

FINAL REPORT

Citizen science for the conservation of high Andean amphibians with school children - "Ciencia ciudaRANA"



JUNÍN, PERÚ, 2021 - 2023

Special acknowledgment

We thank the Rufford Foundation for their generosity and contribution to this project, and for the trust placed in us that has allowed us to contribute to the conservation of the *Telmatobius macrostomus* (Lake Junin frog) and *Telmatobius brachydactylus* (Junín riverside frog or wanchas).

To our local Educational Management Unit, UGEL Junín, for the commitment, interest and participation throughout the years in the execution of this conservation initiative within the Educational Institutions of its jurisdiction.

To SERNANP, specifically, the Junín National Reserve, an area protected by the country of Peru, for participating through specialists and park rangers in the field trips and being actively involved during their execution.

To the Denver Zoological Foundation, for the continuous support, for selflessly providing us with equipment and facilities for the execution of the project and for the timely advice related to field trips.

To VICAM, mainly to Bibiana Vilá for the continuous support in the elaboration of the pedagogical tool directed to the teacher as part of the compilation of experiences of the years of execution of the project.

To Electroperú, for its contribution in the contests in favor of the Chinchaycocha frogs and field trips for students.

IN CAMBIO company for training and strengthening teachers in scientific research in high Andean aquatic ecosystems.

To the teachers of Science and Technology of the Educational Institutions 6 de Agosto, Jorge Chávez Darnell, Libertador Simón Bolívar, San Juan, Santa Rosa, La Victoria de Junín, San Pedro de Parí, Albert Einstein, Andrés Bello López, Miguel de Cervantes Saavedra, Jachahuanca, Puyay, San Francisco de Uco and Agropecuario 114 for their valuable time in motivating students to be interested in the conservation of Chinchaycocha frogs and get involved in the development of scientific investigations presented at the XXXI and XXXII National School Science Fair and Technology (FENCYT) Eureka.

To the fathers and mothers of families for the confidence provided through their sons and daughters to participate in the project. For the interest of involving them in the constructivist learning of our town.

To all students, thank you for those memorable smiles and teachings. The enthusiasm in the field, getting to know the Chinchaycocha frogs and their interest in exploring the Junín National Reserve was a great motivation for the entire team. For the confidence provided in the development of the workshops and learning sessions, as well as in the biological monitoring activities.

And finally, to our team from the NGO Grupo RANA who led the project with great enthusiasm, thank you for your continuous involvement in the development of each activity, overcoming each challenge and the lessons learned.

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Introduction

Citizen science involves the population in the generation and collection of scientific data, the projects framed in it have established notable advances in scientific knowledge, as well as the dissemination of scientific education (Bonney et al., 2009).

This project called "Citizen Science for the conservation of high Andean amphibians with school children - CiudadRANA Science" aims to disseminate information and promote participation among the local student community on the conservation of high Andean frogs, the species of *Telmatobius macrostomus* (Lake Junin frog or Chinchaycocha frog) and *Telmatobius brachydactylus* (Junín riverside frog or wanchas). The activities were carried out within the scope of the Junín National Reserve, recognized as a RAMSAR site since 1997 and identified within the Alliance for Zero Extinction since 2017. This natural protected area by the Peruvian government is home to the species of *T. macrostomus* and *T. brachydactylus*, which are endemic to the high Andean areas of Junín and Pasco, and are endangered due to habitat loss, degradation and fragmentation, overgrazing, pollution, introduction of rainbow trout (*Oncorhynchus mykiss*) as an exotic species and overexploitation of frogs for human consumption (Alzamora et al., 2020).

The purpose of the project was to bring the local and non-local population closer to the conservation of both species of high Andean frogs through: (a) development, implementation and expansion of a citizen science network throughout the province of Junín aimed at teachers and students, (b) preparation of a manual for teachers and a manual for students validated in a participatory manner, (c) institutional recognition of the theoretical-practical work manuals by UGEL - Junín and their insertion in the compulsory study plan of the institutions in the province of Junín, (d) develop scientific monitoring programs for habitats close to the benefited educational institutions, (e) disseminate the results and experiences of the project to the Environmental Management Committee of Lake Chinchaycocha, the Management Committee of the Junín National Reserve and the Bi-regional Plenary of the Chinchaycocha Sustainable Environmental Management Plan, and (f) promotion of knowledge in local communities about the current situation of Junín frogs at fairs, photographic exhibitions, and infographics.

The development of the project involved the local population, organizations and competent authorities in the framework of the conservation of high Andean frogs. The context under health alert by COVID-19 generated limitations and modifications throughout the project, however, it was possible to meet the objectives set, mostly with additional results in order to continue contributing to science and disseminate knowledge of the current status of *Telmatobius macrostomus* and *Telmatobius brachydactylus* species in the local and non-local population.

Background

1. Origin of work



Telmatobius macrostomus (Lake Junin frog) and *Telmatobius brachydactylus* (Junín riverside frog or wanchas) are two high Andean amphibians endemic to the Junín and Pasco regions of Peru, these frogs are categorized as endangered on the IUCN Red List and Supreme Decree No. 004-2014, product of different threats they face such as excessive hunting, habitat alteration and degradation, the presence of invasive species, among others, which have caused an unprecedented decline. In the Junín National Reserve and its Buffer Zone is where there are the largest historical records of both species, this ecosystem is declared a natural area protected by the government of Peru and is characterized by the presence of Lake Junín or also called Lake Chinchaycocha which It is recognized as a Ramsar site.

During 2018 and 2019, the pilot project called "High Andean Amphibian Conservation Initiative in the Chinchaycocha Basin" was developed, implemented in the Junín National Reserve, the project sought to bring the local population closer to the conservation of *Telmatobius macrostomus* and *Telmatobius brachydactylus*, managing to establish a citizen science network made up of 153 students and 10 teachers who reported their findings in I-Naturalist and increased their knowledge, environmental awareness of a farming community was promoted regarding the cleaning of canals, it is a stress factor that disturbs the frogs' habitat; There was a presence in different participatory meetings, interpretive panels were implemented in the Reserve's interpretation center, 11 infographics with scientific content were disseminated through digital channels that reached more than 40,000 people in social media. In the implementation of the project, we worked in coordination with the UGEL - Junín Local Educational Management Unit (local office and part of the Ministry of Education that regulates local educational processes), the National Service of Protected Natural Areas - SERNANP (institution that manages the Reserve Nacional de Junín), Denver Zoo Foundation, Peace Corps, in addition to the participation of 18 local, national and international organizations.

This pilot allowed a series of experiences, lessons learned and alliances that motivated to continue deploying efforts to conserve frogs through education and the strengthening of the citizen science network.

2. Current situation of high Andean frogs

The IUCN Red List of Threatened Species indicates that amphibians are a group of vertebrates comprising more than 7,000 known and recorded species. Currently, 41% of the world's amphibians are recorded as threatened, representing more than 2,900 amphibian species (IUCN, 2022).

Amphibians have existed on earth for more than 300 million years, however, in the last two decades they have experienced an alarming number of extinctions, almost 168 species are believed to have become extinct and at least 2,469 (43%) more have declining populations as noted in a 2004 study (Stuart, 2004).

Until 2022, 659 species of amphibians between terrestrial and aquatic have been identified in Peru. Of these, 28 are water frogs belonging to the *Telmatobius* family. Of this large family in South America, 63 species have been recorded, so in Peru we have approximately 44% (AmphibiaWeb, 2022).

Telmatobius is a genus that has evolved in relation to the aquatic ecosystems of the Andes and its mountain ranges, most of these species live between 3,000 and 4,000 meters above sea level (Barrionuevo, 2016).

The Junín National Reserve is home to two amphibians of the genus *Telmatobius* that are endangered and are endemic to the high Andean areas of Junín and Pasco. These are *T. macrostomus*, known locally as the Lake Junin frog; and *T. brachydactylus*, known locally as the Junín riverside frog or wanchas (Alzamora et al., 2020). Both, are conservation objects of the Junín National Reserve, being declared as priority species for conservation and national protection (Regional Ordinance No. 331-GRJ/CR, 2020).

Direct threats to *T. macrostomus* and *T. brachydactylus* species include habitat loss, degradation, and fragmentation through resource extraction (reed burning and grass extraction), overgrazing (by sheep, cattle, and camelids), pollution (by mining waste, municipal wastewater, agrochemicals, etc.), fluctuations in water levels controlled by the Upamayo dam, the introduction of rainbow trout (*Oncorhynchus mykiss*) and the overexploitation of frogs for human consumption, both for subsistence as a source of protein and for commercial purposes. In addition, projected climate change models indicate temperature increases in the higher altitude regions of the tropical Andes (Watson et al., 2016).

3. Problem analysis

The problem to be solved is the decline in the populations of *T. macrostomus* and *T. brachydactylus*, which is caused by various threats identified in a problem tree. One of the main causes is the "lack of interest of the population in the conservation of high Andean frogs" caused by low environmental awareness

and little knowledge of the current situation of both species of high Andean frogs. This is due to the little dissemination and promotion of information by the competent authorities, little local participation and collaboration in the conservation of these frogs, and little general education for conservation around frogs in the local educational system (Figure 1).

To address these challenges, the transformation of a problem tree to an objective tree was carried out, in which the main objective was to increase the populations of *T. macrostomus* and *T. brachydactylus*. To achieve this objective, it is essential to develop the secondary objectives, among which is evidenced "to bring the population closer to the conservation of high Andean frogs" (Figure 2).

Based on the construction of the objective tree, the proposal for this project called "Citizen Science for the conservation of high Andean amphibians with school children - CiudaRANA Science", its objective is to disseminate information and promote participation among the local student community on conservation. of both high Andean frogs, the species of *T. macrostomus* and *T. brachydactylus*.

