TEMPLATE for FINAL REPORT (Technical)

- This report must be completed and signed by the Co-ordinator.
- The information provided below must correspond to the financial information that appears in the financial report.
- Please expand the paragraphs as necessary.
- ***Please send 1 copy of the report by registered mail and 1 copy by email to the addressees mentioned in the grant agreement. For full information on the Submission of reports please refer to the relevant article in the Grant Agreement – Special conditions. You may provide the report in EN or FR.***
- Unless otherwise specified, the answer to all questions must cover the complete reporting period as specified in Article I.2 of the Special Conditions.

1. Description

1.1. Name of beneficiary of grant contract: UNIVERSIDAD POLITECNICA DE MADRID

1.2. Name and title of the Co-ordinator: Professor Leonor Rodríguez Sinobas

1.3. Name of partners in the grant agreement (if applicable):

1. **UPM** (Leonor Rodriguez Sinobas)
2. **ISA** (Teresa Ferreira)
3. **IST** (Ramiro Neves)

1.4. Title of the Action: DUERO (DOURO) RIVER BASIN: WATER RESOURCES, WATER ACCOUNTS AND TARGET SUSTAINABILITY INDICES

1.5. Number of the Grant Agreement: 07.0329/2013/671322/SUB/ENV.C1

1.6. Start date and end date of the Grant Agreement: 01/02/2014 – 30/04/2014

2. Assessment of implementation of Action activities

2.1. Executive summary

Please give a global overview of the Action's implementation for the whole duration of the project. This executive summary may be used for communication purposes.

The project evaluated from an interdisciplinary point of view the water resources and sustainability indices in the transboundary Duero (Douro) River Basin district (DRBD), which runs through Spain and Portugal. In order to do so, **four main work** packages WP2-WP5 were foreseen, as shown below, and **two pilot basin scales** (Tâmega (Pt) and Eresma-Cega-Adaja (Sp)) were chosen to address specific tasks.

In the **first** "WP2: **Water resources balances**", the System of Economic and Environmental Accounts for Water (SEEAW) were used to fill out of the physical and hybrid tables, and a specific WebGis was implemented. Then, the drawbacks in SEEAW tables were identified and highlighted. Likewise, a specific water resources model were developed and calibrated for the two pilot cases as well. Complementary, since the watershed is mostly a rural area, a crop water footprint balance was developed, and scenarios for optimal water allocation were suggested.

In the **second** "WP3: **Assessment of Uncertainty on Water Resources Estimation**", A confidence interval for the hydrological data was estimated and some ideas for the integration of uncertainty in the SEAAW tables were suggested. In addition, a new procedure to build up a database of rainfall intensities, specifically within 10 min, was accomplished. This could support erosion infiltration / runoff models for developing erosion risk maps.

In the **third** "WP4: **Water Scarcity and Droughts indicators**", WS&D indicators were applied in the two pilot cases to develop WS&D riparian and a river connectivity indicators considering river ecological status. Also, the sustainability of water resources was accomplished by the development of a fish based WS&D and an ecological flow regime indicators. Finally, WS&D indicators were tested under several scenarios at the Cega-Eresma-Adaja and Támega basins scale.

In the **four** "WP5: **Water Resources Planning and Management**", water management strategies have been study in the pilot areas by

1. the assessment of how the river Basin Authorities have integrated quantitative water management issues in the Duero/Douro basins

2. the assessment of water use in the irrigated areas and the development of strategies for its improvement

3. the development of guidelines for better water use in the pilot river basins.

Likewise, the optimization of water allocation was addressed as

1. the development of best practices guidelines for water optimization by maintaining availability and water quality and ecological status of water bodies

2. the development of proposals for river restoration

3. the performance of risk analysis taking into account long term and short term scenarios

4. the evaluation of the effects of different scenarios on agriculture, water availability and ecological status of target fish species.

A document containing the **guidelines,** for water resources diagnostic and management in the framework of ecosystem services and sustainability, was developed summarizing DURERO's achievements. This was disseminated among Douro/Duero stakeholders.

The engagement with stakeholders and diffusion of results was addressed in WP6. **Stakeholder engagement** and WP7. **Difussion**. The diagnoses on water resources and sustainability indices highlighted the best strategies to prevent water scarcity WS in the Duero river basin. Three meetings were scheduled during the project span to present DURERO results to the stakeholders, and a final workshop was held in Valladolid (Spain) in March 2015. These results depict a practical framework to support Spanish and Portuguese Authorities in the development of the next River Basin Management Plans. Moreover, DURERO results were presented in session HS5.2: "Water resources- assessment, management, and allocation - in (semi-)arid regions" within the European Geoscience Union (April 2015), and were also disseminated through various workshops organized by the Spanish Water Authority, EU representatives and other grantees held either in Spain and/or in Brussels. Lately, some of them were presented in the Congress Pedometrics 2015 held in Córdoba (Spain) in Setember 2015, and there is one paper already published in *Ecohydrology*.

DURERO diagnosis would support DRBD stakeholders and policy makers in planning the Innovation Strategies for Smart Specialization at the region level. Furthermore, they will add a valuable input to the 2012 Policy Review and the Blueprint.

2.2. Activities and results

Please list all the activities in line with Annex I of the Grant Agreement

Activity 1:

Title of the activity: WP2. Water Resources Balances

The participants involved in this WP are listed in Table 2.1.

Country	Institution	Participant Name/Short Name
Spain	Technical Univ. Madrid (UPM)	Luis Garrote (LG) David Vicente (DV) Raúl Sánchez (RS) Leonor Rodríguez (LR) Alberto Garrido (AG)
Portugal	Technical Univ. Lisboa (UTL)	Ramiro Neves (RN) Eduardo Jauch (EJ)

Table 2.1. Participants in WP2. Water Resources Balances.

The tasks with their coordinators, and the deliverables with their participants, are presented in Table 2.2. Likewise, the final reports and the list of contributors for the deliverables 1 to 6, can be seen in ANNEX 1. WP2: Water Resources Estimation.

<table>
<tr><th rowspan="2">WP</th><th rowspan="2">TASKS</th><th colspan="2">DELIVERABLES</th></tr>
<tr><th>FINAL REPORT</th><th>DURERO PROPOSAL</th></tr>
<tr><td rowspan="4">WP2</td><td>2.1 Water Res. Sp. Duero Basin (LG)</td><td>1.Development of SEEAW tables
3. Identification of drawbacks in SEEAW tables</td><td rowspan="4">1. Development of SEEAW tables.
2. WebGIS tool
3. Identification of drawbacks in SEEAW tables.
4. Specific water resources model development and calibration for the pilot river basins.
5. Development of crop water foot print balance.
6. Develop scenarios for optimal water allocation.</td></tr>
<tr><td>2.2 Water Res. Pt. Douro Basin (RN)</td><td>1.Development of SEEAW tables
2. WebGIS tool for visualization and interpretation of processed data into SEEAW
3. Identification of drawbacks in SEEAW tables</td></tr>
<tr><td rowspan="2">2.3 Integration Water Resources Balances in RBMP (LG and RN)</td><td>4. Specific water resources model development and calibration for the pilot river basins
6. Develop scenarios for optimal water allocation</td></tr>
<tr><td>5. Development of crop water foot print balance</td></tr>
</table>

Table 2.2. Tasks, coordinators and deliverables for WP2: Water Resources Balances.

