ARCAL

ACUERDO REGIONAL DE COOPERACIÓN PARA LA PROMOCIÓN DE LA CIENCIA Y LA TECNOLOGÍA NUCLEARES EN AMERICA LATINA Y EL CARIBE

PROGRAMA ARCAL 2012-13

XII REUNIÓN DEL ÓRGANO DE REPRESENTANTES DE ARCAL

VIENA, 20 DE SEPTIEMBRE DE 2011

ORA 2011-04
SEPTIEMBRE 2011

PROGRAMA ARCAL 2012-2013

Numero Diseño	Numero Proyect	Titulo Projecto	Area	Nec PER	Pais Lider	Prioridad	Paises participantes	TCF			f/a	
								2012 (EUR)	2013 (EUR)	Total TCF	Total f/a 2012-13	Años futuros
RLA2010043	RLA/0/045	**Fortalecimiento del Acuerdo Regional para el apoyo del Programa ARCAL en America Latina y el Caribe (ARCAL CXXX)** Supporting the Regional Agreement to Strenghten the Latin American Regional Programme (ARCAL CXXX) OBJETIVO: Asistir a los Estados Miembros Participantes en el Programa Arcal para consolidar el acuerdo regional al fin de promover las actividades TCDC y optimizar el programa de Cooperacion Tectica en Latinoamerica y el Caribe	G		DOM		ARG, BOL, BRA, CHI, COL, COS, CUB, DOM, ECU, ELS, GUA, HAI, HON, MEX, NIC, PAN, PAR, PER, URU, VEN, SPA	213 165	121 835	335 000		
RLA2010047	RLA/0/046	**Fortalecimiento de la comunicacion y asociaciones estrategicas en los paises de ARCAL para potenciar el uso de las aplicaciones nucleares (ARCAL CXXXI)** Strengthening Communication and Partnership in ARCAL countries to Enhance Nuclear Applications and Sustainability (ARCAL CXXXI) OBJETIVO: Incrementar la visibilidad y el impacto de los resultados de los proyectos de ARCAL atravez del establecimiento de una estructura de comunicacion especializada para transmitir asuntos nucleares a todos los estados miembros	G		CUB		ARG, BOL, BRA, CHI, COL, COS, CUB, DOM, ECU, ELS, GUA, HAI, HON, MEX, NIC, PAN,PAR, PER, URU, VEN, SPA	159 850	140 431	300 281	367 500	183 750
RLA2010049	RLA/0/047	**Apoyo al proyecto especial de reconstruccion de las instituciones de ciencia y tecnologia en Haiti (ARCAL CXXXII)** Supporting Special Project to Rebuild Haiti's Nuclear Science and Technology Institutes (ARCAL CXXXII) OBJETIVO: Reconstruir y sostener recursos humanos necesarios para ser aplicados en la ciencia nuclear y tecnologia para continuar el desarrollo y bienestar de Haiti	G		HAI		HAI	98 000	93 720	191 720		
RLA201007	RLA/0/049	**Fortalecimiento del entrenamiento del personal tecnico en el mantenimiento de primera linea de los instrumentos nucleares usado en las aplicaciones nucleares del uso medico y de laboratorios (ARCAL CXXXI) asociados a estos servicios** Building Capacity and training Technical Staff for Maintenance of Nuclear Instruments Used in Medical Applications, for Laboratories and for Quality Control for Health Services (ARCAL CXXXI) OBJETIVO: Establecer un programa regional de capacitacion para asegurar la adecuada formacion de aquellas personas en la operacion, comprobaciónу lacibracion, mantenimiento y reparacion de los instrumentos nucleares usados en la medicina nuclear, control de calidad de la radioterapia y la proteccion de radiacion asociada con el servicio y los instrumentos de laboratorio	S	S9	CUB	8	BOL, CHI, COS, CUB, DOM, ECU, GUA, HON, MEX, NIC, PAN, PAR, VEN	157 770	131 660	289 430		
RLA2010027	RLA/1/011	**Automatizacion de sistemas o procesos en instalaciones nucleares (ARCAL CXXIII)** Supporting Automated Systems and Processes in Nuclear Installations (ARCAL CXXIII) OBJETIVO: Automatizar sistemas y procesos utilizando software con garantia de calidad para extender la vida util de instrumentos nucleares	E	E2 E6 E8 S9	MEX	1	ARG, BRA, CHI, COL, COS, CUB, DOM, ECU, ELS, GUA, HAI, HON, MEX, PAR, PER, URU, VEN	192 814	289 736	482 550		
RLA2010024	RLA/5/059	**Fortalecimiento de las capacidades analiticas de los laboratorios oficiales para certificacion de inocuidad de productos de origen agropecuario mediante la aplicacion de tecnicas analiticas convencionales y nucleares (ARCAL CXXII)** Harmonizing Official Control Laboratories to Analyse Chemical Contaminants in Food and feedstuffs (ARCAL CXXII) OBJETIVO: Crear centros regionales de excelencia para el analisis de contaminantes quimicos alimentos a travez de la formacion de laboratorios autrizados para desarrollar, validar e implementar metodos utilizando tecnicas relacionadas a la energia nuclear y organizando programas de prueba	A	A2	CHI	3	ARG, BOL, BRA, CHI, COS, CUB, DOM, ECU, GUA, HON, NIC, PAN, PAR, URU, VEN	185 345	154 910	340 255		
RLA2010038	RLA/5/060	**Armonizacion y validacion de metodos analiticos y entrenamiento para el monitoreo de residuos quimicos de riesgo para la salud humanas en alimentos (ARCAL CXXVIII)** Harmonizing and Validating Analytical Methods to Monitor the Risks of Chemical Residues and Contaminants in Foods to Human Health (ARCAL CXXVIII) OBJETIVO: Garantizar la seguridad alimentaria, promover tecnicas eficientes para la produccion agricola y aumentar las exportaciones de alimento	A	A2	BRA	4	BRA, COS, CUB, DOM, GUA, HAI, HON, MEX, NIC, PAN, PAR, URU, VEN	333 145	248 555	581 700		
RLA2010028	RLA/5/061	**Gestion de calidad de procedimientos integrados para la evaluacion y mitigacion del impacto producido por contaminantes en productos agricolas y matrices ambientales en cuencas de America Latina y el Caribe** (ARCAL CXXIV) Supporting Quality Management for the Assesment and Mitigation of Impacts of Contaminants on Agricultural Products and in the Environment (ARCAL CXXIV) OBJETIVO: Establecer un sistema de gestion internacional de reconocida calidad en la participacion de laboratorios para mantener un seguimiento de las cuencas agricolas de la region	A	A2	ARG	5	ARG, BOL, BRA, CHI, COL, COS, CUB, DOM, ECU, GUA, HAI, HON, NIC, PAN, URU, SPA	251 650	196 715	448 365		
RLA2010029	RLA/5/062	**Aplicacion de isotopos estables N15 y Rb85 para disminuir la degradacion de suelos debido al uso inadecuado de fertilizantes nitrogenados mediante la utilizacion de urea combinada con zeolita natural (ARCAL CXXV)** Applying Stable Isotopes to Assess the Impacts of Natural Zeolite to Increase Nitrogenous Fertilizers Use Efficiency, to Improve Soil Fertility and to Reduce Soil Degradation (ARCAL CXXV) OBJETIVO: Incrementar la produccion global de alimentos y prevenir la polucion del medio ambiente y la degradacion de la tierra a travez de la aplicacion de tecnicas nucleares para evaluar el impacto de fertilizantes naturales para mejorar la fertilidad del suelo	A	A5	ECU	7	BOL, COL, COS, CUB, ECU, GUA, HAI, HON, PAN, VEN	138 300	225 700	364 000	645 000	

PROGRAMA ARCAL 2012-2013

Numero Diseño	Numero Proyect	Titulo Projecto	Area	Nec PER	Pais Lider	Prioridad	Paises participantes	TCF			f/a	
								2012 (EUR)	2013 (EUR)	Total TCF	Total f/a 2012-13	Años futuros
RLA2010030	RLA/5/063	**Induccion de variabilidad mediante mutagenesis raioinducida en plantas nativas con potencial nutritivo y/o medicinal en regiones de origen y dispersion (ARCAL CXXVI)** Supporting Genetic Improvement of Underutilized and Other Important Crops for Sustainable Agricultural Development in Rural Communities (ARCAL CXXVI) OBJETIVO: Mejorar la disponibilidad y el valor de los cultivos con valor especial en América Latina y el Caribe a traves de mutagénesis radioinducido, con énfasis en cultivos infrautilizados	A	A10	MEX		ARG, BOL, BRA, CHI, COL, CUB, DOM, GUA, HAI, HON, MEX, NIC, PAR, VEN	137 011	162 782	299 793		66 244
RLA2010034	RLA/7/016	**Estudios de actualizacion hidrogeologica y de contaminacion difusa de los recursos de agua subterranea en acufieros sub explotados (ARCAL CXXVII)** Using Isotopes for Hydrogeological Assessment of Intensively Exploited Aquifers in Latin America (ARCAL CXXVII) OBJETIVO: Caracterizar el empleo de isotopos ambientales del estado actual hidrogeológico de los acuíferos seleccionados que son intensamente explotados en America Latina y el Caribe	M	M6 M2	MEX	2	ARG, BOL, BRA, CHI, COL, COS, CUB, DOM, ECU, HON, MEX, NIC, PAN,URU	217 399	178 922	396 321	100 000	93 936
RLA2010039	RLA/9/072	**Banco de datos de valores de radioactividad en alimentos tipicos de America Latina (ARCAL CXXIX)** Supporting a Database of Values of Radioactivity in Typical Latin American Food (ARCAL CXXIX) OBJETIVO: Llevar a cabo una caracterización radiológica de la comida tipica que se cultiva en America Latina y la creacion de una base de datos georeferenciada	A	A2	BRA	6	ARG, BRA, CHI, COS, CUB, DOM, ECU, GUA, HON, MEX,PAR,URU, VEN	261 675	231 302	492 977	75 000	

CONTINUACIONES REGIONAL PROJECTS 2012-13		
Proj Num Design N.	**Título proyecto**	**APC**
RLA0037 RLA2007016	ARCAL: Aumento Sustentable de la Utilización de Reactores de Investigación en la Región de ALC, Intercambio de Experiencias, Preservación del conocimiento y formación de recursos humanos, y análisis de necesidad de modernización de algunos	0
RLA0038 RLA2007024	Apoyo a la implantación de la energía nuclear (ARCAL XCV)	0
RLA0039 RLA2007057	Red Latino-Americana de colaboración y educación en medicina nuclear	0
RLA2014 RLA2007057	Mejora de la calidad analítica mediante capacitación en garantía de calidad, pruebas de competencia y certificación de materiales de referencia de matrices utilizando técnicas analíticas nucleares y conexas en la red latinoamericana de técnicas analíticas nucleares (ARCAL XCVII)	
RLA5051 RLA2007018	Utilización de radionucleidos ambientales como indicadores de la degradación de las tierras en los ecosistemas de América Latina, el Caribe y la Antártida (ARCAL C)	5
RLA5056 RLA2007051	Mejora de los cultivos alimentarios en América Latina por mutación inducida (ARCAL CV)	5
RLA5057 RLA2008003	Establecimiento y mantenimiento de zonas libres de la mosca de la fruta y zonas de baja prevalencia en América Central, Panamá y Belice, mediante el empleo de la técnica de los insectos estériles (TIE) (ARCAL CVI)	5
RLA6063 RLA2007040	Mejoras en el tratamiento de los pacientes con cardiopatías y cáncer mediante el fortalecimiento de las técnicas de medicina nuclear en la región de América Latina y el Caribe (ARCAL CIX)	6
RLA6065 RLA2007052	Fortalecimiento de la garantía de calidad en medicina nuclear (ARCAL CXI)	6
RLA6068 RLA2008022	Mejora de la garantía de calidad en radioterapia en la región de América Latina (ARCAL CXIV)	6
RLA7014 RLA2007049	Diseño e implementación de sistemas de alerta temprana y evaluación de la toxicidad de las floraciones de algas nocivas en la región del Caribe, mediante la aplicación de técnicas nucleares avanzadas, evaluaciones radioecotoxicológicas y bioensayos (ARCAL CXVI)	7

