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Water, Energy and Food Nexus in America Latina and the Caribbean: Impacts

2nd Nexus Dialogues Programme Executive Committee Meeting and Partners Meeting

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Why nexus is important?

In Latin America and the Caribbean

- We see in our region **important interdependencies between water, energy and agriculture**. Adequate treatment of these interconnections necessarily demands the nexus approach:
  - Introduction of **modern technologies in irrigation** can: 1) conserve water, but 2) increase energy demand and cause aquifer depletion.
  - **Production of biofuels** can: 1) reduce dependence on oil/gas imports, but 2) negatively affect and make more expensive food production.
  - **Energy subsidies in irrigation** can: 1) increase agricultural production, but 2) cause groundwater drawdown and aggravate social inequalities.
  - Problems in one sector (**droughts or earthquakes** which affect electric supply) can cause damage in other sectors (water supply, irrigation).
  - Changes in **energy prices** can have profound effects on: 1) the feasibility of projects that produce energy (hydroelectric plants), 2) conserve energy (energy efficiency), 3) water tariffs (especially in utilities that use groundwater), and 4) opportunity cost of environmental uses.

The same applies to **agricultural prices**

A first and noticeable change

- The project entitled "**Water, Energy and Food Nexus in Latin America and the Caribbean: Public Policies for Managing Water, Food and Energy Interactions**":
  - The concept "**water, energy and food nexus**" was **virtually unknown in the region** when our project started (late 2016).
  - Now, in part because of our activities, this **concept is increasingly known and used in important national and regional forums** on water, energy, agriculture and climate change:
    - **At the national level** (Argentina, Bolivia, Brazil, Chile, Costa Rica, Ecuador, Dominican Republic, Guatemala, Mexico, Peru, Uruguay and Venezuela):
      - A good proof of this is the fact that this concept is even used in national communications prepared by the countries of the region (as for example, Peru) for the 8th World Water Forum (Brasilia, Brazil, 18-23 March 2018).
    - **At the regional level** (for example, Central American Integration System (SICA), Iberoamerican Conference of Water Directors (CODIA), Association of Water and Sanitation Regulatory Entities of the Americas (ADERASA)).

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Costa Rica: Context

- Request of the **Ministry of Agriculture and Livestock** (MAG) for our cooperation in the application of the nexus approach:
  - With the participation of all sectors (water, agriculture and energy).
- Our cooperation centred on the **Reventazón river basin**:
  - The basin provides 25% of water for drinking water supply in San José.
  - It also accounts for 38% of national energy generation.
  - 85% of vegetable production, for domestic consumption and exports.
- Principal nexus interrelations:
  - **Generally positive experience**: Cooperation and synergies between the hydroelectricity generation sector and the water supply services.
  - **Less positive experience**: Conflicts between water allocation for future hydroelectricity expansion and for irrigation development.
- In the context of **outdated water (and energy) legislation** and a **high degree of informality** in agricultural water utilization.

Costa Rica: Impact

- Our cooperation received **positive evaluations by MAG and the Ministry of Environment and Energy** in that it allowed to analyse long-existing conflicts from a **new (nexus) perspective** and to **formulate public policies** for a better balance between hydroelectric generation, irrigation and agriculture:
  - The result was a **new request for our cooperation** in **applying the nexus approach**, this time in the **Tempisque river basin**, characterized by intensive development of irrigation, hydroelectric generation, fishing and drinking water supply, in the context of water scarcity.
    - The government has already made, and plans, significant investments in hydroelectric and irrigation development in this river basin, but considers that the **water use is not optimal from the nexus perspective**; its special concern is the low level of water use efficiency in the river basin.
  - MAG contacted the Government of Israel with a view to supplement this expected cooperation (research & technical advice) with the assistance of Israel in the training of farmers in intensive water use.

1. Original request for technical advisory assistance.
2. Study (nexus interrelations and policy proposals).
3. Workshop to discuss the draft.
4. New request for assistance.

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Ministerio de Agricultura y Ganadería
Despacho del Ministro

6 de julio de 2016
DM-MAG-0583-16

Señor
Adrian G. Rodriguez
Jefe, Unidad de Desarrollo Agrícola
División de Desarrollo Productivo y Empresarial
CEPAL

Estimado Señor:

Nos gustaría agradecerle por la información de la Plataforma WEF Nexus sobre integración de políticas en seguridad hídrica, energética y alimentaria. Queremos mediante la presente confirmar nuestro interés en este proyecto. Pensamos que el Ministerio de Agricultura y Ganadería (MAG), junto con otras instituciones del sector agropecuario costarricense somos la institucionalidad ideal para trabajar en los objetivos de esta iniciativa. Lo anterior, por cuanto nuestro mandado es ocuparnos de temas de seguridad alimentaria, reducción de la pobreza, riego agrícola, problemas derivados de la escasez del agua, utilización de la biomasa y temas de adaptación, mitigación al cambio climático y la gestión del riesgo.