Results of this activity

2.3. If applicable - Activities that have not taken place

As it is seen in the table above, all the deliverables from WP2 in the DURERO proposal were accomplished although one exception: the elaboration of SEEAW tables related to 'water asset accounts'. These could not be achieved since Tables 6.1 and 6.2 were filled out for a wide period of time (25 years in the Spanish part) and for each zone of Duero basin (80000 km^2). In order to do so, it would have required more resources than those included in the proposal. Nevertheless, the complete water resources balance and water uses presented in the final report will facilitate the understanding of SEEAW definitions with regard to economic terms in the future. Notice that in the proposal, the deliverable numbering was general for all the tasks while in the final report, they were shorted within the task.

2.4. What is your assessment of the results of the Action?

The **global objective** of estimating specific water resources balances in the Duero (Douro) River Basin district (DRBD) (transboundary basin shared by Spain and Portugal) in the framework of the System of Economic and Environmental Accounts for Water or SEEA-Water (SEEAW) was achieved. The specific objectives (see tasks 2.1, 2.2 and 2.3 in Table 2.2) have collected, processed and analysed the available data for the development of detailed DRBD water resources balances, and their integration in the river basin management planning RBMP.

Collaboration between both sides (Spain and Portugal) was permanent during the development of the join water resources balances. However, the lack of standardized information and the lack of periods with similar and reliable information, mainly in the Portuguese side, forced us to study both sides independently although we share information continuously. The results regarding border areas were compared in order to evaluate the consistency of the estimated values.

The deliverables for the tasks 2.1 and 2.2 were the SEEAW tables (chapter VI of the SEEAW document) referred as: Table VI.1 – 'Asset accounts' and Table VI.2 – 'Matrix of flows between water resources'. The period evaluated was 2009-2010 for the Portuguese Douro sub-basins, and 1980/81 to 2005/06 for the Spanish Duero sub-basins. In total, **2028 water balances** were calculated in the latest and **26** in the former. At the beginning of the project, the same period of time was selected in both areas but finally, only one year was analysed in the Portuguese area since the climactic data were not available. The report for Task 2.1 and deliverable 1, presents the methodology used to fill these tables and its application to the Duero Spanish side. The climatic and other hydrological data were provided by the Duero River Basin Authority (hereinafter CHD for its Spanish acronym – Confederación Hidrográfica del Duero) and the Spanish Ministry of Agriculture (MAGRAMA) which shared information with the activity`s person responsible. Likewise, the methodology followed by the Portuguese side is presented in the report corresponding to task 2.2, delivery 1.

A complete and detailed list of drawbacks in SEEAW tables is presented in Task 2.1, deliverable 3 for the Spanish and Portuguese area. As a summary for the Spanish part, the information on water resources and uses obtained from the Duero River Basin Authority does not match the classification proposed in the table III.1 of SEEA. In particular, the break-down of economic activities is classified according to the ISIC Standard, which classification does not match also with the one addressed in DURERO which is based on the groups considered by the Duero River Basin Authority. Thus, it could be a drawback in adapting these balances to fill out of the economical tables in the near future. In the case of the Portuguese part, the two main SEEWater table drawbacks are: 1) their unavailability to describe the dynamics of the system, requiring the support of other tools (in this area, the dynamic flow plays an important role), and 2) the requirement of a huge amount of data, not always available and easy accessible, handled by various organisms and collected with different spatial and temporal format. In addition, the development of the water tables with the present data is complex and which has been required a bigger team in order to assembly and processing all the information. On the other hand, it might not have shown a better and accurate view of the real situation on water availability and use of water resources, since the lack of data.

Likewise, on task 2.3, deliverable 4, an independently report for the Spanish and the Portuguese areas has been developed. They present the methodology followed in the water balance model developed to run the simulations for SEEAW tables. They were used to develop scenarios for optimal water allocation in the Pilot River Basins (Tâmega, Pt and Eresma-Cega-Adaja, Sp).

The assessment of scenarios for optimal water allocation, as it is reported on task 2.3, deliverable 6, concluded that most models fail at reproducing runoff averages in the Duero Spanish basin. Therefore, larger errors can be expected if the model examines the local scale. Among the study models, the CEDEX 2014 was the one which did not show this problem. In this case, the calibrated SIMPA rainfall runoff model was used to estimate streamflow from observed, or simulated, climatic variables. SIMPA is a high-resolution hydrologic model properly calibrated for the Duero basin and the Duero River basin authority considers its estimations reliable. In the Portuguese report, the RPC 8.5 scenario from the IPCC was chosen and run for 6 years, (from 2008 to 2014) which fitted properly the data.

The report on task 2.3, delivery 5, presents the crop water foot print balance maps for the Spanish pilot Cega-Eresma-Adaja system for four years (2009-2010-2011-2012). Results showed that the green water is the largest component in the system, but the water footprint is concentrated in the Northwest part of the basin. The largest footprint was associated with cereal production, followed by industrial crops.

Impact

The deliverables of Tasks 2.1 and 2.2 will be useful for the allocation/planning of water resources in the Duero Basin. Local and National water Authorities might base their future decisions on the water resources balances developed and the results obtained by the specific water resources models and scenarios.

Risks

The analysis of data provided by the basin authority documents showed uncertainty on the flow entering Portugal through the Castro and Miranda reservoirs in Spain. The first is much smaller than the second (≈ 1500 hm^3), although it might not be possible since both dams are a short distance apart, and the drainage area is small. Other sources for data uncertainty have been described in the report. Thus, the decisions based on these results would have an associated risk.

2.5. Describe if the Action will continue after the support from the European Union has ended. Are there any follow up activities envisaged? What will ensure the sustainability of the Action?

Unfortunately, there is not financial support to complete the SEEW tables in economic terms although we will be looking forward for further support.

2.6. How and by whom have the activities been monitored /evaluated? Please summarise the results of the feedback received.

The activity had two main coordinators: Luis Garrote (Sp) and Ramiro Neves (Pt) who supervised the tasks from 2.1 to 2.3. A summary of deliverables and their persons responsible are shown in Table 2.2. The coordinators set out periodically meetings to evaluate the deliverables progress, and quarterly reports for each of them were presented as scheduled.

2.7. What has your organisation/partner learned from the Action and how has this learning been utilised and disseminated?

In general, the experience of implementing the SEEAW in Douro river basin was a laborious task conducted in a short period of time (12 months). In the case of transboundary basins, as Douro, coordination between countries is mandatory to compile information that can be integrated in both areas. The differences in data availability in both countries made difficult to complete the integrated water balance.

The availability of the required data to build a complete water balance is far from being optimal due to factors such as:

- Most components of the hydrological cycle (evapotranspiration, soil moisture, deep percolation, aquifers storage, groundwater runoff and snow-melt runoff) are difficult to determine from direct and accurate measurements and, therefore, they must be modelled or estimated. Estimating techniques may introduce further errors caused by: goodness expressions and equations which represent hydrological processes mathematically; bias occurring in the aggregation of input datasets and parameters; numerical methods used to solve equations, etc.

- Weather variables could be easily measured; the gages for gathering data may cover adequately the surface. Then, the aggregation, or extrapolation, from located data to distributed area data can be difficult as well. Representativeness of the values will therefore depend on the density of observation points. Furthermore, the availability of time-series without gaps and/or with proper length is not always guaranteed.

- Even though reliable measured data are available, different institutions may provide such information. Hence, they may differ either in the measured period or spatial aggregation making difficult the comparison among variables in the water balance.

The complete water balances will support the future elaboration of economics tables of the SEEAW methodology.The consistent hydrological-water-balance basis developed in this WP would facilitate the understanding of SEEAW definitions regarding the economic terms.

The United Nations Statistics Division does not take into account the Water Managers Requirements for the elaboration of System of Environmental and Economic Accounting for Water (SEEAW). It has developed concepts and structures difficult to match with the economic and hydrological data. The economic variables are usually compiled at national level for an accounting period of one year which is the main issue when gathering the required information. This is not very useful for water managers because water availability and it use vary among regions, and seasons within a year span.

