used in the Guidelines. All chapter titles should carefully be checked, just to make them fully corresponding to their contents. • At several places the term Guideline (single) is used. We propose to revise into Guidelines (plural). The latter term is more common and has also been used at several places in the Annex 1 (e.g. page 6). • The Activity team could increase credibility of the guidelines when more references were included. In particular where bold statements are made, references are required. Examples of these statements are: (i) "Human economic activities as well as the expected global climate changes cause an increase of the frequency of extreme climate events, including the risk of floods and droughts" (page 6). IPCC is not so pronounced in their conclusions for all regions, (ii) "The positive role of the forest in limiting floods caused by heavy rains and snow melting on the areas with significant denivelations of the terrain and poorly permeable soils is unquestionable" (page 29). This might be correct, but add reference(s), (iii) "In many cases, it is possible and required to increase and restore the groundwater table level without any harm to agriculture" (page 21). We do not believe that this is supported by the agricultural sector. The sector has to accept that the groundwater tables will be shallower, but in most cases this will lead to a negative impact. However, if you have references claiming the opposite and supporting your statement, you need to add these, (iv) "All the small retention measures aiming at the increasing of the water storage capacity of a catchment have positive social, economic and environmental effects"(page 35). This certainly does not apply to agriculture in all places (see comment under item iii). There are only a few sentences that address the difficulty to find a balance between agriculture and nature/environment. For example: "However, in the areas used for agricultural purposes water conditions can be influenced in a negative way from the crops point of view" (page 33). • Although the PRG is not specifically familiar with natural small water retention measures, we have the feeling that for some sections more recent literature is available. For instance, the InterReg project "Water Scarcity and Droughts - Coordinated actions in European Regions" (WaterCoRe) compiled a Handbook of Good Practice (published after 2010). There must be relevant measures in this handbook. Another example is Figure 2. The map refers to a publication in 2005. Since then we had important new reports from IPCC and likely from EEA, e.g. IPCC-SREX report in 2012 and what about AR5 that was published in 2014/15. Under the detailed comments (see below) we refer at specific points where references clearly are missing.

	• In general there is still a strong bias to floods in the guidelines. Please reconsider text in some places to let the light shine on the drought. The guidelines are for IDMP and the wet part should not be forgotten, but it should not be emphasized. For example, bullet points, page 20. • The Guidelines begin with introductory Chapter 1. In Section 1.2 some short text on droughts and drought management should be added, just to emphasize that the Guidelines are developed within the IDMP CEE and to emphasize that the guidelines are about drought. • In Chapter 2 (page 13), where planning methods are mentioned, some reference could be made to the Guidelines produced in Activity 2.1. The last paragraph in page 15 raises doubts about the need of elaborate discussion on differences between NSWRM, NWRM, SWRM, etc. Sections on landscape and technical retention are rather basic, but in Chapter 1 it should be added and made clear to whom these Guidelines are addressed (target group). • In Chapter 3, Section 3.2, it should be made clear that this particular methodology is being used in Poland and it is given in the Guidelines as an example only. Section 3.1 General Remarks also is rather specific with the example of "Small Retention Program developed for the Mazovian Voivoidship" (page 23). It must be remembered throughout the Guidelines, that in accordance with page 2 there are 9 authors from 4 different countries and the Guidelines are addressed to the whole CEE region. By the way, what is it: „Patency of the water course", mentioned in page 30 at the end of Chapter 3? • The title of Chapter 4 raises some doubts – results of what? Could it be that it is „How can we evaluate the potential of small water retention in terms of flood protection, drought mitigation and biodiversity increase" – anyway, it is not clear. Similar to Chapter 3, detailed specific examples are introduced (i.e. fish ponds) after half a page (page 31). Readers expect to get first some more generic information. • Chapter 5 provides a good overview of the policy context. The abbreviations concerning different plans should carefully be checked (e.g. FPMP). Small retention in four CEE countries is described. The part for Poland is much more elaborated than for the other three countries. The part of Slovenia is very brief and generic. We suggest to elaborate this a bit more. • Chapter 6 is an introduction and summary of case studies from the four partner countries, dividing them into national, regional and special purpose. Its title is too long and too elaborate. It is too much biased to other impacts than drought (especially floods). More focus on drought is required (we are dealing with IDMP). The term drought appears only once in the chapter (page 49). • Chapter 7 (not 6) contains conclusions. Assessment of impact of small retention measures upon water resources and environment should be referred to Table 6. Pros of small water retention are mentioned followed then by cons. This is balanced. It considers that small water retention also could lead to negative impacts. On several places in the Guidelines these negative impacts are forgotten. The final paragraph on page 55 with the statement „it should be noted that the financial support is not sufficient" is not appropriate closure of the Guidelines. Probably Authors wanted to convey the message that usually financial support for the natural small water retention measures is limited.
Detailed comments[4]	The Guidelines still need to be edited by the English language professional editor, aided by the expert familiar with the technical contents of this work. - Page 3, 9. Annexes: usually, the annexes have no chapter number.The same applies to Bibliography.Page 6: Chapter 1 Introduction in report starts with page 1 and not with page 6. The previous pages usually get roman numbers, e.g. i, ii etc. - Page 7, 2nd line: "ECC" has to be replaced with "CEE".

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	- Page 7, Section 1.2, line 6: “significant loss in economy”; not always. A detailed analysis of the economic impact of drought in the Po led also to winners. Be more careful with phrasing. - Page 5, Figure 4: “ground water”, should be one word. - Page 7: Gutry-Korycka 2003; not in list with References. - Page 7: “.....intensification of agriculture and unification of natural habitats, including .... All these factors contribute to the increase of droughts` and floods` hazard(”. “Frequencies is not consistent with the definition of drought used by CEE IDMP. =Droughts are natural hazards not caused by human activities. - Page 8, line 3: “The influence of expected increase of temperature and variations of the precipitation regime will be particularly noticeable in agriculture”; does this not also apply to ecosystems, production forests and other sectors? Many sectors also face the impact of climate change. - Page 8, line 7: “Changes in surface infiltration capacity not only decrease the risk of floods but...”; should rather be “Increase of infiltration capacity not only decrease the risk of floods but also augment soil water holding capacity, which is one of the very positive measures for drought management” (see Activity 5.1 of the IDMP CEE). - Page 8, line below Fig. 2: “Nowadays, the meteorologists have statistically confirmed reference period (time series of discharge, sun intensity have natural changes every about 60 years)”. We are sure that not everywhere in the world meteorologist have such long time series. Add “Nowadays, the meteorologists in the region have...”. Furthermore, we do not fully understand this sentence. Please add Reference(s). - Page 9, line 3 above fig. 3; add reference. Who has done the calculation? In general page 9 misses references. - Page, line 1 above Fig. 3 should be: “Currently, water deficit influences mostly developing countries with low HDI)”; - Fig. 4c: What does it mean that Finland is on top? - Fig. 4: “own drawings”; you should say “Derived from own calculations based on the data from : Natural water ???...”. There are two references beginning with “Natural water l...” of 2013 and 2014. Nothing of 2012. Please clarify. - Page 11, line 3-4: “It should be emphasized that water retention does not generate any additional costs, while ...”; reads quite strange. It is about the non-technical measures. Small-scale technical measures are cheap, but not without costs. - Fig. 5 caption: I miss year of the Rain Water Harvesting publication. - Page 12, line 2-3: should rather be “....retardation of the water runoff from the catchment area after occurrence of the intensive rainfall”. - Page 12, Section 2.1 line 1: You expect references here, to prove that it has already a long history. - Page 12, lines 1 and 2 from the bottom: distinction is made here between technical and non-technical measures, consequently two bottom paragraphs in page 13 should also be Technical … and Non-technical (not Planning)… measures. Planning is just one of the non-technical measures. Some other measures of this type are listed in lines 1 and 3 of Table 1 – among them agrotechnical and agricultural measures, forests, etc. - Page 14, line 7: “All measures...”; it is quite a claim to say that everything is included… Are you so confident? - Table 2: Has “Natural” been defined? In Table 2 the NSWRM are divided into “natural” and “technical” measures, but before all NSWRM were divided into “technical” and “non-technical” measures. Please be more careful with definitions! - Page 15: Following Table 3. “Substantial differences between Tables 1 and 3 are small...”; reads a bit strange. - Page 16: at least strange subdivision; does agricultural land (Sect. 2.2) not belong to the landscape (Sect. 2.3)?

	- Page 17: Paragraph starting with: "Rain water can be retained in soil pores in the aeration zone (a zone between ground level and ground water table level)..." can be deleted because it is very basic for guidelines. - Page 18: What do you mean with an aquifer outcrop? We think that it is a spring. Does an aquifer outcrop delay flow out of the aquifer? Without an outcrop the groundwater would experience more resistance and that would slow down (delay outflow). - Page 18: line 2 bottom: "There are many scientific publications dedicated to the role of the impact of forest on the water balance structure in the catchment"; in that case we would expect to see some references. Page 18 (and other places): What do you mean with "the structure of the water balance"? It is uncommon to use it. We suggest that you discuss somewhere much earlier what is the water balance in the catchment (Runoff = Precipitation – Evapotranspiration – Groundwater outflow). - Page 19, line 4: "The positive role of the forest in limiting floods caused by heavy rains..." Add reference. - Page 20, line 3: "It is recommended to use the classification of the reservoirs as presented in Figure 8". This is a bold statement. Is this a recommendation to all CEE countries? - Page 20, 4 bullet points ("Water reservoirs play an important role in human economy as well as in the environment. Considering the role they play, they can be divided into the following categories:": "drought" is missing. The last bullet could be changed: water reservoirs used to improve relevant terms of the water balance: drought management, alimentation of groundwater aquifer, protection against flood,…etc. - Page 21, line 2: "They are usually constructed to fulfil the economic needs and only occasionally – to fulfil the environmental needs". This is an important statement, because it applies to many cases. - Page 21, line 8: "Groundwater table level has been decreased on vast areas of wetlands. In many cases, it is possible and required to increase and restore the groundwater table level without any harm to agriculture". This is a bold statement. You certainly need to add References. Not all will agree (see above). The same applies to line 2, bottom. - Page 21, line above Fig. 9: "Damming devices with the established (permanent) threshold are constructed on ditches. The level of the threshold is usually situated ca. 40 – 60cm below the ground level" (this level also must be dependent on climate, crop, and soil). - Page 22, line 3 bottom: "Measures within small retention can result in slowdown or limitation of surface and rain water outflow". You need to add "subsurface flow". "Measures within small retention can result in slowdown or limitation of surface and subsurface flow as well as rain water outflow". - Page 23, line above bullet points: "The analysis of the realization of small retention included 12 factors characterizing:". It needs to be made clear that this is not generic, but that these factors apply to Mazovian Voivoidship (PL). - Page 23, 3rd bullet point: what do you mean with: "module of ground water renewable resources)"? - Page 24, line 14 bottom: "water gauge" is general; better to use the term streamflow gauge. - Page 24, line 8 bottom: "number and total amount of high water flow (available resources)". We do not directly see the link ("number"of what?) - Page 24, line 6 bottom: "Hydrological drought caused by lack of precipitation can periodically occur quite often in the CEE countries; - Page 24, line 3 bottom: "However, if shortage of water occurs on the analysed ...caused by anthropogenic factors....". Is this according the definition of drought? Drought is only due to natural climate variability. - Page 25, line 10 bottom and following (page 26): "The detailed characteristic of this kind of analysis (Table 4) should be given as a case study from Poland, Masovian Voivoidship....".

