

	Reporting guidelines	Number of pages: 1 / 5
---	-----------------------------	---

Mission reference
2007 C5 T33

Date:

<h1 style="margin: 0;">Mission report</h1>
--

Expert Name and Function

- Sam Ekstrand. Water Resources and GIS Department Manager. IVL Swedish Environmental Research Institute – Sweden
- Mercedes Alonso. Directora Unidad de Gestión del Proyecto Binacional Catamayo-Chira – Ecuador/Perú
- Edi Juri. Director Dirección Nacional de Hidrografía. Uruguay
- Sergio Gámez. Director Centro de Investigación y Estudios en Medio Ambiente. Nicaragua

Wording of missions: *In short, objective or content of mission*

IVL Sweden is coordinating an EU project called TWINLATIN “Twinning European and Latin-American River Basins for Research Enabling Sustainable Water Resources Management”. TWINLATIN has been in operation since September 2005 with a three-year duration. During the first year efforts have focused on defining prioritised needs from each of the basins, the stakeholder involvement, the data availability, and the construction of a harmonised database. The current relationships are aimed at filling knowledge gaps and providing the basis for the establishment and improvement of integrated water resources management plans (IWRP).

The main training needs have been identified in each of the partners in TWINLATIN and some twinning activities have already taken place. These actions have gone smoothly and all the partners have learned from this twinning process. However, the current funding is limited compared to the gaps in knowledge identified. The partners have decided to look for additional sources of financing a more concrete training program where the central issues are: Database construction and Modelling applications.

IVL (Sweden), UNIGECC (Peru/Ecuador), CIEMA (Nicaragua) and DNH (Uruguay) agreed in that the knowledge, expertise and experience that IVL has in-house can help them to establish a more sustainable IWRM in the respective Latin American basins. It was decided to organise a training activity with database construction and modelling applications as the main content focus.

The training at IVL was attended by participants from three different TWINLATIN basins: two from the Catamayo-Chira basin in Peru/Ecuador, one from the Lake Cocibolca basin in Nicaragua and two from Cuareim-Quarai in Uruguay. The training consisted of two parts (see attached training schedule). The first two weeks were devoted to activities that were common for all participants: lectures in hydrology, hands-on training with hydrological models and the ArcHydro database structure. The last week of the training consisted of supervised work with data from respective basin that the participants were asked to bring to the training. The objectives of the hydrological modelling and the progress of the planned activities in the three basins differed a lot.

1. CONTEXT

<p><u>Place, location:</u> <i>Country visited, Basin Organization concerned, other information about location</i> The training was arranged at the IVL offices in Stockholm – Sweden. The Water Resources and GIS</p>

Department was the responsible for all organisations and the expert provision.

Mission duration:

The training took place between 16 April and 4 May, 2007

2. OBJECTIVE

Initial objectives	Results	Results indicators <i>explain with some details how far the results have been achieved if compared to initial objectives</i>
<p>1 To encourage the exchange of expertise, knowledge and technical personnel.</p>	<p>The main expected result is the strengthening of the effectiveness for integrated water management within the national network of the agreement members.</p>	<p>Catamayo-Chira Basin (Ecuador/Perú)</p> <ul style="list-style-type: none"> • A new DEM (Digital Elevation Model) of the whole basin is being constructed with a 40 m vertical resolution (compared to the current 200 m) and ground truth observations are being conducted in order to validate the land use map. • Training on SWAT model has been taken place. The work done during the training at IVL primarily focused on getting SWAT up and running with the current low-resolution data so that the improved DEM and land use classification can be readily incorporated when they become available. • Model set up for case study in Catamayo-Chira <p>Lago de Nicaragua, Nicaragua</p> <ul style="list-style-type: none"> • Data quality control and checking has been done using the precipitation and discharge data from the basin area. • Filling the data into ArcHydro database. Due to the scarcity of and lack of high-quality time-series data needed for modelling a lot of energy has been put into data check and quality control. • The work was finished during the training and it was also decided that the PCRaster model, which has a reasonable data demand, is going to be set up for three sub basins in the Lake Cocibolca basin. • The setting up of the model was initiated during the training and the main problem to address will be the impact of land use change on river regimes. • Model set-up for case study in Nicaragua Lake <p>Cuareim-Quarai basin (Uruguay/Brazil)</p>

			<ul style="list-style-type: none"> • For several sub basins on the Uruguayan side the MODSIM, which is a generalized decision based support system and network flow model, is set-up. • In order to further study the impact of the reservoirs and find a more suitable model for the studies of water allocation the focus of the Uruguayan participants during the training was to work with the Water Rights Analysis Package (WRAP) Modelling System. • The Uruguayan participants also assisted in giving input to the development of the latest version of the IVL Watshman model. • Model set-up for case study in Cuareim-Quarai
--	--	--	--

It is important to mention that the goals of these proposed exchanges consist of teaching database management, exploring different tools and modelling software, and receiving training in the construction of scenarios.

The professionals that took part of this training activity were those people in charge of the database construction and maintenance as well as the modelling application aspects in their respective basins.

