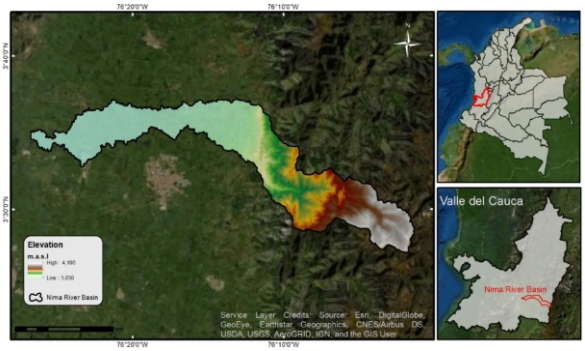
REXUS Project Pilot Areas:
Nima Watershed
(Cauca Valley Department, Colombia)

Participatory System Dynamics Modelling (PSDM) will support understanding of the Water-Energy-Food-Climate (WEFC) Nexus

The Nima River flows into the Amaime River, one of the Cauca River's main tributaries, one of the most important rivers of Colombia. Nima's downstream area is surrounded by agricultural landscapes composed mainly by sugarcane crops. The upstream mountainous zone has conservation priorities such as: Pristine Paramo ecosystem, in addition to Andean ecosystems with several endemic and endangered species of fauna and flora. There is an intersection area between the upstream and downstream areas mainly covered by livestock farming activities.

General Characterization

- **Location:** Cauca River Valley in the Central Andes of Colombia.
- **Elevation:** Ranges between 1,050 and 4,100 MASL ("Las Hermosas National Natural Park").
- **Relevance:** Key to guaranteeing water supply to 9 aqueducts in the municipality of Palmira for 312,519 inhabitants, a hydroelectric plant, and an irrigation district that benefits 6,900 ha of sugarcane in the downstream area.
- **Dry seasons:** January/March & June/September.
- **Rainy seasons:** April/June & September/December.
- **Precipitation:** 1,500 mm/year (lower middle areas)- 2,100 mm/year (upper areas).
- **Average temperature:** 8-24 ºC.
- **Agriculture:** Sugarcane 39.4 %.
- **Other land uses:** Natural forest (21.0 %), Extensive cattle ranching (17.9 %), Paramo vegetation (10.3 %).



REXUS Goals

REXUS aims to address most of the current challenges in the NIMA Basin

- **Water Use Efficiency:** There is a need to increase water use efficiency in the intensive sugar cane cropping system.
- **Nature-based Solutions (NbS):** The watershed would benefit from NbS to address the threat for forest and paramo areas at the highlands, resulting from intensive livestock breeding.
- **Agricultural Management Practices:** There is a need to explore other crop systems and alternatives to reduce environmental impacts of agriculture and livestock in this watershed and use efficiently water sourced by upstream areas.
- **Policy Assessment:** There is a need to regulate material extraction from the Nima river, since it increased the risk of river overflow.
- **Water Quality:** There is a need to improve the pollution of water bodies, which the community has recognized as a key concern.
- **Climate Risk Assessment:** A 1.5°C temperature and 10% precipitation increase by 2040 is projected in the Municipality of Palmira, which might increase drought and flooding risks over the watershed.

How will REXUS work?

The REXUS project will build a conceptual framework that will identify suitable measures for the watershed's challenges in the short, medium, and long term. In the first year, REXUS partners will try to prioritize and analyse the challenges and issues in the watershed; In the second year, the creation of the modelling framework will take place, and finally, in the last year of the project, a scenario analysis in the Nima Watershed will be conducted. The approach throughout the project will be participatory and based on the Learning and Action Alliances (LAAs).

How will the NEXUS be analysed?

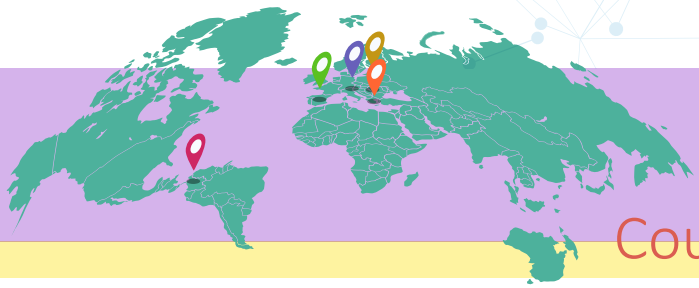
Applying Participatory Systems Dynamic models (PSDM)

PSDM will play an essential role in the LAAs in understanding the complexity of the Nexus. PSDM will complement the Nima watershed planning process, which is part of the territorial planning of the municipality of Palmira. Specifically, PSDM will support an environmental participative diagnostic of the watershed with stakeholders from different sectors, private, public, local community in order to build a territorial participative prospective of the natural resources, through a scenario analysis in the Nima Watershed.

Future perspective: Call to Action

"There are many environmental challenges ahead that will substantially impact our society. That is why we expect from the REXUS project to achieve an environmental diagnosis through a participatory approach of the Nima watershed, that highlights the main environmental problems and needs; the potential Nature Based Solutions (NbS) to address environmental conflicts and challenges; subsequently, it is essential to build a local stakeholders' vision of the future on natural resources, following the approach and guidelines of the Land Management Plan of Palmira."

Dr. Marcela Beltrán, CIAT



Alliance

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