Propuesta de Concepto de Proyecto Regional

Region	Venezuela		
Regional agreement / cooperation (if applicable)	ARCAL	**Nº de prioridad otorgado por el acuerdo regional/de cooperación** (para conceptos propuestos bajo los auspicios de los acuerdos regionales/de cooperación)	M2
Title	Use of the environmental isotopes and hydrogeochemical conventional tools to evaluate the impact of the contamination from agricultural and domestic activities on the groundwater quality.		
Field of activity	Environment		
Category of the regional project [1]	☐ *Transnacional* ☐ *Establecimiento de normas regionales* *X Creación de capacidad para países en desarrollo* ☐ *Actividades conjuntas de CT con una entidad regional o internacional*		
Names and data contact of the project partners and the counterpart institutions (starting main counterpart)	Dr. Ramón Luis Montero Mudarra Hydrogeochemical Laboratory, Geochemical Center, Earth Sciences Institute, Faculty of Science, Central University of Venezuela. Caracas, Venezuela Teléfono profesional: +58-212-6051539; +58-212-6051201 Fax profesional: +58-212-6051152; Teléfono celular: +58-426-3110336 Correo electrónico profesional: ramon.montero@ciens.ucv.ve; ramon.montero@ucv.ve		
Analysis of problems/ deficiencies / regional needs	Geochemically, the study of surface water and groundwater reservoirs is very important because the information obtained can be used to know the processes and factors that control the chemical composition of the water, allowing understand the hydrochemical systems in a particular region and as to clarify the relationship between quality, types of anthropogenic activities , lithological composition of the unit or units and aquifer recharge rate; as well as the effective management and use of water resources. By the other hand, water bodies constitute the final recipients of solutes from other areas of the same watershed. This may result in impact on quality of it, due to the arrival set of chemical species including nutrients, fertilizers, pesticides and herbicides, among others, associated with the various activities that are performed there. Among them, agricultural and livestock practices can lead to the degradation of ecosystems not only through deforestation and erosion, but also by the use of agrochemicals including fertilizers, herbicides and pesticides; affecting the quality of water present in the catchment, leading to the degradation of surface water bodies and groundwater systems in the sector that is undergoing such activities. This allows to point out that, the monitoring and evaluation of these processes is essential to establish comprehensive strategies for management of water resources and reduce negative impacts on water bodies. In Venezuela there are significant water reserves, as in the case of the Watershed of Lake Valencia where subwatershed Taiguaiguai Lagoon is contained. This basin is located in an intermountain graben, between Aragua and Carabobo in central Venezuela region, specifically between the coordinates 67° 20' and 68° 00' west longitude and 10° 00' and 10° 20' north latitude. This region covers an area corresponding to 0.3 % of the territory of Venezuela. Towards its western border is located the Valencia city, and to the east is the area of the city of La Victoria. The Cordillera de la Costa appears toward north of the lake and in its southeastern the Serrania del Interior. The Valencia Lake basin can be defined as a closed basin where rivers that drain into the lake meet. Meanwhile, in Aragua state, with UTM coordinates 660000-670000 1124000-1112000 north and east, to 5 km south of the city of Cagua, explicitly in the south-eastern depression of Valencia Lake, at the Zamora municipality and occupying an about 198 km^2 area, is located the Taiguaiguai Laguna sub-basin. Throughout its history, the Valencia Lake Basin has been always a source of water supply and livelihoods of the people who settled it. At present, the expansion of industry and the agricultural, livestock, poultry and cattle breeding, pig and the rapid growth of the urban areas, has meant that increasing demands fall on the water resources of the region. These demands have begun to diminishing the quality of		