Los objetivos de WEF Nexus son muy similares a nuestras metas destacadas en las *"Políticas para el Sector Agropecuario y el Desarrollo de los Territorios Rurales 2015-2018."* Esperamos continuar el dialogo con usted, ser parte de este proyecto y colaborar con otros actores relevantes en la Región.

Agradeciendo de antemano la selección de nuestro país, me despido con las mayores muestras de mi consideración y estima.

Luis Felipe Arauz Cavallini
MINISTRO

Gg/Ca

Cc: Lcda. Ivannia Quesada, Viceministra MAG
Ing. Guillermo Edo. González Perera, Jefe de DAI

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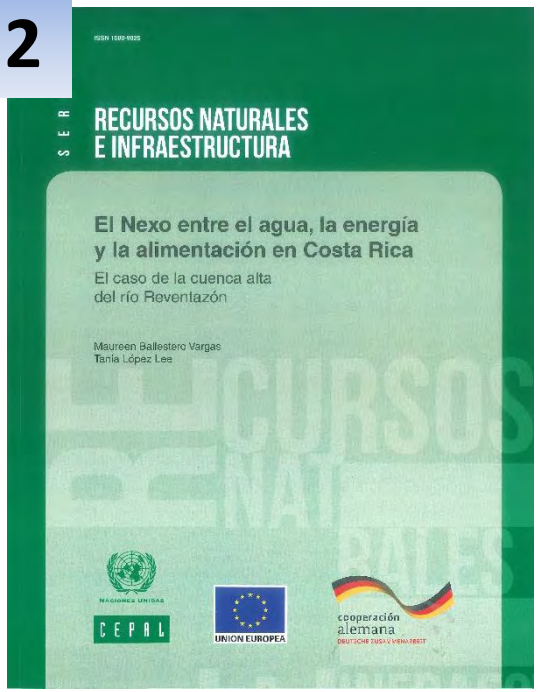

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Ministerio de Agricultura y Ganadería
Despacho del Ministro

22 de noviembre de 2017
DM-MAG-822-2017

Señor
Andrei S. Jouravlev
Oficial para Asuntos Económicos
División de Recursos Naturales e Infraestructura
Comisión Económica para América Latina y el Caribe
(CEPAL)

Estimado señor:

Reciba un cordial saludo. Primero que todo quisiéramos reiterar nuestro reconocimiento a la CEPAL, por el soporte brindado en el desarrollo del estudio y taller nacional: *"Nexo entre el Agua, la Energía y la Alimentación en la Cuenca del Río Reventazón"*.

Hasta hace algunos años, el agua no era una prioridad política ni social en Costa Rica, a diferencia de este momento, donde es indispensable encontrar espacios para hacer un proceso ordenado, consensuado e integral. El Gobierno debe generar políticas públicas que entiendan e incluyan estos nexos y que precisen a las instituciones al dialogo para un uso racional por parte de todos los sectores.

Los resultados derivados del estudio de la cuenca del río Reventazón, nos conducen a plantear una solicitud de cooperación a la CEPAL, para un *"Estudio de caso en el tema de Nexo entre el Agua, la Energía y la Alimentación en la Cuenca del río Tempisque, donde converge un Distrito de Riego con una ampliación en curso, producción agropecuaria y acuícola, el Proyecto de Abastecimiento de Agua para la Cuenca Media del Río Tempisque y Comunidades Pesqueras (PAACUME) y el aprovechamiento de tres plantas hidroeléctricas, en una región de alta escasez de recurso hídrico, además de la necesidad de realizar estudios detallados para la construcción de embalses de agua para la agricultura y consumo humano.*

Hay una gran necesidad de analizar el caso de esta región, donde se ha hecho una gran inversión pública en el desarrollo hidroeléctrico y en la infraestructura de riego. Sin embargo, debemos admitir que estamos lejos de la optimización, debido a que estas interrelaciones no se conectan adecuadamente. Diversas investigaciones coinciden que hay gran margen para mejorar y hacer eficiente el uso del agua de la Provincia de Guanacaste. El estudio de este caso, sería de mucha utilidad en el diseño de acciones y estrategias locales y nacionales. También consideramos que este estudio serviría a otros países de la región, ya que se caracterizan e identifican, temas de gobernanza mediante el nexo agua, energía y producción de alimentos.

Adicionalmente, la Unidad de Asuntos Internacionales (UAI) del MAG, ha establecido contactos con la Embajada de Israel en Costa Rica, y ha planteado la posibilidad de complementar este estudio con

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Mexico: Origins

- One of the principal areas of our work in the region, and for which we are perhaps most known, is public policy advice on the **provision of water supply and sanitation services**:
  - One particular cause for concern in the region is high **electricity consumption of water supply** (from 5% to 30% of operating costs).
  - Another problem area is the **low level of urban sewage treatment** (about 28%), which is the principal source of water pollution.
- The **Meeting of Experts** "Governance of the Water, Energy and Food Nexus: Challenges of the 2030 Agenda in Water and Sanitation" (Guatemala, 6-7 September 2016) (with AECID):
  - Water, energy and food nexus.
  - 2030 Agenda for Sustainable Development and Sustainable Development Goals (SDGs) in water and sanitation.
  - Energy efficiency in water supply and sanitation (ECLAC and GIZ).

