MASARE - Sustainable Aggregates Management in Rivers and Reservoirs

Environmental monitoring and development of public policy tools

Objective

Overall goal

Make progress in the spatial and temporal characterization of sediment transport dynamics in bodies of water in the area of the Río Cuarto (Cuarto River) (Chocancharava), province of Córdoba, Argentina.

Specific goals:

- Determine quantity, quality and size of sediments transported in bodies of water.
- Characterize spatial and temporal variation in the size of bottom sediment transported in bodies of water.
- Estimate the rate of bottom sediment transport and suspension in the study area.
- Transfer the information obtained and the tools developed to sand mine representatives to improve their commercial activities and optimize aggregates extraction.
- Transfer the information obtained and the tools developed to management agencies to adopt measures to mitigate the impacts of erosion and/or sedimentation generated by inadequate sediment management.

Description of citizen participation

Operators of mechanical sand mines installed on the Río Cuarto riverbed in the province of Córdoba, Argentina, are participating in this project on behalf of the community.

The work methodology is defined in a co-creative process based on continuous feedback, which includes all stakeholders (representatives of the community, management agencies and academic and research institutions).

Furthermore, sand mine operators, with extensive experience in the system under study, make significant technical and scientific contributions related to the evolution over time of the different processes to be studied (hydrology, hydraulics, sediment transport, etc.). More specifically, every month, sand mine operators take bed and suspended sediment samples and repeat this procedure after major flood events.

Additionally, operators report rainfall using instrumentation located in each sand mine to correlate the evolution of sediment transport characteristics with existing hydrometeorological conditions.

Representatives of academic and research institutions process the samples. The results are then transferred to the community and management agencies for analysis, and to jointly define and evaluate public policies.

Type of citizen science project

- **Co-created project**: Citizens participate in all stages of the scientific process.

Participating parties.
It is promoted by the School of Exact, Physical and Natural Sciences (FCEFyN), National University of Córdoba (UNC), along with the participation of the following institutions:
- Provincial Administration of Water Resources, Province of Cordoba (APRHi)
- National University of Río Cuarto (UNRC)
- National Scientific and Technical Research Council (CONICET)

Status. In progress.

Time frame. 10/01/2021 - N/A

Frequency. Uninterruptedly.

Participation period. Sustained over time.

Scope of the initiative. Local (city, province).

Geographic scope. Province of Córdoba, Argentina.

Project development members. Representatives of the community and mechanical sand mine operators located on the course of the Río Cuarto.

Number of participants. From 1 to 50.

Action/s involving citizen participation.
- Problem definition.
- Data collection.
- Data analysis.
- Phenomenon monitoring.
- Solution planning.
- Solution deployment.

Citizens participate in all stages of the process.

Technological device/tool required.
- Shovels for extraction of sediment samples from the river bottom.
- Containers for storing bottom and suspended sediment samples.
- Forms to report observations, experiences and comments.
- Rain gauges installed to correlate samples to a hydrometeorological situation.
- Stopwatch and measuring tape to estimate flow rates.

Recruitment methods. Through management agencies, in particular through APRHi, Rio Cuarto delegation.

Replicability. Work has already begun on Rio San Antonio (San Antonio River), one of the main tributaries of the San Roque reservoir, and on Rio Xanaes (Xanaes River) (Rio Segundo).

Scalability. Non-mechanical sand mines will be added in the project, which are low-tech but have a large number of participants, with a significant social impact. The rest of the community will join in later. Therefore, the number of participants as well as the project's spatial coverage are expected to increase annually.

Open access to data. Knowledge and results are transferred to sand miners through reports. In addition, information is transmitted to the rest of society through social media as well as the reports prepared by the people who participate in this project.

Feedback. Sand mine operators receive detailed information on the quality of the sediment they obtain and its spatial and temporal variability. This information will enable them to improve their commercial and extractive activities.

Linkage with state agency/government. Institutional support is provided by:
- Ministry of Public Services of the Government of the Province of Córdoba.
- APRHi.

The data generated in this project are transferred directly to the management agencies in charge of monitoring water resources in the province of Córdoba.

Institutional funds. The outreach departments of the universities in charge of this initiative. Ministry of Public Services, of the Government of the Province of Córdoba. APRHi, Córdoba. CONICET.

Awards/distinctions -.

Knowledge areas/disciplines (OECD)
Natural And Exact Sciences / Earth and Environmental Sciences.
Engineering and Technology / Civil Engineering.

Project leaders.
- Carlos Marcelo García Rodríguez, School of Exact, Physical and Natural Sciences (FCEFyN), National University of Córdoba (UNC) and the National Scientific and Technical Research Council (CONICET) in Argentina.
- Rocío Bianchi, Institute of Advanced Studies in Engineering and Technology (IDIT), CONICET.

Contact information
Email: masareproyecto@gmail.com; carlos.marcelo.garcia@unc.edu.ar; rbianchi@mi.unc.edu.ar
Web: sites.google.com/view/proyectomasare/
Twitter: twitter.com/ProyectoMasare