	There is duplication with page 23. Move some of the text. - Page 26, line 14 bottom: "...oil"? Do you mean "soil"? - Page 27, Table 4: I suggest to align left the following headings in the table: Climate indicators, Hydrological indicators, and Indicators related to land use. - Page 28, Figure 10: what do the classes 4 to 17 mean in the legend. - Page 30: "Use of mathematical model with spatially distributed parameters". We believe that it is a good idea as a final tool, but it likely is too demanding (i.e. data requirements) in a first phase for all natural retention measures. - Page 30 line 6: "Soil and Water Assessment Tool (SWAT) can be used (Arnold et al. 1998). We are not sure which model version exactly is meant, but we believe that eventually a spatially distributed saturated groundwater flow model is needed that allow simulation of lateral groundwater flow from cell to cell (like the SIMGRO model, Querner et al, 2012). - Page 31, line 8: Figure 10 should be Figure 12. - Page 35, line 5 and following bullet points: "The most important benefits of small retention measures are:". This is an important list, but is a bit hidden among other information. - Page 35, line 8 bottom: "Direct assessment can be performed by covering of the selected SRM by a monitoring network before and after its occurrence". Monitoring/field observations are is important as stressed in these Guidelines. PRG appreciates this very much. The monitoring AFTER the implementation is often forgotten/not done. This is really important because you can learn a lot about reality, which is very valuable for following measures. - Page 36, line 13: "The most frequent scenarios that can be found in the literature are:". You have to give references, e.g. using examples – case studies presented in the Annex. Page 36, line 11 bottom: "A number of publications connected to the SWAT present the results of modeling that aim at evaluation of SRM..". Add references. - Page 36 lines 4-6 bottom: remove initials in references (only family name). - Page 36, last 4 lines: SRM is context/location specific by definition. Hence, local prior monitoring and modeling are a prerequisite, as stressed by the Guidelines. - Page 37, start Chapter 5, first 4 lines: are too generic at this place. More focus is required here. - Page 37, caption Fig. 13: "Source: Natural Water 2014" not in list with References. - Page 37 bottom, page 38 top: "The fundamental document that directs the EU water policy is the Water Framework Directive. Among others, it has been implemented by the development of River Basin management Plans (RBMP), Flood Protection Management Plans (FPMP) and Drought Management Plans (DMP)". We believe that the chapter should start with this. It also links directly to the Chapter title. - Page 40 line 13 bottom: a sentence is needed that says that small retention will be described in the four countries (PL, SK, SL and HU) that have compiled the Guidelines. - Page 43 line 5 bottom "It looks that in all Europeans countries the problem with the implementation of the idea of natural small water retention measures is similar". Please add references that prove this statement. - Page 49: first paragraph of Ch. 6 "It is widely ... water balance" are strong sentences. - Page 49 line 10 bottom: "of water management should increasing of natural retention capacity of river basins,.." "increasing" should be "increase". - Page 50 1st half: first pros of small water retention are mentioned followed then by cons. This is balanced. It considers that small water retention also could lead to negative impacts. On several places in the Guidelines these negative impacts are forgotten. - Pages 52-53 Table 6: "Surface waters", "Groundwaters" should be Surface water, Groundwater (single instead of plural). - Page 54: "Master plan" and "master plan"; capital or small, but not both. Rather capital. - Pages 56-59: not all references are complete. Readers should be able to find the reference. In

	particular reports and books need to be checked. Publisher and place need to be added. For example, “Natural Water Retention Measures (NWRM) and the WFD and other daughter directives. Concept Note NWRM. 2013” is hard to find. Where is it published and by whom? Has it a number?

Annex 5D Act. 5.3 Natural small water retention measures

Assessment Peer Review Group (PRG)[5]	27 January 2015
Status	**FINAL/JK/HvL**
Activity	**Act. 5.3 Natural small water retention measures**
	Milestone 4, Best examples of small retention from participating countries
Activity lead	Tomasz Okruszko, Poland
Nature	The final output of Activity 5.3 undertaken by four partners from Poland, Slovenia, Slovakia and Hungary, will be the practical Guideline on natural landscape retention – combining drought mitigation, flood protection and biodiversity conservation. The structure of the Guideline and tentative titles of its chapters are listed in the Activity List. Among others there is a chapter on experiences and critical analysis from the already implemented projects in participating countries, including best examples on combined effects and involvement of stakeholders. These projects are focusing on small scale retention as an adaptive measure mitigating impacts of extreme climate variability. On one hand, these projects conserve water in the landscape as it slows down flood waves during wet period. On the other hand, they increase the buffering capacity of the landscape, which is beneficial during drought period due to increased water retention. Such projects preserve ecosystems that are sensitive to water losses. Nature and landscape values are addressed in cooperation with stakeholders, especially farmers, seeing flood not only as a threat but also as an opportunity for rural development, nature restoration, recreation, enrichment of the habitat – all together these projects show a new approach to water resources management. The small water retention measures include both small hydraulic structures as well as non-technical activities such as reforestation, restoration of wetlands, re-meandering of rivers, and soil structure improvement.
Received	25 November 2014;
General observations	**Accepted** The Activity List describes that by the end of August, the following will be delivered (contribution to the one and only output of Act. 5.3): - Milestone 4 Best Examples, which in the next phase will be summarized in Chapter 6 of the book with guideline. The PRG received the following: - Milestone progress report called “Act. 5.3_Milestone 4 Report 25Nov2014”; - Annex 1_Best cases from Poland - Annex 2_Best cases from Slovenia - Annex 3_Best cases from Slovakia - Annex 4_ Best cases from Hungary. **The milestone report** In total we received 12 case studies from the partner countries. Point 2.1 of the progress report provides a table describing and characterizing briefly all case studies, which follow three

[5] The PRG sincerely apologized for the delayed assessment. The main reason is that the Chair of the PRG from October 2014 onwards appeared not to be available. A took some time to solve this.

	categories: individual case, regional activity and national scale measures. The case studies annexed to the Milestone report are also summarized and commented upon in the remaining chapters of the Guideline which are already drafted and sent to all partners for comments. These remaining chapters are planned to be ready by the end of this year. Item 2.5 (number from the template lost) about links with other IDMP CEE activities is not complete. In addition to Activity 5.1, the 5.3 activity team should analyse at least some links with activity 2.1 (Drought Planning guideline, e.g. Programme of measures) and Act. 5.2 (Drought impact on forests). Furthermore in the final output it should be made clear how measures that primarily meant for other goals than drought, like the reduction of high flows/prevention of floods, fit in a drought management plan. That will not be trivial for all readers of the final guideline. **The case studies (Annexes to the progress report)** • In the first case study from Poland (Development of small water retention program, 1995-2010), the numbers given in the regions (see Fig. 1) should be explained, although it's rather clear that this is the ratio of a number of planned projects and the their number implemented till 2010 (rather small number implemented in some regions could be commented upon briefly). The text should also be checked for a number of repetitions. Few comments explaining the structure of self-governance, both in the regional and local levels, with whom water authorities cooperate would be very useful (e.g. what is the role of the Marshal). Fig. 3 description still in Polish. The same problem in the first page of case study on reservoir Czyzew. • The Vogrscek Dam in Slovenia is a large dam even by the Authors, and this does not agree with the title of the Guideline s (i.e. "small retention"). • In description of the Klatova Nova Ves polder in Slovakia, the word "drought" is not used at all. The same applied to: (i) Rehabilitation of clay pit in village Renče, (ii) In other retention measures, (iii) Reconstruction of the mountain weir HB Klauzy (although all these will reduce drought impacts as well). In others the term drought is used, but it reflects water scarcity/shortage (structural) rather than lack of water due to climate variability (=drought), e.g. Marsh protection in Egyek–Pusztakócs and Case Study (HU), In the Case Study "Water infrastructure including small water retention supports land and water management (HU) drought is not in the objectives of the project, although it is implicitly there (too biased too floods; make drought more explicit). The Karst pond in village Goče is a better example, but drought is hardly mentioned, although the pond is very important to minimize impact to the environment. In all case studies it would be good to relate those, even by few words, to the main subject of IDMP CEE (see above). • In summary, all 12 case studies attached to the Milestone 4 report are interesting and they should provide good illustration to the Guideline (however, this can be finally judged only after receiving the text of the three remaining chapters of the Guideline).
Detailed comments	The language should be improved in some places for those that will be part of the guideline. Comments in other than English languages should be translated into English.

Annex 6 Act. 5.4 Drought Risk Management Scheme: a decision support system

Assessment Peer Review Group (PRG)	24.04.2015
Status	**FINAL/JK/HvL**
Activity	**5.4. Drought Risk Management Scheme: a decision support system**
	Final Activity Report (FAR) and Milestone 3.2 (part of Output 3) Recommendations for operational support system in drought risk management
Activity lead	Dr. Tamara Tokarczyk (GWP Poland)
Nature	Act. 5.4 aims at developing a framework for integrated drought risk mapping that can be adjusted to a given drought context and provide application for a particular scope. The proposed framework is generic in nature. The framework is oriented to look for methods and measures that constitute a comprehensive, multi-purpose and flexible approach that can be detailed and addressed for specific regional purposes. Drought contexts are provided by the three project partners from Lithuania, Poland and Romania. They deal with drought risk mapping for early warning systems (Polish partner), agricultural drought risk mapping to evaluate economic profitability under different management practices (Romanian partner), and risk mapping of water scarcity in the context of integrated water resources management (Lithuanian partner). In the previous reporting period the following work was completed: (i) Milestone 1.1 – Identification of the national measures for drought susceptibility (drought hazard) assessment, (ii) Milestone 1.2 - Identification of the national measures for drought vulnerability assessment (these two milestones together correspond to Output 1), and (iii) Milestone 3.1 - Drought risk management scheme for the Odra River (part of Output 3). Output 2 was approved by the PRG on 16 December 2014, including the two attachments of Milestone 2.1 – Developing methodology for drought hazard mapping with the use of measures for drought susceptibility assessment, and Milestone 2.2 – Framing methodology for vulnerability to drought assessment based on available GIS information, including a population map, type of economic activity map and protected area showing the potental adverse consequences. The last missing Milestone 3.2 is assessed in this document.
Received	Final Activity Report (FAR) of 24.03.2015 summarizing briefly (4 pages) all work done under Act. 5.4 (Outputs 1, 2 and 3) was received by PRG on 9.04.2015. One day earlier the PRG received the Milestone 3.2 report and the Milestone Progress Report.
General Observations	**Accepted with few minor comments.** 7. The PRG agrees with item 2 of FAR that *„activity 5.4 includes elements of operational mode as well as strategic mode", although the phrasing is a bit strange. Risk management, incl. a DDS, is an elelement of drought management, which in this case can be used both in the operational and strategic mode. We also support the conclusion that „....individual elements of drought risk management scheme refer to: monitoring network, drought indicators, drought hazard assessment, drought early warning, drought prediction, impact assessment and risk assessment".* 8. Next, there is an obvious error that reference is made to the 10 step guidelines for preparation of the DMP (mentioned in the original WMO/GWP Guidelines), instead of 7 steps as proposed in Act. 2.1. But it is correct that *„planning process of preparation DSS for drought risk management in Activity 5.4 mainly relate to Step 4 „Produce,update the drought management plan",* but this Step makes not much reference to risk assessment and management (see, for example, Fig. 7 in Guidelines Act. 2.1). This is just one example