[1] Véase el documento titulado "Policy and Procedures for TC Regional Projects" en la dirección: http://pcmf.iaea.org/DesktopModules/PCMF/docs/2014_15_Docs/notes/Regional_TC_Project_Policy.pdf

	source water present therein. In regard to the hydrogeology of the watershed of Taiguaiguai Lagoon, groundwater flows in a northwesterly direction, in the same direction in which the permeability increases. This aquifer is divided into two types: one free regime located at south and other semiconfined regime located northwest, where the permanent aquifer reserves are 237,755,925 m^3 of water (Biondo and Estévez, 2010). Given the characteristics of this sub-basin, monitoring and evaluation of these processes is essential to establish comprehensive strategies for management of water resources and reduce negative impacts on water bodies. The determining of the environmental isotopes ^3H, ^{18}O, ^2H and ^{15}N and the evaluation of the herbicides and pesticides, enable a comprehensive assessment of the pollution in water bodies, as well as the decline in the quality of water resources available.
Why should be a regional project?	Considering the problems of loss of quality of water resources appear to be common in Latin America and the Caribbean by pollution associated with agricultural and urban practices, along with the need to assess the impact on watersheds has use agrochemical arises this project, which aims to integrate purpose and compare the results obtained in similar basins in different areas of South America and the Caribbean. This also imbued with the Objective V in the Program Homeland of Venezuelan government referred to the contribution to the preservation of life on the planet and the salvation of the human species.
Analysis of associations and interested parties	*Describa el análisis realizado de las partes interesadas, indicando todas las interesadas o afectadas, los usuarios finales, los beneficiarios, los patrocinadores y los asociados identificados, y defina claramente las funciones de cada entidad.* The Institute of Earth Sciences (ICT) at the UCV, has a research area related to hydrogeochemical studies of groundwater, thermals, formation and surface waters with extensive experience in the collection, preservation and analysis of water samples. In this sense, the research staff of the ICT has developed methodologies for studies of waters which include: Determination of the major and minority chemical species Na^+, K^+, Ca^{2+}, Mg^{2+}, Cl^-, F^-, HCO_3^-, SO_4^{2-}, NO_3^-, PO_4^{3-} and SiO_2 (dissolved silica) and trace elements B, Li, Rb, Sr, Ba, Al, Fe, Mn, Cu, Ni, Zn, As and Hg; supplied for this purpose of analytical instruments like Atomic Absorption and Emission Spectrophotometer, ICP- OES and Hg elemental analyzer; while the determination of compounds associated with herbicides, pesticides, fertilizers and some aromatics in aqueous solutions and organic matrix by gas chromatography and HPLC. Meanwhile, Laboratory of Soil and Water CIDIAT-ULA has the analytical capability for measuring deuterium (D) and oxygen 18 (^{18}O) in groundwater and surface water samples. Moreover, this laboratory has extensive experience in the development and implementation of projects of Hydrology and Hydrogeology. Nuclear Physics Group of the USB also has a wide range of Nuclear applications in various fields of national interest including Industry, Petroleum, Geology, Hydrology, Environment and Health, among others. In this context, this institution has been serving the country a number of Atomic and Nuclear Analytical Techniques, with the support of the IAEA and the Ministry of Science of Venezuela. The beneficiaries of the project results are all private and public institutions and research entities responsible management of natural resources such as hydrological, hydroelectric, weather, forest, agricultural and livestock; as well as those related to regional and national competition authorities in developing policies and laws that lead to decisions on sustainable management of water and soil resources. Prominent among them, the National Institute of Meteorology and Hydrology (Inameh), Ministry of Environment (Minam), Research Institute of Geology and Mining (INGEOMIN) and Hidroven, among others.
Objetivo general (u objetivo de desarrollo)	Evaluate the impact of agricultural and domestic activities on the quality of groundwater in the sub-basin Taiguaiguai Lagoon, by the use of agrochemicals.