Figure 1. Section of the problem tree

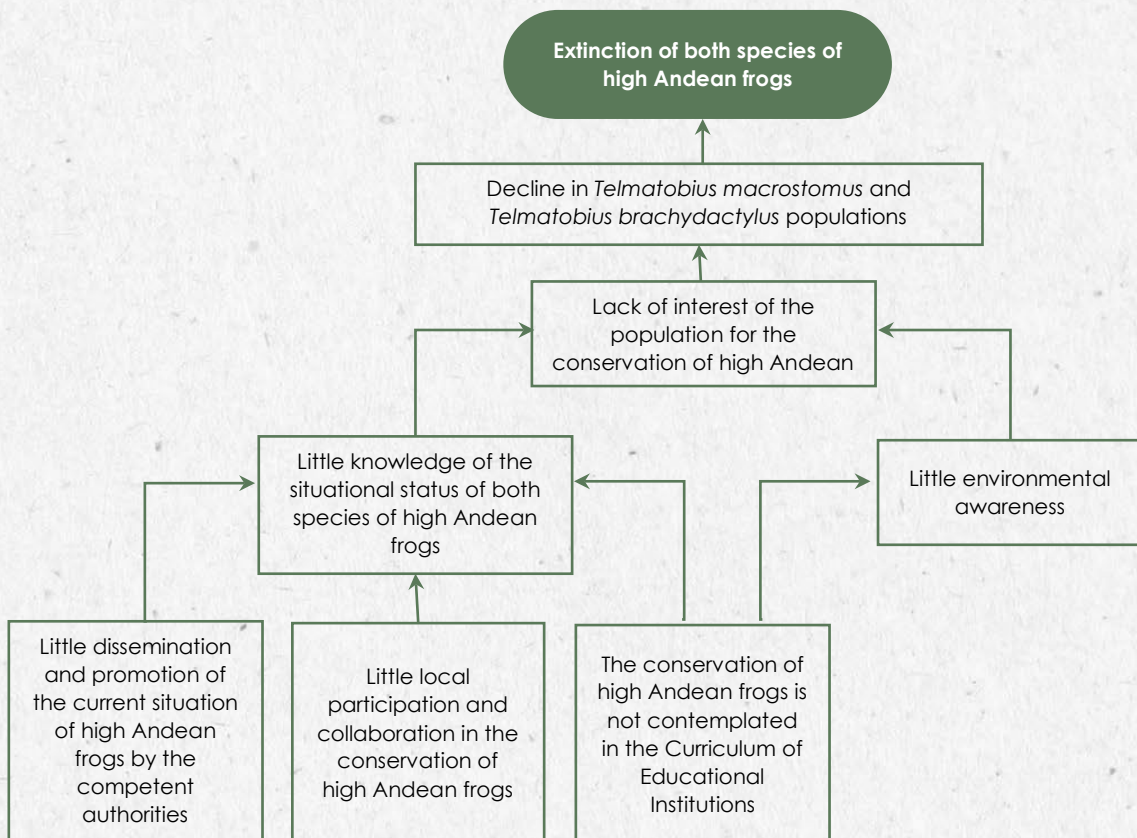
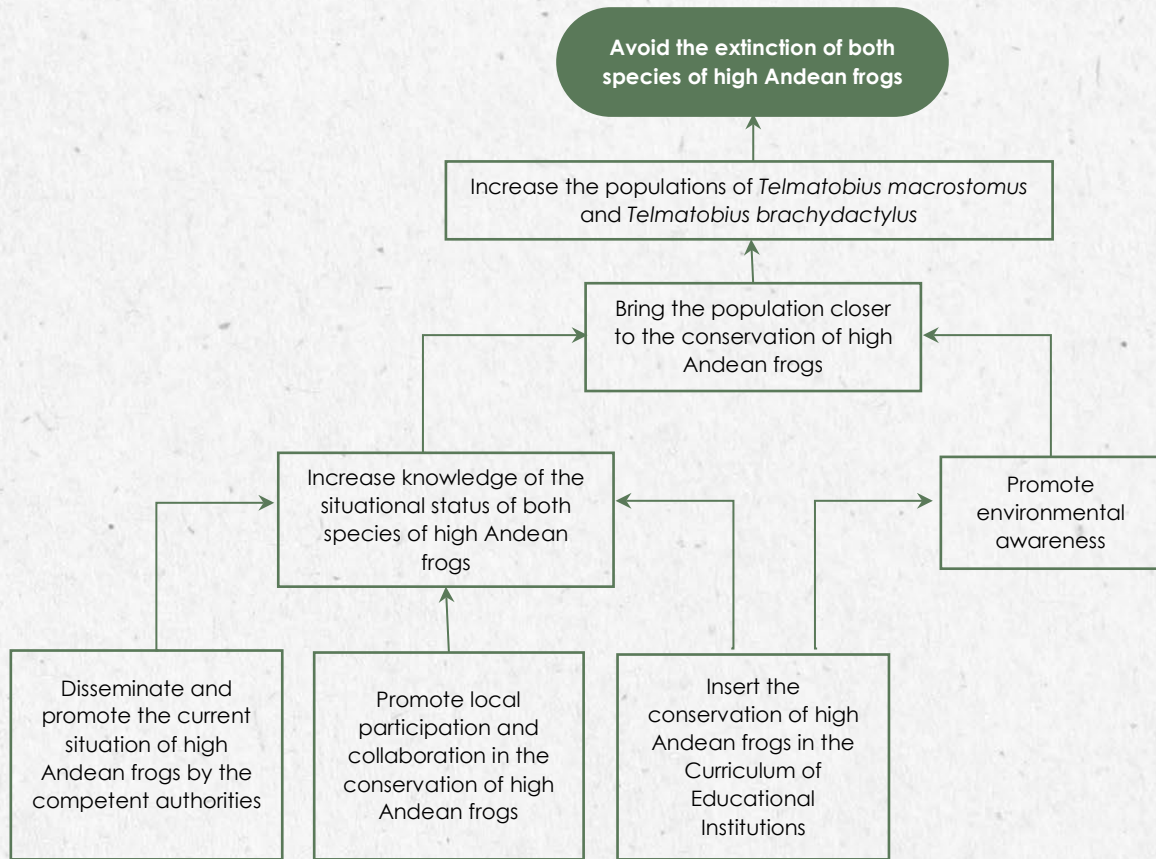


Figure 2. Section of the objective tree



Project description

The project "Citizen science for the conservation of high Andean amphibians with schoolchildren - CiudadRANA Science" seeks to disseminate information and promote the participation of the local student community in the conservation of high Andean frogs, the species of *T. macrostomus* and *T. brachydactylus*. It is developed within the scope of the Junín National Reserve and its Buffer Zone, located in the Junín and Pasco region.

The objectives of the project were achieved through: (a) the project "Las ranas y yo: Ciencia y empatía ciudadana para conservar las ranas de la cuenca del lago Junín"; (b) preparation of "Las ranas y yo: Ciencia y empatía ciudadana - Manual para educadores"; (c) participation in local fairs; and (d) participatory biological monitoring of Chinchaycocha frogs.

Project objectives

- ❖ Further development, implementation, and expansion of a citizen science network throughout the province of Junín focused on increasing the scientific knowledge of local communities through the implementation of workshops (learning sessions) in classrooms and in the field. Students and teachers will collect, process, and disseminate scientific data on the i-Naturalist platform, gain field skills, and receive a deeper understanding of the scientific method.
- ❖ Preparation of two manuals: a manual for teachers and a manual for students. All manuals will be validated in a participatory manner involving teachers from educational institutions, the Educational Management Unit of the province of Junín (UGEL) and SERNANP - National Reserve and Historic Sanctuary of Junín de Chacamarca.
- ❖ Institutional recognition of the theoretical-practical work manuals by UGEL - Junín and their insertion in the study plan to be used by all educational institutions in the province of Junín. The manuals will serve as tools to assist teachers in planning learning sessions designed to promote student participation and understanding.
- ❖ Develop scientific monitoring programs for habitats close to the benefited educational institutions.
- ❖ Disseminate the results and experiences of the project to the Chinchaycocha Lake Environmental Management Committee, the Junín National Reserve Management Committee and the Bi-regional Plenary of the Chinchaycocha Sustainable Environmental Management Plan (designated spaces in which public and private institutions and community members to plan and implement environmental activities) to ensure the future sustainability of the project.
- ❖ Promote knowledge in local communities about the current situation of frogs in Junín through: a) Participation in fairs, b) Photographic exhibitions and, c) Preparation of infographics, with scientific information, presented through social networks and media audiovisual. To generate media interest, this last activity also aims to reach non-residents.