	that better integration of Act. 5.4 and Act. 2.1 would have been desirable. *9.* Item 7 of FAR says that *"final outputs of activity 5.4 provide useful guidance for the countries involved in the project in integrating drought risk management concepts and practices into development of planning and programme frameworks. Cooperation among project participants highlighted the importance of consolidating national and local experiences to inform and guide future cooperation processes in a systematic and integrated manner. The obtained results shall be continuously reviewed with partners and stakeholders through various knowledge-sharing mechanisms, and revised to respond to changing circumstances."* This is very much true and could be also stressed in Activity 2.1 (i.e. compilation a drought management plan should be dynamic with feedbacks and it is never done). *10.* Under item 4 about the implementation process of Milestone 3.2 it is not mentioned, why was it reported separately much earlier than Milestone 3.1? They were both proposed as parts of Output 3. Since Outputs 1, 2 and Milestone 3.1 were assesed and accepted earlier, the following observations refer to Milestone 3.2 only – „Recommendations for operational support system in drought risk management". The mutual relations of all these Outputs and Milestones are obvious but the PRG suggest that the Activity Team integrate these Outputs and Milestones into one properly edited product under the title „Drought Risk Management Scheme: a Decision Support System" (integrated paper). 1. Following Section 1 „Introduction", the Milestone 3.2 report (part of Output 3), is organized into 4 sections on institutional framework, framework for drought risk assessment, framework for drought prevention measures, and framework on decision support tools. This part of the Milestone 3.2 report closes with Section 6 „Conclusions". The next Section 7 „Recommendations for operational support system in drought risk management for agriculture in Poland" looks rather as an appendix, which together with sub-section 7.1 „Actions and measures for drought mitigation" does not fit the Milestone 3.2 (why all of a sudden, without any explanation, the last report in the activity closes with some information about one of the three partner countries, i.e. Poland without providing information about Lithuania and Romania?). 2. The drought management scheme, which is presented in Figure 1, provides a logic sequence, except the step „Drought prediction". This should have been left out for drought management in the operational mode (ongoing, upcoming drought). It needs to be introduced in the strategic mode (future drought) and it should replace step 1 Monitoring network. 3. Section 2 is about the Institutional framework and it is odd that here no reference is made to Step 1 and 2 of Act. 2.1: Guidelines for Drought Management Plans, which also deal with this topic. 4. The purpose of Output 3 is explained in Section 6 Conclusions as: *„to present a basic roadmap for integrating, developing and planning drought risk management tools at different levels, based on best practices, lessons learned and experiences introduced by project partners. The framework for drought risk management scheme was established on four components: institutional, methodological, public and operational"* corresponding to the section titles. Referring to the last paragraph of Section 6, the PRG agrees that *„this document will provide useful guidance for the countries involved in the project in intgrating drought risk management concepts and practice into development of planning and pogramme*

	frameworks. Development of planning and programme frameworks are discussed in IDMP CEE under Activity 2.1 and some parts of Milestone 3.2 could be well used there.
Detailed comments	- The Milestone 3.2 (Output 3) report, as well as Output 1 and 2 reports are written in fairly good English what is important considering the possibility of editing and joining three outputs into one integrated paper.

Annex 7A Act. 5.5 Policy oriented study on remote sensing agricultural drought monitoring methods

Assessment Peer Review Group (PRG)	15 May 2015
Status	**FINAL/JK/HvL**
Activity	**5.5. Policy oriented study on remote sensing agricultural drought monitoring methods**
	Final Activity Report
Activity lead	Prof . Janos Tamas (Hungary)
Nature	The Activity 5.5 is a case study undertaken by three partners from Hungary, Slovakia and Romania, focusing on identification of agricultural drought characteristics and development of a monitoring method (with application of multi-spectral remote sensing data MODIS NDVI) allowing for early warning of drought, before irreversible yield loss and/or crop quality degradation occur. The study area was the Tisza River Basin located in Central Europe within the Carpathian Basin. It was carried out for several different agricultural land uses and water management practices both for rainfed and irrigated systems for the most important crops– in the region (wheat and maize). With the spatial decision support system developed within the framework of the project, the farmers and/or specialized extension services can diagnose drought effects 4 to 6 weeks earlier than before and delineate them more accurately, what is the vital information for global food security and trade. Providing that some mitigation measures and preparedness are in place, such information delivered to farmers and decision makers timely and in an appropriate format can substantially reduce drought impacts. The decision system and related methodology can be applied in other parts of the world, providing country specific data are available and entered into the system.
Received	The PRG was in close contact with the Activity Leader throughout the whole duration of the activity, which lasted from the beginning of 2014 till April 2015. - Final Activity Report: received 19 March 2015 - Revised Milestone 3 / Output 3 Report (two versions: (i) with Track/Change), and (ii) clean version with all revisions accepted, which we received 19 March 2015 - Revised Milestone 3 Progress Report with Track/Change): received 19 March 2015 - Response to our PRG assessment (27.02.20150: received 19 March 2015.
General observations	**Accepted** The PRG compliments the Activity Team with the achieved outcome: i.e. a decision support system for drought monitoring based upon remote sensing and GIS data tools for agricultural drought monitoring and yield loss forecast. This was an innovative task carried out smoothly in collaboration with experts from three participating GWP CEE countries. The work progress was satisfactory during the whole duration of the activity. The PRG appreciated very much that all revisions as response to our PRG assessment (27.02.2015) were clearly marked in the text, and that Activity Team agrees with: (i) the DSS is not meant as guideline for National Governments, (ii) links with other IDMP CEE Activities (2.1, 5.1 and 5.6), and (iii) a more precise description of the role of the Python script (although not

	included in the final version). PRG observed that the substantially revised version of Milestone 3 / Output 3 Report still cannot be treated as a Final Report of all three Outputs of Act.5.5 (was not requested in the Activity 5.1 List). An integrated Act. 5.5 report should make reference to the important work done under Output 1 „Green and Brown water resources on watersheds" and more attention should be paid to Output 2 „Signalling and intervention levels of drought based on remote sensing data sets" (Section 2 of current Output 3 report is not enough). The PRG would like, however, Section 4 of the current Output 3 Report as a last chapter of an integrated Act. 5.5 Report. As said in our previous PRG assessment (27.02.2015), we encourage publication of the outcome of this activity (i.e. an integrated report). However, we are happy to be informed that results have been presented at the General Assembly of the European Geophysical Union (EGU2015), in Vienna, Austria (April 2015) and that a manuscript is under review in the peer-reviewed journal Remote Sensing of the Environment.
Detailed comments	None, although the PRG recommends proofreading by a native speaker if the Milestone 3 Report will be available in the public domain.

Annex 7B Act. 5.5 Policy oriented study on remote sensing agricultural drought monitoring methods

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Response to the Assessment Peer Review Group (PRG) (27. February 2015)	04. March 2014.
Activity	**Act. 5.5 Policy oriented study on remote sensing agricultural drought monitoring methods**
	Milestone 3/Output 3: Integration of RS and GIS tools and intervention levels into drought monitoring
Activity leader	János Tamás, Hungary
PRG group	Confusion of Output – Milestone
Activity leader	We agree, that Output – Milestone is confusing. According to the agreement we should deliver 3 output, though milestone report were asked from the project management. The first two is treated as outputs, published on the webpage of GWP. It is not clear for us if this 3 milestone report should have been the output (with public publishing), or the output should be the final report of the activity?
PRG group	Under "Type of output" you have described there "Guidelines for national governments and local stakeholders to integrate the drought monitoring and intervention levels into national flood and drought protection plans, in application of signalling and intervention levels for farmers". We do not believe that the current version of Output 3 addresses guidelines for the national governments.
Activity leader	We agree, this activity do not support as a guideline for the national government
PRG group	links with other IDMP CEE activities, e.g. Act. 2.1, 5.1 and 5.6 is missing.
Activity leader	added, corrected
PRG group	The Output 3 report needs some editing work and better connection should be made to the work done under two earlier outputs and Chapters 2-4 start with too general information. The place of the text at the end of Chapter 3 and Chapter needs reconsideration. The introduction (page 9) is very general. The first three paragraphs in Page 15 are of introductory character and should rather be presented in introduction to the whole Activity 5.5. The first three paragraphs in Page 15 are of introductory character and should rather be presented in introduction to the whole Activity 5.5.
Activity leader	Accepted, corrected
PRG group	Agricultural Drought Monitoring and Yield Loss Forecasting Method (ADM_YLFM; the use of capital letters is suggested)
Activity leader	accepted, corrected
PRG group	the PRG suggest that the Activity 5.5 team makes special effort to present this method as core in a final synthesis report in the best possible way.
Activity leader	We submitted a publication to Remote Sensing of Environment with the title of „Agricultural drought risk monitoring and yield loss prediction on watersheds". It is under review.
PRG group	With RS you can well map current conditions, but to take it into future you need forecasting methods (kind of modeling approach). This is still not well explained.
Activity leader	The threshold levels was determined based on the linear regression between the yield and NDVI values. Then the regression model were used to determine NDVI threshold, based on the threshold of the yield loss. For example, average wheat yield was set to 3.9 t/ha (Csajbók, 2012). Above this we do

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	not have yield loss. This yield was than put into the regression model, and the NDVI threshold was calculated Therefore the threshold between no yield loss and "Watch" is 0.67. (for June). – Inserted to the report
PRG group	At the end of the introductory section, it would be useful to refer to the related work already done under Milestone 2.
Activity leader	accepted, corrected
PRG group	Chapter 2 (6.5 pages) is concerned with the effects of agricultural droughts (yield loss) and their economic effects (it would probably be better "economic costs").
Activity leader	accepted, corrected
PRG group	It should be made clear in the report that this section of Output 3 is continuation of Chapter 5 in Output 2.
Activity leader	accepted, corrected
PRG group	the Python script given as an Annex 2 to Milestone 3 report requires Python to be installed, which is not available to everybody. Furthermore Python scripts only are understood by experts in programming.
Activity leader	Accepted, and cleared. But python script is very useful for decision makers, if they use (widespreadly applied) ArcGIS software for analysis. This scrip is a kind of definition of Agricultural Drought Monitoring and Yield Loss Forecasting Method indicating the input files, which are described in the Figure 8. model.
PRG group	the yield loss mapping process (model) presented in Fig. 8 is not adequately described.
Activity leader	accepted, corrected
PRG group	The following discussion in pages 12 and 13 (4 bullets) is speaking about the "model" (see 2nd bullet), is it the model shown in Fig. 8?
Activity leader	Yes it refers to Agricultural Drought Monitoring and Yield Loss Forecasting Method
PRG group	The text presented in pages 13 (after the last bullet) and 14 (four bullets beginning the page and another four bullets in the summary) sounds like the end of Output 3 (look at the title). But we still have Chapter 4, which partially also sound as a closure of the whole Output 3 report.
Activity leader	accepted, editing was made
PRG group	The 3.5 pages long Chapter 4 is on possible integration of Agricultural Drought Monitoring and Yield Loss Forecasting method, with drought management plans (planning in general or with Activity 2.1?).
Activity leader	Planning in general
PRG group	The diagrams of Annex 1 on changes of wheat and maize yields andprices could well be shown in the text of the report (Chapter 2).
Activity leader	accepted, corrected
PRG group	-Page 1, 3rd line: "…. than they" rephrase; Page 1, 2nd para, line 2: "forecast able" replace with "forecastable";
Activity leader	corrected
PRG group	- Page 1, 2nd para, line 2: not so obvious that soil moisture data are available on the watershed scale. What do you mean with "plant moisture" (difference between fresh and dry weight)?