Mexico: Origins

Tariffs, service quality, investments, etc.	Access to water sources (water rights), etc.	Drinking water quality, etc.	Discharge permits, budgetary allocations, etc.
Economic regulator	**Water authority**	**Ministry of Public Health**	**Other authorities**

"Common agency" problem

Water supply and sewerage utility

Different authorities (with different objectives) attempt to influence the conduct of a common agent

Energy
(*consumes energy, but can generate it*)

- Energy use in the sector represents from 3% to 20% of the national energy demand.
- Energy costs are an important component (5%-30%) of operating costs.
- Energy consumption can be reduced by 10%-40%.
- There are opportunities in the sector to generate energy and to produce biogas.

Water
(*uses raw water to produce drinking water*)

- The sector is a relatively minor user of water (5%-15%).
- But it is very important in some river basins.
- It has an absolute priority over all other users in allocation.
- It competes with other uses for water, especially with irrigation.
- A reduction in water consumption (or of losses) means lower energy use.

Wastewater
(*generates wastewater or sewage*)

- Low coverage of wastewater treatment (less than 30%).
- Urban wastewater is the principal source of water pollution in many river basins.
- Pollution by urban wastewater negatively affects other water uses, particularly irrigation.
- Wastewater treatment can be a source of clean water for other uses (especially irrigation) and produce energy and biogas.

Mexico: Impact

ANEAS

Ciudad de México, 23 de octubre de 2017

DR. ANDREI S. JOURAVLEV
OFICIAL PARA ASUNTOS ECONÓMICOS
DIVISIÓN DE RECURSOS NATURALES E INFRAESTRUCTURA,
COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE, CEPAL.

Estimado doctor:

Con el agrado de saludarle me dirijo a usted por este medio en relación a la iniciativa que desde la Asociación Nacional de Empresas de Agua y Saneamiento (ANEAS) se está efectuando en relación al nexo Agua-Energía, sobre el cual hemos lanzado actividades para el desarrollo de capacidades e incluso conformamos el Grupo de Cálculo de la eficiencia energética y del potencial de ahorro de sistemas de bombeo de agua (CEEPA).

Como resultado del Taller organizado por la Comisión Económica para América Latina y el Caribe (CEPAL) el 6 y 7 de septiembre del 2016, en la ciudad de Tegucigalpa, en el que ANEAS tuvo la oportunidad de participar, buscamos incorporar a dicho nexo el eje de la Alimentación, asumiéndolo como uno objetivo de capacitación para nuestros organismos operadores asociados.

En ese sentido, como resultado del interés que nos ha provocado los resultados de los trabajos desarrollados por la CEPAL en el marco del proyecto **"Nexo agua-energía- agricultura en América Latina y el Caribe: políticas públicas para la gestión de las interconexiones entre agua, energía y alimentación"**, nos gustaría plantear la posibilidad de generar una colaboración entre CEPAL-ANEAS, con el objetivo de preparar algún mecanismo de capacitación dirigida a organismos operadores mexicanos, en torno a la materia con apoyo institucional de CEPAL.

Para los organismos operadores de México sería una valiosa oportunidad poder concretar esta alianza en pro de contribuir al desarrollo, competitividad y sustentabilidad de los organismos prestadores de servicios de agua.

Atentamente

Roberto Olivares
Director General

www.aneas.com.mx

WORLD WATER COUNCIL

- **Mexico**: National Association of Water and Sanitation Utilities (ANEAS):
  - One area of its special interest is **energy efficiency in water supply and sanitation**.
  - Now ANEAS has identified a **new challenge**, which is to expand its current vision of the **water-energy nexus** by incorporating the **food axis** in it.
  - So ANEAS has requested our cooperation in the **development of a training system** for water and sanitation utilities, which would incorporate the **water, energy and food nexus perspective**.

As a preparatory step for this cooperation with ANEAS, we (ECLAC and GIZ) are now planning a study of relevant cases in Mexico (nexus in drinking water supply and sanitation)

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- **ECLAC**:
  - Nexus can help us advance to a new form of thinking, that is more integrated in comparison with prevailing sector approaches.
  - A very useful tool in our work on SDGs (water, energy, agriculture), that are inseparable, and hence intrinsically imply a nexus approach.
- **Countries**:
  - Argentina, Bolivia, Chile, Costa Rica, Guatemala, Peru, Venezuela, etc.
- **Sectors**:
  - Agriculture (and irrigation), water and sanitation (and treatment), energy (hydroelectricity generation and solar power), and mining.
- **Subjects**:
  - Groundwater management, energy efficiency, child malnutrition, modern irrigation technologies, bioeconomy, adaptation to climate change, multipurpose water use, and water efficiency.

nexus

Federal Ministry for Economic Cooperation and Development

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giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Thank you very much for your attention!

UNITED NATIONS

ECLAC

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