ANEXO 1 - PARTICIPACION PROYECTOS ARCAL 2012-2013

PROGRAMA ARCAL 2012-13

Código Diseño	Num Proyecto	Título proyecto	AREA	NECES PER	PAIS LIDER	ARG	BOL	BRA	CHI	COL	COS	CUB	DOM	ECU	ELS	GUA	HAI	HON	MEX	NIC	PAN	PAR	PER	URU	VEN	SPA
RLA201007	RLA/0/049	Fotalecimiento del entrenamiento del personal tecnico en el mantenimiento de primera linea de los instrumentos nucleares usado en las aplicaciones nucleares del uso medico y de laboratorio asociados a estos servicios.	S	S9	CUB																					
RLA2010024	RLA/5/059	Fortalecimiento de las capacidades analíticas de los laboratorios oficiales para certificación de inocuidad de productos de origen agropecuario mediante la aplicación de técnicas analíticas convencionales y nucleares	A	A2	CHI																					
RLA2010027	RLA/1/011	Automatizacion de sistemas o procesos en instaciones nucleares	E	E2 E6 E8 S9	MEX																					
RLA2010028	RLA/5/061	Gestión de calidad de procedimientos integrados para la evaluación y mitigación del impacto producido por contaminantes en productos agrícolas y matrices ambientales en cuencas de América Latina y el Caribe (ALC).	A	A2	ARG																					
RLA2010029	RLA/5/062	Aplicación de isótopos estables N15 y Rb85 para disminuir la degradación de suelos debido al uso inadecuado de fertilizantes nitrogenados mediante la utilización de urea combinada con zeolita natural (clinoptilolita).	A	A5	ECU																					
RLA2010030	RLA/5/063	Inducción de variabilidad mediante mutagénesis radioinducida en plantas nativas con potencial nutritivo y/o medicinal en regiones de origen y dispersión.	A	A10	MEX																					
RLA2010034	RLA/7/016	Estudios de actualización hidrogeológica y de contaminación difusa de los recursos de agua subterránea en acuíferos sub explotados	M	M6 M2	MEX																					
RLA2010038	RLA5/060	Armonización y validación de métodos analíticos y entrenamiento para el monitoreo de residuos químicos de riesgo para la salud humanas en alimentos de origen animal y vegetal irradiados o no.	A	A2	BRA																					
RLA2010039	RLA/9/072	Banco de datos de valores de radiactividad en alimentos típicos de América Latina	A	A2	BRA																					
RLA2010043	RLA/0/045																									
RLA2010047	RLA/0/046	Proyecto Comunicacion - Fortalecimiento coordinado de la comunicación en los países ARCAL y asociaciones estratégicas para potenciar las aplicaciones nucleares y su sostenibilidad en Latinoamérica.	G		CUB																					
RLA2010049	RLA/0/047	Proyecto Especial Haiti			HAI																					
		* Sujeto revision segun areas cubrir en el RLA2010049																								

ANEXO 2 - BORRADOR DOCUMENTO 'WHITE BOOK'

Este documento será circulado por el OIEA para aprobación de la Junta de Gobernadores en noviembre de 2011. La Secretaria ha incorporado las descripciones de los proyectos ARCAL para el ciclo 2012-2013 con el fin de disponer de información detallada para la aprobación del programa ARCAL por parte de los Representantes ante ARCAL (ORA) durante su XII Reunión Ordinaria.

1. Supporting the Regional Agreement to Strengthen the Latin American Regional Programme (ARCAL CXXX) (RLA/0/045) 01 New

Objectives: To assist Member States participating in the ARCAL programme to further strengthen the regional Agreement in order to promote TCDC activities and to optimize the Agency's regional technical cooperation programme in Latin America and the Caribbean.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	22 065	175 340	5 760	0	0	**203 165**	10 000	0	**10 000**	**213 165**
2013	13 365	99 180	6 000	0	0	**118 545**	3 290	0	**3 290**	**121 835**

PROJECT DESCRIPTION

Problem Statement: Member States participating in the Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) have requested the Secretariat to assist in strengthening the regional agreement to enhance the Agency's regional technical cooperation programme. ARCAL has proved to be an adequate instrument for the promotion of technical cooperation among developing countries (TCDC) in the Latin American and Caribbean region. Through this project the Agency will support ARCAL in further developing mechanisms to generate new initiatives to exchange knowledge and best practices among Member States in applying nuclear technologies and in this way to add value to key development programmes in the region.

Linkages with the regional efforts to address need: The project supports the ARCAL Regional Cooperation Plan and the implementation of the Regional Strategic Profile.

Past and present country efforts to address the need: The IAEA is the Secretariat for the Agreement since ARCAL's inception in 1984. This project will strengthen ARCAL's efforts to promote TCDC while addressing the sustained utilisation of technologies already established within the region. The project will specifically address the development of the new Regional Strategic Profile which will define the region's need and the development of a platform to strengthen the communication among ARCAL stakeholders.

Past and present support by the IAEA in the same FOA: Projects RLA/0/035 and RLA/0/042 have been implemented in the past in order to support the management activities organized for strengthening ARCAL. Under the mentioned projects the Regional Strategic Profile for Latin America and the Caribbean (2007-2013) was elaborated and published, and several initiatives to institutionally strengthen the regional Agreement were implemented. As a result, new lines of action are being developed. On the one hand, work is being done for the design of an ARCAL documentation platform, and ARCAL has also submitted a project on communication in order to address the needs of the region and have available the adequate communication tools to promote the use of nuclear applications. On the other hand, efforts to seek for partnerships and resource mobilization activities are also being organized by ARCAL.

Role if nuclear technology: ARCAL promotes activities for the development of nuclear science and technology in Latin America and the Caribbean and encourages technical cooperation among countries in key sectors such as energy, health, agriculture, hydrology, industry and nuclear safety, among others.

End users: ARCAL Member States, ARCAL National Coordinators, institutions and centres from the participating Member States.

Partnership: CIEMAT / Spain is an strategic partner to ARCAL. Spanish Cooperation and Development Agency has also participated and supported ARCAL's activities in the past. France is also participating/funding ARCAL's activities and it is expected to have other strategic partners.

Strategy and sustainability: Support will be provided to the ARCAL Meetings which are held according to the schedule adopted by the National Coordinators and Board of ARCAL Representatives. The IAEA as Secretariat for the agreement will support the regional agreement in several initiatives to strengthen the cooperation and promote its activities.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Enhanced participation in management activities of ARCAL and increased visibility and ownership of ARCAL Member States.	National Coordinators attend the meetings and strategic results are achieved	Meetings' reports and strategic documents elaborated	ARCAL Member States are involved in the regional activities and nominate National Coordinators according to the ARCAL procedures and guidelines.
Output	Regional mechanisms established to promote and strengthen ARCAL activities.	Number of collaborations with regional partners established and activities for promotion organized.	Publications and reports	Support from ARCAL Member States and from the Secretariat to have financial resources available for the implementation of initiatives.
	Medium Term Strategy developed and implemented	Elaboration of the document	Publication, electronic document	Secretariat's support is provided to facilitate the strategic expertise and organization of meetings to elaborate the document
	Successful ARCAL coordination through the organization of efficient and effective coordination meetings	Meetings organized fulfil their objectives	Meetings' reports	The Secretariat arranges the meetings according to the Technical Cooperation procedures and the ARCAL Manual of Procedures

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

2. Strengthening Communication and Partnerships in ARCAL countries to Enhance Nuclear Applications and Sustainability (ARCAL CXXXI) (RLA/0/046) 01 New

Objectives: Increase visibility and impact of ARCAL projects results through the establishment of a specialized communication structure in Latin America for broadcast nuclear issues in every Member State.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	40 000	109 000	0	10 850	0	**159 850**	0	0	**0**	**159 850**
2013	0	127 180	0	13 251	0	**140 431**	0	0	**0**	**140 431**

FOOTNOTE-a/ FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	0	0	0	0	96 250	**96 250**	0	87 500	**87 500**	**183 750**
2013	0	0	0	0	96 250	**96 250**	0	87 500	**87 500**	**183 750**
2014	0	0	0	0	96 250	**96 250**	0	87 500	**87 500**	**183 750**

PROJECT DESCRIPTION

Problem Statement: "Since the beginning of the ARCAL Programme nuclear applications for solving problems of regional interest have been promoted, as well as their safety. However, the project results, the visibility of their impact and lessons learned haven't been sufficiently promoted. As a result, there is no proper understanding of the usefulness of the projects in our countries and the opportunity that ARCAL represents in their development. Besides, There is need of reach out for partners for ARCAL projects. In the Regional Strategic Profile for Latin America and the Caribbean (RSP), from 2007 to 2013 the following needs / problems were identified: a) Insufficient awareness of policy-makers and scientific community about the usefulness and safety of nuclear techniques, b) insufficient knowledge of the impact of nuclear applications, c) need for improved public presentation of the information and extensive information on nuclear energy and d) need to spread the benefits of nuclear applications to end users taking advantage of the capabilities and experience in the region. Regional Communication Strategy and the Network would integrate existing resources in the region with economic effectiveness for the solution of these problems. The project also responds to the OIOS Evaluation on the Role and Function of the NLO which recommends (no. 7) that recognizes that "the DDG-TC should ensure that sufficient training is provided to all new NLOs and NLAs....to include instructional material that all NLOs are expected to be familiar with, such as: (d) communication and negotiation strategies to be developed with stakeholders, including government offices responsible for approving and overseeing all international technical cooperation activities, sector-specific project counterpart institutions, the UN Resident Coordinator, other international and regional development organizations, the private sector, and research institutions."

Linkages with the regional efforts to address need: The project has been defined inside the needs of the Regional Strategic Profile (S5, M5, E1, E3, E14)

Past and present country efforts to address the need: Cuba, Brazil, Argentina, Chile, and Peru have carried out actions in this address

Past and present support by the IAEA in the same FOA: There has not been support in this particular field before

Role if nuclear technology: Nuclear technology is the technique implemented for the projects whose results and impact will be measured and reported considering the structure and strategy created.

End users: The population of Latin America will benefit, regardless of gender, race, etc., since the results of the project will enhance the growing use of nuclear applications with a greater awareness of its benefits by stakeholders, policy- makers, scientific community and public in general.

Partnership: International organizations also co-finance ARCAL projects besides the IAEA

Strategy and sustainability: The strategy to guarantee sustainability is the commitment of countries and the creation of strategic partnerships at regional level to ensure financial resources

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	1. Managing existing regional strategy for communication of results and impact of ARCAL projects, facilitating the contribution of sustainability with strategic partners.	60 % of the planned actions to be accomplished in 2013 in the countries participating in the project	reports on accomplished actions	Commitment of the countries and IAEA to implement the project
Output	1.1 Design and implementation of the national communication strategy in each country and integrate it into a regional strategy communication	50% countries participating in the project with implemented strategy, 80% of the communication plan accomplished in 2013	Report on the coordination meeting, project report	Support to the dissemination and production of nuclear application communications by the Counterparts that implemented the projects and other stakeholders involved.
	1.2 Management System that allows to present the ARCAL projects impact in the Region	80 % of the participant countries with assessment indicators introduced in its management system in 2013	Report on the project assessment	Institutional support to nuclear application managers
	1.3 Get the appropriate material to reach potential national partnerships to support sustainability of nuclear applications.	80 % of the participant countries will have created strategic partnerships and 100% of the created partnerships will be organized at regional level in 2012, meeting to coordinate national strategies in the region in 2012	partnership agreement taken	Organizations with financial resources that are interested in the project
	1.4.Created repositories of regional technical information on nuclear applications and their impact, accessible to all countries.	Software with database will be introduced and completed in 10 countries in 2012	Technical report	There is information on nuclear applications in each participant country
	1.5 Exchange of updated information of results and impact on nuclear applications.	Communication network in operation and updated in 2013. The impact of 4 projects to be evaluated in 10 countries and 5 communication actions to be accomplished by 2014	report on IAEA supplies , report project, information visible in the web	The network is managed from Vienna

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

3. Supporting a Special Project to Rebuild Haiti's Nuclear Science and Technology Institutes (ARCAL CXXXII) (RLA/0/047) 03 New

Objectives: To rebuild and sustain key human resources necessary to apply nuclear science and technology for the sustainable development and welfare of Haiti.