The dissemination of the activity is presented below in activities 5-6.

Activity 2:

Title of the activity: WP 3. Assessment of Uncertainty on Water Resources Estimation

The participants involved in this WP are listed in Table 2.3. below.

Country	Institution	Participant Name/Short Name
Spain	Technical Univ. Madrid (UPM)	Luis Garrote (LG) David Vicente (DV) Ana Tarquis (AT) Antonio Saa (AS) Jose Luis Valencia Juan José Martinez Sotoca
Portugal	Technical Univ. Lisboa (UTL)	Ramiro Neves (RN) Eduardo Jauch (EJ)

Table 2.3. Participants in WP3. Assessment of Uncertainty on Water Resources Estimation.

The topics/activities and deliverables covered in this WP are shown in the table 2.4 below:

<table>
<tr><th rowspan="2">WORK PAGKAGE</th><th rowspan="2">TASKS</th><th colspan="2">DELIVERABLES</th></tr>
<tr><th>FINAL REPORT</th><th>DURERO PROPOSAL</th></tr>
<tr><td rowspan="2">WP3</td><td>3.1.Integration Uncertainty SEAAW Tables (LG)</td><td>1. Estimation of confidence limits for the hydrological data.

2. Development of new methodology for integration of uncertainty in the SEAAW tables.</td><td rowspan="2">1. Estimation of confidence limits for the hydrological data.
2.Development of new methodology for integration of uncertainty in the SEAAW tables.
3. Database of rainfall intensities time base in less than 24 h, specifically within 10 minutes.
4. Generation of geo-referenced data layers useful for erosion infiltration / runoff models.</td></tr>
<tr><td>3.2.Innovative Method for Water Resources Estimation (AS)</td><td>3. Database of rainfall intensities , specifically within 10 minutes.

4.Generation of geo-referenced data layers to support erosion infiltration / runoff models.</td></tr>
</table>

Table 2.4. Tasks and deliverables of WP 3: Assessment of uncertainty on Water Resources Estimation.

Notice that in the proposal, the deliverable numbering was general for all the tasks while in the final report, they were shorted within the task.

Results of this activity

Final reports for the deliverables 1 to 4, listed in Table 2.4 with the list of participants, are in ANNEX 2. WP 3: Assessment of uncertainty on Water Resources Estimation.

2.8. If applicable - Activities that have not taken place

All activities have been addressed.

2.9. What is your assessment of the results of the Action?

The **specific objectives** of action 2 were: 1) to test the integration of water resources balance in the Spanish Duero Basin management planning, and 2) to assess data uncertainty, and develop a new methodology for their integration in the water balances in order to estimate the confidence limits for the hydrological data. These were achieved and presented in the deliverables of tasks 3.1 and 3.2 (see Table 2.4) which final reports are included in ANNEX 2.

Most planning decisions are based on historic naturalized stream flow series obtained from rainfall and temperature data. These are included in a rainfall-runoff model which assumes the stationary hypothesis: future hydrological series will behave like past ones however, the uncertainty associated to them is usually neglected. The uncertainty analysis follows the traditional approach of water resources management studies: from rainfall to runoff, and from runoff to the performance of the water supply system with the application of the Monte Carlo simulation. In this, critical parameters on the input system are sampled from suitable probability distributions in order to analyse the probability distribution of the output system. In this study, the uncertainty on the hydrologic series was analysed by studying the rainfall-runoff relationship, and the results were then used to analyse the risk analysis of water supply systems, by running the water resources model with the ensemble of the hydrological series. The results showed the uncertainties in hydrologic series and their impact on water resources management decisions for the systems within the Spanish Duero Basin.

The report of deliverable 2 presents a comprehensive analysis regarding the variability of the significant parameters to fulfil SEEA water balances for a 26-year-long period (from the hydrological year 19080/81 to 2005/06) for the Spanish Douro basin. It contains the analysis of seasonality and inter-annual variability of: precipitation, total runoff, soil storage and actual evapotranspiration and the correlation coefficients of each set of data series for each zone or exploitation system.

Results for deliverable 3 have applied an innovative methodology for the Spanish Duero basin to collect information of existing pluviograph charts that overcomes the deficiency encountered in the rainfall raw data for the estimation of soil erosion. Most soil erosion models, or hydrological processes, need an accurate storm characterization however, this data are not always available and in some cases indirect models are generated to fill this gap. In Spain, the rain intensity data is estimated for time periods less than 24 hours. Due to the difficulty in obtaining precipitation data with adequate temporal resolution over large areas, the rainfall erosivity parameter R (soil erosion equation) has been calculated using a series of simplified equations available in scientific literature, however the new methodology proposed here has characterized rainfall paying attention to temporal variations and therefore, improving the estimations. Likewise, multifractals theory was applied to develop probability density functions of rain intensity for the climatic stations used in the study.

Complementary to delivery 3, the potential of indexes based on land cover, NDVI (Normalized Difference Vegetation Index) were also explored for its application in soil erosion assessment which brings the opportunity to evaluate its evolution over time. They were applied to the Cega-Eresma-Adaja subbasin for the development of soil loss maps from 2009-2012. The results were compared with other indexes such as the Fournier index as it is presented in the report for deliverable 4.

Impact

The deliverables of Tasks 3.1 might be included in SEEA Water Tables methodology. Also, the deliverable of Tasks 3.3 could be incorporated in the methodology commonly used to estimate soil loss.

Risks

The use of new indexes might have a risk inherent to the methodology used in determining NVDI.

2.10. Describe if the Action will continue after the support from the European Union has ended. Are there any follow up activities envisaged? What will ensure the sustainability of the Action?

It is not foreseen the continuation of the Action.

2.11. How and by whom have the activities been monitored /evaluated? Please summarise the results of the feedback received.

The coordinators are shown in Table 2.4. They supervised the time table for the deliverables, and continuously monitored their assessment by setting out periodical meetings which evaluated the deliverables progress. The quarterly reports were presented as scheduled.

2.12. What has your organisation/partner learned from the Action and how has this learning been utilised and disseminated?

One of the lessons learnt was that reducing the uncertainty on the hydrologic series would impact on water resources management decisions for the systems within the Spanish Duero Basin making them more reliable. Likewise, it was seen that the innovative methodology developed in deliverables 3 and 4 brings an opportunity to reduce the errors in soil erosion models, when using rainfall probability density functions such the one proposed.

The dissemination of the active is presented below in activities 5-6.

Activity 3:

<u>Title of the activity: WP 4. Water Scarcity and Droughts Indicators</u>

The participants involved in this WP are listed in Table 2.4 below.

Country	Institution	Participant Name/Short Name
Spain	Technical Univ. Madrid (UPM)	Diego García de Jalón (DG) Marta González (MG) José María Santiago (JS) Carlos Alonso (CA) Rafael Muñoz Mas Ingrid Maldonado Judit Maroto Gonzalo Rincón Joaquín Solana Santiago Saura
Portugal	Technical Univ. Lisboa (UTL)	Teresa Ferreira (TF) Rosario Fernandes (RF) Pedro Segurado (PS)

Table 2.5. Participants in WP4. Water Scarcity and Droughts indicators.