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Activity leader	accepted, point source soil moisture data are available on areas of several watershed, but not watershed scale; plant moisture refers to water supply of plants. - corrected
PRG group	- Page 1, 2nd para, line 8: refer to Act. 5.1;
Activity leader	accepted, and added
PRG group	- Page 1, 2nd para, line 15: we miss soil texture in addition to stratification and soil structure;
Activity leader	corrected
PRG group	- Page 1, 3rd para, line 7: "....important water reserve facilities concerning...."; what do you mean "water reserve facilities"?
Activity leader	reserve refers to retention - deleted
PRG group	- Page 2, para 3: present tense and past tense are mixed. The end of Chapter 1 should provide an outlook what will come in the report and hence it should be in the present tense. For instance, "recommended" (line 2) should be "recommend" or "gives a recommendation";
Activity leader	accepted, corrected
PRG group	- Page 6, last bullet point: "Export Markets: Export..."; no need for all these capitals. It should read: "Export markets: export...";
Activity leader	corrected
PRG group	- Page 7, line 2: "....and in Costumer Countries, Domestic destination would be more emphasized," no need for all these capitals. It should read: "....and in costumer countries, domestic destination would be more emphasized,";
Activity leader	accepted, corrected
PRG group	- Page 7, last bullet point, line 2: "freshwater" should be "fresh water";
Activity leader	accepted, corrected
PRG group	- Page 8, Figure 6: maps need to be in a higher resolution (current version: vague);
Activity leader	Unfortunately, those maps are not available in higher resolution, since they are clipped from world scale maps. We made smaller size or they may be cleared.
PRG group	- Page 8, figure caption: "Net exporters are shown in green and net importers in red. (Mekkonen and Hoekstra, 2011)" remove full stop after "red";
Activity leader	corrected
PRG group	- Page 8, figure caption: "(based on FAOSTAT data)" this needs to be more precise, e.g. year;
Activity leader	corrected
PRG group	- Page 8, 1st para: "few weeks delay would result that the maize has not reached the early grain filling stage to the drought period (mid-July) yet, but still was before flowering" we do

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	not believe that the term "drought" has been used here in the correct way. It seems that every year around mid-July a drought would occur, which is a bit strange that there is every year a drought around this time. The dry period around mid-July seems to be a normal feature of the climate;
Activity leader	accepted, corrected
PRG group	- Page 8, 2nd para: I miss references
Activity leader	Pepó and Sárvári, 2011 refers to the whole paragraph.
PRG group	- Page 8, last but one para, last line: wrong use of the term "drought". Is this due to climate variability?
Activity leader	Drought is good term, since it refers, that drought can appear at the crucial vegetation states of FAO 400 maize. It is corrected in the text.
PRG group	- Page 9, heading: the word "process" makes it unclear. Do you mean "development"?
Activity leader	accepted, corrected
PRG group	- Page 9, Chapter 3, 2nd paragraph, line 8: " and issuing yield forecasts at a range of spatial scales ". Add "allow". " and allow issuing yield forecasts at a range of spatial scales ". RS itself does not issue forecasting, but the data from do ("allow");
Activity leader	accepted, corrected
PRG group	- Page 9, 2nd line bottom: "EDO data" is insufficient for reader to know what you mean. Add reference or web link. You also need to add "simulated soil water anomaly";
Activity leader	reference added
PRG group	- Page 10, last line: "In contrast to conventional agricultural drought indexing methods, agricultural drought monitoring and yield loss forecast" bit confusing. Do you mean: "In contrast, conventional agricultural drought indexing methods, agricultural drought monitoring and yield loss forecast based on RS"?
Activity leader	This should emphasize, that our method is non point source data based method, but RS, with a certain spatial resolution.
PRG group	- Page 11, 2nd line: "....were formulated with calibrating of the important crops and fruits (wheat, corn) which are..." examples read a bit strange. You expect an example of fruit between the brackets;
Activity leader	corrected
PRG group	- Page 11, 2nd para, line 2: "....model (Figure 8.) and Python script (Annex 2.) were generated..", no full stop after the numbers of figures and tables. For example, "...model (Figure 8) and Python script (Annex 2) were generated...". This to more cases in the report;
Activity leader	corrected
PRG group	- Figure 11, caption: "Figure 8. The final model for creating yield loss map" revise: in "Figure 8. The final model for creating the yield loss map.";
Activity leader	corrected

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PRG group	- Page 12, Table 2, last column: the larger than sign should be >40%, >2.8 and >1.6;
Activity leader	corrected
PRG group	- Page 13, second bullet point, line 3: " regime map (developed in Output 2, chapter 6.) those sites.." should be " regime map (developed in Output 2, Chapter 6) those sites...";
Activity leader	corrected
PRG group	- Page 13, 1st para, line 8: "40 %" should be "40%", no space.
Activity leader	corrected

Annex 7C Act. 5.5 Policy oriented study on remote sensing agricultural drought monitoring methods

Assessment Peer Review Group (PRG)	27.02.2015
Status	**FINAL/JK/HvL**
Activity	**5.5. Policy oriented study on remote sensing agricultural drought monitoring methods**
	Milestone 3/Output 3. Integration of RS and GIS tools and intervention levels into drought monitoring
Activity lead	Prof.dr. Janos Tamas (Hungary)
Nature	The Activity 5.5 is a study undertaken by three partners from Hungary, Slovakia and Romania, focusing on identification of agricultural drought characteristics and development of a monitoring method allowing for early warning of drought (with application of remote sensing data), before irreversible yield loss and/or crop quality degradation occur. The spatially-oriented decision support system to be developed will help farmers to reduce drought risk by plant specific calibrated drought indexes. It will produce drought maps and allows risk evaluation. This methodology will be ready to be applied in other CEE countries when country specific data are available and entered into the system. The study has three important outputs (milestones), which correspond and relate each other in hierarchical way.
	29 January 2015
General observations	**Accepted with minor revision** The package that was sent to the PRG contained the Milestone 3 progress report, together with the Output 3 report "Integration of RS and GIS tools and intervention levels into drought monitoring system" The Activity has been complemented with the series of three Outputs that eventually shall lead to a monitoring method using remote sensing data, which can be used for a spatially-distributed early warning of agricultural drought. One to two months before the harvest the crop yield loss at the end of the growing season can be forecasted. Our first observation is that the whole Activity 5.5, however, has a strange structure. The three documents that build upon each other are Outputs, which means that these are final products and that these are/will become available on the public website. However, the Outputs are also called Milestones. Usually Milestones are stepping stones towards a finally deliverable, i.e. in IDMP terminology an Output. This is confusing. Actually, a Milestone cannot be an Output. It is one of the two, and the Output is much more important. The use of Milestones and Outputs as synonyms is odd and makes it very confusing. It appears that the final outcome of Act. 5.5 are three reports that need to be read in a row, where the last one describes the integration of components into a drought monitoring system. We wonder, if a reader of Output 3 will understand the link with the previous two Outputs. These are well described in the Milestone 3 Progress Report, which however, will not be available to the general public. The PRG cannot blame the Activity Team for this, because the Activity List has been accepted in an early phase of the project. The team followed the approved Activity List and worked accordingly, which has to be accepted.

	Output 3, which is addressed in this PRG assessment, focuses on the impact of agricultural droughts on wheat and maize (yield loss) and their economic effects (Chapter 1), the process of MODIS NDVI based agricultural drought monitoring and yield loss forecasting method (Chapter 2), and possible integration practices of drought monitoring signalling and intervention levels to drought management plans (Chapter 3). Output 3 report is a continuation of Output 2 report, especially its Chapter 5 on "Identification of remote sensing based drought monitoring and intervention levels". **Comments on Milestone 3 report (progress)** As background of the whole Activity 5.5, under item 2.1 a short summary of the Milestone (progress) report is presented. The progress to the objectives of this activity (item 2.2) and the expected final output (item 2.3) are well described. Links with other IDMP CEE activities are well elaborated in the progress report (item 2.5). Under item 2.4 the Activity Team describes that there are no deviations from the original plan mentioned in the Activity Lists. Under "Type of output" you have described there "Guidelines for national governments and local stakeholders to integrate the drought monitoring and intervention levels into national flood and drought protection plans, in application of signalling and intervention levels for farmers". We do not believe that the current version of Output 3 addresses guidelines for the national governments. It seems to be impossible to reach both groups with the same document. However, we do not believe that Act. 5.5 should do this. If the Activity Team describes clear links with Act. 2.2, 5.4 and. 7.1 in the final version of Output 3 report then this part will be well covered. **Comments on Output 3 report** The structure of Output 3 report needs some revision. Among other the links with other IDMP CEE activities, e.g. Act. 2.1, 5.1 and 5.6 is missing. The Output 3 report needs some editing work and better connection should be made to the work done under two earlier outputs and Chapters 2-4 start with too general information. The place of the text at the end of Chapter 3 and Chapter needs reconsideration. To summarize it should be made more clear that the Agricultural Drought Monitoring and Yield Loss Forecasting Method (ADM_YLFM; the use of capital letters is suggested) developed by the Activity 5.5 team, is very attractive and sounds very useful – the PRG suggest that the Activity 5.5 team makes special effort to present this method as core in a final synthesis report in the best possible way. The report (21 pages) contains 4 chapters, references and 2 annexes. In the 2nd PRG report the point was raised that the Activity Team at several places describes that the methodology will also be developed for drought forecasting. The PRG does not understand how with remote sensing data only, drought or yield forecasts can be made. With RS you can well map current conditions, but to take it into future you need forecasting methods (kind of modeling approach). This is still not well explained. The PRG anticipates that the state of the crop reflected by the normalized NDVI for wheat in June and maize in the period mid-July-August is representative for the crop yield loss over the whole growing season (application of regression). This is not well explained in the current Output 3, nor in the previous two Outputs. The description of the forecasting approach is a hidden on several places (Output 2, pages 13-15; Output 3, page 12 and 3rd bullet point, page 14). The Activity Team needs to realize that readers might have another expectation of forecasting. For example, that you every week or 10 days monitor the NDVI and based on this a forecast will be made for the next week or 10 days (similar to weekly/10-day weather forecasting).