Project Duration: 4 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	58 000	40 000	0	0	0	**98 000**	0	0	**0**	**98 000**
2013	15 000	68 720	0	10 000	0	**93 720**	0	0	**0**	**93 720**

PROJECT DESCRIPTION

Problem Statement: The catastrophic earthquake of 12 January 2010 resulted in devastating destruction to much of Haiti's infrastructure, including scientific and technical institutions along with significant loss of life and capability. The on-going IAEA technical cooperation programme, including regional activities and their benefits, were compromised by these events and the resulting impact on human resources, enabling policies, programmatic frameworks, and general dislocation of function and operation in Haiti's national scientific and technical institutions.

Linkages with the regional efforts to address need: At the Reunión del Grupo Directivo OCTA en colaboración con el Grupo de Trabajo del ORA, 31 May to 4 June 2010, ARCAL Represenatives, in consultation with the Haitian National Coordinator, discussed and approved a proposal for a Special Regional project to assist the reconstruction and recovery of the sector of scientific and nuclear technology in Haiti.

Past and present country efforts to address the need: At the time of the earthquake 7 national projects were on-going and Haitian counterparts were participating in 39 regional projects. Project activities covered the priority areas of food production and safety, integrated pest management, human health, and environment management. However, much of the scientific, regulatory and technical infrastructure were damaged. The first phase of this proposal is intended to assess the conditions and status of nuclear science, technology and regulatory infrastructure.

Past and present support by the IAEA in the same FOA:

Role if nuclear technology: Previous assistance in the focus areas of food production and safety, integrated pest management, human health, and environment management demonstrated the importance of nuclear technology for Haiti's development. The issue under consideration is replacing, strengthening and developing the human resources necessary for successful, safe and sustainable applications of nuclear technology. The agreed programmatic approach seeks: 1) to utilize ARCAL expertise to assess needs, requirements, possible extra-budgetary funding opportunities and enabling conditions for sustainable technical cooperation in support of Haiti's reconstruction and development; 2) to foster lasting relationships between advanced ARCAL national institutes and Haitian counterpart in areas of common high priority in order to better enable successful participation in ARCAL Regional Projects planned for 2012-2013 and thereby maximize the benefits of participation, and; 3) to assist in planning and design of national projects and participate in their implementation.

End users: The direct beneficiaries will be science and technology institutes utilizing technical applications to foster human development in food production and safety, integrated pest management, human health, and environment management. The indirect beneficiaries will be the people of Haiti who should have safer and more abundant food products and healthier environment due to the technical services provided by these institutes.

Partnership: Numerous partnerships have been suggested in the focus areas of food production and safety, integrated pest management, human health, and environment management, including FAO, USAPHIS, PAHO, GEF, UNEP. as well as bilateral donors including USA, Canada, France and Spain.

Strategy and sustainability: The ARCAL Special Project and Mechanism will utilize relevant Member States' scientific, technical and regulatory capabilities to provide expertise, cooperation and support to afflicted counterpart institutions in Haiti. Equally important, opportunities will arise to demonstrate the role and value of nuclear science and technology to Haiti's reconstruction partners, as well as the learning and experience gained from working in close collaboration with the international development community. A process of engagement with Haitian counterparts and development partners will help refine the country's regional and national priority areas in nuclear science, technology and regulation. A coordinated and interdependent programme of regional cooperation and national institutional development is expected to result with special emphasis in proven areas of technology and knowledge transfer such as Human Health, Food and Agriculture, and Water Resource management. Consultations will be based on current sectorial development plans and seek to build partnerships taking into account the technical expertise that ARCAL/IAEA can provide. The management strategy seeks to leverage the Agency operational resources with ARCAL technical and scientific expertise by utilizing the capabilities of ARCAL Member State national institutions to assess, consult, coordinate, conceive and implement activities aimed at rebuilding Haiti's scientific, technical and regulatory institutions through: 1. Well designed national projects, and 2. Effective participation in regional projects. The ARCAL and the IAEA would jointly seek to mobilize resources from the multi and bi-lateral sources to finance larger scale and longer term institutional support projects. The implementation of projects would be organized as a collaboration whereby human resource development activities would be undertaken through ARCAL mechanisms, and physical enhancements and upgrading of institutional plant and equipment would be undertaken through IAEA mechanisms.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Well-designed and long term country programme and implementation schemes covering 4-6 years to develop key technical, scientific and regulatory capabilities for Haiti's national development.	Approval of Haiti Country Programme for 2013-2014	BOG action	Haiti national authorities agree on relevant national priorities, an integrated approach between regional and national programmes, and partner organizations play a cooperative and substantive role in programme development.
	Effective mechanisms for Haitian counterparts to maximize the benefits of regional cooperation.	Agreed Project Annexes for 5-6 ARCAL Regional Projects.	Agreement on Project Annexes by ARCAL DTMs	Agreement can be reached on a limited number of relevant ARCAL Regional projects where advanced ARCAL institutions agree to play role of mentor to Haitian counterpart institutions
	Formalized relationships between ARCAL member institutions and Haitian counterparts enjoying full support and commitment of national authorities.	Trillateral agreement between Haitian National Authorities, ARCAL/OCTA, IAEA Secretariat	Records of ARCAL proceedings	Agreement can be reached among ARCAL Regional Coordinators on the terms of the Agreement
	For the Agency, a new and more practical model for delivering technical cooperation to member states that lack the normative institutional capabilities to successfully absorb the technology and knowhow for safe, secure and effective utilization of nuclear energy and technology	Best Practices document and practical model for delivering technical cooperation to member states that lack the normative institutional capabilities to successfully absorb the technology and knowhow for safe, secure and effective utilization of nuclear energy and technology	Publication of document	The model and best practices for Haiti have relevance for other less advanced member states
Output	1.1 Reports and action plans from ARCAL expert missions	Action Plans approved	Mission reports	ARCAL experts are available and released for assignment
		Agreements with donors	Report of donor meetings	
	1.2 Suitable National project concepts and work plans	project concepts drafted	concepts submitted	
	1.3 Planned and designed National projects when ARCAL regional projects are not appropriate to the need	Project Designs drafted	Project Designs submitted	
	1.4 Human Resource Development strategies for key institutions	Draft Strategies prepard	Mission reports	Haitian Institutions are prepared and able to plan HR requirements
	1.5 Donors and resource mobilization plans and agreements	Resource plans agreed	Report of donor meetings	Donors are interested in supporting Haitian country programme
	2.1 Agreed Project Annexes for ARCAL projects and complete work plan covering the activities;	Project Annexes approved	Report of OCTA meeting	Agreement of DTMs for selected ARCAL regional projects
	2.2 Reports and action plans from ARCAL expert missions	Follow-up actions taken	Mission reports	ARCAL experts are available and released for assignment
	3.1 A Trilateral agreement between IAEA - ARCAL/OCTA - Haitian National Authorities providing for Project Annex Agreements	Agreement approved	OCTA Reports	Commitment of ARCAL MS to Haiti nuclear sector reconstruction
	3.2 Agreed Project Annexes for ARCAL projects and complete work plan covering the activities;	Project Annexes approved	Report of OCTA meeting	Agreement of DTMs for selected ARCAL regional projects
	4.1 Best Practices report based upon observations and recommendations from ARCAL expert missions	Best practices identified	Mission reports	ARCAL experts are available and released for assignment
	4.2 Donors and resource mobilization agreements	Agreements with donors	Report of donor meetings	Donors are interested in supporting Haitian country programme

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

4. Building Capacity and Training Technical Staff for Maintenance of Nuclear Instruments Used in Medical Applications, for Laboratories and for Quality Control for Health Services (ARCAL CXXI) (RLA/0/049) 01 New

Objectives: Establish a regional human resource training program to ensure proper training of those people in the operation, testing and calibration, maintenance and repair of nuclear instruments used in nuclear medicine, quality control of radiotherapy and radiation protection associated with the service and laboratory equipment

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	0	68 250	31 520	0	28 000	**127 770**	30 000	0	**30 000**	**157 770**
2013	8 910	42 750	32 000	0	28 000	**111 660**	10 000	10 000	**20 000**	**131 660**

PROJECT DESCRIPTION

Problem Statement: The quality and safety have become characteristic elements of effective and successful medical practice. Worldwide has developed a broad culture of quality and safety in medical use of ionizing radiation, a culture that has been integrated into the various branches of the diagnosis and treatment. An important aspect of infrastructure equipment used in nuclear medicine, radiotherapy and radiology in the Member States of the IAEA is the conservation in time of all the technique used to ensure effective radiation protection and effective treatment of the patient, keeping in good technical and operational condition the equipment, through its calibration, predictive maintenance and repair.

Linkages with the regional efforts to address need: Sector S, S9 Need. Insufficient human resources in the region trained in the maintenance, predictive, preventive and corrective maintenance of laboratory equipment and diagnostic and treatment, through nuclear technology pieces of equipment with many years of use

Past and present country efforts to address the need: The projects have been more focused on nuclear instrumentation in laboratories, although some for medical use, such as (ARCAL XXXIV, ARCAL XXXV, ARCAL LIII, ARCAL LXXXI,

Past and present support by the IAEA in the same FOA: In all ARCAL projects implemented in the past 15 years related to Nuclear Instrumentation (ARCAL XXXIV, ARCAL XXXV, ARCAL LIII, ARCAL LXXXI,) different results related to train technical staff , and to improve national and regional laboratories and centers was achieved.