The topics/activities and deliverables covered in this WP are shown in the table 2.6 below:

WORK PAGKAGE	TASKS	DELIVERABLES	
		FINAL REPORT	DURERO PROPOSAL
WP4	4.1. WS&D Indexes (TF (Pt);MG (Sp))	1. Development of a WS&D riparian indicator. 2. Development of a river connectivity WS&D indicator.	1.Development of a WS&D riparian indicator. 2.Development of a river connectivity WS&D indicator. 3.Development of a Fish based WS&D indicator. 4.Development of ecological flow regime WS&D indicators 5.Testing different WS&D indicators under different scenarios at pilot basins or at the basin scale. 6.Guidelines of the best water management in irrigated agriculture in the pilot basins.
	4.2. Sustainability of Water Resources (TF (Pt);DG (Sp))	3. Development of a Fish based WS&D indicator. 4. Development of ecological flow regime WS&D indicators 5. Testing different WS&D indicators under different scenarios at pilot basins or at the basin scale.	

Table 2.6. Tasks and deliverables of WP 4: Water Scarcity and Droughts indicators.

In WP4, all the deliverables from the DURERO PROPOSAL has been accomplished however the deliverable 6 was moved to WP5 (Deliverable 3.Assessment of water use in the irrigated areas and development of strategies for its improvement). When preparing the final report, we thought that it would fit better in WP5 than in WP4 thus, we made the change.

Results of this activity

The evaluation and selection of the best sustainability indices regarding water efficiency and ecosystem services were described in this activity. This activity showed that using a graph-based methodology is an effective tool for classifying and identifying fragments more susceptible to river general connectivity. It is worth to mention that some results were based on over simplified assumptions due to logistic, time and data limitations. Nevertheless, the studies addressed provide a general framework for further studies which should include more data.

The final reports for deliverables 1-5 are included in ANNEX 3. WP 4: Water Scarcity and Droughts indicators. A summary of them are presented below.

Spanish pilot case

The Cega river has experienced a drastic change in its hydrological regimen, becoming an "intermittent runoff river". As average, it conveys a null discharge seventeen days per year since 1978. A transition is shown from a perennial to a temporary regime in late 70s, supported by the decreasing trends in annual runoff detected since 50s within the Cega river basin. This might be caused by the slight increase in temperature, and a change of land use in the basin. The agricultural crops and pastures have been partial abandonment and replaced by natural vegetation and reforestation.

In the Adaja river, the minimum flow has increased during summer in recent years. Likewise, reductions on peak flows and increases of minimum flows have also been reported at inappropriate time. These may have been caused by the operation of the new damn at "Castro de las Cogotas" as well as other factors such as climate change which affects the flow and hydrological regimes. The environmental flows for the three biological stages of barbell are suggested as: 1.63 m3/s (fry), 2.9 m3/s (juvenile), and 3.6 m3/ s (adult).

Flow at the Cega river has decreased mainly by the groundwater extraction.

The geomorphological variable "valley width" played a key role in the riparian vegetation, conditioning all their structural components (area, density, shape and shape complexity), with an abrupt change in the riparian responses when the valley width reached a value between 200 and 300 m. From a management point of view, minimum values of 40 Hm^3/year and 3 Hm^3/month should be at least assured to allow the maintenance of large and wide riparian patches at the expense of less heterogeneous patches.

Portuguese pilot case

In deliverable 1, a multi-driver methodology to model the riparian vegetation structure at a basin scale level was developed. The predicted riparian indicator was used as a surrogate for the assessment of the ecosystem service availability in the Tâmega basin, a sub-basin of River Douro which is considered a benchmark basin due to the reduced level of human activities comparing with the remaining Douro basin. Mapping the riparian width in the all Tâmega basin was elaborated and tributaries were detected as the most sensitive segments for services availability. These results are a practical framework for the implementation of next River Basin Management Plans.

The RPC 8.5 scenario (IPCC, 2013) forecasts changed in Tâmega flow regimes (see deliverable 5.1). Particularly, it is expected a reduction in the average flow, near 15%, and an increased in heavy rain events (2%). Though all the hydrological and land use variables predicted significant differences in future desertification scenarios, a larger amount of change is needed to detect significant differences in the riparian vegetation structure. However, caution must be observed in compositional shifts caused by future human impacts. It is expected that connected and wider riparian patches will correspond to well-preserved areas but they can be the result of the replacement of near-natural formations by monospecific stands of non-riparian or non-native species. Future studies about the influence of water scarcity and desertification impacts in the riparian structure should comprise the indirect impacts of climate change scenarios, including the modifications in the hydrology due to dam construction and the quantification of water abstraction from river and from groundwater. For instance, the future River Basin and Management Plans for the Tâmega basin predicts the construction of five dams, which can lead to significant shifts on the riparian vegetation habitats downstream dams. Additionally, a spatial explicitly scenario of future land use/land cover would improve riparian width predictions.

The best Water Scarcity and Droughts biological indicator, is presented in deliverable 5.2 for different scenarios. The methodology also searched for historical maps in all the cartographic documents produced between 1800 and 1950 in order to validate the indicators chosen using the historical approach. Twenty-six cartographic documents were found concerning the Tâmega basin however, no riparian features neither river morphological aspects, such as banks or islands, were delineated in any of these maps.

The transversal barriers of the Tâmega basin had an impact on the connectivity for the three dominant fish types, contributing to a decrease of more than 90% of the overall connectivity of the river network. This decrease may be further exacerbated by the effects of climate change. The overall connectivity is essentially maintained by the Tâmega main course and the larger tributaries.

The predicted decrease in flow under the climate change scenario will affect segments that are already been affected by the presence of barriers. Furthermore, the projected four hydropower dams are also shown to affect segments that are already under higher risk of connectivity loss.

Although, the study is a preliminary attempt to identify appropriate fish-based indicators based on quantitative criteria on the predictive fish habitat losses and gains, the results indicate that fish of the Tâmega pilot catchment are potentially sensitive to the hydrological alterations expected under the future climate change scenario.

2.13. If applicable - Activities that have not taken place

All the activities have been accomplished.

2.14. What is your assessment of the results of the Action? Include observations on the performance and the achievement of outputs, outcomes, impact and risks in relation to specific and overall objectives, and whether the Action has had any unforeseen positive or negative results. (Please quantify where possible).

Task 4.1 assessed the best WS&D indicators for estimation of desertification risks and developed specific targets regarding water efficiency, ecosystem services, land-use and climate change adaptation for the sustainability in the Tâmega and Cega-Adaja- Eresma systems (see results on the report for deliverables 1 and 2). Likewise, Task 4.2. proposed specific targets to enhance sustainability of water resources in those sub-systems (see results on the report for deliverables 3 and 4).

Impact

The results improved our understanding and quantifed the loss of connectivity in the rivers Cega and Pirón. The deliverables in Task 1 showed that in a future context of water scarcity, the knowledge of which river reaches are the most important in the overall connectivity is critical to implement wise policies of water resources utilization. The results shown at the pilot basin could be valuable for water decision authorities in these basins.

The results obtained in Tâmega basin can be used as practical tool in water management plans, since it allows to identifying and prioritize riparian areas with high risk of band reduction and consequent reduction of ecosystems services availability.

Risks

Some of the methodologies used in the tasks were preliminary thus, they would need further development.

2.15. Describe if the Action will continue after the support from the European Union has ended. Are there any follow up activities envisaged? What will ensure the sustainability of the Action?

The application of graph models to determine ecosystem connectivity will continue in other basins in Brasil. The funding will be mainly obtained from the national Portuguese funding agency. Connectivity losses are also being used in the Tagus basin to quantify pressures affecting the ecological status, for the 7th Frame EU-project MARS.

2.16. How and by whom have the activities been monitored /evaluated? Please summarise the results of the feedback received.

The coordinators are shown in Table 2.6. They supervised the time table for the deliverables and continuously monitoring their assessment by setting out periodical meetings. They evaluate the deliverables progress, and the quarterly reports that were presented as scheduled.

