



**Environmental Protection of
International River Basins Project**
Contract No. 2011/279-666



This project is funded by
The European Union

A project implemented by a Consortium
led by Hulla & Co. Human Dynamics KG

Terms of Reference

Improvement of water resources management and ensuring efficient water use through development of a system for an automated, centralized, on-line control of actual water use in Metsamor (Sevjur) River basin of Akhuryan BMA of Armenia

I. Background

The consultant will assist Human Dynamics to fulfil its requirements under the EU technical assistance contract "Environmental Protection of International River Basins (EPIRB)". The overall objectives of the EPIRB project are:

- To improve availability and quality of data on the ecological, chemical, and hydro-morphological status of trans-boundary river basins including groundwater; and
- To develop River Basin Management Plans for selected river basins / sub-river basins according to the requirements of the WFD.

The project is being implemented in six countries (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine) and five pilot river basins:

- Akhurian Basin District (Armenia),
- Central Kura (Azerbaijan),
- Upper Dnieper Basin (Belarus, Ukraine),
- Chorokhi-Adjaristskali Basin (Georgia),
- Prut Basin (Moldova, Ukraine)

As part of the River Basin Management Plan development process the project will implement selected number of improvement measures from the overall Programme of Measures (PoM), as defined under the Water Framework Directive. The selected measures have been agreed with the beneficiaries in each country and will be executed in accordance with the EC contractual conditions. In the Republic of Armenia the following measures have been chosen:

- Refurbishment of GW monitoring network in the pilot basin, including the construction of at least one new borehole in Akhuryan River Basin and refurbishment of several existing boreholes in Ararat Artesian Basin. Design and tender documents to be prepared by state Hydrogeological Monitoring Centre who will also undertake the site supervision.
- A demonstration project for the automated monitoring the critical water abstractions in the Metsamor (Sevjur) River basin in order to strengthen compliance and improve water resource planning and management. The monitoring system will include the development of software and installation of meters and telemetry in a trial area with the objective of testing its feasibility for application on a nation-wide scale in key problem areas.

The following Terms of Reference are for the demonstration project for **improvement of the water resources management and ensuring efficient water use through development of a system for an automated, centralized, on-line control of actual water use in Metsamor (Sevjur) River basin.**

II. Scope of Work

Major part of the Metsamor River Basin of Akhuryan BMA is located in Ararat Valley. Ararat valley is the largest agricultural zone in Armenia, providing up to 40% of the agricultural GDP of the country. It includes artesian aquifers (Ararat Artesian Basin) with groundwater of high quality. These waters have been historically used for drinking, irrigation purposes and, but during the recent decade the intensively expanding fish farms have become one of major users of these waters.

Since 2006, a large number of fish farms have been established in the Ararat valley, in part due to the rich supply of artesian groundwater of high quality and low cost. Considering both groundwater uses with and without water use permits, the total groundwater use in 2013 was 1.6 times the level approved (in 1984) by the State Committee on Reserves. Groundwater use by fish farms alone exceeded this level. Though the actual abstraction from permitted wells for all water uses (1,337 million cubic meters per year) was less than the amounts of those permits (1,571 million cubic meters per year), total abstraction was greater for two reasons. First, in some cases, fish farms are abstracting more water than allowed by their water use permits and second, there are illegal wells operating without water use permits. There are recorded 531 wells abstracting an estimated 416 million cubic meters per year without water use permits, including 35 fish farming wells discharging 47 million cubic meters of waste waters per year. Thus, due to artesian groundwater depletion, the conflicts with other artesian groundwater uses – irrigation, domestic, industrial, and cooling waters – are increasing, and there is a high concern within the government, academia, non-governmental organizations and citizens of the depletion of these resources if this use trend continues.

To improve the situation it is proposed to develop an on-line water use control system in the basin both for surface and groundwater resources. The system will allow the WRMA and its Akhuryan BMA to control the water use in online regime, including checking how the water users comply with the conditions stipulated in the water use permits. Also, it will allow all current and potential water user, as well as public to see the abstraction volumes and regime in the basin in real time.