	Introductory Chapter 1 (1.5 page) begins with a good discussion of drought impacts, focusing on a shortage of information concerning soil water and plant moisture contents. Such information is of crucial importance for forecasting and assessment of agricultural droughts in watershed and regional scales. Those hydro-physical characteristics are the basic indicators of the soil sensitivity to drought. Next, the point is made about economics of drought risk reduction. To achieve this reduction, the first action is to improve drought forecasting and early warning system. But the expenditures related to such improvements must always be analysed and balanced with benefits accruing from the increase of crop yields and improvements in the area of food safety and human security. Next, impact of drought on yields and prices of wheat and maize, which are taken as the most representative crops in the region studied, are considered. At the end of the introductory section, it would be useful to refer to the related work already done under Milestone 2. It is a bit strange that in such chapter with a lot of good background information references are very limited (only 2 references). These could increase credibility of the mandate to work on agriculture drought monitoring and forecasting. Although, there is good information in this chapter, you may wonder how much duplication there is in the several CEE IDMP Outputs when the generic aspects of drought are described like in this chapter. Chapter 2 (6.5 pages) is concerned with the effects of agricultural droughts (yield loss) and their economic effects (it would probably be better "economic costs"). The chapter begins with a historic overview (2004-2014) of the development of the grain market, including a good discussion of regulatory and structural changes in the grain and maize markets. There is a long list of other factors in the report influencing crop prices: growing population, strength of national economies and stock changes are just a few to be mentioned here in the assessment. The conclusion is rather obvious that attributing significance to only one factor deciding on crop prices is impossible. Chapter 3 (6 pages) is on the importance and advantages of the process already introduced in Milestone 2 (especially Chapter 5). The introduction (page 9) is very general. It should be made clear in the report that this section of Output 3 is continuation of Chapter 5 in Output 2. The first two pages of Chapter 3 (pages 9 and 10), are discussing the RS data that have several advantages over meteorological observations for crop yield forecasts. They provide timely, accurate and objective evaluation of crop growing conditions and allow to make yield loss forecast at different spatial scales. On page 11, where reference is made to the Milestone 2 report, there is the information that "a user friendly drought monitoring and yield loss mapping process model (Figure 8) and Python script (Annex 2) were generated to make it possible for yield forecasting of other users in ArcGIS environment." This reference is not clear. First, the Python script given as an Annex 2 to Milestone 3 report requires Python to be installed, which is not available to everybody. Furthermore Python scripts only are understood by experts in programming. Hence, Annex 2 needs to be better explained, and if not feasible, it can also be deleted. Second, the yield loss mapping process (model) presented in Fig. 8 is not adequately described. The purpose of NDVI threshold reclassification shown in Table 2 in page 12 of Milestone 3, based on Table 2 of Milestone 2 report, is not adequately explained (actually, this seems to be the yield loss forecasting method, see general remark on the Output 3 report, page 2 of this PRG assessment). The following discussion in pages 12 and 13 (4 bullets) is difficult to read (references to Outputs 1 and 2); speaking about the "model" (see 2nd bullet), is it the model shown in Fig. 8? The text presented in pages 13 (after the last bullet) and 14 (four bullets beginning the page and another four bullets in the summary) sounds like the end of Output 3 (look at the title). But we still have Chapter 4, which partially also sound as a closure of the whole Output 3 report. Some editing work is required. The positive point is that the Activity Team explains why the NDVI is used rather than fAPAR (Fraction of Absorbed Photosynthetic Solar Radiation, which is known to be

	also strongly related to water stress and has been selected by the JRC EDO (this was requested by the PRG in the previous assessments). The 3.5 pages long Chapter 4 is on possible integration of Agricultural Drought Monitoring and Yield Loss Forecasting method, with drought management plans (planning in general or with Activity 2.1?). The first three paragraphs in Page 15 are of introductory character and should rather be presented in introduction to the whole Activity 5.5. Same applies to the bullets in page 16 on drought monitoring, which should also be presented much earlier. The remaining part of this section still has not much to do with integration of the method (methodology?) developed by Activity 5.5 team with drought management plans. Actually, the Chapters 2-4 all suffer from a too general introduction. The structure of Output 3 needs to be reconsidered. The text needs more focus, i.e. the Agricultural Drought Monitoring and Yield Loss Forecasting Method (ADM_YLFM) should be the core. In the current version too much additional information is provided, or at least it is on places where you do not expect this as a reader. Hence, the ADM_YLFM is hidden and a bit lost. Concerning the annexes, the diagrams of Annex 1 on changes of wheat and maize yields and prices could well be shown in the text of the report (Chapter 2). Annex 2 on the Python script for yield loss forecast mapping is already commented upon.
Detailed comments[6]	The editorial and generic aspects of more detailed comments are mentioned above. The English language is quite good and not much more than a normal computer checking is needed. Clearly, if a native speaker would be available, it would the readability of the report. - Page 1, 3rd line: "…. than they" rephrase; Page 1, 2nd para, line 2: "forecast able" replace with "forecastable"; - Page 1, 2nd para, line 2: not so obvious that soil moisture data are available on the watershed scale. What do you mean with "plant moisture" (difference between fresh and dry weight)? - Page 1, 2nd para, line 8: refer to Act. 5.1; - Page 1, 2nd para, line 15: we miss soil texture in addition to stratification and soil structure; - Page 1, 3rd para, line 7: "….important water reserve facilities concerning…."; what do you mean "water reserve facilities"? - Page 2, para 3: present tense and past tense are mixed. The end of Chapter 1 should provide an outlook what will come in the report and hence it should be in the present tense. For instance, "recommended" (line 2) should be "recommend" or "gives a recommendation"; - Page 6, last bullet point: "Export Markets: Export…"; no need for all these capitals. It should read: "Export markets: export…"; - Page 7, line 2: "….and in Costumer Countries, Domestic destination would be more emphasized," no need for all these capitals. It should read: "….and in costumer countries, domestic destination would be more emphasized,"; - Page 7, last bullet point, line 2: "freshwater" should be "fresh water"; - Page 8, Figure 6: maps need to be in a higher resolution (current version: vague); - Page 8, figure caption: "Net exporters are shown in green and net importers in red. (Mekkonen and Hoekstra, 2011)" remove full stop after "red"; - Page 8, figure caption: "(based on FAOSTAT data)" this needs to be more precise, e.g. year; - Page 8, 1st para: "few weeks delay would result that the maize has not reached the early grain filling stage to the drought period (mid-July) yet, but still was before flowering" we do not believe that the term "drought" has been used here in the correct way. It seems that every year around mid-July a drought would occur, which is a bit strange that there is every year a drought around this time. The dry period around mid-July seems to be a normal

[6] The list with detailed comments is any way not supposed to be complete. Just the comments we found when we quickly reading the text.

	feature of the climate; - Page 8, 2nd para: I miss references, i.e. frequency has increased and the nutrient supply has decreased; - Page 8, last but one para, last line: wrong use of the term “drought”. Is this due to climate variability? - Page 9, heading: the word “process” makes it unclear. Do you mean “development”? - Page 9, Chapter 3, 2nd paragraph, line 8: “ and issuing yield forecasts at a range of spatial scales “. Add “allow”. “ and allow issuing yield forecasts at a range of spatial scales “. RS itself does not issue forecasting, but the data from do (“allow”); - Page 9, 2nd line bottom: “EDO data” is insufficient for reader to know what you mean. Add reference or web link. You also need to add “simulated soil water anomaly”; - Page 10, last line: “In contrast to conventional agricultural drought indexing methods, agricultural drought monitoring and yield loss forecast” bit confusing. Do you mean: “In contrast, conventional agricultural drought indexing methods, agricultural drought monitoring and yield loss forecast based on RS”? - Page 11, 2nd line: “....were formulated with calibrating of the important crops and fruits (wheat, corn) which are...” examples read a bit strange. You expect an example of fruit between the brackets; - Page 11, 2nd para, line 2: “....model (Figure 8.) and Python script (Annex 2.) were generated..”, no full stop after the numbers of figures and tables. For example, “...model (Figure 8) and Python script (Annex 2) were generated...”. This to more cases in the report; - Figure 11, caption: “Figure 8. The final model for creating yield loss map” revise: in “Figure 8. The final model for creating the yield loss map.”; - Page 12, Table 2, last column: the larger than sign should be >40%, >2.8 and >1.6; - Page 13, second bullet point, line 3: “ regime map (developed in Output 2, chapter 6.) those sites..” should be “ regime map (developed in Output 2, Chapter 6) those sites..”; - Page 13, 1st para, line 8: “40 %” should be “40%”, no space.

Annex 8A Act. 5.6 Upgrading agricultural drought monitoring and forecasting: the case of Ukraine and Moldova

Assessment Peer Review Group (PRG)	8 June 2015
Status	**FINAL**
Activity	**5.6. Upgrading agricultural drought monitoring and forecasting: the case of Ukraine and Moldova**
	Final Activity Report - **Milestone 4: Ukraine: Upgrading of forecasting models for identification of crop yield losses caused by droughts (Output 3a)** - **Milestone 4: Moldova: Development of proposals for the precipitation harvesting and practices for moisture conservation in agricultural lands (Output 3b)** - **Reply to PRG Comments**
Activity lead	Anna Tsvietkova (GWP Ukraine) and Ecaterina Kuharuk (Moldova)
Nature	Ukraine is one of the main producers of grain on the world market. Annual crop losses due to extreme weather conditions in Ukraine, mostly droughts, are in the range of hundreds of million Euros. Upgrading agricultural drought monitoring and forecasting in the Ukraine and adjacent Moldova is a necessity, which should consider climate zonation and drought risk areas in Ukraine and the shared Moldova-Ukraine Dniester River Basin. The existing agro-climatic zonation is based on the meteorological observations from the period 1956-1985, which cannot be assumed to be representative for current conditions. Additionally, trends in changes of soil water holding capacities as a function of erosion that is driven by agricultural crop patterns and slope inclinations are needed to be studied. The Activity List also foresees in development of forecasting models for identification of crop yield losses caused by droughts. Possible mitigation measures for the agricultural sector to adapt to negative drought effects are studied. Another important project purpose is raising drought-related awareness of stakeholders and policy makers in water management and agriculture areas.
Received	Final version of Final Activity Report (FAR): 24 April (1st version); 18 May (2nd version) PRG was asked to wait assessing the 1st version until the Milestone 4 Report was submitted. The 2nd version appeared to be identical to the previously submitted document. On 18 May 2015 (together with the 2nd FAR version), PRG received: - Milestone 4 (Output 3a) - Milestone 4 (Output 3b) - Reply to PRG Assessment (13 April 2015).
General observations	**Accepted with minor (editorial) comments** The work progress and discussions with the PRG were acceptable during the whole duration of the activity. Some problems remained unsolved because of the special political situation in both countries. The PRG accepts the work done by the Activity Team according to the Activity List updated in October 2014. The way Activity 5.6 was organized in outputs, steps and milestones, which were