Role if nuclear technology: An important aspect of infrastructure equipment used in nuclear medicine, radiotherapy and radiology in the Member States of the IAEA is the conservation in time of all the technique used to ensure effective radiation protection and effective treatment of the patient keeping in good technical equipment, through its calibration, predictive maintenance and repair. That is why as there are new specialists need to be trained

End users: End users are nuclear medicine services, diagnostic radiology and radiotherapy. Specialists and technicians in the region engaged in maintenance and repair

Partnership: No

Strategy and sustainability: The strategy to achieve planned outcomes focused in training technical staff, in strengthen regional designated training centers in the Latin America region and in provision some spare parts and experts missions.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Developed a training program for personnel responsible for first line maintenance of nuclear equipment used in medical applications, laboratory and quality control, reconciled at the level of all participating countries	Training programm developed, validated and implemented in group trainings and RTC	Edited and distributed a Digital versions in CDs of training programm, technical guides and procedures	Project has been approved Availability of experts in LA region Project funds are allocated Local Budget is approved and allocated
	Strengthened at least one regional center for training in first line maintenance of nuclear equipment used in medical applications, laboratory and quality control in health care.	Well equiped according the new requirements and knowledge of expert and/or supervisors updated	Receipt of purchase orders for regional centers and reports of fellowships assigned to selected regional experts	Project has been approved Project funds are allocated Local Budget is approved and allocated
	Trained technical personnel in nuclear electronics and instrumentation basics and in maintenance and repair of nuclear instruments used in medical applications.	Trained in first line maintenance 16 specialists or technicians of the region	Reports of fellows, evaluation reports at the end of training activities	Existence of specialists who need training Availability of experts Local and project funds are allocated
Output	Create training programme in nuclear instrumentation to develop first line maintenance capacity for instruments used in nuclear medicine, radiotherapy and laboratory applications.	Addopted and validated basic training program in Nuclear Instrumentation in Dec 2012	Report of expert meeting	Local Budget and project funds are allocated Availability of experts Project has been approved
	Development of maintenance technical guide and test procedure after repairing jobs, for analog and semi-digital gamma cameras.	Approved and evaluated technical guide and procedure	CD edited and distributed	Availability of experts Local Budget and project funds are allocated
	Development of maintenance technical guide and test procedure after repairing jobs for Tomographic scanners.	Approved and evaluated technical guide and procedure	CD edited an distributed	
	Strengthening and Enhancement of existing ARCAL Regional Training Centers to provide regional support in related training activities.	Improved the equipment of 2 regional centers and updated knowledge of 4 regional experts from RC	Receipt of purchase orders for RC and assigned fellowships for 4 experts	Local Budget for improvement RC and project funds for FS and EQ are allocated
	Group training on basics of nuclear electronics and nuclear instrumentation in RTC	Trained 4 technicians in May 2013	Reports of fellows and supervisors	Existence of specialists who need training Local and project funds are allocated
	Regional training course on maintenance gamma cameras.	Trained 6 technicians	Reports of RTC participants and evaluation report of activity	Existence of specialists who need training Local and project funds are allocated
	Regional Training course on maintenance tomograph (CT).	Trained 6 technicians	Reports of RTC participants and evaluation report of activity	Existence of specialists who need training Local and project funds are allocated Availability of experts
	Provision of spare parts and expert services on request participating countries	Repaired 2 gamma cameras and 2 CT scanners from the region	Receipt of purchase order for spare parts, reports of expert missions and test report of repaired instrument	Spare part are available in the market Availability of experts Funds are allocated

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

5. Supporting Automated Systems and Processes in Nuclear Installations (ARCAL CXXIII) (RLA/1/011) 02 New

Objectives: To automate systems and processes with software quality assurance extending the useful life of nuclear instruments.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	0	92 290	4 195	0	76 329	**172 814**	20 000	0	**20 000**	**192 814**
2013	11 746	130 220	0	0	76 770	**218 736**	71 000	0	**71 000**	**289 736**

PROJECT DESCRIPTION

Problem Statement: Nuclear Instrumentation (NI) is an important part of any application of the nuclear technology (in the fields of Energy, human health, agriculture, industry, etc). This discipline is highly associated to the use and development of nuclear electronics and software; it is very dynamic and requires a constant update of the professionals involved with it. Then, the activities of nuclear instrumentation related with necessities E2, E6, E8 and S9, could be improved in the region by the exchange of experiences in refurbishing or automation of systems or process and training courses for actualization in calibration, tasks maintenance and repair of nuclear instruments. Causes: In Latin America and the Caribbean, there are nuclear instruments or systems with components having bad functioning or they are out of use. Some components as controllers, obsolete recorder devices, etc. could be replaced with a personal computer and software that could substitute those old devices. Some processes as calibration of nuclear measuring instruments, could be automated, simplifying personal work, and avoiding exposition to ionizing radiations. Effects: Nuclear instruments out of use, bad results, excessive exposition to ionizing radiations, etc.

Linkages with the regional efforts to address need: E2, E6, E8, S9 E: Energy and Industry. S: Human Health of the Regional Strategic Profile.

Past and present country efforts to address the need: During the last years, with the implementation of several regional projects (ARCAL), Latin American countries have established good cooperation and some infrastructure regarding maintenance and repair of nuclear instruments, applicable to the nuclear technology (energy, human health, agriculture, industry, etc). As the nuclear instrumentation is very dynamic and requires a constant update of the professionals involved with it, the issue to which the project will contribute is the training of personnel, by means of training courses, to contribute to preserve the instruments in good functioning. The automation of systems and processes is very useful to convert old equipment in a modern system and simplify the work. For the project success it is necessary that all experiences and infrastructure available and achieved in past projects, could be used. It is important to consider this proposal from a regional approach, because it supports activities meeting the needs of member states.

Past and present support by the IAEA in the same FOA: During the last years, with the implementation of several regional projects (ARCAL). Latin America countries have established good cooperation and some infrastructure regarding maintenance and repair of nuclear instruments, applicable to the nuclear technology (Energy, human health, agriculture, industry, etc). The projects have been providing: training courses, experts formation, support to national laboratories and regional centers, procedures for the maintenance and repair of nuclear instruments, etc. The regional centers and national laboratories have been established for calibration, repair and maintenance of: detectors, analog electronics, multichannel analyzers, gamma-camera maintenance, radiotherapy dosimetric instrumentation, x-ray equipment used in medical diagnoses, and other radio-diagnostic equipment, and also for training. Procedures for electrical calibration of electrometers have been developed too. Personnel have been trained in the maintenance of electrometers and chambers used in radiotherapy. Technical documents were prepared for the maintenance and repair of RIA, LSC and X-ray equipment and are being used by the ARCAL programme participating countries. For Quality Control QC, technical documents were developed of which 5 were for repair and maintenance of; low cost test instruments and four for TLD Readers. -. Maintenance with QC assured a proper operation of nuclear instruments and reliable measurements or images. - The modernization of two TLD Reader models (Teledyne 7300 and Harshaw 2000) was carried out. With the development of software validation methodology and procedures in ARCAL XCIX project, the systems and processes automated will be validated and it will help to guarantee the quality of the software applied to NI. Training courses on LabVIEW have been dictated

for countries of the region, but only three or four countries had license of use, now all the countries of the region participating in ARCAL XCIX have the LabVIEW software, an important tool for software development used for data acquisition, automation and refurbishing. The training courses in this project have been dictated by regional lecturers. RLA/4/006 (1986-1992) Nuclear Instrumentation (ARCAL II) TO STRENGTHEN THE REGIONAL CAPABILITY FOR THE REPAIR AND MAINTENANCE OF ELECTRONIC INSTRUMENTS AND TO PROMOTE REGIONAL CO-OPERATION. RLA/4/008 (1991-1996) Nuclear Instrumentation - Phase II (ARCAL II) To strengthen the regional capability for maintenance and repair of nuclear electronics and micro-processor-based instruments and to promote regional co-operation in this field. RLA/4/011 1995-1999 Nuclear Instrumentation Maintenance (ARCAL XIX) To consolidate infrastructure for maintenance and repair of nuclear instruments, including the supply of hard to find spare parts. RLA/4/013 (1997-2003) Quality Assurance in Analytical Laboratories (ARCAL XXVI) To design a quality assurance programme and introduce it in the participating analytical laboratories; to achieve recognition or accreditation of at least one laboratory in each participating country at national or international level. RLA/4/014 (1999-2003) Calibration of Radiotherapy Dosimetry Instrumentation (ARCAL XXXIV) To establish centres for calibration, repair and maintenance of radiotherapy dosimetric instrumentation and to elaborate procedures for electrical calibration of electrometers, enabling component calibration; to train personnel in the maintenance of electrometers and ionization chambers used in radiotherapy and to create a data bank for radiotherapy equipment use and performance. RLA/4/015 (1999-2003) Training and Repair of Nuclear Instrumentation (ARCAL XXXV) To enhance the capability and capacity of the existing national and regional nuclear instrumentation centres; to train technical staff in repairing and maintaining nuclear instruments and to provide spare parts. RLA/4/017 (2001-2006) Quality Control in the Repair and Maintenance of Nuclear Medical Instruments (ARCAL LIII) To enhance the existing infrastructure of the national and regional centres; and to train technical staff to enable them to maintain and repair x-ray diagnostic equipment using quality control (QC) procedures. RLA/4/019 (2005-2008) Upgrading of Nuclear Instrumentation Laboratories (ARCAL LXXXI) To enhance the main laboratories working with nuclear instrumentation by implementing quality systems, developing interfaces and data acquisition systems, and restoring the functionality and modernization of equipment. RLA/4/022 (2009-2011) Updating Knowledge, Introducing New Techniques and Improving the Quality of Nuclear Instrumentation Activities (ARCAL XCIX) To contribute to the sustainable development of the capabilities of the region, updating the technical skills of the professionals involved with activities related to nuclear instrumentation (software validation, development, refurbishing, upgrading, quality control, etc.) in medicine, research, industry, agriculture, radiological safety. Reference: http://tc.iaea.org/tcweb/projectinfo/default.asp

Role if nuclear technology: The role of nuclear technology is addressed in the different fields of application, this proposal pretends to help to acquire skills for automation of systems for the upgrading and good functioning of nuclear instrumentation applied in nuclear technology.

End users: National Laboratories on nuclear instrumentation for development, maintenance, repair and calibration of nuclear equipment, institutions that depend on the use of nuclear measuring instruments, and at the end it provides benefits to the population in general.

Partnership: N/A

Strategy and sustainability: The strategy of the project is to establish a good communication with the member states with the purpose of obtaining the next goals: a) Automation of systems or processes applying software quality assurance to extend the useful life of nuclear instruments. b) Knowledge updates through training courses on nuclear instrumentation. c) Experiences interchange for the operation, maintenance and security of the research reactors, and d) Following of the Software Validation Methodology at the region and the continue evaluation of the methodology in software applied to nuclear installations.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Methodology for Software Validation applied to nuclear instrumentation at Institutional Level using ISO standards is in place in the region.	Procedures and trained staff	Procedures and number of trained personnel	Availability of experts and a host institution for training courses.
	Advanced techniques for developing automating systems and processes are available and in use at institutional level in the region.	Systems or processes automated	Report of the system or processes automated	Availability of experts and a host institution
	Introduction in the region of Detectors Simulation using Monte Carlo Technique and Geant4	Technicians prepared in Geant4	Reports of training coursed.	Availabilty of Experts
Output	Project management	The project plan and Report of the project	Meeting reports	Participation of all Countries

		results		
	Training courses (4) related with nuclear instrumentation and automated processes developed for staff training in the region	Material developed for 4 courses related to nuclear instrumentation	Developed Material	Availability of experts
	Updated version of the procedures in software validation	Procedures and training courses	Procedures and report of training courses	Availability of experts and a host institution for training courses.
	Staff trained in Software validation	15 Technicians prepared in Software Validation	Report of training courses	
	System or processes automated applying software quality assurance	Systems or processes automated	Report of the system or processes automated	Availability of a system or process to be automated
	Experiences interchange Strategy on automation or refurbishing nuclear instruments.	Report delivered	Report of activities	Availability of experts and a host institution for meeting.
	Trained personnel in specific needs	Fellowships prepared in the regional centres	Training certificates	Regional centers available for providing training
	Staff members trained in Geant4	30 Technicians prepared in Geant 4	Report of training courses	Availability of expert and a host institution for training course.

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

6. Harmonizing Official Control Laboratories to Analyse Chemical Contaminants in Food and Feedstuffs (ARCAL CXXII) (RLA/5/059) 24 New

Objectives: To form regional centres of excellence for analysis of chemical contaminants in food and feedstuffs through formation of authorised reference laboratories developing, validating and implementing methods utilising nuclear and related techniques and arranging proficiency testing schemes.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	13 065	60 000	17 280	0	50 000	**140 345**	20 000	25 000	**45 000**	**185 345**
2013	8 910	80 000	6 000	0	25 000	**119 910**	10 000	25 000	**35 000**	**154 910**

PROJECT DESCRIPTION

Problem Statement: Chemical contaminants found in food are hazardous to human health, damaging to the environment and can curtail trade. For example, since July 2010, because of presence of veterinary drug residues the European Union (EU) has rejected over 40 consignments of food of animal origin from the Latin American Region. To overcome such problems and to enhance and improve consumer food safety and capacity for regional and international trade, the countries in Latin America have set up laboratories to support implementation of National Residue Control programs similar to those in the EU, USA and Japan. However they are all at different levels of development. This is mainly due to limited resources, lack of appropriate skills and analytical methods. Also these Official Control Laboratories need to demonstrate their competence to trading partners through proficiency testing schemes, accreditation and positive audits. This project proposes to enhance capacity and ensure sustainability of the network of the National Control Laboratories in the region formed with IAEA support (RLA5055) by augmenting and consolidating their efforts and forming Regional Reference Centres specializing in various aspects of residue analysis, informing and supporting each other and the less developed laboratories. Their focus will be on methods development and validation, arranging technology transfer and proficiency testing schemes.