Hence, the overall objective of this pilot project is to assist the regulation of surface and groundwater use in the basin, ensure transparency and tighten up policing through development and introduction of automated and centralized control system. Development and introduction of water use on-line control system will be done using modern technologies, which will be replicated throughout the country if proved to be successful. The data collected by the automated, centralized control system should ensure continuous registration of actual water use and be accessible to all stakeholders, through the WRMA information portal.

The main stakeholders of the project will be the Water Resources Management Agency (WRMA) of the Ministry of Nature Protection of Armenia and the Akhuryan Basin Management Authority, as well as Armavir Marz Service of the State Environmental Inspectorate of the Ministry of Nature Protection of Armenia. These 3 agencies are considered as the main beneficiaries, since they are the ones who will have the control function, and will have authorization to manage the on-line system. In addition to them, all current and potential water users will benefit from the system, given that they will have the accessibility to view the actual water use in the basin in real-time.

III. Implementation, deliverables and timeframe

The main output of the project is to improve the water resources management and ensure efficient water use the development of a system for an automated, centralized, on-line control of actual water use in Metsamor (Sevjur) River basin.

The scope of works will consist of the following key components:

- (i) Development of detailed terms of reference and scope of the on-line water use control system;
- (ii) Development of computer program for the system;
- (iii) Installation of the system at the 3 control points (WRMA, Akhuryan BMA and Armavir Marz Service of the State Environmental Inspectorate (SEI));

- (iv) installation of the computer program on the servers and delivery of corresponding training in system use;
 (v) economic assessment for full introduction of the system, including costs for water users to install automatic meters and meter reading systems¹ throughout Armenia.

The proposed innovative approach is in line with the initiative of the Government of Armenia (GOA) to revise the Republic of Armenia law “On Environmental Control”, which is currently passing its second reading in the Parliament of Armenia, and which introduces the principle of self-monitoring, including for water sector.

Also, if the pilot project proves to be successful, WRMA plans to expand it throughout the country. To do that WRMA plans to put a condition in the water use permits that that water users have to install meters (with certain specifications) at their own cost.

IV. Deliverables and timeframe

The duration of the assignment is **12 months**. The expected commencement of the assignment is November 1, 2014 and the completion date is September 31, 2015.

The assignment is divided into five consecutive phases with the following schedule of deliverables:

| Task | 2014 | | 2015 | | | | | | | | |
|--|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|
| | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| 1. Development of detailed TOR and scope for the system | | | | | | | | | | | |
| 2. Development of computer program for the water use on-line control system and testing | | | | | | | | | | | |
| 3. Procurement of 3 computer servers for the 3 system control points and testing equipment | | | | | | | | | | | |
| 4. Installation and testing of the system, installing 3 digital water meters at selected points and delivery of training | | | | | | | | | | | |
| 5. Full economic assessment for introduction of the system | | | | | | | | | | | |

The consultant will provide the following reports:

- Inception report – 15 November 2014
- Computer programme manual – 28 February 2014
- Procurement and installation plan – 31 March 2015
- Training materials and report – 31 July 2015
- Final report – 30 September 2015

All documents shall be prepared in the English and Armenian language.

¹) Automatic Meter Readers is a system and process used to remotely collect water meter data without the physical presence of personnel at the reading point. Automatic Meter Readers afford water suppliers with a cost effective solution to meter reading. Automatic meter readers use a real time wireless communication network to connect digital water meters with a central management system.

V. Remuneration and payment schedule

The overall budget of the pilot project is up to **40,000 euro and includes the cost of installation of 3 water meters at selected location and corresponding meter reader device supply and installation.**

The tranches made will be subject to acceptance of the tasks according to the following breakdown:

- 20% upon completion of task 1,
- 30% upon completion of tasks 2 and 3,
- 50% upon completion of tasks 4 and 5.

V. Reporting

The contractor shall report to the project TL, Timothy Turner regarding overall deliverables and to the Country Water Management Expert Vahagn Tonoyan, for all day-to-day management issues.