2.17. What has your organisation/partner learned from the Action and how has this learning been utilised and disseminated?

The conclusions for this activity showed that the targets developed for reducing the vulnerability of water resources in the two pilot river basins: Cega-Eresma-Adaja (Spanish site) and Tâmega (Portuguese site) will allow the preservation and/or restoration of the natural water balance. Moreover, these results could be extrapolated to the whole basin based on the conclusions for these catchments and on the information available for the whole basin, including the water resources model.

The dissemination of the active is presented below in activities 5-6.

Activity 4:

<u>Title of the activity: WP 5: Water Resources Planning and Management</u>

The participants involved in this WP are listed in Table 2.6. below.

Country	Institution	Participant Name/Short Name
Spain	Technical Univ. Madrid (UPM)	Diego García de Jalón (DG) Marta González (MG) Alberto Garrido (AG) Luis Garrote (LG) Miguel Marchamalo (MM) Leonor Rodriguez (LR) Spanish Duero Basin Authority
Portugal	Technical Univ. Lisboa (UTL)	Teresa Ferreira (TF) Rosario Fernandes (RF) Eduardo Jauch (EJ) Ramiro Neves (RN)

Table 2.6. Participants in WP5. Water Resources Planning and Management.

The topics/activities and deliverables covered in this WP are shown in the table 2.7 below.

As it is shown in the table, all the deliverables from the proposal were accomplished except the deliverable 5.

WP	TASKS	DELIVERABLES	
		FINAL REPORT	DURERO PROPOSAL
WP5	5.1.Water Manag. Strategies (MM)	1. Assessment of how the River Basin Authorities have integrated quantitative water management issues in the selected basins. 5.**(Deliverable 6 from WP4)** Assessment of water use in the irrigated areas and development of strategies for its improvement. 7. Guidelines for saving/reusing water in the pilot river areas.	1. Assessment of how the River Basin Authorities in the selected river basins have integrated quantitative water management issues in the preparation of the 2015 River Basin Management Plans 2. Best practices guidelines for water optimization improving water availability and water quality and ecological status of water bodies, maintaining ecosystem services and sustainability. 3. Development of proposals for river restoration. 4. Performance of risk analysis taking into account long term and short term scenarios. 5. Development of econometric model analyzing the economic drought risk. 6. Evaluation of the effects of different scenarios on agriculture, water availability and ecological status of target fish species. 7. Guidelines for saving/reusing water in the pilot river areas while maintaining ecosystem services and sustainability.
	5.2 Optimizat. of Water Allocation (TF (Pt); DG (Sp))	2. Guidelines for water optimization improving water availability and water quality 3. Development of proposals for river restoration 4. Performance of risk analysis taking into account long term and short term scenarios ~~(5) Development of econometric model analyzing the economic drought risk~~. 6. Evaluation of the effects of different scenarios on agriculture, water availability and ecological status of target fish species.	

Table 2.7. Tasks and deliverables of WP 5: Water Resources Planning and Management.

Results of this activity

The results for this activity are included in the final reports for deliverables 1-7 of ANNEX 4. WP 5: Water Resources Planning and Management. A summary of them is presented below.

The results for the task 5.1.Water Management Strategies, deliverable 1, showed that the Spanish Douro Basin Authorities has followed the Guidelines of the Water Frame Directive over the last decades. The DRBMP allocates the available resources to current needs and, likely, future water uses in the scenario established for 2015. It assessed and respected the environmental flows needed for maintaining the life of main fish and riverside vegetation. These were set out in the DRBMP as continuous flow values for each month and water body, and must be respected as long as the natural availability allows them. As a result of the new DRBMP, a discharge of 4242 hm^3/year is allocated (400 hm^3/year smaller than it was allocated by the 1998 Plan). Out of the total consumption, 80% corresponded to irrigation and the remaining 20% to urban and industrial water supply. Likewise, the Albufeira Hispano-Portuguese Agreement, and the allocations previously established in the National Water Management Plan for aquifers shared between various basins, has been respecte. In addition, programmes for water body status monitoring have been implemented to assess the quality/quantity of water resources, and protected areas.

Point sources and diffuse pollution on water bodies caused by the users' pressure on the natural environment, were also identified. Pressure on water abstractions (superficial and subsurface waters) is still an issue caused, particularly, by the hydro-morphological deterioration of the river systems which aroused the habitat loss with the consequent occupation of rivers by opportunist or invasive species. This steeped the loss of biodiversity. Nevertheless, up to date, the unavailability of using ecological status indicators, such as fish population sensitive to these pressures, has made the problem partially concealed although, about 3600 barriers, at various degrees of permeability for the fish population, were documented together with almost 1100 canalized sections and about 600 bank reinforcement actions.

Optimal water allocation, improving water availability for the irrigation areas at the pilot basins, could be accomplished following the best practices guidelines described in the report of deliverables 2 and 3. Specific guidelines for water optimization improving water availability and water quality and ecological status of water bodies are described in the two reports of deliverable 2. One contains the general ideas and the other is specific for the Tâmega basin. The criteria for intervention in river basin systems highlighting the processes and main elements to restore are described in the two reports for deliverable 3.

The assessment of the potential for improved water resources management to optimize the allocation of the water resources in the Spanish Duero basin under a range of short term and long term scenarios, and with the application of risk analysis techniques, is fully detailed in the report of deliverable 4. In the one hand, a general methodology for the definition of optimal water allocation rules for a system of reservoirs were defined, which allows the identification of a set of candidate thresholds for activation of the operating rules. This water allocation method proved its effectiveness in terms of improvement of the objective function in three water resources systems in the Duero basin with different characteristics. On the other hand, for all analysed models, the water availability in the climate change period is smaller than in the control period, meaning that demand management will be required to adapt to climate change in the study sub-basins. In order to estimate water allocation in the future scenarios, the need for irrigation demand reduction can be addressed if adequate correlative policies are adopted. The comparative effect of the three policy measures analyzed, by evaluating the trade-offs between irrigation demand reduction and the corresponding measure, only a change in environmental flow requirements could affect the Duero/Douro basin in a significant way. This measure, however, would have important negative consequences that would have to be carefully analyzed from an economic perspective.

In the report 5, a study of the assessment of the irrigation water use was carried out in the Spanish irrigation District "Río Adaja". It analysed the water use efficiency and the water productivity indicators for the main crops for three years: 2010-2011, 2011-2012 and 2012-2013. The results showed that deficit irrigation was applied in the first two years in most crops with the improvement of water productivity. Thus, strategies of deficit irrigation are advisable for most cropping pattern maximizing the famers´ gross income in the irrigation district.

The report of deliverable 6, summarizes the results of activity 3 regarding the understanding and quantifying the loss of connectivity in the rivers Cega and Pirón. It highlights that this loss is caused by the presence of transversal obstacles and their impact in the natural movement of representative fish species like brown trout, barbel and the northern straight-mouth case. The downstream sections in Cega River are key targets for conservation due to their importance in maintaining connectivity to the most upstream sites. Thus, connectivity restoration will have positive impacts on freshwater fish species, especially on those obligated to migrate to complete their life cycle.

The results indicated that the many transversal barriers of the Tâmega basin have a huge impact on the connectivity for the three dominant fish types, contributing to a decrease of more than 90% of the overall connectivity of the river network. The results also indicated that this decrease may be further exacerbated by the effects of climate change.