Linkages with the regional efforts to address need: Sector A – Necessity A2 - Restricted access to international markets due to the presence of Chemicals in livestock and agricultural products, posing a risk to human health. (PER)

Past and present country efforts to address the need: All countries in the region , have implemented official programmes for the determination of residues in food (vegetable and animal product). These programs have different levels of development especially for the analytical capacity of the different laboratory. These programs are very

similar and are exigency of the importing countries principally the EU and USA. In view of the limited recourses and technological access, it is necessary to establish between laboratories in the region, activities to improve and expand the analytical capabilities.

Past and present support by the IAEA in the same FOA: The Project ARCAL RLA 5055 aims to establish and institutionalize the coordination between government laboratories in the region, through exchange of experience of the laboratories. it is a first step that does not cover all needs and requirements that are demanded by the laboratories. Through the activities carried under the project, the laboratories have been able to incorporate new methodologies and analytical techniques, improve their quality systems and exchange experiences between laboratories. This new projects aims to extend the available techniques in each laboratory, incorporating the use of certified material and analytical assessment tool for programs of development the new methods of analysis according to the present instrumental condition.

Role if nuclear technology: Nuclear analytical techniques are required to complement standard non nuclear techniques, also, applications of isotopes marked as internal standards for the use of control and validation of chromatographic techniques.

End users: The main beneficiary is the general population of the countries in the region, and importing countries of products, who are best able to ensure the safety of their food. Also laboratories of the region, with better analytical capacity, and better coverage, with reliable results with quality standards. Also, producers and exporters who can have best laboratories for certification of exports in the required standards, allowing trade and strengthen the exchange of products of animal and agricultural origin as a basis for development of our countries.

Partnership: Considering that the project is related to FAO's policies on quality and food safety, and DG Health and Consumers of the European Union (DG SANCO), the main commercial area of agricultural exports, contributions of these institutions with experts and training are expected. It is also considered the cooperation and commitment of the laboratories of the Member states in the region, similar to Chile's Agricultural and Livestock Service (SAG), through the exchange of experiences and methodologies, and intercomparison rounds.

Strategy and sustainability: This project will strengthen institutions and laboratories of the participating countries. It will improve the certification of food of animal origin for export and domestic consumption. The integration between the laboratories of the region will improve the human and technical resources through cooperation between institutions

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

7. Harmonizing and Validating Analytical Methods to Monitor the Risk of Chemical Residues and Contaminants in Foods to Human Health (ARCAL CXXVIII) (RLA/5/060) 24 New

Objectives: To ensure food safety, to promote good agricultural and production practices and to enhance food exports.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	8 710	16 780	34 560	3 095	130 000	**193 145**	120 000	20 000	**140 000**	**333 145**
2013	111 375	17 180	0	0	60 000	**188 555**	0	60 000	**60 000**	**248 555**

PROJECT DESCRIPTION

Problem Statement: Safety of food is a basic human requirement. "Food safety" implies absence or acceptable and safe levels of contaminants, adulterants, naturally occurring toxins or any other substance that may make food injurious to health on an acute or chronic basis. Food systems in developing countries are not always as well organised and developed as in the industrialised world. Moreover, problems of growing population, urbanisation, lack of resources to deal with pre- and post- harvest losses in food, and problems of environmental and food hygiene mean that food systems in developing countries continue to be stressed, adversely affecting quality and safety of food supplies. People in developing countries are therefore exposed to a wide range of potential food quality and safety risks. Access by developing countries to food export markets in general, and of the industrialised world in particular, will depend on their capacity to meet the regulatory requirements of importing countries. For most developing countries, agriculture lies at the centre of their economies and food exports are a major source of foreign exchange and income generation for rural and urban workers in agriculture and agro-industrial sectors. The long-term solution for developing countries to sustain a demand for their products in world markets lies in building up the trust and confidence of importers in the quality and safety of their food supply systems. This requires improvement within national food control systems and within industry food quality and safety programmes. Such efforts will greatly help in increasing the relatively small share of developing countries in the international food trade. Quality and safety of food have to be ensured throughout the food production, processing, storage and distribution chain. Food monitoring is essential in maintaining the credibility of the food control system, and therefore development of a regional strategy to ensure food safety deserves highest regional priority.

Linkages with the regional efforts to address need: Food is a good indicator of the state of the environment in which it is produced. Monitoring of environmental contaminants therefore not only assists in ensuring food safety but can also give early warnings about the state of the environment, to enable appropriate action for maintaining its productivity. Objective – To ensure food safety, to promote good agricultural and production practices and to enhance food exports.

Past and present country efforts to address the need: This proposal differentiates from other in view of the aim to harmonize the utilized methodologies in projects previously subsidized by IAEA. Harmonization in the usage (in America Latina and Caribe) of detection methodology in relation to the presence of chemical residues in food oriented to local consumption and exports, with the purpose to promote good agricultural practices of production, export and manufacturing of food treated, among others, by the applications of nuclear technology, and irradiation. It is also proposed an evaluation and data analysis of the detected problem through the contamination analysis in the main export grains and for local consumption, thereby determining an accurate picture of the key problem at international level, through a document with all participating countries.

Past and present support by the IAEA in the same FOA: Previous projects supported by IAEA, amongst which two projects in Brazil (RLA 5050 and 5053), deal with different aspects concerning strengthening of analytical laboratories and chemical residues analysis.

Role if nuclear technology: Mass spectrometry in conjunction with the use of stable isotopes is the most appropriate technology to analyse chemical residues and contaminants in food products. The use of radiotracers such as 14C-labelled pesticides and detection by Liquid Scintillation Counting is also very appropriate during method validation, to establish method performance parameters.

End users: Government Institutions from sanitary food control and customs to control ports and airports from the Ministry of Health and Agriculture. Consumers since their governments will be able to better regulate the quality of food.

Partnership: FAO, IICA, OIRSA

Strategy and sustainability: Considering the diversity of food products available in the region and the different levels of knowledge from each participant, the strategy must consider regional differences and the different foods and infrastructure of the participating countries

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Analytical systems for food monitoring established and harmonised in participating countries.	Number of laboratories seeking accreditation and number of analytical services provided	National statistics, Laboratory reports, Project report	Improved national policy on food security; national commitment with the project and awareness on the relevance of food safety
Output	Personnel trained and analytical methodology, including QA/QC measures (ISO17025), established.	Methodology established by 2013 and personnel trained by 2012/2013	Experts report	Adequate institutional funding for internationally recognized standard methodology is assured
	Centers of excellence for food control recognised regionally.	Number and kind of regional collaboration services, including advise and expertise, provided by 2013	Country reports, Project report	National support for food control is kept as a priority
	Framework system for database of contaminant levels in food established.	Database established by 2013	Project report, web page	Cooperation on a regional basis for data registration and exchange

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

8. Supporting Quality Management for the Assessment and Mitigation of Impacts of Contaminants on Agricultural Products and in the Environment (ARCAL CXXIV) (RLA/5/061) 24 New

Objectives: The overall objective of the Project is to establish internationally recognized quality management systems in participating laboratories for the sustainable monitoring of representative agriculture catchments in the region.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	13 065	112 610	20 975	0	50 000	**196 650**	40 000	15 000	**55 000**	**251 650**
2013	54 295	17 180	0	25 240	50 000	**146 715**	40 000	10 000	**50 000**	**196 715**

PROJECT DESCRIPTION

Problem Statement: The LAC region covers a large topographic and climatic diversity that is reflected in a wide variety of ecosystems. Agriculture is an important strategic economic resource for all countries in the region. Agrochemicals are helping realize the United Nation Millennium Development Goals (MDGs) but their use raises a number of problems such as potential risks for human health, trade restrictions and environmental damage. This situation requires coordinated national and regional actions to reduce adverse impacts in human and the environment. The project participants will work cooperatively on the core programme: Strengthening the laboratory network with QuEChERS like methods; harmonizing methodologies and reporting systems by participating in inter-laboratory comparison exercises, audits and annual questionnaires; providing integrated monitoring data on high impact rating agrochemicals as indicators of good agricultural practices (GAPs); calibrating risk assessment tools; estimating environmental contaminants load and determining interactions between agrochemicals and soil constituents by isotopic and conventional techniques. In addition, sub-regional groups will address priority issues: monitoring of wetlands and buffer zones approaches for remediation, determining pest resistance levels/mechanisms, monitoring of accelerated degradation of agrochemicals. As members of a wider group, the project participants will apply proven technical solutions and efficient information and communication technologies to allow countries without any existing capacity to begin training and applying the accumulated knowledge resources of the network when resources become available.

Linkages with the regional efforts to address need: A2 and M1 of the Regional Strategic Profile.

Past and present country efforts to address the need: Projects RLA 5/0/50 completed and RLA/5/053 on-going. The previous projects resulted in the strengthening of the analytical capacity in the involved LAC laboratories, the

establishment of feedback mechanisms with farmers and linked institutions, the use of environmental indicators for the assessment of GAPs and the use of impact prediction models. The next phase would focus on analytical quality management and establishing business plans to ensure sustainable laboratory monitoring.

Past and present support by the IAEA in the same FOA: Regional projects RLA 5/0/50 completed and RLA/5/053 on-going.

Role if nuclear technology: Isotopic techniques (radio labelled pesticides) will be used to determine interactions between agrochemicals and soil constituents. Degradation of pesticides and sorption studies in soil will be performed. Although conventional techniques can be used, isotopic methods remain one of the most effective, cost–efficient mechanisms of evaluating pesticide behaviour in soil, especially in transformation studies.

End users: Organizations involved in the agricultural production and environmental regulator institutions will be benefited with objective indicators for the assessment of management pesticides effectiveness. Producers will be able to apply the objective indicators derived of the obtained information for the pest management. Environmental contamination and food control will lead to a safe production and competitive international trade terms, implying socio-economic benefits for producers and the community in general. Since females make up a large proportion of the population actively participating in agricultural labour, they will get a direct benefit with the adoption of GAPs by commercial producers. The consumers, men and women, from the local and international market, will get safety food products with minimal environmental impact.

Partnership: The project will be implemented in coordination with INIA, Spain (Dr Jose Luis Tadeo) and with local organizations such as IICA, OIRSA and FAO.