Project Scope

1. Location

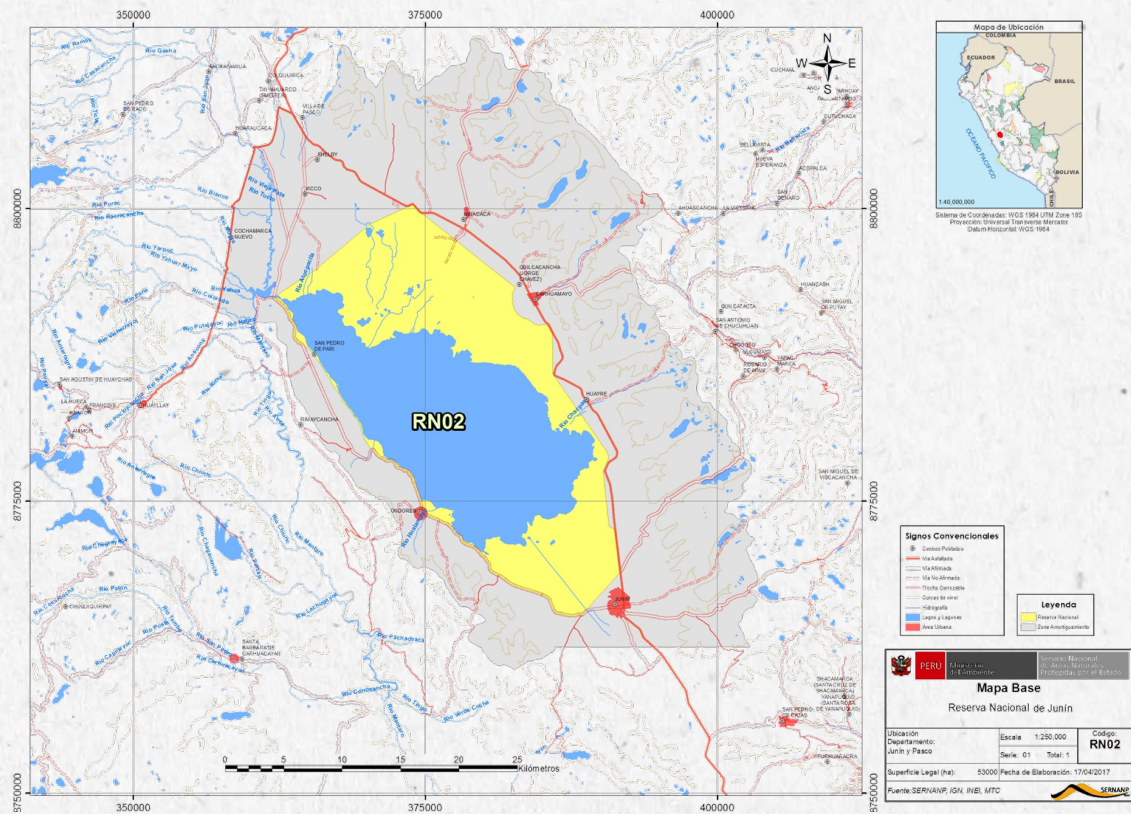
The activities will be implemented in the Junín National Reserve (RNJ) and its Buffer Zone located between 4,050 and 4,500 meters above sea level, at the coordinates Latitude: 11° 3' 24.19" S and Longitude: 76° 9' 26.27" W. The Junín National Reserve was declared by the Peruvian state as a Protected Natural Area in 1974 by Supreme Decree No. 0750-74-AG, this ecosystem is characterized by the presence of Lake Junín or Chinchaycocha which is recognized as a site RAMSAR since 1997 for being a wetland of international importance for the habitat of waterfowl. Recognition as a RAMSAR site seeks the long-term conservation and sustainable use of the site (National Institute of Natural Resources, 2008). Also, it is identified within the Alliance for Zero Extinction (AZE) since 2017 as one of the most important sites for the conservation of global biodiversity due to the presence of the species *Laterallus tuerosi* and *Podiceps taczanowskii* categorized as Endangered according to the IUCN (American Bird Conservancy, 2022).

The RNJ has an extension of 530 km², it is located in the regions of Junín and Pasco (Figure 3) covering the districts of Ondores, Carhuamayo and Junín in the province of Junín as well as in the districts of Vicco and Ninacaca in the province of Pasco (National Institute of Natural Resources, 2008).

This ecosystem is located in the high Andean zone of Peru and is surrounded by agrarian communities and districts with populations that take advantage of their natural resources, but also carry out some activities that impact the habitats of Junín frogs (*T. macrostomus* and *T. brachydactylus*) such as illegal hunting, the introduction of exotic species, habitat alteration and degradation (Watson et al., 2017) in addition to climate change.

The Junín National Reserve and its Buffer Zone is the area where the project is planned to be implemented for the following reasons: a) to be the Protected Area with the largest historical records of *T. macrostomus* and *T. brachydactylus* frogs, in addition to being ecosystems of two local endemic birds that are also threatened; b) support of local actors, institutions and allies of the education sector in the area; c) give continuity to the initiatives, projects and activities identified in the Junín Frog Conservation Program; and d) our proposal is an activity identified in the Environmental Planning for the Conservation of Lake Chinchaycocha and the Master Plan of the Junín National Reserve.

Figure 3. Geographic map of the Junín National Reserve



Note. Prepared by SERNANP

2. Environmental aspects

The climate of the RNJ area is cold with temperatures between 3° and 7° being the period between May and September, the coldest months. Its location in the Peruvian Andes leads to identifying a dry season from April to November and a rainy season from December to March, so the average annual rainfall is 940 mm. It should be noted that there are transition stages between seasons. According to the climatic data used in the classification system by the Thornthwaite method, the zone has been identified as Humid - Frigid, with periods with almost no rain, between the months of May and September. On the other hand, the temperature of the lake Junín is determined at different depths: 17°C at 15 cm, from 15.5°C at 1 m, from 15°C at 3 m, and from 14°C at 6 m. Regarding the average monthly temperature of the San Juan river basin, it has not varied, ranging from 3.5° to 5.5°C for the upper part of the basin and between 4.6° and 6.7°C in the lower part (National Institute of Natural Resources, 2008).

Regarding hydrography, Lake Junín is located in the upper part of the Mantaro basin with an average extension of 470 km². The lake is being fed by 12 rivers and 20 streams in which the Yahuarmayo, Maraychaca, Condorcocha and Huascán rivers stand out, all of them located to the west of the towns of Carhuamayo and

Ninacaca and other rivers are the San Juan, the San Jose, the Chacachimpa. The Upamayo dam, put into operation in 1936 and from which the Mantaro River is born, regulates the water level of Lake Junín for the generation of electricity at the Malpaso hydroelectric plant (National Institute of Natural Resources, 2008).

Regarding the flora, they inhabit around 109 species of flora. Its location varies depending on the bodies of water, which generally present characteristic natural or plant associations. Dividing into categories of bofedales, pajonal, puna grass and reeds (Alzamora et al., 2020; National Institute of Natural Resources, 1996).

Regarding the fauna, the most valued species are birds since their meat and eggs are part of the diet of the local inhabitants. More than 130 species of birds between residents and migratory birds have been registered. Highlighting the Junín Grebe (*Podiceps taczanowskii*) and the Junín Black Rail (*Laterallus tuerosi*). Also, you can find a wide variety of wildlife species, such as mammals, reptiles, amphibians and fish. Among the amphibians, there are five species of amphibians and two are endemic and endangered species, which are *T. macrostomus* (Figure 4) and *T. brachydactylus* (Figure 5) (Alzamora et al., 2020).

Figure 4. *Telmatobius macrostomus* (Lake Junin frog)



Photo. Roberto Elías

Figure 5. *Telmatobius brachydactylus* (Junín riverside frog or wanchas)



Photo. Andrew Watson

3. Social aspects

According to the 2017 census, around 26,119 people live in the five districts of the Junín and Pasco regions that include the Junín National Reserve within their area, with the Junín district being the most populous. The urban population is the one with the greatest presence with approximately 86% of the total population (National Institute of Statistics and Informatics, 2017).

Within the scope of the Junín National Reserve, there are 10 agrarian communities (Table 1) with an extension of 2,008 km² located inside the

protected natural area and its buffer zone. Around 9,478 people live in these communities, which are organized through a General Assembly and a community board (Alzamora et al., 2020).

Table 1. Peasant communities in the Junín National Reserve

District	Agrarian community	Extension (km ²)	Population
Carhuamayo	Carhuamayo	32.62	391
	Matacancha	6.54	2
	Santa Clara de Chuiroc	14.22	39
Ondores	San Juan de Ondores	377.67	655
	San Pedro de Pari	149.84	210
Junín	Huayre	61.41	518
	Villa Junín	147.41	2677
Ninacaca	San Pedro de Ninacaca	900.00	2067
Vicco	Cochamarca	59.54	409
	Vicco	258.77	2510
TOTAL		2 008.03	9478

Note. Prepared by Alzamora et al. 2020.

4. Cultural aspects

Tourism in the Junín National Reserve focuses on the visit of the Junín Grebe, in addition, the other representative bird species of the area. The scenic beauty of Lake Chinchaycocha is also a cited reason. Finally, of the tourists who visit the Junín National Reserve, 50% have the objective of visiting the historical monuments (National Service of Natural Areas protected by the state, 2012).

Within the RNJ, the inhabitants of the area carry out economic and cultural activities such as the extraction of champa (block grasses) used as fuel and the vicuña chaccu that consists of the temporary capture of vicuñas to shear them on commemorative dates (Alzamora et al., 2020; National Institute of Natural Resources, 2008).

5. Economic aspects

The localities placed within the five districts of the scope of the RNJ develop a series of activities that sustain their economy; however, they do cause certain impacts to this area, the lake, and surrounding areas by not being developed

sustainably. At present, activities such as subsistence livestock, maca agriculture (for export and trade) and potatoes for local consumption as well as for the markets of the cities of Lima and Huancayo are developed (National Institute of Natural Resources, 2008).

On the other hand, mining activity has been carrying out its activities for 300 years, leaving notorious environmental liabilities but also beneficial actions for the population such as road construction, increased trade and cultural exchange. There are three mining companies that operate upstream of the Upamayo dam. These companies are the Volcán Mining Company, which operates the Paragsha Mining Unit, the Aurex Mining Company, and the El Brocal Mining Company, the Colquijirca Mining Unit. Dedicating itself to the extraction of gold, silver, lead and zinc (Alzamora et al., 2020).

