



## **Catchment-Based Monitoring Project in Ghana (Basin level & National IWRM Plan)**

### **Project title**

**Monitoring groundwater resource occurrences and their quality in the Tano and Pra River Basins with surface water quality monitoring in the South-western, Coastal and Volta River Basins**

**[Contract Number: 223078]**

### **Collaborating Agents**

#### **Contracting Authority :**



**Ministry of Finance & Economic Planning  
Accra-Ghana**

#### **Consultant:**



**CSIR-Water Research  
Institute  
Accra**

#### **Client:**



**Water Resources Commission  
Accra**

#### **Financing:**



**European Union (EU)  
European Development Fund  
(EDF)**

**Project Staff:**

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**Executive Summary**

In December 2009, an agreement was signed between the European Union (EU), the Ministry of Finance and Economic Planning and the CSIR Water Research Institute (WRI) to focus on Integrated Water Resources Management (IWRM) in Ghana. This was a follow-up to the Danish International Development Assistance (Danida) initiative on the Water and Sanitation Sector Programme Support (WSSPS) in the Country. The WSSPS also included a component for continued support for the introduction of Integrated Water Resources Management (IWRM) by the Water Resources Commission (WRC). It is against this background that the Water Resources Commission collaborated with the EU to assist through their European Development Fund (EDF) to fulfill the call for the preparation of national IWRM and water efficiency plans. The scope of the project was to assess the surface water quality of Southwestern, Coastal and Volta Rivers System as well as the assessment of groundwater quality and groundwater level fluctuations monitoring in the Pra and Tano river basins. The project is being financed by the European Union. The implementation date of the project is 1st January 2010 and shall run for 24 months from this date. The National IWRM Project has been categorized into two-component activities; *the groundwater resource* and *the surface water quality assessments*.

Surface Water Quality Assessments was carried out in 40 locations (ie; 31 river stations and 9 reservoir/lakes stations) in the Volta, Southwestern and Coastal Rivers Systems in 2010. Sampling of the rivers and lakes took place at quarterly intervals within the months of March, July and October 2010. Against the background of several technical hitches in the course of the analysis, assessments were carried out on the following physico-chemical water quality parameters: Temperature, pH, Conductivity, Total Suspended Solids (TSS) and Transparency, Nutrients, Major Ions, Micro-Organic Pollutants, Trace metals in water & fish, and sediment analysis. All the Laboratory analyses were performed in accordance with Standard Methods for the Examination of Water and Wastewater. Various levels of physico-chemical and bacteriological contamination were observed in the water samples. The high measured BOD level indicates the occurrence of organic pollution in the surface water resources with the Volta Rivers Systems appearing less polluted than the Southwestern and the Coastal Rivers Systems.

Most of the river waters were classified as Class II (*fairly good water quality*), with few exceptions which were in Class III (*poor water quality*). It is recommended that further studies should be carried out on organic micro pollutants in sites that recorded traces of such contaminants and public education of the communities on water quality issues should be carried out in order to improve the quality to Class I (*good water quality*).

Phytoplankton samples were collected in ten reservoirs, lakes and rivers in the South-western, Coastal and Volta Basins during the first quarter and third quarter. Two samples were taken from each water system giving a total of 40 samples for the year 2010. All samples were analysed and the results indicated high levels of *Euglena*, *Phacus* and *Trachelomonas* species as a result of high organic pollution state of the waters. Sampling sites such as Ajena, Barekese and Sogakope recorded a number of cyanobacteria taxa counts such as *Cylindrospermopsis*, which are toxic species and has potential negative consequences on human health when ingested orally through drinking water.

Within the period under review, available hydrogeological data within the Pra and Tano river basins were collected from CWSA and also from WRI's hydrogeological database. The analysis of the existing data collated shows that a total of 3,368 boreholes have been drilled in the study basins with 165 boreholes being dry and/or abandoned. During the period under review, arrangements were concluded with the District/Municipal Assemblies within the study basins to release some of the abandoned boreholes for monitoring activity. Consequently, 20 of them which are located at strategic positions were released in the Pra and Tano river basins, and are to be rehabilitated for the monitoring activity. Groundwater level measuring device (Divers) has been installed to begin the level fluctuation data collection. Monitoring is still in progress to facilitate the achievement of comprehensive results.

## **Objectives:**

### *The general objectives:*

- To develop “an efficient and effective management system that exists for the sustainable development of Ghana’s water resources to ensure full socio-economic benefits for present and future generations”.
- To expand the structured, well-targeted water quality monitoring programme, which will enable WRC to achieve a general assessment of the state of the water quality of the south-western, coastal and Volta river basins in relation to sustenance of aquatic life and with due consideration to user-related purposes (water supply, irrigation, consumption of fish) focusing on surface water (rivers and lakes).

- To rehabilitate existing boreholes located at selected priority areas in the Pra and Tano river basin to carry out regular groundwater (level) monitoring, collect data and desk analysis to assist in the water resource assessment studies.

*The specific objectives:*

#### **Water Quality Assessment**

- To sample water from selected rivers and lakes thrice in the year spanning over the months of March, July and October.
- To conduct laboratory analysis of the surface water samples.
- To take photograph of the state of the waters during each sampling activity.

#### **Groundwater Assessment**

- To collect and collate available data on existing boreholes
- To select twenty wells and consequently visit the boreholes to assess their functionality status
- To make request for the selected boreholes from the District Assemblies and CWSA
- To rehabilitate (airlift) and conduct pumping test of those boreholes.
- To protect the monitoring wells with metallic fence
- To install divers for the monitoring activity
- To visit the monitoring wells quarterly in order to download data on the groundwater level fluctuation and collect groundwater sample for physic-chemical analysis.
- To prepare inventory of groundwater abstraction points in the Pra and Tano river basins.

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EU-Project. (Dec. 2010). Basin Level & National IWRM Plan - *Monitoring groundwater resource occurrences and their quality in the Tano and Pra River Basins with surface water quality monitoring in the South-western, Coastal and Volta River Basins*. Annual Report. Contract No. 223078. CSIR-WRI Library Publication, Ref No. WRI/CAR No. 161.

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