	revised during the project, made it very hard to assess the different outcomes. For example, the reaction of the Activity Team to the PRG assessment (13 April 2015) concerning (Outputs 3a, 3b and 5) was not fully understandable at first. The Activity Team should assist the PRG better in providing more information on what the document is about. It appeared to refer to the PRG's Detailed comments, but it had more the nature of unfinished working document (e.g yellow-highlighted text at the end of the 2-page document. The Activity was reconsidered based on the Self-Study Overview prepared by the Activity Leaders from UA and MD, and a meeting in October 2014 (Budapest) with the Programme Manager and the PRG. They all realized that the situation in both countries is very difficult because of the war in the Eastern Ukraine, which started in May 2014, and hence coordination of the activity is difficult and challenging. In light of the situation it was agreed to update the original Activity List. First Outputs 1 and 2 were retained as planned in the original Activity List. Next it was decided to restrict the following study to two main crops (i.e. winter wheat and spring barley) and not to work on a new, not yet identified crop. The final phase of the Act. 5.6 was planned as follows: **Milestone 3** – report on "Review climate-zoning and mapping of drought risk areas in Ukraine and Dniester river basin" (Step 3). The report also included information on Steps 4 and 6. PRG has assessed Milestone 3 (16 December 2014), which is included in the 2nd PRG Report; **Milestone 4** – delivery: end of 2014 – Output 3a (1st UA model) & Output 3b (MD) and Output 4 – Remedial measures for the agro-sector to mitigate negative effects of the drought; **Milestone 5** – planned delivery: 15 March 2015 – Output 3a (2nd UA model) & Output 5 – joint UA/MD workshops for the decision makers and other dissemination activities. Despite the difficult working conditions the Activity Team achieved substantial output: (i) updated agro-climate zoning of the Ukraine and the shared Moldova-Ukraine Dniester river basin, (ii) drought risk maps showing sensitive areas, (iii) models to forecast drought-related yield loss for major crops (winter wheat and barley), and (iv) guidance good practices of soil moisture conservation in (Moldova) and on crop-drought management (Ukraine). **Final Activity Report (FAR)** • PRG supports the Activity Team' conclusion that outcome partly belongs to operational (actual drought information, forecast crop yield losses) and to strategic (agro-climatic zonation under future climate) (item 2).Indeed the work contributes to DMP activities: (i) characterisation and evaluation of historical drought events (186 stations, 1961-2014; 20 stations in shared Driester River Basin), (ii) establishment drought indicators and thresholds for classification, (iii) establish drought early warning system, and (iv) development programme of measures (item 2). • The Activity output is well described (item 5) and seems to have generated exploitable knowledge (added value) beyond the IDMP CEE project (e.g. SPI as drought indicator and agro-climatic zones). • MD seems to have established good contacts with stakeholders (local authorities, farmers), which is a major step forward in adequate land and water management (erosion control) that includes drought management. • PRG is pleased to read the self-reflection: i.e. coordination of joint UA and MD activities (reporting, workshops) could have been better. This lesson learnt is important for future joint activities. **Milestone 4: Ukraine: Upgrading of forecasting models for identification of crop yield losses caused by droughts (for two crops).** The updated report has a different structure than the Output 3a report assessed before by the

	PRG (3 sections instead of 5). In addition, the PRG assessment was referring to the page numbers of the former text – the pages of new (updated) text of the report are not numbered at all. PRG did not assess this part of the revised Milestone Report again, because it was agreed that revisions had to be marked. Generally it looks that the updated text has included all comments made by PRG. This part of the Milestone Report has a very technical nature (formal model description, input data). It is meant for a small group of technical experts. **Milestone 4: Moldova: Development of proposals for the precipitation harvesting and practices for moisture conservation in agricultural lands (Output 3b).** In the updated report, all changes suggested by the PRG were accepted by the Activity team and marked on the original text. The work done by the Moldavian Activity Team is accepted although numbering of pages would improve future use of the document (e.g. reference to certain findings). **Reply to PRG Comments from 13 April, Date 17 April 2015.** The 2 pages long reply has no proper title and only from the text can be seen that this reply is referring to both Output 3a (Ukraine) and Output 3b (Moldova) reports (see also comment above). The replies are referring to the original page numbers what in case of Output 3a report is not acceptable (see above comment about Output 3a report).
Detailed comments	

Annex 8B Act. 5.6 Upgrading agricultural drought monitoring and forecasting: the case of Ukraine and Moldova

Reply to PRG Comments from 13 April

Date: 17 April 2015 (PRG received 18 May 2015)

Detailed comments:

- *Milestone 4 Ukraine, Page 3, bullet point 9: why starts SPI not earlier than 2014 for historic, analysis and model development? You have historic precipitation;*

SPI was not known and introduced in the assessment of hydrometeorological (HM) data till 2014. Thanks to the participation of Ukrainian HydrometCentr expert in the IDMP SPI was tested firstly for the historical analysis and than it has been used for the analysis and model development.

- *Milestone 4 Ukraine, Page 3, 2 lines above table: "10-days stepping" rephrase: "10-day Steps"*

incorporated

- *Milestone 4 Ukraine, Page 3, Table: caption (i.e. title) required explaining the content of the Table*

accepted and incorporated;

- *Milestone 4 Ukraine, Page 4, first lines: "The droughts warning system incudes...." strong point!!*

accepted and info was detailed see the M4 edited text;

- *Milestone 4 Ukraine, Page 4, Section 3.1: why is the Bova's aridity coefficient not in list Section 2?*

accepted and incorporated in previous chapter ;

- *Milestone 4 Ukraine, Page 4, Section 3.1: Bova's aridity coefficient; add reference;*

reference included into the Reference list at the end of the M4;

- *Milestone 4 Ukraine, Page 4 and following: equation should have numbers. It is easier to refer to*

accepted and incorporated

- *Milestone 4 Ukraine, Page 4, 4th line bottom above equations: the ones proposed by M.S. Kulik and the second – by E.O. Tsuberbiller; who are these; add proper reference (e.g. year)*

reference included into the Reference list at the end of the M4;

- *Milestone 4 Ukraine, Page 5, the second decade of vegetation: strange to have the number in front of the equation. Common practice is to have the number behind the equation. Why has this equation a number and the others not?*

this is as we present in Ukraine; it is not a number of equation, it is a conditions;

- *Page 6, Thirteenth decade of vegetation: again; strange to have the number in front of the Equation*

the same explanation as we present in Ukraine; it is not a number of equation, it is a conditions;

- *Milestone 4 Ukraine, Page 8, last paragraph: "....before (tabl..1) and after (tabl..2) upgrading." rephrase ".....before (Table 1) and after (Table 2) upgrading."*

tables numeration was changed adequately, see the M4 edited.

Annex 8C Act. 5.6 Upgrading agricultural drought monitoring and forecasting: the case of Ukraine and Moldova

Assessment Peer Review **Group (PRG)**	13 April 2015
Status	**FINAL/JK/HvL**
Activity	**5.6. Upgrading agricultural drought monitoring and forecasting: the case of Ukraine and Moldova**
	Milestone 4 **Ukraine (Output 3a and 3b):** Upgrading of forecasting models for identification of winter wheat and spring barley yield losses caused by droughts; **Moldova (Output 3b):** Development of proposals for the precipitation harvesting and practices for moisture conservation in agricultural lands; **Moldova and Ukraine (Output 4):** Workshop for farmers in Moldova and Ukraine. **Milestone 5** Ukraine: Upgrading of forecasting models for identification of crop yield losses caused by droughts (for the 2nd crop)
Activity lead	Dr. Tatiana Adamenko – UkrHydroMetCentre, Ukraine Dr. Ecaterina Kuharuk – Moldavian Institute for Soil Sciences
Nature	Ukraine is one of the main producers of grain and barley on the world market. Annual crop losses due to bad weather conditions in Ukraine, mostly droughts, are in the range of hundreds of million Euros. Upgrading agricultural drought monitoring and forecasting in the Ukraine and adjacent Moldova is a necessity, which should consider a new climate zonation and drought risk areas in Ukraine and the shared Moldova-Ukraine Dniester River Basin. The existing agro-climatic zonation is based on the meteorological observations from the period 1956-1985, which cannot be assumed to be representative for current conditions. Additionally, trends in changes of soil water holding capacities as a function of erosion that is driven by agricultural crop patterns and slope inclinations are studied. The Activity List also foresees development of forecasting models for identification of winter wheat and spring barley yield losses caused by droughts. Possible mitigation measures for the agricultural sector to adapt to negative drought effects are studied. Another important project purpose is raising drought-related awareness of stakeholders and policy makers in water management and agriculture areas.
Received	22.01.2015 Milestone 4 (Outputs 3a, 3b and 4) 24.03.2015: (Milestone 5 (upgrade for 2nd crop)
General observations	**Accepted with minor revisions** The package that was sent to the PRG on 22.01.2015 contained the Milestone 4 progress report for Activity 5.6 and three annexes: Annex 1_ Output 3a and 3b report (Upgrading of forecasting models for identification of winter wheat and spring barley yield losses caused by droughts, and Annex 2_Output 3b report (Development of proposals for the precipitation harvesting and practices for moisture conservation in agricultural lands). Two reports from the workshops with farmers in Moldova and in Ukraine are mentioned, but will be submitted later (links to seminars / consultation meetings in 2014 are provided in the Milestone 4 Progress Report). On 24.03.2015 the PRG received Milestone 5 (Ukraine: Upgrading of forecasting models for identification of crop yield losses caused by droughts - for the 2nd crop). **Comments on Milestone 4 Progress Report** Under item 2.1, the report summarizes what has been done in two partner countries in the period August – December 2014 (work reported in Output 3b was done in early 2015). **The**

	Ukrainian experts have been working on upgrading the „Automatic Drought Assessment in Ukraine" forecasting model for winter wheat and spring barley harvest losses (Outputs 3a and 3b). The model allows estimating oblast-level average drought-induced reduction of crop yields (see comments about the model in Annex 1 report). For the catastrophic droughts of 2003 and 2007 when the annual losses in grain production in Ukraine exceeded Euro 3 billion, the model calculation showed 30 to 50% shortfall of winter wheat harvest, when the actual losses were in the order of 50% or even more. Concerning the spring barley harvest, the model calculations showed 30 to35% shortfall, while the actual reduction reached 35%. It is pointed out that the drought indices used in the model adequately describe the drought phenomena, but none of them alone provides a quantitative assessment (crop reduction is estimated in % only). **The Moldavian experts** have been working on development of a field research based guide for farmers on precipitation harvesting and moisture conservation in agricultural lands (see Output 3b – Annex 2 report). The draft of a guide was presented in three rural centres of Moldova: northern (Telenesti), central (Hincesti) and southern (Cahul). Those meetings were attended by more than 60 persons representing all main target groups involved in rural development in Moldova. The purpose of next item 2.2 of the Milestone 4 Progress Report is to describe work progress of towards objectives of the Act. 5.6 - Outputs 3a and 3b. Concerning work done by the **Ukrainian experts** there is only a general statement made in the progress report that the upgraded model improves the crop yield forecast in many respects - Annex 1 report is more precise in this respect and reports forecast improvements of this forecast by 2-5% for winter wheat and 5% for spring barley . This report comments also on identification of climate change trends (Milestone 2) and new agro-climatic zoning (Milestone 3). Work by the **Moldavian experts** focused on the use of new agro-zoning maps for identification of priority regions where moisture protection measures should be installed. Concerning the question at what stage Act 5.6 is now in the process of producing the final outputs (item 2.3), the Milestone 4 Progress Report states that outputs 1, 2, 3a (for one crop), 3b and 4 are all done. Only Output 3a (for the second crop) and Output 5 are to be completed in the final phase of the IDMP CEE. Links with other IDMP CEE activities (item 2.5) mention Act. 7.1, where the upgraded forecast model for crop harvest losses (Output 3a) is planned to be presented (see also comments about Output 3a (Annex 1)). Some links are also foreseen with Act. 5.1. It would also be beneficial to consider links with more activities, in particular how the monitoring and forecasting fits in the Guidelines (Act. 2.1), Natural small water retention measures (Act. 5.3), Drought Risk Management Scheme: a decision support system (Act. 5,4) and Policy oriented study on remote sensing agricultural drought monitoring methods (Act. 5.5). Under item 2.6, publication of the Guide on Moisture Conservation is reported. Information on few conferences given under item 2.7, has not much to do with the requested list and details of National Reports. **Comments on Output 3a and 3b reports, part of Milestone 4 and Milestone 5 (Ukraine: Upgrading of forecasting models for identification of winter wheat and spring barley yield losses caused by drought)** The 13 long report has 5 sections, plus list of references (22.01.2015). This report has been complemented with a 4 page report that describes the 2nd crop (24.03.2015). The reports describe an interesting empirical / conceptual approach to assess drought impacts in the Ukraine (the "Automatic Drought Assessment in Ukraine" model). The first report has a brief introductory, Section 1 that provides information on annual losses in grain production in the years 2003 and 2007 of catastrophic droughts, which exceeded 3 billion Euro. It is stressed that some regions in Western Ukraine where until recently droughts were almost never observed, now experience droughts of different intensities. A bit strange that a number of interesting and far-reaching facts are given without any reference to the literature or earlier Act. 5.6 output. Section 2 provides a list of 9 drought indicators being used in Ukraine and selected due to