In a future context of water scarcity, the knowledge of which river reaches are the most important in the overall connectivity is critical to implement wise policies of water resources uses. The analysis of the results will determine which obstacles alter more longitudinal connectivity, and assess the target sections for the conservation and/or management of these obstacles to improve system connectivity. Thus, based on climate change forecasts, the thermal habitat would produce a decrease in brown trout range by the year 2100. Considering the fish survey made in 1997 and 1998, the reductions would affect the brown trout population up to 38% in the Cega stream, and up to 11% in the Pirón stream. Future significant declines in summer flow can exacerbate the negative impact of increased water temperature on trout populations in the climate change scenarios by reducing, both the suitable spatial habitat and the warming resistance of the water mass. This is supported by the report of the Duero Basin Authority indicating the loss of biodiversity in the area.

Finally, the report of deliverable 7 "*Guidelines for water resources diagnostic and management in the framework of ecosystem services and sustainability*" summarizes the diagnostic tools for water resources planning in the framework of ecosystem services, and sustainability as well as the development of a WS&D indicators, the uncertainty analysis and the forecasting of water resources and ecosystem services in the framework of global change developed in the project. It also contains the results of their application to the pilot cases.

2.18. If applicable - Activities that have not taken place

The deliverable 5 in the proposal "Development of econometric model analyzing the economic drought risk" could not be achieved since neither was data available nor economic resources.

2.19. What is your assessment of the results of the Action?

DURERO project developed a set of calibrated tools and indexes for assessing water over-exploitation and land degradation in European Water Districts. It also provides the following recommendations for the expansion of these demonstrative activities to other EU basins:

1. Implement a real-time monitoring network, combining hydro-meteorological stations, models, remote sensing and field presence, to assess the technical and ecological status of Water Systems.
2. Estimate uncertainty and take it into account in water management schemes, decisions and predictions.
3. Include climate change scenarios in water management schemes, decisions and predictions.
4. Develop fitted models to forecast main hydrological and ecological variables in the framework of global change.

5. Brings a strong applied research line to support water management strategies in the next decades.

Impact

It is foreseen that the operation decision support tools and guidelines will provide requirees input to the Blueprint and 2012 WS&D Policy Review and for further development of the Research and Innovation Strategies for Smart Specialization in the Duero (Douro) basin.

Risks

Some methodologies has used simplified and practical assumptions to analyze water resources and define the best WS&D indicators although the issues studied would have been better characterized by the application of other methodologies more complex but less practical. Further studies would be advisable to compare their results.

2.20. Describe if the Action will continue after the support from the European Union has ended. Are there any follow up activities envisaged? What will ensure the sustainability of the Action?

It is not foreseen the continuation of the Action.

2.21. How and by whom have the activities been monitored /evaluated? Please summarise the results of the feedback received.

The activity has one coordinator for taks 5.1 and two coordinators for task 5.2 as it is shown in Table 2.7. They supervised the time table for the deliverables and continuously monitoring their assessment by setting out periodically meetings to evaluate the deliverables progress and by the quarterly reports that were presented as scheduled.

2.22. What has your organisation/partner learned from the Action and how has this learning been utilised and disseminated?

The interdisciplinary approach followed to develop the guidelines for saving water in the pilot river areas while maintaining ecosystem services and sustainability (in deliverable 3) has brought the opportunity to make a complementary approach that covers most of the areas for planning, allocation and management of water resources.

The dissemination of the activity is presented in the activities 5-6 below.

Activity 5:

Title of the activity: WP 6: Stakeholder Engagement

The participants involved in this WP are listed in Table 2.8.

Country	Institution	Participant Name/Short Name
Spain	Technical Univ. Madrid (UPM)	Marta González (MG) Leonor Rodriguez (LR) David Vicente (DV) Raúl Sánchez (RS) Diego García (DG) Judit Maroto Duero Basin Authorities Agricultural Technical Institute of Castilla and León, Irrigation District Association of Castilla and León Hydropower Manufacturers

Table 2.8. Participants in WP4. Stakeholder Engagement.

The topics/activities and deliverables covered in this WP are shown in Table 2.9.

WORK PAGKAGE	TASKS	DELIVERABLES	
		FINAL REPORT	DURERO PROPOSAL
WP6 (LR)	6.1. Correct Running Engagement Activities 6.2. External Stakeholder and End-user Engagement	1.Report on stakeholder engagement	1.Report on stakeholder engagement.

Table 2.9 Tasks and deliverables of WP 6. Stakeholder Engagement.

Results of this activity

In this WP, the results of DURERO were shared with relevant parties and local stakeholders in order to highlight consensus activities and measurements for preventing water scarcity and halting desertification. It can be seen in ANNEX 5, report deliverable 1.

2.23. If applicable - Activities that have not taken place

2.24. What is your assessment of the results of the Action?

Duero basin Authority has followed the compliance of environmental objectives from the WFD. Likewise, it highlighted consensus activities and measures for preventing water scarcity and halting desertification. Within this framework, DURERO will activate the appropriate corrective measures for the stakeholders to adapt a positive attitude towards the new proposed methods and in this way, encourage other stakeholders to implement DURERO solutions.

2.25. Describe if the Action will continue after the support from the European Union has ended. Are there any follow up activities envisaged? What will ensure the sustainability of the Action?

Even though the DURERO project brought the opportunity to work close with the Duero stakeholders (Duero Basin Authority, Irrigation Communities, Agricultural Technical Institute of Castilla and León, Hydropower enterprises), it is not expected to continue the action “per se” since funds are not available. Nevertheless we will look forward to further collaboration in another project.

2.26. How and by whom have the activities been monitored /evaluated? Please summarise the results of the feedback received.

The coordinator of the activity supervised all the communications with stakeholders previous to the workshop in a close collaboration with MG (see Table 2.9).

2.27. What has your organisation/partner learned from the Action and how has this learning been utilised and disseminated?

The close collaboration with the Duero Basin Authority in the development of the SEEAW Tables made possible to fulfil the scope of DURERO project on time. In addition, DURERO has brought the opportunity for further collaboration in the areas of planning, allocation and management of water resources in the Duero basin.

The dissemination of the active is presented below in activities 5-6.

Activity 6:

<u>Title of the activity: WP 7: Dissemination</u>

The topics/activities and deliverables covered in this WP are shown in the table 2.6 below:

TASKS/COORDINATOR	DELIVERABLES/RESPONSIBLES
7.1. Direction WP Dissem. Activities 7.2. Intern. Extern. Dissem. Activities	1.Quarterly reports and interim and final report (LR,LG,RN,TF,DG,AG, AT)
7.3 Project Public Website (RS)	1.Quarterly reports and interim and final report (LR,LG,RN,TF,DG,AG, AT) 2. Publication of findings via journals and conference papers (All participants)
7.4. DURERO Policy Recommendation (LR)	1.Quarterly reports and interim and final report (LR,LG,RN,TF,DG, AG, AT) 2. Publication of findings via journals and conference papers (All participants)
7.5. Dissemination on Journal, Congresses, Conf. (LG,RN,TF,DG)	3. Publication of findings via journals and conference papers (All participants) 4. Organization of Congress (LR)

Table 2.10. Tasks and deliverables of WP 7: Dissemination.

Results of this activity

The web page of the project www.durero.eu contains all the information generated during DURERO project such as: the quarterly and final reports; deliverables for all WPs, meetings, and guidelines.

Partners met in three face to face meetings: kick off (Madrid, 28.01.2014), mid term (Lisbon, 19.12.2014), and final meeting (Vienna, 15.04.2015); and one “on-line” meeting (15.06.2014) as well (see program and list of participants in www.durero.es). Likewise, three meetings were set off on a quarterly basis with the Duero Basin Authorities to debate on the activity’s quarterly progress report, and highlight further tasks. A final meeting and workshop was held also in Valladolid on March 27, 2015 (see activity 5, deliverable 1) for stakeholder engagement with the title “Approaching proposals on water resources planning for the XXI century”. Table 2.11 shows some pictures of these events.