Strategy and sustainability: ARCAL regional projects have shown how production may be improved and monitoring data used to fine-tune good agricultural practice (GAP) for local conditions. However, in many countries there is a lack of laboratory capacity and even countries with laboratories accredited at current international standard there is a lack of instrumentation such as liquid chromatography/mass spectrometry necessary for achieving the required sensitivity and proof of identity. This is especially important for many developing countries that depend on food exports for economic take-off and development. Thus it is essential to support national food control systems through the development of the necessary analytical capacity to monitor key food contaminants and ensure food quality. The access to food control laboratories and related services represents the minimum requirement to generate monitoring data for the risk management activities within a nation. Currently, outsourcing analytical services and the use of private analytical services are the only option available in some countries but cannot be promoted as a regular practice. By committing to this project each national government needs to establish and sustain accredited laboratories for the control of food consumed nationally and exported by effective monitoring of small and large scale producers. The project would follow a modular approach applying successful approaches and coordinating donor resources to accelerate the commissioning of laboratories and mass spectrometers. In addition the capacity delivery would be multidisciplinary, encompassing the need for a well-integrated system.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Increased number of accredited laboratories. Improved technical level of all network laboratories.	Number of quality audits in participating laboratories by 2013.	Activities Report. Audits and accreditation certificates	National commitment with the project; availability of suitable staff and equipment; budget executed as approved
	Improved applications of pesticide management practices	Number of modified pesticide management practices in selected catchments by 2013	Laboratory reports. National official reports	Governmental commitment with the project objectives; commitment of stakeholders
	Improved risk and quality management in the LAC region	Number of solutions to sub-regional issues provided by the regional laboratory network by 2013.	Laboratory reports. National official reports	High level decision makers are committed to the project; availability of suitable staff and equipment; budget executed as approved
Output	1.1 Methodologies and reporting systems harmonized	Successful participation in one interlaboratory comparison by 2013.	Project reports and Laboratory documents	Agreement between counterparts
	1.2 Quality management systems established according to ISO 17025.	SOPs, record systems, instrument calibration and laboratory quality manual prepared by 2013.	Reports and Laboratory documents	ISO 17025 will be used as official guideline
	1.3 Enlargement of the laboratory network.	Countries without any existing capacity applying the accumulated knowledge	Annual questionnaires. Reports of the activities.	Operative regional network

		resources of the network by 2013. Number of staff trained by 2013.		
	2.1 Pesticides impact assessed through monitoring and risk tools calibration	Number of reports	Country report	Monitoring and risk assesment tools available
	2.2 Established collaborative work with stakeholders	Feedback through National Workshop	Country report	Operative stakeholders network
	2.3 Kd/Koc database generated for selected catchments in the LAC region	Two pesticide studies per country completed by 2013	Reports and Laboratory documents	Labeled compounds available and personnel trained
	2.4 Identification of transport pathways and fate of selected pesticides for the represented LAC catchments	Number of catchments characterized by 2013	Reports and Laboratory documents	Training to support the implementation
	3.1 Pesticide fate models generated in the LAC region	Number of models generated by Q1/2014	Country reports, Project report	
	3.2 GAPs analysis carried out and research activities needed for supporting sustainable farming systems outlined	Number of awareness raising seminars in each country by 2013	Country reports, Project report	Stakeholders feedback and training to support the implementation

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

9. Applying Stable Isotopes to Assess the Impacts of Natural Zeolite to Increase Nitrogenous Fertilizer Use Efficiency, to Improve Soil Fertility and to Reduce Soil Degradation (ARCAL CXXV) (RLA/5/062) 21 New

Objectives: To increase the global production of food and prevent environmental pollution and degradation of soils, through the application of nuclear techniques to assess the impact of natural fertilizers to improve soil fertility management

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	**Sub-Total**	Equipment	Sub-Contracts	**Sub-Total**	
2012	0	25 000	0	0	70 000	**95 000**	43 300	0	**43 300**	**138 300**
2013	46 585	0	0	80 115	35 000	**161 700**	45 000	19 000	**64 000**	**225 700**

FOOTNOTE-a/ FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	**Sub-Total**	Equipment	Sub-Contracts	**Sub-Total**	
2012	0	25 000	0	0	150 000	**175 000**	150 000	0	**150 000**	**325 000**
2013	75 000	75 000	0	0	0	**150 000**	170 000	0	**170 000**	**320 000**

PROJECT DESCRIPTION

Problem Statement: There is little knowledge or awareness among farmers of the care required to control environmental pollution through the more efficient use of chemical fertilizers. Land management practices that improve crop production while preventing soil degradation are urgently needed. The use of natural materials such as zeolites, which act as a soil conditioner with a high action exchange capacity, enables the sorption of ammonium (NH4+), moisture and micro- and macro-nutrients, thus reducing fertilizer use and water consumption by 20 to 40%. Crops require significant amounts of nutrients for high yields, N being the nutrient that most affects the quality and performance of the plant. The proposal will use N15 as a tracer to determine crop N uptake together with Rb85 to determine the absorption of potassium (K+) by proxy. Potassium promotes well-developed root systems, and helps the formation of sugars and starches and the movement of nutrients through the plant.

Linkages with the regional efforts to address need: Alimentary Security need A5 of the Regional Strategic Profile (IAEA-ARCAL).

Past and present country efforts to address the need: The Member States participating in this project have has implemented initiatives: to modernize the agricultural sector, with the following objectives to improve agricultural production and productivity and to diversify the development of research. The objective these Special Programme for Food Security is to promote the establishment of national food security policies aimed at improving the income of farming families based on increased agricultural production and productivity.

Past and present support by the IAEA in the same FOA: No previous regional projects in Latin America are identified to address this issue. At the national level, the following projects have had IAEA assistance: a) efficient use of nitrogenous fertilizers in rose production applying the N15 isotopic technique (ECU/5/024); b) improving the productivity of oil palm crops in soils of low fertility with drought problems using the neutron probe and the N15 and Rb85 isotopes. These studies have been performed in support of sustainable agriculture.

Role if nuclear technology: Methods based on stable isotopes are very useful in agricultural research and the achievement of increased global production, to produce food as efficiently as possible and assist in the on-going battle against hunger preventing environmental pollution and degradation of soils to properly use fertilizers. The need to maximize the efficient use of nitrogenous fertilizers, together with concern for minimizing environmental pollution is of vital importance for studies of employment of N-15 because it allows for more accurate and quantitative results in the short term. Nuclear science provides valuable tools to monitor factors such as micronutrient. The characteristics of nuclear techniques make them an ideal tool to achieve better diagnosis and monitoring of agricultural issues and mitigation strategies. FAO/IAEA have shown that the use of nuclear techniques is most appropriate tool to give early solution to the current issue of rational management of plant nutrition.

End users: Farmers in the area of the participating countries to improve production techniques, saving the inputs, protecting the soil, pollute less and obtaining the highest performance and above all by applying an alternative environment-friendly The community surrounding the study area will improve their living standards The general population to have a better product characteristics. Research institutions of member countries to have new knowledge.

Partnership: Ministry of Electricity and Renewable Energy Ministry of Agriculture seed producers Association with potato ZEONATEC (Extractors zeolite) Food and Agriculture Organization (FAO)

Strategy and sustainability: The project will be lead by the National Counterparts but it should involve the participation of the Ministries of Agriculture and Farmers representatives of each Member State to ensure sustainability. Application of nuclear techniques (N15 and Rb85) to evaluate the uptake of N and K in the selected crops and assess the fate of applied fertilizers as influenced by zeolite as a soil conditioner/soil amendment.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Application of zeolite as an ecological fertilizer alternative by using nuclear techniques to prove their efficiency	The farmers using the technique by 2013	Record of inspections verifying the use of the technique	The technique is applied properly
Output	Increased crop production reducing nitrogenous fertilization and increased N fertilizer use efficiency	% Reduced utilization of urea by project completion and increase in N fertilizer use efficiency	(i) Record of consumption of commercial fertilizers at the start and after the trial (ii) Progress reports	Information on fertilizer consumption available from all participants
	Raising of awareness and consciousness in farmers about proper management of nitrogenous fertilizers and the importance of natural zeolite fertilizer in improving fertilizer and water use efficiency.	Number of farmers given on raising awareness to the community	List with signatures of attendees and copies of certificates awarded	Attendance by members of the community
	Outreach on application of the alternative technology	60% of the community with knowledge of the technology by project completion	Information sheets	Support of the institutions involved

Major inputs (items with a cost of over Euro 150,000)

Description	Amount
Training of scientist and technicians on soli analysis of macro an micro nutrients using N15 and Rb85 and interpretation of results (external contribution)	150 000
Provision of equipment to strength the capabilities of laboratories to harmonize the implementation of protocols to test different combinations of zeolite.	150 000
Provision of equipment to strength the capabilities of laboratories to harmonize the implementation of protocols to test different combinations of zeolite.	170 000

10. Supporting Genetic Improvement of Underutilized and Other Important Crops for Sustainable Agricultural Development in Rural Communities (ARCAL CXXVI) (RLA/5/063) 20 New

Objectives: To improve the availability and value of crops of special value in Latin America and the Caribbean through radioinduced mutagenesis, with emphasis on underutilized crops

Project Duration: 3 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	12 194	30 000	17 280	25 998	51 539	**137 011**	0	0	**0**	**137 011**
2013	12 474	0	6 000	8 834	105 474	**132 782**	30 000	0	**30 000**	**162 782**
2014	13 034	35 000	9 152	9 058	0	**66 244**	0	0	**0**	**66 244**

PROJECT DESCRIPTION

Problem Statement: Middle and South America are two relevant centers of origin and domestication of many species with present and/or potential importance as food or as medicine, naming, corn, beans, chilli, avocado, vanilla, cocoa, husk tomatoes, tomatoes, chía (Salvia hispanica), quinua, amaranth, kiwicha, among many others. Many of aforementioned species are relevant because of their nutritive value or because their use in traditional healing practices. However most of these species remain underutilized because they are grown only at the local level. Even some of these species are endangered because the knowledge of its cultivation and use pertain to older generations in the Villages and the new generations leave rural communities looking for better opportunities, thus being the chain of transmission of traditional knowledge about these plants, its culture, and use, disrupted. On other hand, Latin America also share several of the main constraints to human development: a) Poverty that reaches 39 % of population, being about 18% in extreme poverty, according to the World Bank(1). b) Undernourishment that affects 45 million inhabitants in Latin America according to FAO (period 2003-2005% (2)), with rural and marginated areas more affected. c) Some countries in Latin America are facing an increasing prevalence of diseases, for example according to the World Diabetes Foundation (3) almost 6% of the adult population suffers from diabetes. d) Deterioration of natural resources in Latina America is increasing. According to FAO (4) population pressure, accompanied by rising demand for food, fuel and construction materials, is placing progressively more intense pressure on the region's natural resources. It estimates that soil erosion, acidification, loss of organic matter, compaction, nutrient impoverishment and salinization have reduced productivity on more than 3 million sq km of farmland, while almost 800,000 sq km of drylands are threatened by desertification due to overgrazing, overexploitation of vegetation for domestic use, deforestation and inappropriate irrigation methods. One underappreciated factor potentially contributing to solving the problems is the improvement of underutilized and other important crops for sustainable acricultural developement in rural communities. [References; 1. Banco Mundial. La pobreza y creciemiento: circulos viciosos y virtuosos. Washingotn DC. Banco Mundial, 2006. 2. FAO. The state of food insecurity in the world. 2008 3. http://www.worlddiabetesfoundation.org/composite-165.htm. Consulted 08/25/2010 4. http://www.fao.org/ag/magazine/spot4.htm. Consulted 08/25/2010]

Linkages with the regional efforts to address need: Regional Strategic Profile need No. A-10

Past and present country efforts to address the need: The present proposal has evolved as consequence of interaction of several teams working on collection, characterization, conservation and improvement of native genetic resources working in Mexico: Colegio de Postgraduados, Instituto de Biologia de la Universidad Nacional Autonoma de México, Instituto Nacional de Investigaciones Nucleares. Interactions with South America, particularly with Universidad Agraria de la Molina in Perú and Fundación Proinpa de Bolivia through two IAEA fellowships allowed to develop protocols for assessment of resistance to adverse conditions of pseudocereal accessions, and to obtain interspecific hybrids of pseudocereales With Universidad Nacional David Alcides Carrion,

Peru, interaction on selection and improvement of pseudocereales was performed under the national project CONACYT 33285 Genetic improvement of two species of Chenopodium genus. These collaborations were focused only on the most important cultivars of studied species, neglecting other local cultivars like chía roja or kañawa, which also have relevance as nutritive and tolerant crops, but that are grown locally.. Close collaboration with Instituto de Ciencias Agrícolas de Cuba, Universidad de El Salvador, El Salvador, Instituto Nacional de Investigaciones Agrícolas de Santo Domingo, Centre de Recherche et Documentation Agricoles Port Au Prince Haití, Universidad Nacional de la Asunción, Asunción Paraguay and Instituto Nacional de Tecnología Agropecuaria de Argentina among others has been developed through Project ARCAL RLA5056, "Fortalecimiento de los cultivos a través de de mutaciones inducidas (ARCAL CV)", in which all participants have reached a consensus regarding to the risk of lost of diversity of valuable native germplasm due to several factors such as population growth, change of use of the land, and the substitution of native varieties by improved ones. The danger of lost of diversity of native crops must be addressed tacking in account that some problems that the region faces, such as climatic change, overdependence in very few species for the world food supply (wheat, corn, rice, potatoes), undernourishment and even the scarcity of fuel, could be solved in part with the rational and sustainable use and improvement of native crops which up till now remain underutilized. Project ARCAL RLA5056 established a strategy to improve crops to obtain tolerance to adverse conditions, in many cases on staple crops, being required a more comprehensive approach which include underutilized native crops not only with potential for food but also for medicinal use. Considering that many native crops are distributed over all Latin America, facing in some cases similar problems regarding pests, diseases, abiotic stress and market entry requirements is practical to cooperate between national institutions under a regional and multidisciplinary approach, intending to obtain improved varieties through radioinduced mutagenesis, making use of biotechnological tools such as tissue culture and molecular markers.