	simplicity of their calculation and simultaneous reflection of both atmosphere and soil droughts. These are indicators by Selyaninov, Shashko and Prosterov (none of them is defined and described in the report, nor a reference is given), the number of days with relative humidity < 30%, the number of days with maximum temperature > 30 C, and three indicators related to soil moisture contents in soil layers 0 – 20 cm, 0 – 50 cm and 0 – 100 cm under winter, early spring and late spring crops, and SPI which is used since 2014. Threshold values of these indicators (except SPI) are given for 5 drought intensity categories: severe, heavy, medium, weak and none. In the following Section 3, drought impacts on winter wheat crop yield are assessed with application of "Automatic Drought Assessment in Ukraine" model. A brief description of the empirical model presented in Section 3.1 is not sufficient for full understanding of its structure and assumptions. The model equations for calculation of crop yield losses (page 4) are given in Russian language only. Understanding the interrelations listed in pages 5 and 6 (first, second and thirteenth decade of vegetation) require at least some guidance by the report Authors. Notation of some equations is incorrect, like e.g. C3 = C3 – 0.025 in Equation 13.1 and other similar equations. Pages 5 and 6 are more a listing of the code of a computer programme. You may wonder, if these do not fit better in an annex. There is the same problem with Section 3.2 (Input data) – again listing the four groups of input data is not enough – some description of each block of data is needed. It is hard / impossible to find the link between the input data and the model (Sections 3.1 and 3.2). Finally Section 3.3 (Modelling results) – providing the description of the contents of tables R.1 and R.2 is not enough – at least examples for one 10-day period or any other relevant time slot should be presented. Section 4 of Outputs 3a and 3b report is concerned with the results of model upgrade. The original model and the upgraded model are not well introduced at the beginning of the report. A single comparative analyses of the 2007 Odessa case (3a) for winter wheat and 2007 Xarkivska case (3b) for spring barley are insufficient for absolute evaluation that the upgraded model improves the accuracy of prediction of crop losses (see the last sentence on page 8). In addition, for unknown reasons the spring barley (3b) water demands are not presented (Tables 1.2 and 2.2) – such information is given for winter wheat. There are substantial differences in the input data in Table 1 and Table 2. Model parameters are the same in both tables, but the essence of the proposed upgrade of the model is not quite clear. The input data are important, but should be included in annexes. Section 5 starts very generic. It suggests that all type of crop yield models need an update because of climate change, but this depends on the type of model. Empirical models, like you used in your study usually do. The PRG has also noticed that some of the references are more than 50 years old and it would advisable to discuss in the report how your upgraded approach relates to some newer approaches to modelling crop yields and their losses caused by drought. **Comments on Output 3b report (Development of proposals for the precipitation harvesting and practices for moisture conservation in agricultural lands)** This short 6 pages long report has four sections: 1. Introduction, 2. Practices, 3. Conclusions, and 4. References. In the introductory Section 1, reference is made to the Consultation Dialogue on drought management organized in the Soil Research Institute of Moldova on 16 December 2014. In Section 2 "Practices", two categories of agro-technical practices for moisture conservation in Moldova are presented: (1) General, referring to soil processing, cultivation, ploughing between rides in multi-annual plantations, and (2) Specific activities slowing down the erosional processes and reducing surface runoff, moisture retention through creation of "special spaces" (?; do you mean micro-depressions?) on the soil surface for moisture accumulation, through additional ploughing "creating depressed forms with the depth 10-20 cm on the surface of arable land, etc. The rest of Section 2 contains three tables of a rather general nature, in particular the text on page 5 is very general, basic soil information. It also includes two

	photographs showing the Mini-Till machine for soil tillage in combination with subsoil ploughing and soil profile showing the distribution of lucerne roots ploughed by the Mini-Till machine. In Section 3 "Conclusions", it is stressed that capacities and experience of Moldavian agricultural and local authorities to deal with drought management are limited by financial constraints which do not allow the farmers to buy machines, fertilizers, etc. Still the national dialogues are very well received by the farmers and they should be continued along with further development of drought indicators and implementation of the climate change adaptation strategy and rural development. It should be added that work done by the Moldavian experts on moisture conservation practices should definitely be linked to IDMP CEE activities 5.1 and 5.3.
Detailed comments[7]	The English language of the reports is better than before but in the final joint activity report it should be still improved. - Milestone 4 Ukraine, Page 3, bullet point 9: why starts SPI not earlier than 2014 for historic analysis and model development? You have historic precipitation; - Milestone 4 Ukraine, Page 3, 2 lines above table: "10-days stepping" rephrase: "10-day steps"; - Milestone 4 Ukraine, Page 3, Table: caption (i.e. title) required explaining the content of the table; - Milestone 4 Ukraine, Page 4, first lines: "The droughts warning system incudes...." strong point!! - Milestone 4 Ukraine, Page 4, Section 3.1: why is the Bova's aridity coefficient not in list Section 2? - Milestone 4 Ukraine, Page 4, Section 3.1: Bova's aridity coefficient; add reference; - Milestone 4 Ukraine, Page 4 and following: equation should have numbers. It is easier to refer to; - Milestone 4 Ukraine, Page 4, 4th line bottom above equations: the ones proposed by M.S. Kulik and the second – by E.O. Tsuberbiller; who are these; add proper reference (e.g. year); - Milestone 4 Ukraine, Page 5, the second decade of vegetation: strange to have the number in front of the equation. Common practice is to have the number behind the equation. Why has this equation a number and the others not? - Page 6, Thirteenth decade of vegetation: again; strange to have the number in front of the equation; - Milestone 4 Ukraine, Page 8, last paragraph: "....before (tabl..1) and after (tabl..2) upgrading." rephrase ".....before (Table 1) and after (Table 2) upgrading."; - Milestone 4 Moldova, page3, line 1: "existed" revise in "existing"; - Milestone 4 Moldova, page 3, 2. Practices, line 2: "...between rides in multiannual plantations...." revise in "...between rides in multi-annual plantations...."; - Milestone 4 Moldova, page 3, 2. Practices, line 3: "..., which facilitate slowing of the erosional processes" revise in ""..., which facilitate slowing down of the erosional processes"; - Milestone 4 Moldova, page 3, 2.Practices, 1st bullet point: "....This moisture moves in the soil profile with a gravitation in a liquid...." revise in "....This moisture moves in the soil profile gravity force in a liquid...."; - Milestone 4 Moldova, page 3, 2.Practices, 2nd bullet point: soil moisture cannot be absorbed by soil patterns; - Milestone 4 Moldova, page 3, 2.Practices, 3rd bullet point: "....characterized by the loses of moisture through..." revise in "....characterized by the losses of moisture through..."; - Milestone 4 Moldova, page 3, 2.Practices, first line below bullet points: not "mm width", but

[7] The list with detailed comments is any way not supposed to be complete. Just the comments we found when we quickly reading the text.

	"mm depth"; - Milestone 4 Moldova, page 3, 2. Practices, 3rd line bottom: "...processes significantly influence on the resources of soil moisture." rephrase.; - Milestone 4 Moldova, page 4, Table 1: the terms "General moisture" and "Resources of productive moisture" are not defined and uncommon. Do you mean "total available soil moisture" and "readily available soil moisture". Is "common" identical to "general"; - Milestone 4 Moldova, page 4, line below table: uncommon to put a whole reference in the text. Hast to be included in the References (there it is, fine); - Milestone 4 Moldova, several pages: "soil processing", do you mean "soil tillage"; - Milestone 4 Moldova, page 5, Table2: "Moisture very accessible for plants - Interval of moisture content from total saturation to field capacity..". Please note that a lot of agricultural crops are in trouble if the soil is about saturated. Crop water uptake is very limited under these conditions.

Annex 9A Act. 7.1 Development of Compendium of Good Practices

Assessment Peer Review Group (PRG)	1 August 2015
Status	**FINAL JK/HvL**
Activity	**7.1. Development of Compendium of Good Practices**
	Compendium of good practices (draft)
Activity lead	Gregor Gregoric (ARSO/DMCSEE), Tanja Tajnik (external expert)
	The Compendium of Good Practices includes a review of existing documents on drought management implemented across Europe. These countries are Greece, Italy, Portugal, Spain and others. Other existing drought policy and management documents besides DMPs of SE countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Hungary, Montenegro, Moldova, Romania, Greece, Turkey and Slovenia) are analysed. Focal points of DMCSEE and IDMP Activity Leads are interviewed about drought policy and management in their countries/regions/organisations. Cooperation with the European Drought Centre, European Drought Observatory, DMCSEE, UNECE and other relevant institutions is searched. Final publication is envisaged as mix of existing information and accomplishments of IDMP CEE. Mainly success stories from WP2 and WP5 are described in the publication. The Compendium intends to reach: (i) the general public, (ii) policy makers, and (iii) end users / stakeholders (e.g. farmers, water managers).
Received	23 June 2015
General observations	**Accepted with small editorial revisions and some suggestions to elaborate.** It was decided that the PRG would assess the final draft instead of the final version of the Compendium, which allows suggestions to be incorporated. The PRG understands that since "brief notes/articles" of a few completed IDMP CEE activities are not yet available, this assessment addresses not the complete, final version, but the most recent Final Draft of the Compendium of June 20, 2015. Obviously, PRG acceptance implies that the last chapters will be completed. The PRG is satisfied that the Final Draft the Compendium takes into consideration the last recommendations made by PRG on the Milestone 3 Progress Report (30 January 2015) and Annex 1 that contains the Draft Compendium of Good Practices itself. The links between the Compendium and IDMP CEE WP2 and WP3 are clearly strengthened and the originally planned "Review of drought management projects implemented in European countries" is now included in the Compendium as Chapter 6 "EU drought projects – examples/good practices" (pages 38 - 45). Other PRG recommendations concerning the Draft Compendium of January 2015 are also taken into account, but still some additional corrections are needed (see below). Chapter 1 is a short introduction explaining the purpose of the Compendium and its structure (definition or even better a brief discussion of the term "good practice" could be added). It also needs some editorial revisions (see attached version of Compendium with some PRG comments). The new Chapter 2 presents information on the Programme (IDMP CEE) and the principal implementing organizations of GWP CEE, i.e. WMO/GWP and DMCSEE. Section 2.2 on the link