Alternatively, the Spanish Water Authority held one meeting in Madrid (12.06.2014) to present and discuss the procedure and difficulties to fill out the SEEAWATER tables in different Spanish basins with the participation of rest of the grantees and the Spanish watersheds Authorities. Presentations can be seen at: www.seeawater.eu.

The EU representatives organised two meetings in Brussell: kick off (07.02.14) and the 3rd meeting of the CIS working group on water account (19.03.15). The presentations can be access by clicking at (https://circabc.europa.eu/w/browse/eabd73d9-293f-4cec-a09a-193121788a04).


(a)


(b)

Table 2. 11. DURERO meetings: (a) kick-off meeting in Madrid (Spain) and (b) stakeholder meeting in Valladolid (Spain).

Finally, the last meeting to present DURERO’s results and conclusions was held in Vienna within the framework of the European Geoscience Union Assembly 2015 in Session HS5.2 ‘‘Water resources - assessment, management, and allocation - in (semi-)arid regions” (15.04.15). During the session, partners discussed with the international participants the results and highlighted future perspectives of collaboration. This session was announced to all national stakeholders (irrigation communities, local water agencies, agricultural agencies, water/agriculture policy makers) and local groups and research communities and international organisms (DG- ENVIRONMENT and the JOINT RESEARCH CENTRE (JRC)). See the program of the session at
http://meetingorganizer.copernicus.org/EGU2015/session/17298.

In addition, DURERO was invited to present its results in the International Meeting “Improving water accounting at the basin scale Agenda” organized by the ASSET grantee and held in Cartagena (Spain) on 23-24th February 2015 (see agenda cliking at http://www.upct.es/~agua/DRAFT_AGENDA_INTERNATIONAL_MEETING_WATER_ACCOUNTING.pdf).

Finally, results from WP3 has been presented in “Pedometrics 2015” held in Córdoba (Spain), 14-18 September and it will be published in and Special Issue in *Geoderma*. The title of the oral communication was as follows:

Saa Requejo, A.; Tarquis, A.M.; Sotoca, M.; Valencia Delfa & Rodríguez-Sinobas, L. 2015. Development of new indexes and metrics: irregularity of the vegetative activity.

2.28. If applicable - Activities that have not taken place

2.29. What is your assessment of the results of the Action?

All the meetings listed in the above sections shared DURERO findings and discussed the policy recommendations delivered in the project. They were aimed at facilitating the widespread acceptance of the results, and sought the support of key decision-makers for their implementation.

2.30. Describe if the Action will continue after the support from the European Union has ended. Are there any follow up activities envisaged? What will ensure the sustainability of the Action?

Since the scope of DURERO was multidisciplinary and partners have different expertise, its results and conclusions are still in the process to be published in international journals although the following is already published:

Santiago, J.M.; García de Jalón,J.M; Alonso, C.; Solana,J. and, Ribalaygua, J.; Pórtoles, J and Monjo, R. 2015. Brown trout thermal niche and climate change: expected changes in the distribution of cold-water fish in central Spain. *Ecohydrol*. (wileyonlinelibrary.com) DOI: 10.1002/eco.1653.

The general guidelines will be sent to the Duero/Douro basin Authority for its dissemination among local stakeholders.

2.31. How and by whom have the activities been monitored /evaluated? Please summarise the results of the feedback received.

The activity has one coordinator for each tasks except for the dissemination on journals, congresses and conferences where each partner coordinated itself (see Table 2.10). Basin authorities have been aware of the activities of the project during its duration, through information and discussions. A copy of the project's conclusions will be send to the Duero/Douro basin Authorities. A presentation of the results will be scheduled for one of the next Basin Council meetings.

2.32. What has your organisation/partner learned from the Action and how has this learning been utilised and disseminated?

It is been described in the above sections.

1. Project Management, Co-ordination and other Co-operation

1.1. How do you assess the project management?

Project management was run properly with a vivid enthusiasm from all the institutions involved. Both presence and remote meetings were held to discuss the planning and the "on-going" of actions among partners. They were coordinated by the project management and tasks/wor were distributed timely. Two stakeholder meetings were scheduled to disseminate the results and to get feedback that was incorporated into the project. Likewise, continuous email exchange, together with skype meetings whenever needed, insured communication among partners. The final "live" discussion took place in Session HS5.2 "Water resources - assessment, management, and allocation - in (semi-)arid regions" in the EGU 2015 in Vienna, that was dedicated to the project results. Overall, the project management run smoothly leading to the accomplishment of project goals.

1.2. How do you assess the relationship between the formal partners of this grant agreement (if applicable)?

The partners' activities were twinned for Portugal and Spain. In each country, parallel groups of researchers with different expertise who worked in similar activities dealing with: hydrology and land use, modelling at the basin scale, and especially at the target pilot basins. They shared information permanently. Some researchers, from the two countries, have participated together in European projects for over a decade. The parallel setting of the project's activities has proved very fruitful.

1.3. Is the partnership to continue? If so, how? If not, why?

The participants from ISA are submitting proposals to European funding and a joint PhD thesis in Ecohydrology is just starting. Whenever possible, and funding available, we foresee to proceed DURERO´s consortium working together in other lines regarding availability and sustainability of water resources..

1.4. Where applicable, describe your relationship with any other organisations involved in implementing the grant agreement:

- Associate(s) (if any). No applicable.
- Sub-contractor(s) (if any). No applicable.

1.5. Where applicable, outline any links and synergies you have developed with other actions. No applicable.

2. Visibility

How is the visibility of the EU contribution being ensured in the Action?

The European Commission may wish to publicise the results of Actions. Do you have any objection to this report being published on DG ENV website? If so, please state your objections here.
No objections

3. Comments on Financial implementation

This part of the technical report should include the following points: overview of cost incurred and any relevant issues from the partnership agreements (if applicable). Please give sufficient detail to establish a clear link between technical activities and costs declared in the financial report and attach a copy of the completed Consolidated Cost Statement table from your Final financial report.

The total eligible cost for the action was 181.254,50 € as it can be seen in Table 2.12.

Consolidated Cost Statement for the Action					
ATTENTION/ to be completed by the Co-ordinator only if the project involves one or more Co-beneficiaries					
Part A: Eligible cost categories	**Rate %**	**€**	**Part B: Financing Plan**	**€**	**% of eligible costs**
A: Personnel		152.428,99	EU contribution*	135.940,87	75,00%
B: Travel and subsistence		12.725,37	Contribution of the Co-ordinator	25.989,95	14,34%
C: Equipment		484,17	Contribution of the Co-beneficiary(ies)	19.323,68	10,66%
D: Sub-contracting / External assistance		0,00	Other sources of funding	0,00	0,00%
E: Other direct costs		3.758,20	Direct revenues	0,00	0,00%
Indirect costs / overheads	7,00%	11.857,77			
TOTAL ELIGIBLE COSTS		181.254,50	**TOTAL**	181.254,50	

* eligible costs x EU-funding rate OR maximum EU-contribution, whatever is lower!

For information only	
"In kind" contributions / costs not included in the budget (ineligible costs)	0,00

Table 2.12. Consolidated Cost Statement from DURERO`s final financial report

The information between categories and technical activities are written below:

A. Personnel

The total cost for personnel was 152.428,99 € which was distributed as: 86.557,63 €, 34.094,19 €, and 31.777,07 € for UPM, IST and ISA, respectively.