3. ACTIVITES DEVELOPED during the mission

The activities carried out are listed in the following table.

Programme

<u>Date</u>	<u>Time</u>	<u>Activity</u>
Mon 16/4	09:00 – 11:30 12:30 – 16:30	Welcome and Introduction Introduction to ArcGIS (MO)
Tue 17/4	09:00 – 16:30	Relational databases. ArcGIS exercise (MO)
Wed 18/4	09:00 – 16:30 18:00 –	ArcHydro: Introduction to ArcHydro Tools. Database build-up exercise (MO) <i>Social event</i>
Thu 19/4	09:00 – 16:30	ArcHydro: Linking to Watshman (MO, BH)
Fri 20/4	09:00 – 11:30 12:30 – 16:30	Lecture: Runoff modelling I (TP) SWAT: Introduction. AVSWAT Interface (PW)
Weekend		
Mon 23/4	08:00 – 17:00	<i>Field excursion to main site of the NOPEX Climate experiment.</i>

	Reporting guidelines	Number of pages: 4 / 5
---	-----------------------------	---

Tue	24/4	09:00 – 11:30 12:30 – 16:30	Lecture: Runoff modelling II (TP) SWAT: DEM processing and watershed delineation (PW)
Wed	25/4	09:00 – 11:30 12:30 – 16:30	SWAT: Processing of soil and landuse grids. Soil type and landuse, HRUs (PW,TP) SWAT: Building of model input files. Work with example datasets (PW, TP)
Thu	26/4	09:00 – 11:30 12:30 – 16:30	SWAT: Sensitivity analysis. Auto-calibration. Uncertainty analysis (PW, TP) SWAT: Work with example datasets (PW, TP)
Fri	27/4	09:00 – 16:30	Model setup for case studies in respective basin
Weekend			
Mon	30/4	09:00 – 16:30	Model setup for case studies in respective basin
Tue	1/5		Public holiday
Wed	2/5	09:00 – 16:30	Model setup for case studies in respective basin
Thu	3/5	09:00 – 16:30	Model setup for case studies in respective basin
Fri	4/5	09:00 – 16:30 12:30 – 16:30	Training summary: Model results. Discussion. Work plan for continued modelling activities

4. LESSON LEARNT during the mission

(what could be shared with other partners and/or introduced in guidelines, as far as IWRM is concerted)

- **About methodology:**

- This type of activity should not be carried out as a traditional lecture based training course. Instead the focus should be on addressing hands-on problem solving within the specific work packages. In this way the participants can have a better perspective about what are the problems in details and referred them to the whole project.
- It was very important for IVL to gain a direct insight of the different groups' technological level and their way of facing and solving technical problems. This enables IVL to be more effective/efficient when dealing with more detailed and deeper transfer of knowledge.
- Every participants gain knowledge and understanding from the other participants as the supervisors encouraged a continuous discussion between the groups and as well as there were scheduled presentations during the training.

About Practice:

- Each participant should carefully prepare the information and data before and in advanced. The data gathering process will help them in understanding and identifying the needs and gaps.
- Because the programme was flexible it is very important that there is a clear goal for the twinning activity in this case the setting up of a model for their own basin
- The language was not a problem as the activity had a technical focus (modelling, database construction, etc), and actually it increase the cooperation between individual groups since they could explain for each other if there was a subject not totally understood.
- The field visit was aiming at giving the participants a wider perspective of hydrology in Nordic conditions. It gave also an excellent opportunity to look at advanced hydro-meteorological measuring methods and discuss the different components of the hydrological cycle.

5. DISSEMINATION (opportunities and difficulties)

In what measure these learnt lessons are applicable to:

- **The basin Organization the expert belongs to:**

The most important application is the possibility to be more effective in the data handling and better correlation within the factors involved in the IWRM concept (soil, water, public participation). The use of geo-referenced database and the use of suitable modelling tools will help the organization being more effective/efficient in their tasks.

All participants are now connected and they use to ask each other about technical problems and solutions. This network is another opportunity to disseminate knowledge.

- **National IWRM practice:**

The participants came from National and/or leading organisations in charge of water management (quantity and quality) meaning that all the knowledge gained through this training activity have also a National perspective. This capacity building activity will help them to improve their technical strength in an integrated approach.

- **Regional experience:**

TWINLATIN has as one of the final results to create all conditions for applying the IWRM in other basins. The training activity, the network created, the increased level of capacities and the interest and needs for implementing more integrated approaches in Latin American countries will contribute to increase the regional knowledge and capacity for IWRM.

- **Worldwide:**

This activity where European and Latin American participants come together and learn from each other is and excellent example of the fruitful cooperation and the effectiveness of this type of activities.

6. IDENTIFIED TIPS

Identified tips which could be useful for colleagues

The data preparation and checking should be done in advance before running the training activity in order to focus on application and tools instead of on data quality.

The training activity must have a final technical objective. Setting up the database for the basin and/or setting up the SWAT model for the basin. This clear objective helps the participant to see the activities in a real situation and real problem solving approach.

The language is not a barrier when you mix different people with different level of English. Provide a place for discussions and let the participants interact between each other.