	between GWP CEE / IDMP CEE and the global initiative still needs to be completed. The same applies to Section 2.3. World Meteorological Organization. Hyperlinks to relevant own IDMP CEE outputs is great idea. This also applies to other chapters (of course, language of outputs needs to be checked). The new Chapter 3 on "Drought Management" begins with description of the initial "Review of the current status of implementation of the drought management plans and measures" in the 10 GWP CEE countries implementing the IDMP CEE. Next there is a good presentation of the "Guidelines for Drought Management Plans & National Consultation Dialogues" (numbers for Activity could have been added). You should stress more the importance of the NCDs (important IDMP CEE outcome). There seems to be some contradiction for the guiding principles of the preparation of the Drought Management Plans (two guiding principles, i.e. EU and WMO/GWP, see comment in Compendium). The following part of Chapter 3 with a short description of drought management plans, which are already developed in 10 European countries is a good addition to the Compendium. However, you jump here (Section 3.2) from drought to desertification. You know these terms are different. The text with examples from different countries is still useful and even important, but needs an introduction how drought and desertification are related and why these Actions to Combat Desertification are so important for DMP. The chapter closes with fairly complete description of IDMP CEE Activity 5.4 "Drought risk management scheme: a decision support system". A DSS is a crucial element both in: (i) day-to-day management of an ongoing drought, and (II) developing pro-active measures to be prepared for future drought. However, the role of a DSS in DMP should be a bit more elaborated at the start of Section 3.3. We suggest to use the seven steps developed in Act. 2.1 more as a leading principle. The role of the DDS should be put in this context. Chapter 4 on "Drought monitoring and forecasting- examples" contains a good description of two relevant activities of IDMP CEE: i.e. 1.3 Drought data exchange platform and 5.5 Policy oriented study on remote sensing agricultural drought monitoring method (number of activity is to be added). See detailed comments below. Please note that drought monitoring is not meant to mitigate according to the IPCC terminology (see comments in Compendium). Please note that policy makers and stakeholder are more sensitive to impacts than to physical indicators that describe the natural hazard. We suggest to elaborate a bit on this. Again, it might be an idea to link it to the seven DMP steps (Act. 2.1). The structure of Chapter 5 on "Measures to reduce drought impacts, vulnerabilities and risk" is similar to Chapter 4 – four relevant activities of IDMP CEE: namely Act. 5.1 Increasing soil-water holding capacity in agriculture, Act.5.2 Natural small water retention measures, Act.5.3 Assessment of drought impact on forests, and Act. 5.4 Upgrading agricultural drought monitoring and forecasting: the case of Ukraine and Moldova. See detailed comments below. Be careful to use the generally-accepted definition of drought intensity for another purpose. We think that is good to make a distinction between the strategic mode (adaptation on the long run) and the operational mode (managing ongoing drought). You might even describe this in Chapter 4. Act. 5.2: bit strange in a Drought Compendium to start with floods. We suggest to begin with drought and then say that it is also beneficial for floods. Section 5.3: Introduction is only dealing with climate change and forest. In this Compendium you need to start first with "drought". In the next step, you can say that it is projected that future droughts will be more severe and this requires forests to be better prepared for these more severe conditions. Act. 5.6 is reported under Chapter 5: I miss an introduction. At least you need to make clear what the difference between Act. 5.5 and Act. 5.6, and why this Activity is not reported under Chapter 4 that also deals with monitoring.

	Chapter 6 on "EU drought projects – examples/good practices" still needs some work. The first 9 lines of the chapter (untitled) are not good as an introduction to this chapter. The following description of 14 projects should be somehow unified. For example, "Drought R & SPI studies" are more than a page long, "DMCSEE" is not clear at all (all activities of the Centre?), AMICE is one sentence only. Does all 14 projects belong to EU research programme – LUCINDA, IMAGE, MIDMURES, RIADE? For some projects (e.g. XEROCHORE, DROUGHT-R&SPI) you describe what these aim at and not what these have achieved (more important for the Compendium). The last Chapters 7 "Communication with the end users" and 8 "Conclusions" are still to be written.
Detailed Comments	Before publication, all the so called "brief notes/articles" on individual IDMP CEE activities presented in the Compendium should be checked by the native speaker (i.e. language proof reader) and in terms of contents accepted by the Activity Leaders, whose names are indicated in the Compendium. For example, the text of Act. 5.2 and Act. 5.6 has not only the problem of the language – the substance is not fully understandable. Some PRG comments are provided in the attached version of the Compendium (file: Compendium_23June 2015 PRG Comments JK_HvL 01 August2015. Please note that these comments are not inclusive.

Annex 9B Act. 7.1 Development of Compendium of Good Practices

Assessment Peer Review Group (PRG)	27 March 2015
Status	**FINAL/JK/HvL**
Activity	**7.1. Development of Compendium of Good Practices**
	Milestone 3. Compendium of good practices (draft)
Activity lead	Gregor Gregoric (ARSO/DMCSEE), Tanja Tajnik (external expert)
Nature	The Compendium of Good Practices includes a review of existing documents on drought management implemented across Europe. These countries are Greece, Italy, Portugal, Spain and others. Other existing drought policy and management documents besides DMPs of SE countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Hungary, Montenegro, Moldova, Romania, Greece, Turkey and Slovenia) are analysed. Focal points of DMCSSE and IDMP Activity Leads are interviewed about drought policy and management in their countries/regions/organisations. Cooperation with the European Drought Centre, European Drought Observatory, DMCSSE, UNECE and other relevant institutions is searched. Final publication is envisaged as mix of existing information and accomplishments of IDMP CEE. Mainly success stories from WP2 and WP5 are described in the publication. The Compendium intends to reach: (i) the general public, (ii) policy makers, and (iii) end users / stakeholders (e.g. farmers, water managers).
Received	9 February 2015
General observations	**Draft accepted with editorial revisions** The package that was sent to the PRG contained the Milestone 3 progress report dated 30 January, 2015 and two annexes: Annex 1_Draft Compendium of Good Practices and Annex 2_Revised Activity List_January 2015. **Compendium of good practices (draft)_ progress report of 30 January 2015** PRG understands that since final results of IDMP CEE activities (WP2 and WP5) are not yet available (item 2.1), the only possibility was to review in the reporting period work already done in specific activities (already finished Milestones) and plan the structure of the whole compendium. Under item 2.3, the work plan for the next 4 months is presented, but the proposed dates for completion of last two tasks depend entirely on the dates of completion of the final activity reports. The PRG recommendation made in the Milestone 2 assessment report to strengthen links between the Compendium and ongoing WP2 and WP5 work must now be made even stronger than before. More comments and suggestions on the structure of the compendium and its contents are offered in the following discussion of Annex 1. It is a bit odd (item 2.4) that the Activity Team decided to exclude a "review of drought management projects implemented in European countries" (originally this was planned as one of the chapter of the Compendium) using the page limit as a main reason. This exclusion assumes that WP2 and WP5 will provide more valuable information than the findings of drought management projects in Europe. This review could have been done before the outcome of WP2 and WP5 will become available. **Annex 1_Draft Compendium of Good Practices_January 2015** The 1st chapter should begin with an introduction of the objectives and scope of the Compendium. An excellent example of a similar compendium is the Science Document: "Best Practices on National Drought Management Policy" by UNCCD, FAO and WMO of February 2012.

	This Document was presented at the High Level Meeting on National Drought Policy (HMNDP) held in Geneva on 11-15 March 2013 (see the web under HMNDP). Just to quote "The lists of best practices that follow are examples of measures that should be considered as part of framing a national policy for each drought-prone nation". The Document concentrates on five following areas under which the best practices are listed: (1) Promoting standard approaches to vulnerability and impact assessment, (2) Implementing effective drought monitoring and early warning systems, (3) Enhancing preparedness and mitigation actions, (4) Implementing emergency response and recovery measures that reinforce national drought management goals, and (5) Understanding the cost of inaction (this is great!). In your IDMP CEE Compendium a similar role is supposed to be played by Chapters 3, 4 and 5. Going back to Chapter 1 "Preface", it is suggested to begin with Objectives and Scope of the Compendium, offering next some presentation of WMO, UNCCD, GWP & GWP CEE, DMCSEE, European Commission (e.g. http://ec.europa.eu/environment/water/quantity/good_practices.htm; http://www.crcpress.com/search/results?kw=Andreu&category=all) - it means institutions (projects, programmes) being a source of good practices presented in the Compendium, of course stressing the role of IDMP CEE. Chapter 2 could be based on the Activity 2.1 of IDMP CEE "Guidelines for Drought Management Plan" plus Slovenian National Action Plan – kind of frameworks for all best practices presented in the following chapters of the Compendium. Probably here also the National Action Programmes to Combat Drought and Desertification could be grouped (just contents, principles, etc. – these are not good practices, just information where additional good practices could be found. We miss Spain (in particular the experiences in the Jucar River basin in the listing; you can have a look at: http://www.eu-drought.org/flyers). Chapters 3, 4 and 5 and 6 as proposed by Gregor and Tanja are OK. We are bit confused about Chapter 6. We believe that future is important, e.g. links with GDIS, EDO, IDMP Helpdesk, but we are not sure if people who will consult IDMP CEE output that they would expect to find this in the Compendium. On the other hand, one additional chapter on Drought Risk Management (based on Act. 5.4) might be considered. Following the above structural comments, only pages 16 to 20 of draft Compendium remain to be discussed. Most important is that in the beginning of the Compendium (Chapter 1), a definition (or better some discussion) of "good practice" should be presented. For example: "A good (or best) practice is a method or technique that has consistently shown results superior to those achieved with other means and that is used as a benchmark" or "… set of guidelines or ideas that represent the most efficient or prudent course of action." Looking for example at Activity 5.4 (page 16) "identification of the national measures for drought susceptibility (drought hazard) assessment" is not a good practice – a good practice is a specific national measure for drought susceptibility (drought hazard) assessment. Another example concerning good practices in Activity 5.1 (page 18) is a specific method for increasing soil water holding capacity, e.g. subsoiling. But it is fully understood that to identify properly good practices you need to have the final activity reports – this comment is not a criticism of the current draft but just a reminder what should be the contents of the Compendium. Could be, however, that without waiting for the final activity reports, the group preparing the Compendium could ask Activity Leaders what "good practices" they may propose. **Annex 2_Revised Activity List_January 2015** This version of the Activity List (no date) is no longer valid anymore and the only comment by PRG is that it should be updated again.

Detailed comments[8]	None at this moment. English language of the annexes is promising. - Annex 1, page 3: please note that drought also has winners in addition to stakes that loose (Musolino et al., 2015: Ex-post evaluation of the socio-economic impacts of drought in some areas in Europe. In: In: Andreu, J., Solera, A., Paredes-Arquiola, J., Haro-Monteagudo, D. & Van Lanen, H.A.J. (Eds.), Drought: Research and Science-Policy Interfacing. CRC Press, 71-78).You might find more informative cases in this book (Gregor Gregoric has a copy of the book). - Annex 1, page 3: The text focusses too much on “avoid” stress/ impacts/damage. This is an ideal aspiration, but in most cases drought manager cannot reach this. They have to accept “impact / damage reduction”, but no zero damage. Annex 1, page 3: “IDMCEE” should be “IDMP CEE”.

[8] The list with detailed comments is in no way supposed to be complete. Just the comments we found when we quickly reading the text.