On the other hand, the Upamayo dam helps the hydroelectric companies Electroandes and Electroperú to make use of water resources for electricity production that supplies the cities of Lima, the central jungle and other cities (National Institute of Natural Resources, 2008).

6. Educational aspects

Regarding the educational aspects, it can be noted that the demand for this service has been increasing in our country due to the number of educational institutions present in the five districts. Currently, the district of Junín has 38 institutions, Carhuamayo with 29, Ondores with 13, Ninacaca with 26 and Vicco with 12. But the illiteracy rate exceeds 85% of the population in each district, with Ondores being the district with the highest rate (88.1%) and Junín the one with the lowest percentage (85.5%) (National Institute of Natural Resources, 2008).

Beneficiaries

1. Students

The students of the educational institutions located around the Junín National Reserve were the protagonists and direct beneficiaries of the project, by being participants in the various workshops carried out and learning sessions generating identity from the biodiversity of their environment and contributing to the conservation of the species of *T. macrostomus* and *T. brachydactylus* in the area of the Junín National Reserve.

The students participating in the biological monitoring are beneficiaries through citizen science for the learning and experiences obtained in the field in order to achieve an approach to the conservation of both high Andean frogs, *T. macrostomus* and *T. brachydactylus*.

In 2021, there were a total of 66 secondary level students from the 5 Science and Technology Clubs of the Educational Institutions as detailed in Table 2. In 2022, there were a total of 362 secondary level students from the 13 Educational Institutions as detailed in Table 3.

Table 2. General data of Educational Institutions in 2021.

Educational institution	District, Province	Teacher of the Science and Technology Club	N° Students
6 de Agosto	Junín, Junín	Alix Anibal Gamarra Contreras	15
Jorge Chávez Darnell	Carhuamayo, Junín	Adelaida Condor Anco	17
Libertador Simón Bolívar	Junín, Junín	Alejandra Francisca Gamarra Contreras	14
San Juan	Ondores, Junín	Ydelo Victorio Valerio	9
Santa Rosa	Carhuamayo, Junín	Yuliana Raquel Capcha Hurtado	11

Table 3. General data of Educational Institutions in 2022.

Educational institution	District, Province	Science and Technology Teacher	Grade	N° Students
Libertador Simón Bolívar	Junín, Junín	Alejandra Francisca Gamarra Contreras	1° A	23
		Yesica Pilar Panduro Llamcachagua	1° B	29
La Victoria de Junín	Junín, Junín	Luis Ivan Yantas Cruz	1° A y B	36
San Pedro de Pari	Ondores, Junín	Jorge Luis Navarro Panez	1°	3
Santa Rosa	Carhuamayo, Junín	Alix Anibal Hilario Villegas	1° A, B y C	34
Jorge Chavez Dartnell	Carhuamayo, Junín	Silvano Teófilo Chagua Güere	1° A, B, C y D	79
		Adelaida Condor Anco	4° B y D	17
6 de Agosto	Junín, Junín	Shandhy Kharyn Casas Arroyo	1° A, B, C y D	68
		Edy Teodora Gómez Guadalupe	1° E y F	29

Albert Einstein	Ulcumayo, Junín	Yuliana Raquel Capcha Hurtado	1° A	7
Andrés Bello López	Ulcumayo, Junín	Yudith Yumelia Torres Camavilca	1° A	8
Miguel de Cervantes Saavedra	Ulcumayo, Junín	Luis Enrique Olivares Suere	1° A	5
Jachahuanca	Ulcumayo, Junín	Araceli Ruth Rojas Maravi	1° A	3
Puyay	Ulcumayo, Junín	Jaime Fausto Espinoza Barrera	1° A	3
San Francisco de Uco	Ulcumayo, Junín	Rocio Katy Yantas Chuco	1° A	3
Agropecuario 114	Ulcumayo, Junín	Victoria Pilar Campos Calderón	2° A	11

2. Teachers

In 2021, the advisory teachers of the Science and Technology Clubs at the secondary level of the project were beneficiaries by having continuous accompaniment in the elaboration of a scientific investigation and opening of its presentation at the XXXI National School Fair of Science and Technology (FENCYT) Eureka Virtual 2021.

In 2022, first grade secondary school teachers in the Science and Technology area in the competent Educational Institutions of the UGEL Junín enrolled in the project "Las ranas y yo: ciencia y empatía ciudadana" are benefited by having continuous accompaniment in the elaboration of their scientific research and opening of their presentation at the XXXII National School Fair of Science and Technology (FENCYT) Eureka Virtual 2022.

Likewise, they are direct beneficiaries of "Las ranas y yo: Ciencia y empatía ciudadana - Manual para educadores", being the direct recipients of the pedagogical tool and protagonists of the implementation of the learning sessions. The development of technical assistance and updating to 16 teachers included field trips to collect information and take samples; and virtual synchronous and asynchronous technical assistance, through Google Meet, Zoom and Google Classroom.

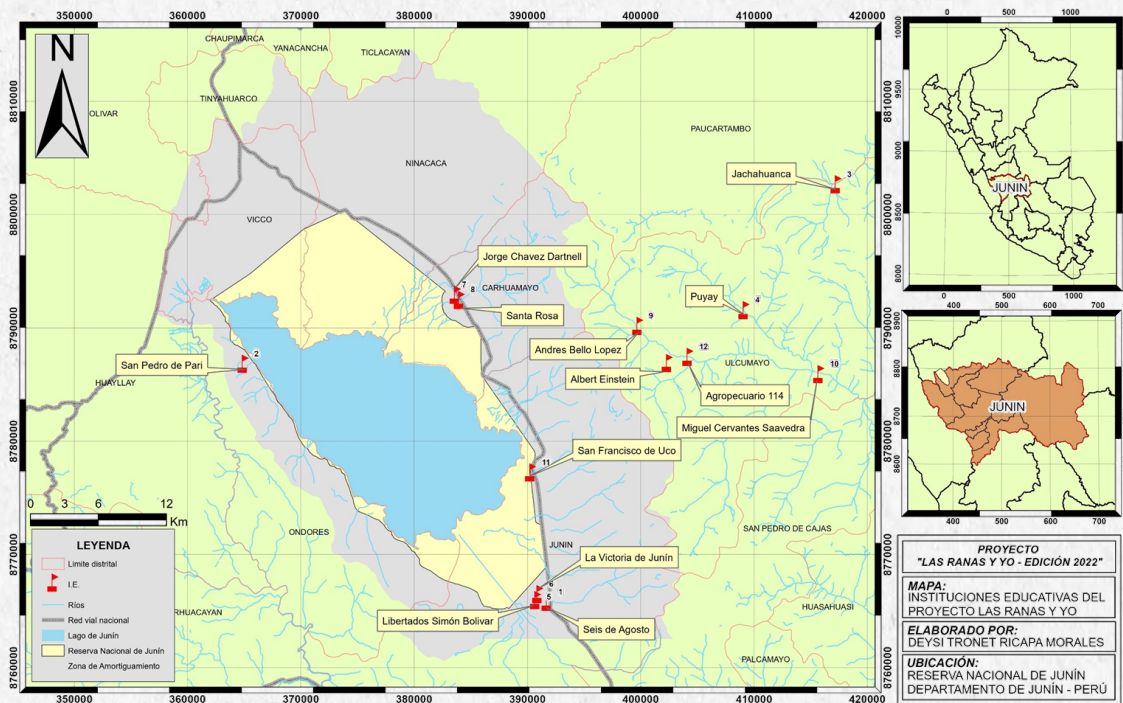
The participating teachers of the participatory biological monitoring of the Chinchaycocha frogs are beneficiaries through their accompaniment to their students and learning to use monitoring equipment in the field for future expeditions in the Junín National Reserve.

3. Educational institutions

In 2021, the project "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín lake basin" benefited five Science and Technology Club of the Educational Institutions: 6 de Agosto, Jorge Chávez Dartnell, Libertador Simón Bolívar, San Juan and Santa Rosa. All educational institutions are secondary level, mixed gender and located in the province of Junín, Junín region.

In 2022, it benefited thirteen Educational Institutions San Pedro de Pari, Libertador Simón Bolívar, 6 de Agosto, La Victoria de Junín, San Francisco de Uco, Santa Rosa, Jorge Chávez Dartnell, Andrés Bello López, Albert Einstein, Agropecuario 114, Miguel Cervantes Saavedra, Jachahuanca and Puyay competent to the UGEL Junín. All the educational institutions are secondary level, mixed gender and are located in the districts of Junín, Carhuamayo, Ondores and Ulcumayo, province of Junín, Junín region (Figure 6).

Figure 6. Educational Institutions benefited from the project



Note: Prepared by Grupo RANA

4. Community of the Junín region

The community of the Junín region is a beneficiary in general due to the revaluation of the endemic high Andean frogs of the Junín National Reserve, an increase in the scientific level in the educational level through of the project and increased knowledge of the current situation of the Lake Junín frog through the participation of local fairs.

Strategic allies



1. Local Educational Management Unit - UGEL Junín

UGEL Junín is the Institution focused on promoting the educational development of our students; strengthening pedagogical management together with our directors, teachers and administrators; accompanying the implementation of national education policies and coordinating the articulation with Local Governments, with the purpose of promoting the training, protection and continuous improvement of the educational system in the Province of Junín.

The alliance with the UGEL Junín allowed institutional support from the presentation of the proposal to initiate communications with the directors and teachers of the secondary level of the Science Clubs of the Educational Institutions selected from the project. A cooperation agreement was established to provide facilities for the execution of the workshops to the students and authorization for field trips.