Analysis of the objectives	○ Physicochemical characterization of the groundwater and surface waters at the Taiguaiguai Lagoon Sub-basin, through the measurement of the parameters electric conductivity, pH, Eh and temperature. ○ Implement the hydrogeochemical study of the groundwater, through the determination of the majority and minority chemical species Na^{+}, K^{+}, Ca^{2+}, Mg^{2+}, Cl^{-}, F^{-}, HCO_3^{-}, SO_4^{2-}, NO_3^{-}, PO_4^{3-} and SiO_2 (dissolved silica). ○ Implement and strengthen the implementation and use of environmental isotope hydrology ^{3}H, ^{18}O, ^{2}H, and ^{15}N, in the evaluation of water bodies, which together with the determination of the chemical species, strengthen the identification of the factors and processes determining the chemical quality; and to evaluate the impact of contamination process on groundwater bodies by agricultural and domestic activities. ○ Evaluate the possible origin and presence of trace elements B, Li , Rb , Sr, Ba, Al, Fe, Mn, Cu, Ni, Zn , As and Hg on groundwater and its impact on human health. ○ Assess the presence of pesticides and herbicides in groundwater bodies and their likely impact on human health. ○ Know the source of nutrients in groundwater and its possible relation to agricultural and livestock activities in the basin. ○ The hydrogeochemical study of the groundwater using environmental nuclear techniques are tools that give forcefulness and sustenance to the results obtained by conventional techniques, since it can help identify whether the source of certain nutrients such as N is of animal, vegetable or associated with the use of fertilizers. Meanwhile, the isotopes ^{18}O and ^{2}H, is a tool to determine the origin of differentiating water from rainwater that used in irrigation or stored in lakes, ponds and water puddles. It may also be useful to know whether groundwater is being salinized by evaporation of water soil during the dry season or as the result of poor agricultural practice. ○ Contribute to human resource development, through their training in the use of nuclear techniques in hydrogeological studies and contamination processes of underground and surface water systems. ○ Determine the degree of intervention to which the proposal is being submitted through the implementation of environmental isotopes area. ○ Generate a database accessible to the sectors of political decision on the management of water resources as well as the current status of the same.
Technology's nuclear role and IAEA	In the context of the nuclear techniques to be applied, it requires the determination of isotope ratios for Stable Isotopes of H, O and N. In this, both CIDIAT-ULA as the Center for Nuclear Physics of the USB can be entities of significant support in the phase of isotopic analysis of water samples. Also, financial management and procurement of IAEA standards for the determination of pesticides in groundwater samples captured support is required. Moreover, IAEA technical support for training in the preparation of environmental samples, the corresponding isotopic measurement and interpretation of results is required, through the implementation of courses, granting of scholarship for partners and for the postgraduate students of undergraduate and graduate that are involved in the project. This will greatly help in the formation of human resources in this area of knowledge.
Project duration	Is proposed as the starting date of the project in January 2016, the execution will run for two years.
Requirements of participation	*Indique los requisitos mínimos que las instituciones de contraparte en los Estados Miembros deberían cumplir para participar en este proyecto, y cómo se verificará el cumplimiento de estos requisitos.* As a minimum requirements by the institutions of the counterparty in Member States is the availability of human resources, interest in training their staff in the use and benefits of environmental isotopes and the presence of adequate infrastructure allowing the development of the project; and which are of interest for the study watershed similar to those observed in the Taiguaiguai Lagoon problems.
State participants members	Participates as project proponent counterpart the Hydrogeochemistry Laboratory of the Center Geochemistry Institute of Earth Sciences. This under the Faculty of Sciences of the Central University of Venezuela, the corresponding institution contributes to the availability of human resources and infrastructure counterpart.
Funding and budget project	*Proporcione una estimación de los costos totales del proyecto y de los fondos que se prevé recibir de cada parte interesada.*

	Euros	Observación
Participación de los gobiernos en los gastos		

	Instituciones de contraparte		5,000.00	
	Otros asociados		8,000.00	
	Fondo de Cooperación Técnica (FCT) del OIEA	Scholarships / scientific visits / training courses / workshops	2 2 2 (courses) / 2 (workshops)	
		experts	*2*	
		equipment		
		Standards	*2,000.00*	Standards of pesticides and herbicides
		TOTAL		