Field visits should focus on how the information flow in the water sector is, what are the tools used and how is the interaction with stakeholders.

7. PERSONAL COMMENTS

What does the missionary think about his mission?

- From the professionals that attended this training course point of view, the activity was very fruitful. The activities were carried out considering a suitable practical level and the solving problems approach. The theory and practice learnt at the course can be easily adapted and implemented in their daily work regarding water resources management.
- For the IVL experts this activity was an excellent opportunity to realise the real problem level in the LA basins. This knowledge is a key aspect when organising and dealing with knowledge transfer projects and local technological needs.

8. CONTACTS

The following table indicates the people involved in this training activity:

Name	Organisation	E-mail	Phone number
Tony Persson	IVL, Sweden	tony.persson@ivl.se	+46 8 598 563 97
Peter Wallenberg	IVL, Sweden	peter.wallenberg@ivl.se	+46 98 563 92
Mikael Olshammar	IVL, Sweden	mikael.olshammar@ivl.se	+46 8 598 563 08
Bokai Huang	IVL, Sweden	bokai.huang@ivl.se	+46 8 598 563 51
Sam Ekstrand	IVL, Sweden	sam.ekstrand@ivl.se	+46 8 598 563 45

Karen Valdivieso	UNIGECC, Peru/Ecuador	kvaldiviezo@aeci.org.pe	+51 73 32 33 71
Andoni Iriarte	UNIGECC Peru/Ecuador	andoniiriard@yahoo.es	+51 73 32 33 71
Silvana Alcoz	DNH, Uruguay	salcoz@dnh.gub.uy	+598 2 916 4783
Marcelo Martin	DNH, Uruguay	mmartin@dnh.gub.uy	+598 2 916 4783
Miguel Blanco	CIEMA, Nicaragua	meblanco_ch@yahoo.es	+505 270 1515

9. BIBLIOGRAPHY

Main documents, manuals or supports used during the mission which could be useful for colleagues

Name	Description / Notice
<ul style="list-style-type: none"> • ArcHydro, GIS for Water Resources. David R. Maidment, editor 	This book presents an improved standard for creating and using data in hydrologic projects. The ArcGIS hydro data model is the latest innovation in GIS modelling and increases the potential to integrate data from many sources to solve a wider range of water resource problems.
<ul style="list-style-type: none"> • SWAT user manual (downloaded from web site) 	User Manual. SWAT model is a continuation of thirty years of non-point source modelling. In addition to the Agricultural Research Service and Texas A&M University, several federal agencies including the US Environmental Protection Agency, Natural Resources Conservation Service

Websites		
Name	Description/ Notice	Address
SWAT home page	Describe the basis of SWAT model, user manual, downloads, and application	http://www.brc.tamus.edu/swat/
ESRI GIS and mapping software's	ArcGIS tools description	http://www.esri.com/

	Reporting guidelines	Number of pages: 8 / 5
--	-----------------------------	----------------------------------

Mission reference
2007 C5 T33

Date:

Financial report

Expert Name: Silvana Alcoz and Marcelo Martin
--

Date of arrival	Date of departure	Number of days	days cost (€)	travel cost (€)	Total*
17 April 2007	04 May 2007	18	€70*18*2= € 2.520	€1000*2 = € 2.000	€ 4.520

* We use the Oanda currency converter to exchange in euro at the date on the travel invoice.

Name and address of the Basin Organisation :
To: Dirección Nacional de Hidrografía , Ministerio de Obras Públicas – Uruguay Bank's name: Bank's address: Account number: Bank Code: IBAN code **: SWIFT BIC CODE :

** IBAN CODE is only for European country.

Expert Name: Karen Valdivieso and Andoni Iriarte

Date of arrival	Date of departure	Number of days	days cost (€)	travel cost (€)	Total*

* We use the Oanda currency converter to exchange in euro at the date on the travel invoice.

Name and address of the Basin Organisation :
To: Bank's name: Bank's address: Account number: Bank Code: IBAN code **: SWIFT BIC CODE :

** IBAN CODE is only for European country.

**Expert Name: Miguel Blanco**

Date of arrival	Date of departure	Number of days	days cost (€)	travel cost (€)	Total*
14 April 2007	07 May 2007	24	€ 70*24 = € 1.680	€ 1.000	€ 2.680

* We use the Oanda currency converter to exchange in euro at the date on the travel invoice.

Name and address of the Basin Organisation :

To: Centro de Investigación y Estudios de Medio Ambiente, Universidad de Ingeniería – Nicaragua

Bank's name:

Bank's address:

Account number:

Bank Code:

IBAN code **:

SWIFT BIC CODE:

** IBAN CODE is only for European country.

Papers to join:

- Original justificatives : Plane Ticket and Boarding Pass**

Just keep one copy of due justificatives for yourself.

Send due report to following address:

Techware c/o hydrocontrol
Project TWINBASIN
Strada 52 Poggio dei Pini
09012 CAPOTERRA. (CA)
ITALY
E-mail: info@techwarenet.org
Fax: +39 070 725 478