In the elaboration of the pedagogical tool "Las ranas y yo: Ciencia y empatía ciudadana - Manual para educadores" we had the continuous and active accompaniment of the specialist of the Science and Technology area of the UGEL Junín for its curricular insertion and to ensure its execution in subsequent years as part of the Curricular Program.

2. Junín National Reserve - SERNANP

SERNANP is a public institution whose mission is to ensure the conservation of the Natural Protected Areas of Peru, their biological diversity and the maintenance of their environmental services.

Within the framework of the project and the participatory biological monitoring of the Lake Junin frog, the alliance is made through the Junín National Reserve that allowed the execution of biological activities and monitoring within the protected natural area and its buffer zone. Likewise, it provided facilities for accompanying specialists and park rangers on field trips.

3. Denver Zoological Foundation

The Denver Zoological Foundation is a recognized NGO in wildlife conservation. It is on a mission to inspire communities to conserve wildlife for future generations.

The alliance allowed the timely advice of specialists in field trips in the Junín National Reserve and provided monitoring equipment and facilities for the execution of the project and the participatory biological monitoring of the Lake Junin frog.

4. Electroperú

Electroperú is a company whose objective is to dedicate itself to the activities of the generation, transmission and commercialization of electrical energy, in order to ensure the supply of energy demand. They are supplied from the Mantaro Hydrographic Basin that covers the departments of Pasco, Junín, Huancavelica and Ayacucho. The Mantaro River originates in Lake Junín, which is regulated by the Upamayo Dam, the most important seasonally regulated reservoir in Peru.

The alliance with Electroperú allowed the sponsorship of prizes for the Internal Action Contest in favor of the conservation of Chinchaycocha frogs in the framework of the graduation of the project.

5. CAMBIO

CAMBIO is an organization made up of professionals who provide courses, advice and training to the general public. The organization provided training to teachers on the process of preparing a scientific investigation and advice on the research topics selected in the learning sessions carried out with the students.

Project "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín lake basin"

1. Description

"Las ranas y yo" or in english "Frogs and me" is an educational project developed in the Educational Institutions of the secondary level of the Junín region, Peru, which uses citizen science and environmental education as tools through the application of the constructivism method that allows revaluing the knowledge of the students. The project is led by the NGO Grupo RANA, UGEL Junín, Rufford Foundation, New England Biolabs Foundation and The Mohamed bin Zayed Species Conservation Fund in collaboration with the Denver Zoo Foundation, SERNANP - Junín National Reserve, CAMBIO and Electroperú.

Its purpose is to develop collaborative research with local students and teachers framed in two lines of research: 1) fill information gaps about high Andean frogs and their habitats, and 2) mitigate threats to them.



2. Objectives

- ❖ Strengthening the competences about investigates and explains in students and teachers of first grade of secondary school in the area of Science and Technology in the competent Educational Institutions at the UGEL Junín.
- ❖ Contribute to the conservation of the frogs of the Chinchaycocha lake basin, creating awareness and sensitizing students and teachers of first grade of secondary school in the area of Science and Technology in the Educational Institutions competent to the UGEL Junín.
- ❖ Develop scientific research regarding the aquatic ecosystems of the Junín National Reserve.

3. Methodology

Figure 7. Route of the “Las ranas y yo” methodology in 2021



Note: Prepared by Grupo RANA

During 2021, the project was developed in five Science and Technology Clubs of the Educational Institutions 6 de Agosto, Jorge Chávez Darnell, Libertador Simón Bolívar, San Juan and Santa Rosa. They were selected under evaluation criteria such as previous participation in the project during the year 2019 and the development of communications with the director of the Educational Institution and the advisory teacher of the Science and Technology Club.

The methodology of the program in 2021 (Figure 7) begins with the coordination with the respective advisory teacher of the Science and Technology Club, a meeting to present the project to the parents was organized and the registration to "Las ranas y yo" through the authorization and commitment letter signed by you. This stage lasted one week where the documents corresponding to the students enrolled in the project were received.

Due to the health emergency caused by COVID-19, the Ministry of Education (MINEDU) declared the continuity of the educational service through virtual classes. Under this context, personalized digital literacy was carried out as the first interaction with the enrolled students where they were given advice on the use of digital tools such as Google Meet and the creation of their own Gmail accounts. Likewise, a record of the conditions of the students' electronic equipment was made to evaluate their situation regarding access to virtual classes, this evaluation allowed providing accessibility support to students who had economic difficulties regarding access to the Internet.

An initial diagnosis was made to the enrolled students regarding their expectations regarding the project and their previous knowledge of

conservation of *T. macrostomus* and *T. brachydactylus* through individual interviews by telephone or face-to-face calls (Figure 8).

Figure 8. Initial diagnosis for students in 2021



In the project, 14 workshops were planned for each Science and Technology Club classified into 10 scheduled workshops and four optional workshops (Table 4). The weekly schedules of the virtual modality workshops were programmed with the support of the respective advisory teacher outside regular school hours, and the face-to-face virtual workshops were carried out with prior coordination with the Educational Institution, authorization from the parents and complying with the Biosafety protocol for the prevention and control of COVID-19 in Peru.

Table 4. Details of project activities in 2021.

N°	Activity name	Modality	Date	Description
1	Welcome to the project	Virtual / Scheduled	05/2021	<ul style="list-style-type: none"> ❖ Project opening meeting. ❖ Presentation of the team and the project.
2	Exploring the frogs of the Junín National Reserve - wet season	In-person / Scheduled	06/2021	<ul style="list-style-type: none"> ❖ Application of the Biosafety Protocol for the prevention and control of COVID-19 in Peru. ❖ Field trip to the Chacachimpa river and Carhuamayo river of the RNJ.

				<ul style="list-style-type: none"> ❖ Learning about the Lake Junin frog and its status. ❖ Biological monitoring of frogs in the wet season. ❖ Recognition of the protected natural area with a park ranger. ❖ Accompaniment of research advisors.
3	Sharing our experiences in the field	Virtual / Scheduled	06/2021	<ul style="list-style-type: none"> ❖ Reinforcement of learning about the Lake Junin frog and its situation. ❖ Socialization of learning in the field through photographs and significant experiences.
4	Iniciando mi proyecto de investigación	Virtual / Scheduled	06/2021	<ul style="list-style-type: none"> ❖ Reflection on the curiosities that emerged from the field trip experience. ❖ Brainstorm among students about research topics. ❖ Selection of the research topic.
5	Defining my research project	Virtual / Scheduled	07/2021	<ul style="list-style-type: none"> ❖ Formulating the research problem. ❖ Definition of research objectives. ❖ Classification of the research approach: qualitative or quantitative ❖ Statement of the research hypothesis.
6	Looking for scientific information	Virtual / Scheduled	07/2021	<ul style="list-style-type: none"> ❖ Learning about the search for scientific information through digital tools. ❖ Video tutorial on the search for scientific information. ❖ Delimitation of the theoretical framework on the research topic.
7	Designing my research project	Virtual / Scheduled	07/2021	<ul style="list-style-type: none"> ❖ Definition of the research methodology. ❖ Approach to procedures for data collection in the field.
8	Collecting data in the field	In person / Scheduled	08/2021	<ul style="list-style-type: none"> ❖ Application of the Biosafety Protocol for the prevention and control of COVID-19 in Peru. ❖ Field trip to the Chacachimpa river and Carhuamayo river of the RNJ.

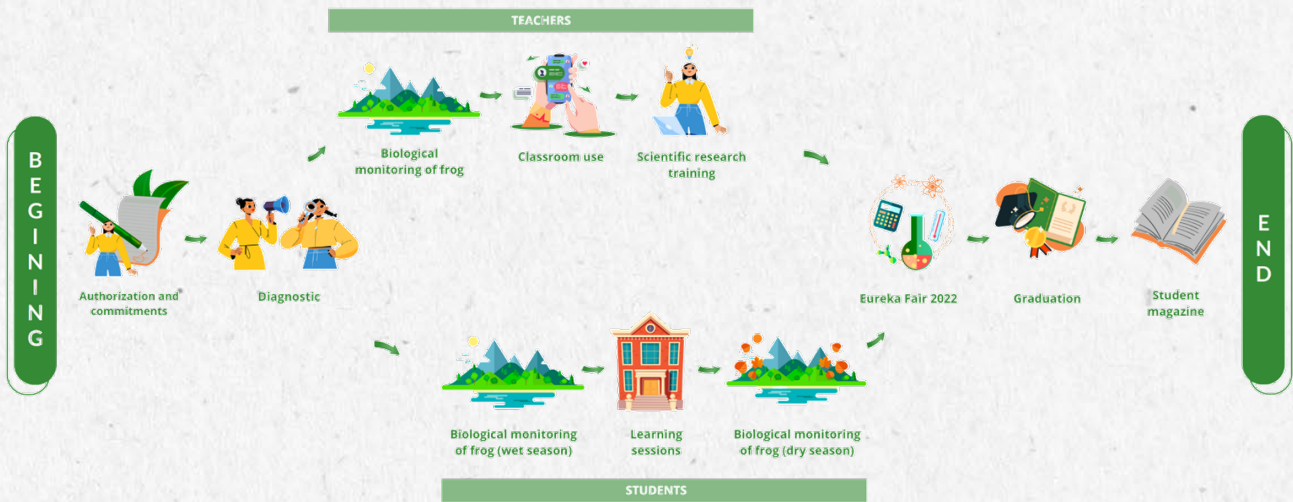
				<ul style="list-style-type: none"> ❖ Designation of roles in the field. ❖ Record of environmental data. ❖ Application of the research methodology.
9	learning from researchers	Virtual / Optional	08/2021	<ul style="list-style-type: none"> ❖ Inspiration for scientific research through specialists.
10	Analyzing my field data	Virtual / Optional	08/2021	<ul style="list-style-type: none"> ❖ Transfer of the field data sheet. ❖ Field data analysis.
11	Findings of my research project	Virtual / Optional	08/2021	<ul style="list-style-type: none"> ❖ Discussion of the data obtained in the field. ❖ Conclusion of the research results.
12	Finishing my research project	Virtual / Optional	09/2021	<ul style="list-style-type: none"> ❖ Consolidation of the research project in a report to present to the EUREKA Fair.
13	Exploring the frogs of the Junín National Reserve - dry season	In person / Scheduled	09/2021	<ul style="list-style-type: none"> ❖ Application of the Biosafety Protocol for the prevention and control of COVID-19 in Peru. ❖ Field trip to the Chacachimpa river and Carhuamayo river of the RNJ. ❖ Learning about the Junín Giant Frog and its status. ❖ Biological monitoring of frogs in the dry season. ❖ Recognition of the protected natural area with a park ranger. ❖ Accompaniment of research advisors.
14	My graduation	In person / Scheduled	10/2021	<ul style="list-style-type: none"> ❖ Application of the Biosafety Protocol for the prevention and control of COVID-19 in Peru. ❖ Official closing ceremony of the project. ❖ Internal competition for conservation action in favor of frogs. ❖ Recognition of graduate students.