The IST partner funded the Scholarship of Eduardo Jauch who worked in: WP2 (Taks: 2.2 Water Resources Portuguese Douro Basin and 2.3 Integration Water Resources Balances in RBMP, Portuguese site), WP4 (Task 4.1. Water Scarcity and Droughts indicators, deliverables 1 and 2 Portuguese side; Task 4.2. Sustainability of Water Resources, deliverables 3, 5 Portuguese site), WP5 (Task 5.1. Water Management Strategies, deliverable 7;Task 5.2. Optimization of Water Allocation, deliverable 2) and WP7 (Dissemination). Other cost covered the working hours of the associated professor Ramiro Neves who was the coordinator of this IST group who worked in: WP2 (Taks: 2.2 Water Resources Portuguese Douro Basin and 2.3 Integration Water Resources Balances in RBMP, Portuguese site); WP5 (Task 5.1. Water Management Strategies, deliverable 7; Taks 5.2. Optimization of Water Allocation, Deliverables 2 and 6), WP6 (Task: 6.2.External Stakeholder and End-user Engagement) and WP7 (Dissemination). Likewise, it covered the contribution of Gabriela Pita in WP4 (Task 4.2. Sustainability of Water Resources, deliverables 3, 5 Portuguese site),.

The ISA partner funded the junior research fellowships of Inês Ramos Vila and Filipa Geirinhas. The first participated in the development of WP4 (tasks: 4.1. WS&D Indexes, deliverable 2 and 4.2. Sustainability of Water Resources for the portuguese site). The second worked in the administration of the project for ISA group. Other cost covered the working hours of the Professor Maria Teresa Ferreira who was the coordinator of ISA group and participated in WP4 (Task 4.1. Water Scarcity and Droughts indicators, deliverables 1 and 2, Portuguese side; Task 4.2. Sustainability of Water Resources, deliverables 3, 5, Portuguese site), WP5 (Task 5.1. Water Management Strategies, deliverable 7; Task: 5.2 Optimization of Water Allocation, deliverables: 2,3, 4), WP6 (Task: 6.2.External Stakeholder and End-user Engagement) and WP7 (Dissemination).

The UPM partner funded the following grants:

- David Vicente who worked in: WP2 (Task 2.1 Water Resources Spanish Duero Basin, deliverables 1 and 3; Task: 2.3. Integration Water Resources Balances in RBMP, deliverables 3,4,6) Water Management Strategies, deliverable 7;Task 5.2. Optimization of Water Allocation, deliverable 2), WP5 (Task 5.1. Water Management Strategies, deliverable 7), WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement) and and WP7 (Dissemination).
- Ernesto Casani who helped in WP3 (Task 3.2. Innovative Method for Water Resources Estimation, deliverable 3)
- Management weather database)
- Gonzalo Blanca who helped the activities developed in WP2 (Taks: 2.3. Integration Water Resources Balances in RBMP, deliverable 5).
- Gonzalo Rincón who gave support to WP4 (Taks 4.1. WS&D Indexes, deliverable 2)

Other cost covered the working hours of the following professors:

- Diego García de Jalón who worked in: WP4 (Task4.1. Water Scarcity and Droughts indicators, deliverable 1; Task 4.2. Sustainability of Water Resources, deliverables 3,4,5 (Spanish site))WP5 (Task 5.1. Water Management Strategies, deliverable 7; Task: 5.2 Optimization of Water Allocation: deliverables 2, 3 and 6); WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement) and WP7 (Dissemination).
- Luis Garrote who worked in: WP2 (Task 2.1 Water Resources Spanish Duero Basin, deliverables 1 and 3; Task: 2.3. Integration Water Resources Balances in RBMP, deliverables 3,4,6); WP3 (Task 3.1. Integration of Uncertainty in SEAAW Tables, deliverables 1,2); WP5 (Task 5.1. Water Management Strategies, deliverable 7;Task: 5.2 Optimization of Water Allocation: deliverables 4), WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement) and WP7 (Dissemination).
- Ana María Tarquis who worked in: WP2 (Taks: 2.3. Integration Water Resources Balances in RBMP, deliverable 5),WP3 (Task 3.2. Innovative Method for Water Resources Estimation, deliverables 3,4), WP5 (Task 5.1. Water Management Strategies, deliverable 7), WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement) and WP7 (Dissemination).
- Antonio Saa who worked in: WP3 (Task 3.2. Innovative Method for Water Resources Estimation, deliverables 3,4), WP5 (Task 5.1. Water Management Strategies, deliverable 7), and WP7 (Dissemination).
- Alberto Garrido who worked in: WP2 (Taks: 2.3. Integration Water Resources Balances in RBMP, deliverable 5), WP5 (Task 5.1. Water Management Strategies, deliverable 7), WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement), and WP7 (Dissemination).
- Leonor Rodríguez Sinobas was the general coordinator of DURERO´s project who worked in: WP1, WP2 (Task 2.1 Water Resources Spanish Duero Basin, deliverable 1), WP5 (Task 5.1. Water Management Strategies, deliverables 5 and 7); WP6. (6.1. Correct Running Engagement Activities; Tasks: 6.2.External Stakeholder and End-user Engagement), and WP7 (Dissemination).
- Raúl Sánchez Calvo who worked in: WP2 (Task 2.1 Water Resources Spanish Duero Basin, deliverable 1), WP5 (Task 5.1. Water Management Strategies, deliverable 5 and 7), WP6.

(Tasks: 6.2.External Stakeholder and End-user Engagement), and WP7 (Dissemination). It was the person who developed and maintained DURERO's web.

- Marta González who worked in: WP4 (Task 4.1. Water Scarcity and Droughts indicators, deliverables 1,2), WP5 (Task 5.1. Water Management Strategies, deliverable 7; Task: 5.2 Optimization of Water Allocation: deliverable 3), WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement), and WP7 (Dissemination).
- Miguel Marchamalo who worked in: WP5 (Task 5.1. Water Management Strategies, deliverable 7), WP6. (Tasks: 6.2.External Stakeholder and End-user Engagement), and WP7 (Dissemination).
- Esperanza Luque who was the administrative manager and gave support to coordination and diffusion of the project.

B. Travel and subsistence

The total cost for travel and subsistence was 12.725,37 € which was distributed as: 7.871,95€, 1.179,53 €, and 3.673,89 € for UPM, IST and ISA, respectively. It covered the expenses of the following activities:

- WP1 and WP7: kick-off, mid-term and final meetings hold in Madrid, Lisbon and Wien, respectively; travels of the Coordinator to Brussels' meetings, and presentation of DURERO results in Valladolid and Wien.
- WP2and WP6: Visits to Duero/Douro Basin Authorities to get data to develop the SEEAW tables and to engage the stakeholders.
- WP3 (Task 3.2. Innovative Method for Water Resources Estimation, deliverable 3) and WP5 (Task 4.2. Sustainability of Water Resources, deliverables 4,5): Field trips to get data.

C. Equipment

The total cost for equipment was 484,77 € which was distributed as: 153,14€ and 170,15 € for UPM and IST, respectively. It covered the expenses of computer systems elements (WP2-WP7), and canon for scanner (WP3, Task 3.2. Innovative Method for Water Resources Estimation, deliverable 3).

E. Other Direct Cost

The total cost for travel and subsistence was 3.758,20 € which was distributed as: 2.575,87€, 60,00 €, and 1.122,33 € for UPM, IST and ISA, respectively. It covered the expenses of the following activities:

- Food and beverage for the kick-off meeting.
- Fees for the European Geoscience Union to held the final meeting and present DURERO´s results.
- Office, computer and printing supplies.
- WEB page.
- Couriers.
- Publication of papers.

Signature: …… …………………………Location: Madrid (Spain)

Date report due: June 30 th, 2015………………..…Date report sent: Final updated report was sent Ocotber 29 th, 2015