Past and present support by the IAEA in the same FOA: IAEA has been supporting projects on the same field of activity through Project ARCAL RLA5056, "Fortalecimiento de los cultivos a través de de mutaciones inducidas (ARCAL CV)", that has allowed to perform activities oriented to the improvement of crops for tolerance to adverse conditions among participating countries. As stated before, also IAEA has supported research contracts such as Neglected crops 10427/RO IAEA 14035, which allowed to obtain advanced lines of pseudocereals and legummes. Regarding to formation of human resources IAEA has given support through fellowships (Fellowships IAEA Mex 3028-González, IAEA Mex 3026 García, and IAEA 3027 Torres), devoted to in vitro culture, hybridization on pseudocereals and molecular training, respectively.

Role if nuclear technology: Radioinduced mutagenesis is a plant breeding approach recommended: a) when is necessary to modify one or some traits in a cultivar generally acceptable, b) when a cultivar is propagated mainly vegetative or c) in those cases when the diversity has been dramatically reduced due to genetic erosion. As many of the native underutilized crops, pertain to one of the groups cited above, this strategy is highly advisable to be applied aiming to obtain improved varieties. Having at our disposal tools that allow reducing space and time to evaluate each generation, like tissue culture, the potential of radioinduced mutagenesis is enhanced. The use of molecular markers will allow advances in the process of selection, provided that appropriate protocols for molecular studies already exist for the native species studied. The advantage of the nuclear technique regarding to conventional methods such as hibridization and recurrent selection is that good local native cultivars need in many cases to be improved in one trait, which can be accomplished by mutagenesis. Radioinduced mutagenesis is the only alternative to induce variation in vegetatively propagated plants and on plants propagated with seeds having reduced genetic variation.

End users: The improved lines and varieties resulting from the project will be used by farmers inhabiting rural areas of the Mexican and Andean high plateau and growers inhabiting tropical and subtropical areas of Middle, South America and the Caribbean where underutilized species with nutritive and nutraceutic potencial are grown. Generally speaking participant countries of the region will be beneficiated because these project will promote the conservation and use of valuable native genetic resources (some of them endangered) favouring the development of a sustainable agriculture.

Partnership: FAO, Department of Underutilized Crops in Latin America.

Strategy and sustainability: Natural mutation is a fundamental and natural source of genetic variability in plant species evolution that allows growers to adapt them for the development of modern agriculture, practices that can be accelerated by radiation induced mutations. This approach will be applied to obtain outstanding genotypes through a participative strategy involving growers in the selection of starting genotypes and in the definition of traits requiring to be modified. This process will permit model crops to generate lines with better traits that will increase availability of foods and other products specially of underutilized crops with nutritive and nutraceutic value. The project strategy is to apply radioinduced mutations techniques aiming to obtain improved genotypes. The species that will be improved under this project, according to the demands of participating countries can be divided in two main groups: a) Food security: Pseudocereals (quinua, amaranth, huauzontle, chía), tubers (oca and yuca), fruit crops (avocado), tomatoes, beans, vigna, and corn from the high plateaus. b) Native crop species with nutraceutic potential: Chipilin

(Crotolaria longirostrata), estevia (Stevia rebaudiana), espinheira santa (Maytenus ilicifolia), olluco (Ullucus tuberosus) , isaño (Tropaeolum tuberosum) and rosa de jamaica (Hibiscus sabdariffa). The radioinuced mautagenesis approach will be enhanced by application of biotechnological tools such as tissue culture and molecular markers.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Rural communities having increased availability of native and underutilized crops providing improved production in quantity and quality contributing to reduction of malnutrition and contributing to sustainable socioeconomic development.	Number of advanced mutant genotypes of crops of interest for Latin-American and the Caribbean food security obtained	Reports, national or international registration of new mutant lines.	Participating countries have signed the FAO treaty on germplasm exchange
Output	Genotypes, Land races and or species of native and underutilized crops identified for their potential as nutritious food crops and or adaptability to harsh environments for further study and dissemination to farmers throughout the region.	Number of selected genotypes of crops with socioeconomic interest with focus on underutilized crops per country	Extension reports per counterpart.	Counterparts have identified genotypes to work with and have defined traits to be improved
	Protocols established for mutation induction and further molecular characterization on underutilized crops and selection in dissemination and release.	Number of protocols established per country. Number of putative mutants selected.	Reports, IAEA mutant database	Counterparts have irradiation facilities available.
	Capacity on the implementation of mutation induction for crop improvement together with soil, water and nutrients management and molecular characterization enhanced in all MSs.	Number of events of dissemination held.	Reports of dissemination events. Number of visits to the ATENA Webpage.	Positive results have been obtained through execution of the project.

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

11. Using Isotopes for Hydrogeological Assessment of Intensively Exploited Aquifers in Latin America (ARCAL CXXVII) (RLA/7/016) 15 New

Objectives: To characterize using environmental isotopes the current hydrogeological condition of selected aquifers that are intensively exploited in Latin America and the Caribbean.

Project Duration: 3 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	30 860	40 000	0	0	91 539	**162 399**	55 000	0	**55 000**	**217 399**
2013	15 185	40 000	36 000	0	52 737	**143 922**	35 000	0	**35 000**	**178 922**
2014	0	40 000	0	0	53 936	**93 936**	0	0	**0**	**93 936**

FOOTNOTE-a/ FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	0	0	0	0	0	**0**	50 000	0	**50 000**	**50 000**
2013	0	0	0	0	0	**0**	50 000	0	**50 000**	**50 000**
2014	0	0	0	19 410	0	**19 410**	0	0	**00**	**19 410**

PROJECT DESCRIPTION

Problem Statement: The importance of underground hydric resources is greater in countries in Latin America with extensive arid regions, where the subsoil is typically the primary and only permanent source of water. A large part of usable fresh water travels through and is stored in the top 1,000 m of the land's surface, where aquifers with high permeability are located and which are more actively renewed, economically accessible and contain good quality water. The availability of surface water is critically dependent on variations in pluvial precipitation. On the other

hand, underground hydric resources, in general, are less affected by these climatic variations, since aquifers serve as regulating vessels containing stored reserves accumulated over centuries, with a magnitude generally much greater than the annual recharge. In most Latin American countries, watersheds with high population indices are generally those with the greatest amount of economic development due to their productive activities. These areas are strategic to the development of the region and are characterized by accelerated growth and high demographic density. The population to available water volume ratio indicates that most of these watersheds experience water stress. Sustained economic development requires increasing volumes of water which is overdrawn from the subsoil. Paradoxically, water drawn due to limitations in drainage infrastructure, along with other contaminating sources, turns into contaminant loads that affect the quality of overdrawn aquifers. The result of this complex problem is a reduction in the quantity and quality of underground water resources. This situation has led to very complex problems for the end users of water resources, such as: social conflicts due to competition for water, health risks in the form of gastrointestinal diseases, increased costs of pumping to reach deeper water levels, salinization of cultivated lands from the application of water with a high dissolved solids content, effects of land subsidence and cracking on public works, etc. The areas that are most affected show aquifer depletion levels of up to 2 m/year and land subsidence rates of 15 cm/year. In addition to these problems are the possible, yet still unknown, effects of climate change on the future availability of aquifers. To help control, mitigate and even reverse this trend, it is necessary to identify the availability of existing underground water resources in the basins, evaluate the evolution of the quality of water due to natural and anthropogenic origins and determine the effects of both climate change and aquifer over drafting using updated hydrogeological and hydro chemical studies, effective monitoring networks and the incorporation of methodologies with geochemical and isotopic indicators that enable evaluating the effects of climate change so that, together, they contribute to the sustainable management of groundwater resources. These circumstances are common in several Latin American countries; therefore, it is crucial to establish an integrated management of watersheds and natural resources using a regional approach, which would contribute experience and knowledge to determine more viable solutions for attaining sustainability in the region.

Linkages with the regional efforts to address need: This proposal relates to the Strategic Profile for Latin America and the Caribbean (PER in its Spanish initials) 2007-2013: (M1) Lack of or insufficient early warning systems, diagnostics and evaluations of the environmental impact of contamination from pesticides, persistent organic compounds, heavy metals and other contaminants from anthropogenic and natural origins in foods and environmental matrices at the basin level, and (M2) Inadequate systems for the management and protection of and knowledge on the availability and quality of water resources.

Past and present country efforts to address the need: Federal organizations and several authorities from countries in the region, in charge of the management of water resources, have developed hydrogeological updating studies to determine the availability of groundwater in overdrawn aquifers. However, complementary methodologies are required to determine, in a timely manner, the effects of over drafting, climate change, contamination, etc. on the quality and quantity of groundwater resources. This project will incorporate recent methodologies and the use of geochemical and isotopic indicators to characterize the effect of climate change, diffuse pollution and over drafting on the availability of aquifers. Water management is associated with two fundamental complex components: social and technical. Because of the great similarity in the region in the causes of deterioration, scarcity and competition for water, the regional approach undoubtedly will benefit the projects' outcomes. Administering institutions and end users of groundwater resources will have the potential to apply the projects' achievements and developments that are aimed at solving this problem in the countries in the region.

Past and present support by the IAEA in the same FOA: Since 1973, the IAEA has developed regional projects for technical cooperation related to the exploration, evaluation, conservation and development of hydric resources (ARCAL XIII, ARCALXXXI, etc.). These efforts allowed for the possible incorporation of nuclear and geochemical methodologies in the study of hydric resources, the training of qualified human resources on the subject and the development of infrastructure for the isotopic analysis of water samples. The above contributed to understanding the nature of surface and underground water resources as well as incorporating the results obtained into the management of the aquifers. The population's increasing need for water in several countries in the region has been met gradually and in a prolonged manner, resulting in an imbalance in the natural functioning of the aquifers and, consequently, leading to the over drafting of aquifer resources. This complex problem, which is associated with the limited economies of the region, has resulted in large deficiencies in updated knowledge about the quantity and quality of the hydric resources located in the basins. Additionally, the still unknown effects of climate change may be involved in the availability of said resources.

Role if nuclear technology: This project will make use of stable isotopes of water molecules and radioactive isotopes existing in the environment, together with other non-nuclear conventional methodologies. This multidisciplinary approach has proven useful by providing results that allow drawing conclusions that are safer and more dependable with respect to the nature and management of groundwater resources, especially for cases needing

information to determine the effects on aquifers of long-term phenomena, such as climate change and aquifer overdrafting.