The scientific research reports completed in Workshop 12 - "Culminating my research project" were presented to the UGEL Junín stage of the XXXI National Science and Technology School Fair (FENCYT) Eureka Virtual 2021, a virtual

national contest for research projects and / or technological solutions in the field of science and technology.

At the end of the development of the workshops, face-to-face interviews were conducted with graduate students about their thematic life experiences to assess the impact of the program personally and as a community.

Figure 9. Route of the "Las ranas y yo" methodology in 2022



Note: Prepared by Grupo RANA

During 2022, the project was developed in 13 Educational Institutions San Pedro de Pari, Libertador Simón Bolívar, 6 de Agosto, La Victoria de Junín, San Francisco de Uco, Santa Rosa, Jorge Chávez Darnell, Andrés Bello López, Albert Einstein, Agropecuario 114, Miguel Cervantes Saavedra, Jachahuanca and Puyay. They were summoned through the UGEL Junín for their participation in the project through the first grade high school Science and Technology teachers.

The methodology of the program in 2022 (Figure 9) begins with a meeting to present the project to the teachers and the registration for "Las ranas y yo" is communicated through a letter of authorization and commitment. Teachers continue with an initial diagnosis through individual interviews on skills in issues related to the Junín National Reserve, pedagogical methodologies, and scientific research.

The implementation of "Las ranas y yo: ciencia y empatía ciudadana - Manual para educadores" as a pedagogical tool is aimed at teachers in the area of Science and Technology in the Educational Institutions of the first grade of secondary school located around the Junín National Reserve, designed according to the Secondary Education Curricular Program approved by Ministerial Resolution No. 649-2016-MINEDU. For the effective implementation of the manual for teachers, a face-to-face and virtual Course was developed for technical assistance and updating for teachers. Which consisted of a virtual classroom in Google Classroom, which details 18 audiovisual materials for the

learning sessions and includes sections for receiving evidence, suggestions and experiences on its use.

Likewise, to strengthen their research capacities on the habitats of frogs and their ecosystems, exploration trips to the research site were carried out in May (Figure 10), and 7 theoretical-practical training on research (Figure 11) from the approach of a research idea to writing the scientific research report from June to August. Personalized accompaniment was provided to the teachers who had the fulfillment of the deliverables requested during the project.

Figure 10. Field trip with teachers in 2022



Figure 11. Synchronous training in research in 2022



In the project, 2 learning experiences and 5 learning sessions in each one were planned to be implemented by teachers in their respective Science and Technology classrooms. The field trips with students and teachers were carried out in the dry and wet season within the scope of the Junín National Reserve with prior coordination with each Educational Institution, authorization from the parents and complying with the Biosafety Protocol for prevention and control of COVID-19 in Peru.

Table 5. Details of project activities in 2022

N°	Activity name	Modality	Date	Description
1	Project presentation	Virtual	03/2022	Provide greater scope on the call and guidelines of the project to first grade secondary school teachers.
2	Call for the project	Virtual	04/2022	Receive the registration of teachers through letters of commitment.
3	Project update	Virtual	04/2022	Update of the project schedule to insert it into the programming of the school academic calendar.
4	Workshop on the use of virtual Classroom	Virtual	05/2022	Train on the use of the Classroom platform through a demonstration workshop.
5	Initial diagnosis for teachers	Virtual	05/2022	Individually interview each teacher about their pedagogical and investigative capacity.
6	Field trip plan	Virtual	05/2022	Present the scheduled activities and materials required for the field trip with teachers in two teams.
7	Field trip with teachers	In person	05/2022	Technically train project teachers regarding biological monitoring of frogs in Huarmipuquio, an area of the Junín National Reserve.
8	I Field trip with students	In person	05/2022	Develop Learning Session 1 - "Exploring the Junín National Reserve" and the biological monitoring of frogs in Huarmipuquio or Carhuamayo, depending on the proximity to the Educational Institution.

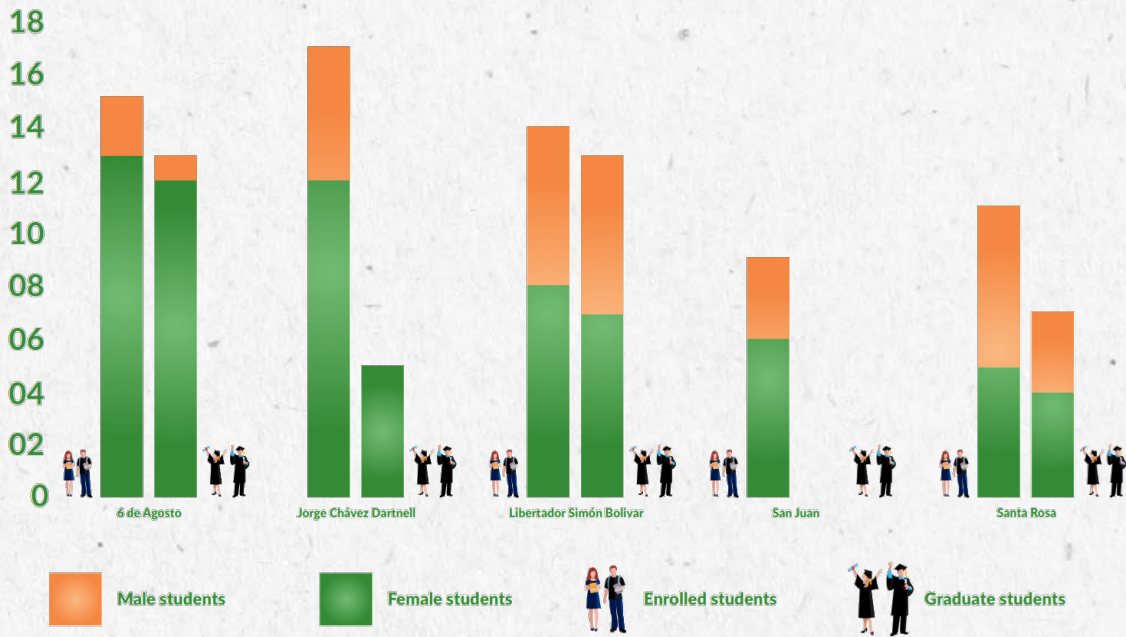
9	Asynchronous training by virtual Classroom	Virtual	05/2022	Facilitate the guidance, use, understanding and good development of activities in the learning sessions through a detailed explanation.
10	Learning Session 1 to 5 – Learning Experience 01	In person	06/2022	<ul style="list-style-type: none"> ❖ Establish the biotic and abiotic factors, levels of ecosystem organization (individuals, population, community), and ecosystem services of the RNJ. ❖ Describe the Junin lake frog and its biological development processes in relation to the aquatic ecosystem of the RNJ.
11	Research Training 1	Virtual	06/2022	Train teachers in scientific research (types, processes, variables), within the framework of their research.
12	Research Training 3	Virtual	06/2022	Reinforce the selection methodology of the research idea in the framework of their research.
13	Research Training 4	Virtual	07/2022	Train teachers on the Theoretical Framework and Methodology in the framework of their research.
14	Research Training 5	Virtual	07/2022	Provide guidelines on the development of the field trip plan
15	Research Training 6	Virtual	07/2022	Train teachers on data analysis in the framework of their research through the use of the Excel tool.
16	Research Training 7	Virtual	07/2022	Train teachers on the bases of the CONCYTEC - EUREKA 2022 fair
17	Learning Session 1 to 5 – Learning Experience 02	In person	07/2022	<ul style="list-style-type: none"> ❖ Obtain scientific data from the application of the research methodology. ❖ Support the relevance of their conclusions in relation to the research question.
18	Research Training 8	Virtual	08/2022	Reinforce teachers on the logical framework of scientific research, as a summary of previous training.

19	II Field trip with students	In person	08/2022	Develop field trips with students and teachers for the collection of data and biological samples according to their scientific research in the aquatic ecosystems of the RNJ.
20	Participation in the Eureka Fair 2022	Virtual	08/2022	Accompany in the writing of scientific research reports according to each teacher.
21	Research Training 9	Virtual	08/2022	Train teachers on the methodology and analysis of research results on aquatic macroinvertebrates
22	Sharing of scientific research experiences	In person	09/2022	Exchange the results and conclusions of the scientific investigations carried out by each Educational Institution.
23	Contest of Good Practices in Educational Management 2022	Virtual	10/2022	Apply the project "Las ranas y yo" as Good Educational Management Practices 2022 through the contest of the Ministry of Education of Peru.
24	Closing of the project "Las ranas y yo - 2022 Edition"	In person	12/2022	<ul style="list-style-type: none"> ❖ Recognize the commitment of the teachers of the project in its 2022 edition. ❖ Carry out a project feedback workshop with the participating teachers.
25	Student magazine of scientific research	Virtual	2023	Publish a student scientific magazine with the summaries of the scientific investigations carried out in the year 2022 on the giant frog of Junín and its aquatic ecosystem in the RNJ.

