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Extended Abstracts

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1.1
Evaluation and management of groundwater — sustainable exploitation

title: **Integrated water resources management: from monitoring to eco-strategic initiatives**

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INTRODUCTION

Act locally, plan and interact globally. Effectively, despite each site and each water source are particular, the overall approach towards groundwater management and survey is generally going through the following processes:

- Hydrogeological study from local recognized Hydrogeologists and Geologists in order to fully understand how the aquifer systems in place are functioning from the recharge area to the catchments. These investigations are ideally leading to a schematic conceptual model of the site, what is helping also non-specialist actors involved in the integrated water management to get a good idea of the natural behaviour.
- Vulnerability study with proper risks assessment of the aquifers and production catchments, as well as proper water balance to help preserving the Water Resources over the long term in an efficient and proactive way.
- Efficient monitoring system (production wells but also representative and relevant piezometers) to ensure full overview of the water-bearing's status and evolution in terms of quantity and quality.
- Definition and triggering of strategic sustainable projects aiming to reduce as much as possible the potential threats that might have been identified against the environment and the groundwater in particular (i.e. agricultural practices, land use, flooding).

STANDARDISED MONITORING SYSTEM

You only can manage what you can measure, this is also true for the groundwater, reason why Nestlé Waters developed an interactive tool to monitor closely each of its water source.

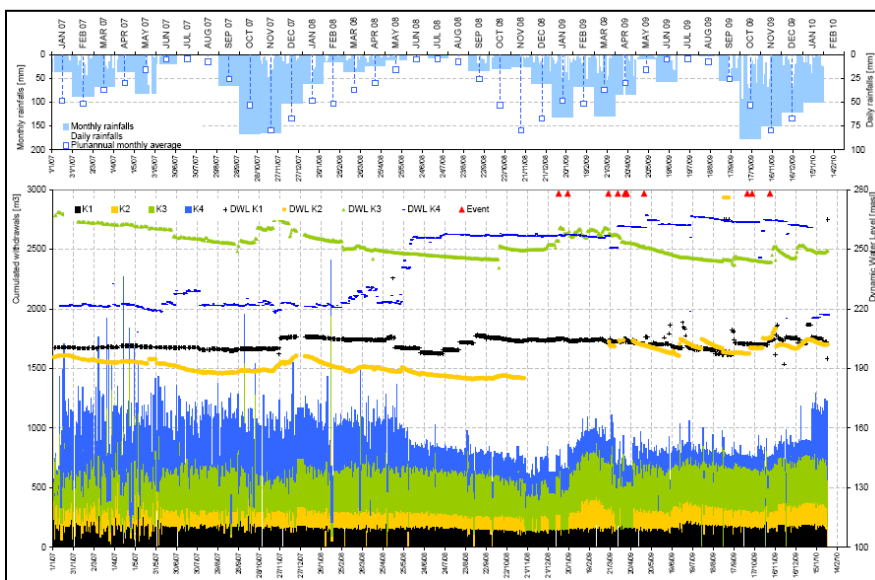


Figure 1. Example of processed synthetic information representing simultaneously the recharge by the rainfalls (upper graphic) with the dynamic water levels (DWL) in response to the withdrawals from four different wells.

For all of them, withdrawals, instantaneous discharge, temperature, conductivity, dynamic water levels and rainfalls are monitored continuously or on a daily basis, while other parameters like static water levels in relevant piezometers and turbidity are also monitored on a regular basis. On top of that, a high performing quality monitoring system (chemistry and microbiology) is carried out from the water sources to the filling machines, including pipes, water storage tanks and water treatment processes. The key data provided by each industrial site for each of the production well is then regularly processed and reviewed by the Zone Water Resources Manager. This Hydrogeologist is consolidating, reviewing, organising and regularly updating these important data with the relevant figures and graphics.

CENTRALISED INTERACTIVE WATER RESOURCES DATABANK

All the key information concerning Water Resources in general is important to be shared internally between the different responsible managers (Water Resources, Environment, and Quality).

