



# MATTEO

## Educational linkage, interinstitutional integration and environmental monitoring



### Objectives

#### Overall goals:

- Highlight the importance of crowdsourcing data which may be later used for optimal water resource management.
- Promote interinstitutional and intra-institutional work, by encouraging the partaking of students at different educational levels.
- Promote citizen participation in scientific projects
- Foster the involvement of public and private schools of any kind.
- Plan the participation of residents in recording hydrometeorological data.

#### Specific goals:

- Record and analyze weather data to characterize particular physical phenomena (for example, heavy storms) occurring in the area; also, contribute to the determination of certain methodological aspects and to instrumentation making.
- Establish ties at every educational level between public and private educational establishments.
- Crowdsourc data to co-create knowledge with the aim to mitigate the effects of environmental hazards (floods, droughts, wildfires, pollution, etc.).

### Description of citizen participation

Children and young people carry out hydrological and hydrometeorological measurements and build their own low-cost instruments. These instruments are validated by comparison with official instruments (for example, the instruments are installed in the National Weather Service educational experimental fields). Additionally, the students are promoters of what they have learned, applying it to their daily environment. Private residents have been incorporated to collaborate with data recording, giving rise to MATTEO R., where the R in the last name (Ravagli) refers to Residents. Today, schools from the MATTEO project are currently participating in international scientific projects such as PREVENIR project, funded by the Science Agency of Japan.

### Type of citizen science project

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

#### Participating parties.

- Faculty of Exact, Physical and Natural Sciences (FCEyN, in Spanish) of the National University of Córdoba (UNC, in Spanish).
- National Scientific and Technical Research Council (CONICET, in Spanish) of Argentina with the support of allied institutions.

**Status.** In progress.

**Time frame.** 01/03/2018 – N/A

**Frequency of project execution.** Uninterruptedly.

**Participation period.** On a sustained basis.

**Scope of the initiative.** International (two or more countries).

**Geographic scope.** In the province of Córdoba, other provinces (Salta, Tucumán, San Luis, Chubut), and foreign countries (Perú, United States, Colombia).

**Project development members.** It has been developed with the collaboration of both scientists and participants without formal training.

**Number of participants.** Over 1001.

**Action/s involving citizen participation** Problem identification. Data collection. Data analysis. Phenomenon monitoring. Solution design. Solution implementation. Citizens are involved in the entire process.

#### Technological device/tool required.

- Low-cost automated commercial weather stations.
- Low-cost temperature and humidity sensors.
- Beaufort scale.
- Commercial rain gauges and eco-rain gauges (built with recyclable material).
- Other low-cost weather instruments built by the students, faculty and families in each educational community.

**Recruitment methods.** Educational institutions joined the initiative as a result of the interest of both students and the teaching staff. Specific collaboration agreements have been signed with several educational institutions and the Directorate of Technical Schools of the Province of Córdoba to incorporate this project into the curricula recommended by said directorate.

**Replicability.** The current network comprises over 50 educational establishments situated in the province of Córdoba. The project is being replicated in the province of Salta by Universidad Católica de Salta (Catholic University of Salta) (UCASAL, in Spanish), and in Tucumán by the Faculty of Exact Sciences and Technology of the National University of Tucumán and INFINOA (CCT CONICET – Tucumán), as well as in the provinces of Chubut and San Luis. It is also being implemented in Colombia (Institución Educativa El Salado [Educational Institution El Salado], Envigado) and in the United States (Lincoln Trail Elementary – Mahomet, Illinois).

**Scalability.** Every year, the number of participants increases significantly.

**Open access to data.** The findings and the knowledge are disseminated through social media and by means of the reports created by project members. The data collected by citizens is published in <https://matteo.aprhi.gob.ar/> of public access.

**Feedback.** Students, teaching staff and residents prepare a set of guidelines which are incorporated into the new stages of the project.

#### Linkage with state agency/government.

- Ministry of Public Services of the Province of Córdoba.
- Provincial Administration of Water Resources of Córdoba.
- Ministry of Education of the Province of Córdoba.
- National Weather Service (SMN) in the Subregional Semiarid Region Center of the National Water Institute.

The data generated in this project are transferred directly to the government agencies responsible for monitoring the water resources of the province of Córdoba.

**Institutional funds.** They have been obtained from the extension secretariats of the universities leading this initiative. Besides, financial support and donations were provided by the following entities: the Ministry of Public Services of the Province of Córdoba; the Provincial Administration of Water Resources of Córdoba, the Department of Atmospheric Sciences of the University of Illinois at Urbana-Champaign; the Semi-arid Region Deputy Management of the National Water Institute, the Municipality of Villa Carlos Paz, and CONICET.

**Awards/distinctions.** It has been declared a project of legislative interest at a local level in the city of Villa Carlos Paz (Declaration No. 025/2019-202) and by the Municipality of Sinsacate (Ordinance No. 1108/2021).

#### Classification of knowledge areas (OECD).

Natural Sciences / Earth and related Environmental sciences  
Engineering and Technology/ Civil Engineering  
Agricultural Sciences/Other agricultural sciences

#### Project leaders.

- Carlos Marcelo García Rodríguez, Physical and Natural Sciences (FCEyN, in Spanish) of the National University of Córdoba (UNC, in Spanish) / National Scientific and Technical Research Council (CONICET, in Spanish) of Argentina.
- José Manuel Díaz Losada, FCEyN / UNC y CONICET.

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