4. Results and discussion

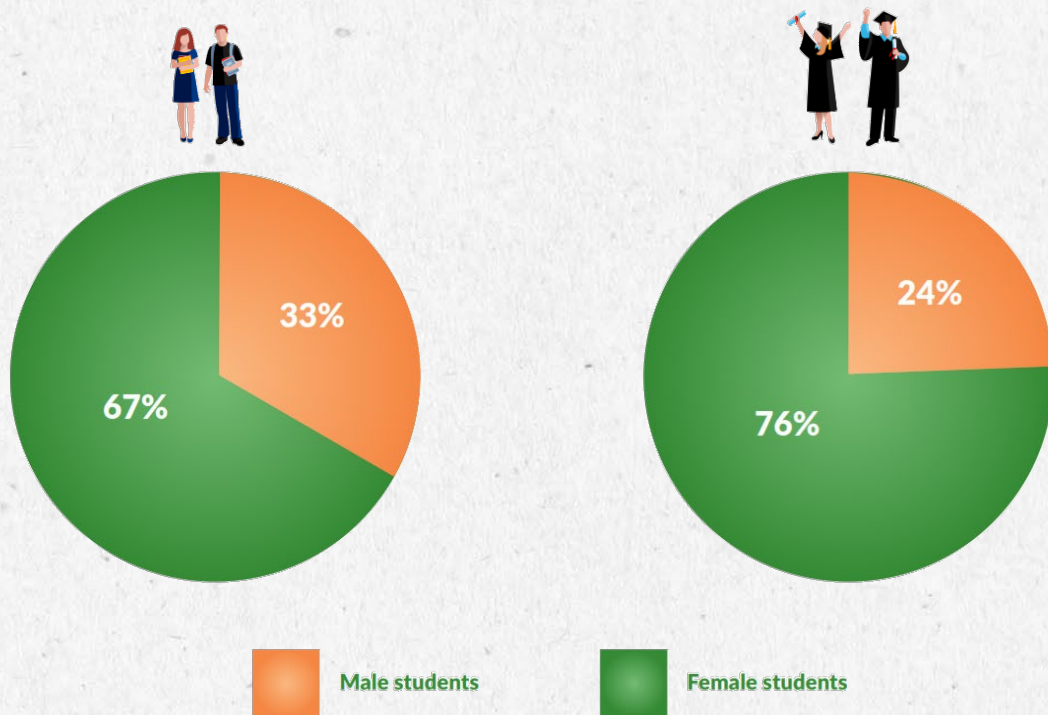
Regarding participation throughout the execution of the program in 2021, at the beginning there were 66 students enrolled from five Educational Institutions: 6 de Agosto (15), Jorge Chávez Darnell (17), Libertador Simón Bolívar (14), San Juan (7) and Santa Rosa (11); of which 44 are women (66.7%) and 22 are men (33.3%). The project was completed by 37 students from only four of the Educational Institutions: 6 de Agosto (15), Jorge Chávez Darnell (17), Libertador Simón Bolívar (14), San Juan (7) and Santa Rosa (11); of which 28 are women (75.7%) and 9 are men (24.3%). The predominance of female students throughout the execution of the program is visualized (Figure 12, Figure 13).

Figure 12. Students by educational institution and gender in 2021



Note: Prepared by Grupo RANA

Figure 13. Total students by gender in 2021



Note: Prepared by Grupo RANA

In the program, a total of 61 workshops were carried out, distributed in 44 virtual workshops through the Google Meet platform, four in person graduation ceremonies in Educational Institutions and 13 field trips in the Chacachimpa, Carhuamayo and Ayac rivers of the RNJ with the application of the Biosafety protocol for the prevention and control of COVID-19 in Peru (Figure 14).

Regarding the virtual workshops, there was the continuous participation of the students in the six scheduled workshops of this modality. The San Juan educational institution did not have participation in the optional workshops due to economic limitations such as access to internet services and the very small number of people enrolled in the project. On the other hand, the other educational institutions successfully completed the workshops; It should be noted that extemporaneous meetings were held requested by the teacher of said educational institutions for coordination and additional advice to their scientific research, which adds up to a total of nine out of time meetings.

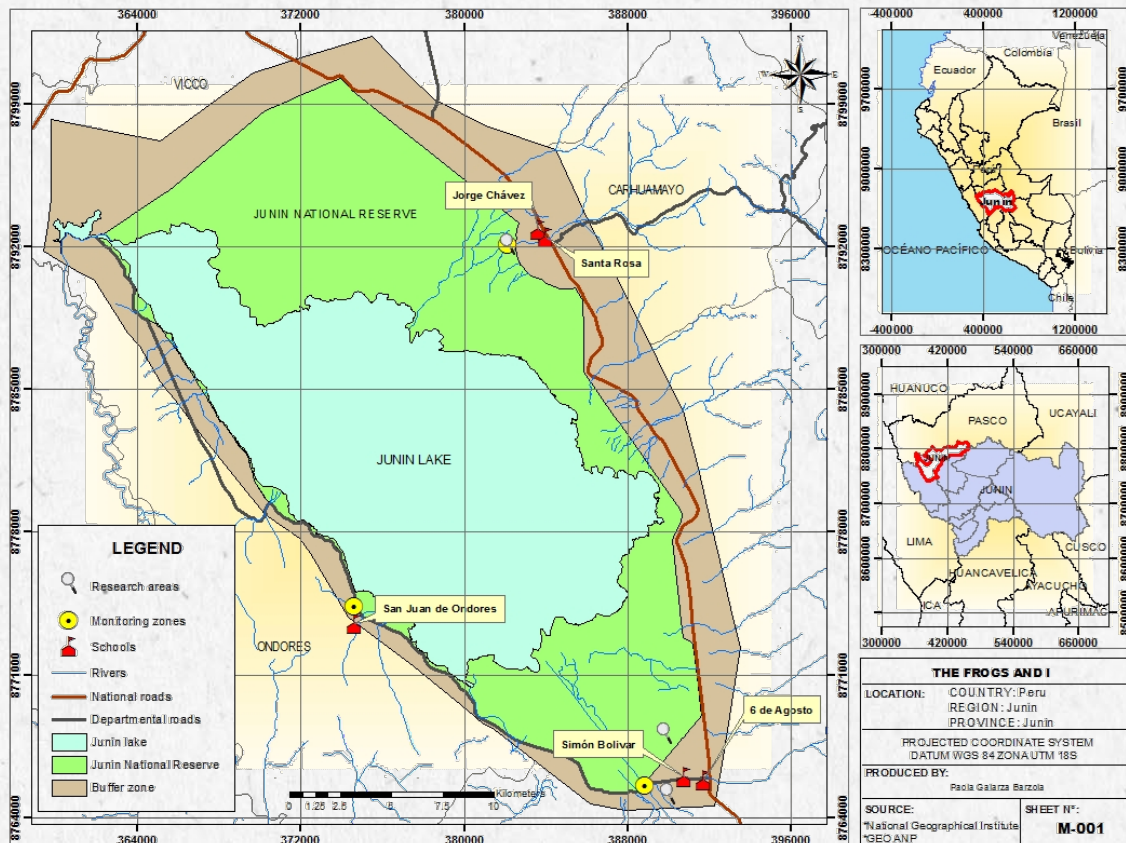
Figure 14. Students in virtual workshops in 2021



Note: Prepared by Grupo RANA

The field trips consisted of participatory biological monitoring of Chinchaycocha frogs in the wet season and in the dry season, and the collection of data in the field according to the scientific research defined by each Science and Technology Club. The monitoring zones are geographically located in the area of the RNJ, said zones are respectively close to an educational institution to facilitate access to said zone, as well as promote local exploration in its environment (Figure 15).

Figure 15. Map of the scope of implementation in 2021



Note: Prepared by Grupo RANA

The first field trip corresponding to Workshop 2 - "Exploring the frogs of the Junin National Reserve in the wet season" took place on June 15, 17 and 18, 2021, each Science and Technology Club participated in their respective assigned day. It was carried out in the Chacachimpa river, Carhuamayo river and Ayac river of the RNJ. It consisted of learning about *T. macrostomus* and its situation, the biological monitoring of frogs in the wet season, the recognition of the protected natural area with a park ranger and the accompaniment of research advisors.



The second field trip corresponding to Workshop 8 - "Collecting data in the field" (Figure 16) took place on August 9, 10, 12 and 13, 2021. It was carried out in the Chacachimpa river and Carhuamayo river of the RNJ. It consisted of data collection according to the field plan of each investigation defined in the Science and Technology Club through the designation of roles in the field and the application of the research methodology.

Figure 16. Field trip for scientific research in 2021



The third field trip corresponding to Workshop 13 - "Exploring the frogs of the Junín National Reserve - dry season" took place on October 30, 2021. It was held in the RNJ community of Huarmipuerto.



"When I went out to the field, at first I felt a little nervous because it was my first time but I was also very proud of the moment when I got into the water, I felt very happy because I finally said I am looking for frogs so that they can continue in the future existing and do not become extinct"

Milagritos C., 13 years old

"I learned that there are different types of frogs, toads, and I thought that there was only one species in Junin and there were many more, and that's what I learned."