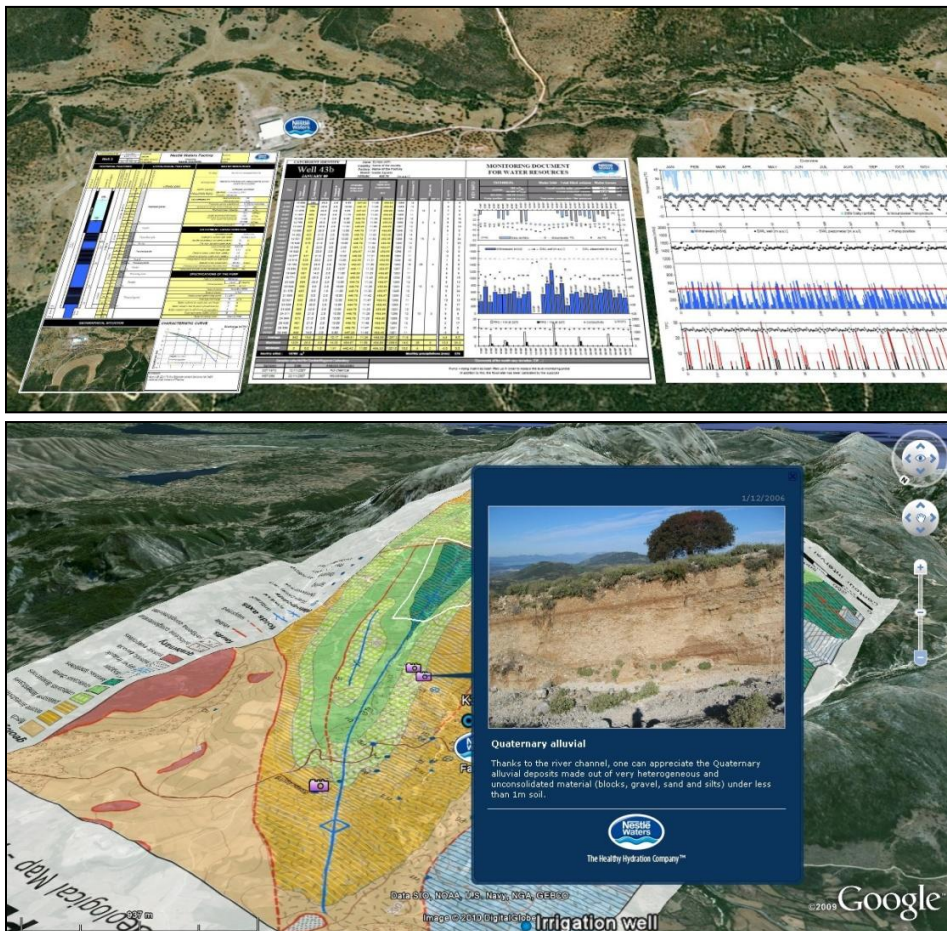


Figure 2. Above: representation of the daily key information collected from each production catchment. From left to right: Well ID, monthly and yearly graphical compilations. Below: example of customized window representing relevant observations from the field.

Nevertheless, in a big Group like Nestlé Waters, the specialists are often far from the production sites and the local management. So, in addition to the monitoring data and graphics those need to be updated regularly, a lot of multidisciplinary figures and references must also be available through a centralised and secured corporate server. For this reason, Nestlé Waters developed and implemented through Google Earth a customised Water Resources databank. In a very interactive way, this tool is allowing the organisation and the access to many important documents like maps and pictures of course, but also to full studies or reports concerning Geology, Hydrogeology or Vulnerability that are sometimes getting lost or “sleeping” in folders or cupboards. Just like an intranet site, this is how all the responsible persons within the Markets have a remote access to the most updated water resources databank.

LONG TERM ECO-STRATEGICAL INITIATIVES

The groundwater management cannot be separated from the global water cycle. So once the groundwater functioning and vulnerability are well understood and the monitoring system is in place, a preventive approach intends to stimulate and to coordinate at the level of the whole recharge area, a number of preventive eco-strategic initiatives to protect the aquifers and the environment over the long term. The objective is to harmonize the economic development on the one hand, and the sustainable preservation of the environmental resources on the other hand. The aim is to reduce on the long term the potential threats on the water resources. These eco-strategic projects are going from application of new alternative agricultural practices (without pesticides) to original initiatives like phyto-remediation, biogas installation or short circuits for fruits and vegetables for example.

CONCLUSION

The sustainable and responsible management of the Water Resources is the baseline for Nestlé Waters’s business. Hydrogeological knowledge and high performing monitoring system are the pillars for relevant integrated management. Nevertheless, the Group is also convinced that Sustainable Management is simultaneously an excellent opportunity for local economic development, by creation of “Shared Value” with the local Stakeholders that want to collaborate over the long term. As a matter of fact, the stimulation and the implementation of eco-strategic initiatives are now totally part of this “partnership” sustainable management that Nestlé Waters wants to disseminate all over its production sites.



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