



Uruguay's Program for Small Hydro Power (SHP) and Agricultural Resilience

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OVERVIEW OF URUGUAY



Country name:	República Oriental del Uruguay
Land area:	176,215 km ²
Population:	3.4 million inhabitants
Annual growth rate:	0.3 %
Density:	19 inhabitants/km ²
GDP:	USD 15,414/inhabitant
Life expectancy:	77 years
Infant mortality rate:	7.7/1000



Context

- Uruguay Agricultural sector
 - ✓ Produce food for 28 million people (3,4 million inhabitants)
 - ✓ 70% of national exports
 - ✓ 80% of national greenhouse gas emissions (Uruguay iNDC aims to reduce emissions intensity in the sector)
- CC agricultural sector: frequent and severe droughts and floods
- National Plan for Climate Change 2009 define irrigation projects a strategic line for **adaptation**
- Energy Policy **mitigation** goals: 50% primary energy and 90% of electricity from renewables

Reason for project

- Contribute to resilience in the agricultural sector, using clean energy sources
- Encourage the development of multipurpose irrigation systems, SHP making more profitable the irrigation business
- Adaptation and mitigation in integrated way
 - ✓ reducing climate variability risk from droughts and floods
 - ✓ increase agricultural production by ensuring water access
 - ✓ generating electricity while using water for irrigation



Barriers

- Lack of experience with SHP associated with irrigation dams
- Present reliable supply of electricity limits the capacity to develop new projects of generation
- Regulatory and Policy:
 - priorities in the use of water for irrigation instead of generation are needed to assure farmers their main business
 - limitations in the electricity market
- Financial: Poor experience accessing climate finance.

WHAT the program aims to do

- overcome the barriers to the development of irrigation + SHP dams, through demonstrative pilot projects

- **Phase 1 - Pilot projects**

SHP Incorporation in existing irrigation dams to prove the concept and develop capacities, prior to scaling up

Existing irrigation dam



+ Energy
Generation
(SHP)

- **Phase 2**

Scaling up in new and bigger irrigation + SHP dams

HOW the program will do it

- Policy changes:
 - enable multipurpose dams bigger than 5 MW to be self-dispatched
 - Include in the Irrigation Law under treatment in parliament
 - power generation activities
 - priority of irrigation over the generation, in multipurpose dams
- Financial Mechanism:
 - Phase 1: Pilots of SHP incorporation in existing irrigation dam
 - 1st pilot supported by the investment and special PPA
 - Other pilots, up to 2 MW of total power: supported by part of the investment and special PPA support
 - Phase 2: Projects of irrigation + SHP in new dams
 - investment Loan support + private funds (17 new dams)

HOW the program will do it

- Technical Assistance
 - For the final formulation of the program
 - Program follow up
 - Feasibility studies for new multipurpose dams
 - Financial analysis needed to implement phase 2.

WHO will implement

Farmers	Public Utility
Ministry of Industry, Energy and Mining	Ministry of Livestock, Agriculture, and Fishing
Ministry of Housing, Territorial Order and Environment (Climate Change and Water offices),	National Emergency System (SINAE)

Expected outcomes

Strong change in the paradigm of water resource management for Adaptation.

New players associated to achieve co-benefits (irrigation + SHP)

Innovative program, combines adaptation and mitigation to climate change and will increase productivity and return of investment.

Adaptation expected results :

- Reduction of risks that climate variability has for agricultural production.
- Irrigation improve crop yields (100-150% for maize, 30-50% in soybean) and 100% increase in meat and milk productivity
- Integrated management water resources improvement

Expected outcomes

Mitigation expected results :

- Reduction of emissions by substitution of fossil sources in the SHP electric energy generation
 - 92 ktCo2 – phase 1 (project life 25 years)
 - 1.000 ktCO2 – phase 2 (project life 25 years)

Country's capabilities improvement :

