WASACA

ABSTRACT

Climate change and increasing demand in water resources lead to a gradual drying up of the South American Andean Plateau region (Altiplano). The desertification process in combination with unsuited agriculture practice to respond to a world market interest in Quinoa crop represents a major threat to the regional economic sustainability. Water scarcity and soil degradation associated to the current situation lead to a progressive decrease of Quinoa crop yield production while this activity represents one of the main economic activity of the region. This situation is expected to get worse at horizon 2050 and 2100 in consequence of climate change scenarios. In this context, wastewater irrigation is foreseen as an “obvious” trajectory adaptation to overcome both water scarcity and soil degradation at short-term scale. However, at long-term scale wastewater irrigation also comes with important environmental and sanitary hazards, which could worsen the current situation. This is especially true over the Altiplano where the geological context and numerous mining activities bring elevated metal concentrations into the water resources potentially used for irrigation purpose.
The transition toward an optimal regional agriculture adaptation requires a clear understanding of the current situation and the factors (climate, agriculture management) that have led to it. This task is complicated due to data scarcity and lack of control related to the remote and socio-economic context. In this context, the project aims at developing remote sensing based tools and modelling approach to understand (1) the respective role of climate changes and land use land cover modification in (i) the regional water scarcity process and (ii) soil degradation in terms of soil salinity and metal pollution. Considering the particular regional context and interest in the use of wastewater for irrigation, a special attention will be paid to highlight the potential catalytic effect of such practice on land degradation. The generated outputs will serve as support to develop a continuous participatory approach in order to raise awareness on potential unsuited practices to engage a co-thinking process toward sustainable adaptation at horizon 2050 and 2100.
Regarding the multi-disciplinary context of our proposition, the project will be led through the collaboration of different French, Bolivian and Brazilian research units regarding their expertise in modelling (Espace-Dev, IGE, IHH), remote sensing (TETIS, Espace-Dev), geochemistry (HSM, IGE, UnB) and participatory approach (GREEN, NGO “Agua sustentable”).

Keywords : Brazil, Bolivia, Sustainability, Agriculture, Climate, Remote Sensing, Participatory approach

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Project leader : Frédéric SATGE
Project leader's institution : IRD
Project leader's RU : ESPACE-DEV

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Funding : Labex

GOAL

The main objective of the project is to carry out a diagnosis of the impact of agricultural practices (in

particular land use land cover transformation by extensive production) and the use of wastewater for irrigation in a context of climate change and, on the basis of this diagnosis, to develop participatory approach to i) raise awareness of the availability of water resources and environmental degradation and ii) engage a collaborative process with stakeholders and smallholders to look at sustainable trajectories by 2050 and 2100. To make up for the lack of data and above all to enable a regional diagnosis, we will rely on a combination of products from remote sensing and in situ data acquired from reference sites. Beyond its interest in providing relevant information for the elaboration of public policies for the sustainable development of the Altiplano, we aim to develop knowledge and tools of interest to other semi-arid regions, which face similar problems.

ACTION

WP-1: Disentangle the impacts of climate and Land Use Land Cover (LULC) changes on water resources availability
WP-2: Environmental degradation associated to metal contamination and soil salinity
WP-3: Engaging stakeholders for sustainable agriculture practices