End users: The end users of water resources are the inhabitants in watershed regions. Population projections for the year 2030 for the Latin American region is estimated to be 677, 422 million inhabitants. Learning about the way aquifers work and about the effects of anthropogenic or natural actions--such as aquifer overdrafting, quality degradation and climate change, among other factors--will allow for establishing water resources management and protection programs that benefit all users and society at large. The main outcomes are: to obtain indicators of sustainable management in order to preserve groundwater quantity and quality; develop standards for the protection of the aquifer system, aimed at rural producers, and; disseminate results and practical measures to preserve the quantity and quality of water among users, so as to incorporate a culture of protection of water resources.

Partnership: In the case of Mexico: The National Water Commission (CONAGUA) is a federal institution responsible for water management and performs the updating of the hydrogeological studies of aquifers in operation. The Mexican Institute of Water Technology (IMTA) is a public agency facing the challenges associated with water management, and proposes new approaches to research and technological development to protect the resource and allocate it efficiently and equitably among the various users. In the case of Uruguay: National Mining and Geological Survey Service. Office: 60 m2. Lab: 100 m2. Technical staff consists of 2 geologists, 1 agricultural engineer, 2 technicians in geology, all with extensive experience in hydrogeology. Three laboratory analytical chemists. In the case of Nicaragua: Centro para la Investigación en Recursos Acuáticos de Nicaragua: radiochemical and isotopic laboratory, hydrogeology laboratory, natural waters laboratory. INETER: water resources area, meteorology area. IAEA: laboratory of isotope hydrology. Geologists (2), Hydrogeologists (2), Geohemist (1), Hydrologist (1). During preparatory and coordination meetings, the rest of the participating countries will define the entities and organizations that will support each case study, including the areas of human and financial resources, bank information, previous studies, infrastructure for analysis and the measurement of variables, etc.

Strategy and sustainability: During the development of the project, it is recommended that the institutions from the participating countries be involved, to whatever extent possible, in the governmental bodies responsible for the management of hydric resources (federal, state or municipal), since these are the entities in a position to apply the outcomes of the project for the benefit of the end users of hydric resources. Aquifers that are currently in use, of importance to the water supply for the country and for which basic hydrogeological data are available will be investigated. The aquifers that have these characteristics will be considered as the study area for each of the participating country.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	National institutions capable and competent to use of environmental isotopes in hydrogeological assessment of intensively exploited aquifers.	Aquifers characterized and assessed based upon standard methodology and/or case studies prepared.	Expert missions to assess technical capabilities and methods; mission reports.	The outcome depends on financial resources provided by local institutions. Delaying or reducing these resources will affect the scope and fulfillment of established objectives
	Updated hydrogeological characterization of selected intensively exploited aquifers.	Final report of results, including conclusions and recommendations for improving, mitigating and/or solving the problems related to the aquifers studied. Technical documents and manuals that assist in the sustainable development of the resource and publications for the dissemination of the knowledge gained.	Review and evaluation of obtained results, performed by the Technical Project Officer and the authorities involved.	
Output	Output 1: Updated Hydrogeological model of the exploited aquifer.	By December 2014 and for each study area, an improved hydrogeological conceptual model developed, indicating: natural recharge and discharge areas for groundwater mean residence times for groundwater, and hydraulic connections between aquifers and surface water in the watershed.	Final technical reports	Weather conditions and public order in all study areas, allow the development of the field work as planned.
	Output 2: Human resources capabilities in assessment of groundwater aquifers.	By December 2014 and for each study area, an interdisciplinary working team trained in the use of nuclear tools for water resources	Reports of trainees in the framework of fellowships, scientific visits and training courses given in the project	The conditions of employment stability for staff selected in the training program, allow

		assessment.		them to put into practice the knowledge acquired for the benefit of the project.
	Output 3: Capabilities for field and laboratory hydrogeological investigations.	By December 2014, improved logistics capabilities of the institutions involved in the project, to carry out sampling campaigns and analysis of samples in the laboratory, in relation to the capabilities present at the beginning of project ARCAL.	Purchase Orders for equipment and laboratory supplies	Customs procedures for imports of equipment donated by the Agency are expeditious and allow for normal development of the field work.

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

12. Supporting a Database of Values of Radioactivity in Typical Latin American Food (ARCAL CXXIX) (RLA/9/072) 19 New

Objectives: To carry out a radiological characterisation of typical food cultivated in Latin America and to create a georeferenced database.

Project Duration: 2 Years

Budget:

CORE FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	0	151 335	25 340	0	0	**176 675**	85 000	0	**85 000**	**261 675**
2013	86 147	51 585	0	93 570	0	**231 302**	0	0	**0**	**231 302**

FOOTNOTE-a/ FINANCING

Year	Human Resource Components (Euro)						Procurement Components (Euro)			Total (Euro)
	Experts	Meetings	Fellow-ships	Scientific Visits	Training Courses	Sub-Total	Equipment	Sub-Contracts	Sub-Total	
2012	50 000	0	25 000	0	0	**75 000**	0	0	00	**75 000**

PROJECT DESCRIPTION

Problem Statement: Radionuclides are being incorporated into the environment by way of dispersion, dilution and transport over short and long distances, and can also concentrate on certain specific materials, such as food, grasses and others. The route of radionuclides in the environment can be observed at all levels of the ecological pyramid, irrespective of their natural or artificial origin. Radioactive contamination persists for years and it might produce crops with increased radioactivity. Animals fed with pastures contaminated with radionuclides transfer these contaminants to humans after digestion. For all these reasons, it is of utmost importance to reliably characterise the presence of radionuclides of both natural and artificial origin in typical American foods and incorporate them into a regional data bank. The characterisation of radioactive background values for domestically produced food can also bring added value to all countries engaged in the export of food, because radiological food certification for export is a requirement that virtually all countries have adopted after 1986 in the wake of the Chernobyl accident. Benchmarks to demonstrate the levels of existing activity concentration in food are an important fact when signing contracts for exporting food on the international market. The creation of a database with information generated by the region itself constitutes an important outcome for the region. By means of using the experience of some countries in the area and free software as a suitable tool for networking, the application may be used by large groups of institutions, private or public, without the need to allocate resources that are significant for achieving the traced objectives. This project will set up a geo-referenced database on radioactivity measures in typical Latin American food, using the benefits of free platforms. To this end, the participating countries will join their available skills, both infrastructure and human resources, for the achievement of the project's objectives.

Linkages with the regional efforts to address need: Food Safety (A2) is a need under the Regional Strategic Profile.

Past and present country efforts to address the need: The ARCAL project "Regional Harmonisation of Technical Requirements and Quality Specifications for the Control of Radioactive Contamination of Food" harmonised some procedures for food analysis in the region for the period 2005-2007.This project will be of great importance since it will serve to consolidate the previous project. The steps are the choice of the kind of food, analysis and the formation

of a reference geo-database. The creation of a database with information generated by the region constitutes an important outcome for our region. By means of using the experience of some countries in the area and free software as a suitable tool for networking, the application may be used by large groups of institutions, private or public, without the need to allocate resources that are significant for achieving the traced objectives. This project will set up a geo-referenced database on radioactivity measures in typical Latin American food, using the benefits of free platforms. To this end, the participating countries will join their available skills, both infrastructure and human resources, for the achievement of the project's objectives.

Past and present support by the IAEA in the same FOA: The ARCAL project for the period 2005-2007 RLA (Regional Harmonisation of Technical Requirements and Quality Specifications for the Control of Radioactive Contamination of Food) tried to harmonise procedures for food analysis. The following countries participated in this project: Brazil, Argentina, Chile, Costa Rica, Cuba, El Salvador, Guatemala, Haiti, Mexico, Paraguay, Dominican Republic, and Uruguay.

Role if nuclear technology: To answer the problem of determining the presence of radioactive contamination in food, the only possible test methods are those that use a detection equipment of ionising radiation as a way to quantify and/or identify the presence of radionuclides. The realisation of this project will require a portion of radiochemical food analysis. Radiochemical techniques and gamma spectrometry will be used since conventional techniques cannot be used for the radiological characterisation of food. The specific objectives are the following: 1. To determine the most typical foods produced in each of the participating countries; 2. to establish an inventory of radio elements to be determined in the identified foods; 3. to harmonise analytical procedures for the determination of radionuclides of interest; 4. to determine levels of activity concentration of radionuclides of interest in different food; 5. to incorporate data from each country into a Geographic Information Systems (GIS).

End users: The results of this project will have a major social benefit for the countries of the region in particular and for the international community, since they are a useful tool in the service of national authorities responsible for emergency management, radiological and nuclear safety, environmental health, occupational health and others. Similarly, international organisations will benefit by ensuring protection of human health and environment, and the peaceful use of nuclear energy, as well as international scientific institutions working on these issues. The database will help to integrate a large number of information not yet available in an integrated manner, and will also support studies related to the establishment of recommendations by the relevant agencies in setting national and international dose limits. Although there are no direct implications for action in the productive sector, the GIS can also serve to provide useful information which can be used in the marketing of agro-industrial products, among others.

Partnership: de Investigaciones Energéticas, Medioambientales y Tecnológicas, Madrid, España. This organisation will provide technical advice in implementing the project (provision of experts and scholars and/or scientific visits).

Strategy and sustainability: This project aims to contribute to the improvement of the qualifications in these countries. Another focus of the project is the strengthening and dissemination of the use of GIS. To achieve this goal, a series of training events, expert missions and scientific visits for different institutions participating in this project have been planned.

Outcomes and Outputs

		Indicators	Means of Verifications	Assumptions
Outcome	Radiological characterisation of typical regional food.	Regional database with the specific activity values ??determined for radionuclides in foods typical in December 2013	Database	There are human resources and technical infrastructure available and appropriate in each of the participating countries Support from governments and the IAEA of the countries participating in the project
	A Geographic Information System (GIS) with equalised information, related to the radiological characterisation of typical regional food has been established.	Posted a Geographic Information System that includes the specific activity values for radionuclides in certain typical foods in December 2013	Geographic Information System published	There are resources available in the participating countries. Support from governments and the IAEA of the countries participating in the project
Output	A database with the radiological characterisation of typical regional food has been set up.	Built the regional database with the specific activity values ??determined for radionuclides in foods typical in December 2013	Database	There are human resources and technical infrastructure available and appropriate in each of the participating countries
	A Geographic Information	Posted on Geographic	Geographic Information	There are human resources

	System (GIS) with equalised information, related to the radiological characterisation of typical regional food has been set up.	Information System that includes the specific activity values ??for radionuclides in certain typical foods in December 2013	System published	available in the participating countries. The non-support of governments and the IAEA to the countries participating in the project.

Major inputs (items with a cost of over Euro 150,000) No elements with a cost of Euro 150,000

Technical Cooperation Field of Activity Codes used for new projects

Code	Field of Activity
1	Building nuclear science competencies
2	Reference products for science and trade
3	Nuclear knowledge and human resource management
4	Energy planning
5	Introduction of nuclear power
6	Nuclear power reactors
7	Nuclear fuel cycle
8	Research reactors
9	Legal, governmental and emergency preparedness and response infrastructures
10	Safety of nuclear installations
11	Control of radiation sources
12	Radiation protection of workers and patients
13	Transport safety
14	Nuclear security
15	Water resources management
16	Understanding climate change
17	Marine and coastal environments
18	Cleaner and safer management of industrial processes
19	Radioactive waste management, decommissioning and environmental remediation
20	Crop production
21	Agricultural water and soil management
22	Livestock production
23	Insect pest control
24	Food safety
25	Prevention and control of cancer
26	Radiation oncology in cancer management
27	Nuclear medicine and diagnostic imaging
28	Radioisotope production and radiation technology for health care
29	Quality assurance and metrology in radiation medicine
30	Nutrition and infectious disease management