- New legal frameworks approved to promote irrigation and generation
- Qualified technicians in application and maintenance of SHP.
- 200.000 new hectares irrigated in Uruguay
- New political frameworks and country's commitments with the climate change agreements

Program Financing

PHASE 1 : Pilots of SHP incorporating (2,1 MW max.) in existing irrigation dams

	Investment	pay a promoted price in the PPA	Feasibility studies	Sub-Total
Domestic Public contribution		8,60	0,35	8,95
Private Funds	2			2,00
International Support (Grant)	6,40		0,25	6,65
Total Phase 1 (million USD)				17,60

PHASE 2 – Projects of Irrigation + SHP in new Dams

	Investment to build 17 irrigating + SHP new dams
International Support (Loan)	153
Private Funds	65
Total Phase 2 (million USD)	218

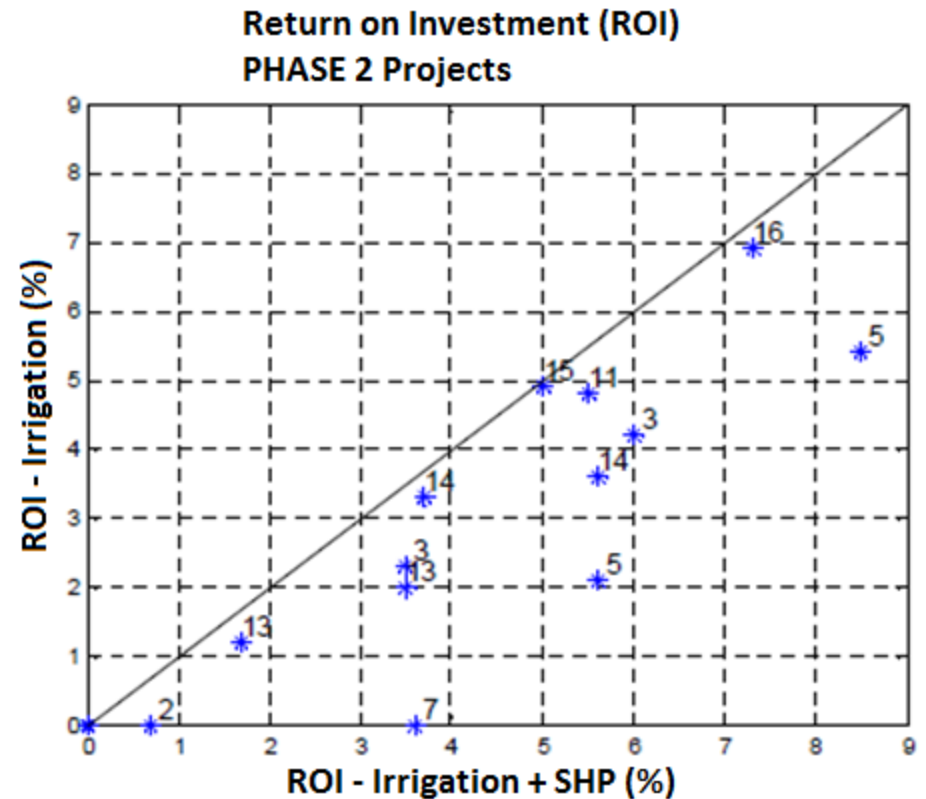
Conclusions

- Profitability of the irrigation + generation project is higher than projects of only irrigation

- Program contributes in the adaptation of a key sector

- Transformational change of water resource management (irrigation + power generation)

- Program is replicable because Uruguay only stores in dams 5% of the runoff water



Conclusions

- National commitment (funds support)
- Aligned with national policies (irrigation development-adaptation, renewable energy-mitigation)
- The program needs support:
 - to enable the learning period and
 - to give visibility to the co-benefits of the concept
- The program will help to fulfill the goals in mitigation and adaptation stated in the iNDC, throughout:
 - Reducing emissions intensity and helping to deal with climate change and variability in the agricultural sector
 - Promoting renewable energy development

Thank you for your attention ...

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