Rubi V., 16 years old





"The first memory of the project is going to the Chinchaycocha Lake and we have gone to monitoring the frogs"

Yunsu M., 11 years old

Likewise, three activations were carried out among the students through the implementation of challenges. The objective of the first challenge "Reporter in action" was to promote an experiential approach to the decline of the frog population in Junín through an interview with a family member, revaluing ancestral knowledge and preparing a letter inspired by the shared history. The second challenge "Conservation Researchers" is related to the elaboration of the theoretical framework of the scientific research of its Science and Technology Club through the search for a scientific article related to the subject, likewise an illustrative video was provided on the search for scientific articles and truthful information. Finally, the third challenge "Creativity in action for little frogs" encourages student creativity through the preparation of a poster on the importance of high Andean frogs in the Junín National Reserve (Figure 17).

Figure 17. Activations of "Las ranas y yo" in 2021



Workshop 14 - "My graduation" was divided into two stages, which were the official closing ceremony of the project (Figure 18) and the internal competition for conservation action in favor of Chinchaycocha frogs (Figure 19). The internal Contest was held on October 8, 9 and 11, 2021 at the facilities of the Jorge Chávez Dartnell and 6 de Agosto Educational Institutions, as well as at the Junín House of Culture for the I.E. Liberator Simon Bolívar. The contest consisted of the preparation of project proposals for the conservation of frogs. The winning projects were awarded prizes such as a mountain bike, a sound system and a backpack with a school kit financed by the company Electroperú.

Figure 18. Official closing ceremony of the project in 2021



Figure 19. Internal contest in favor of frogs in 2021

While the project has been implemented, it has been enriched with different experiences, which have allowed us to understand the needs of the educational community, among which is generating identity from the biodiversity of its environment and having within reach an accompaniment for the development of scientific research. Thus, in 2021, "Las ranas y yo" not only contributed to the development of skills, but also allowed joint collaboration in research related to frog ecosystems.

The elaboration of four scientific research (Table 6) was achieved, of which three had continuous accompaniment until their presentation at the XXXI FENCYT - Eureka Virtual 2021 and a partial accompaniment, virtual national project contest research and/or technological solutions in the field of science and technology. The four scientific investigations obtained the first four places in the second stage UGEL Junín and the scientific investigation of the Science and Technology Club of the Jorge Chávez Dartnell Educational Institution achieved the pass to the fourth National stage.

Table 6. Scientific research by Science Club in 2021

Educational institution	Title	Position
6 de Agosto	Influence of wastewater on the water quality of the frogs' habitat using pH as an indicator	Second Place - UGEL Junín Stage
Jorge Chávez Dartnell	Evaluation of water quality in a transect of the Carhuamayo River based on the presence of benthic macroinvertebrates	First Place - UGEL Junín Stage
Libertador Simón Bolívar	Evaluation of the quality of residual waters emerging from the oxidation pools (Treatment plant) of the Chacachimpa river and management proposal	Third Place - UGEL Junín Stage
San Juan	-	-
Santa Rosa	Identification of fish species that inhabit the Carhuamayo river, Carhuamayo district, Junín province and region	Fourth Place - UGEL Junín Stage

The impact of the program was evaluated through the collection of life experiences in the students, evidencing the inspiration and involvement generated towards the conservation of high Andean frogs.

Below are some of the final messages given by the students that we hope will be an inspiration for the promotion of more citizen science projects at an educational level:

"Take care of what you have around you and research deeper, it is very beautiful and big; when you are in a project it is very interesting."

Anyely A., 16 years old



"Lake Junin frog are very important and we must take care of their habitat without contaminating the rivers."

Julio T., 14 years old

"Nature is part of us and thanks to it we can survive, we must take care of it and thank it for giving us support and beautiful and perfect animals."

Raquel M., 15 years old



"I am very grateful for the project for the respective teaching and the great learning about frogs and their importance in the province of Junín."

Danitza P., 15 years old

For the implementation of the 2022 Edition, the signing of the "Inter-institutional cooperation agreement between the Junín Local Educational Management Unit and the Grupo RANA Association" was achieved, which aims to establish mutual collaboration links to combine efforts, resources, experiences and techniques capacities and professionals aimed at encouraging, promoting and executing activities and/or projects that contribute to the development of environmental education, conservation of Chinchaycocha frogs and their ecosystems, strengthening the development of investigative and research skills in students and teachers of the districts of Ondores, Carhuamayo, Junín and Ulcumayo; the agreement lasts until 2024. Directorial Resolution No. 00561-2022 UGEL Junín provides guidelines to diversify the science and technology curriculum for the first year of secondary education in relation to the project "Las

ranas y yo: Ciencia y Empatía Ciudadana" ratifying the insertion of the project in local formal education.

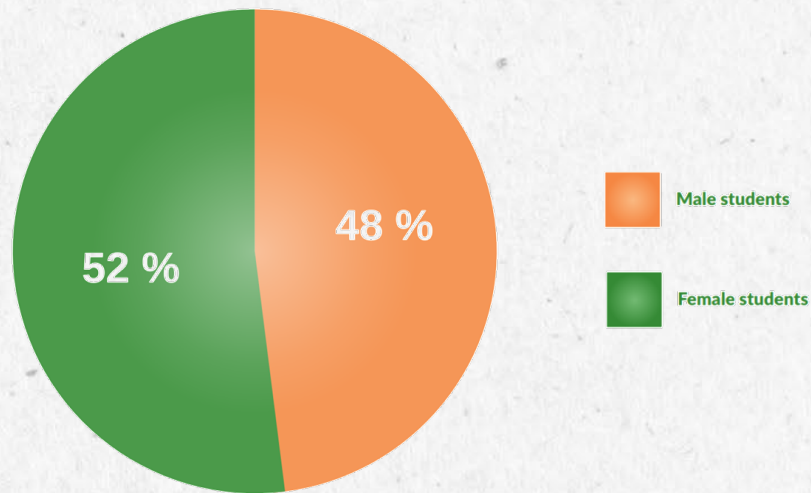
Regarding the participation throughout the execution of the program in 2022, there were 362 secondary level students and 16 teachers registered in the Science and Technology area of 13 educational institutions: Libertadores Simón Bolívar (52), La Victoria de Junín (36), San Pedro de Pari (3), Santa Rosa (34), Jorge Chávez Darnell (100), August 6 (97), Albert Einstein (7), Andrés Bello López (8), Miguel de Cervantes Saavedra (5), Jachahuanca (3), Puyay (3), San Francisco de Uco (3) and Agropecuario 114 (11); of which 189 are women (52.2%) and 173 are men (47.8%), achieving gender equity in program participation (Figure 20, Figure 21). Likewise, the program was aimed at first grade high school students (330) but it had the participation of second grade (11) and fourth grade (21) due to the interest of some teachers.

Figure 20. Students by educational institution and gender in 2022



Note: Prepared by Grupo RANA

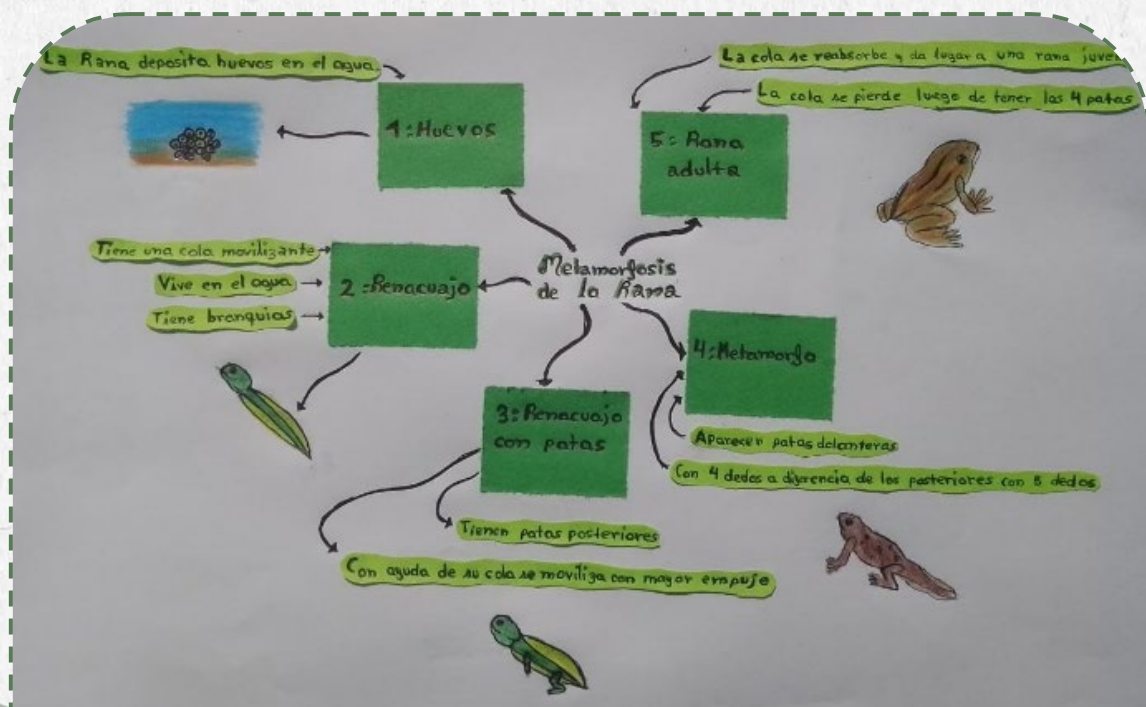
Figure 21. Total students by gender in 2022

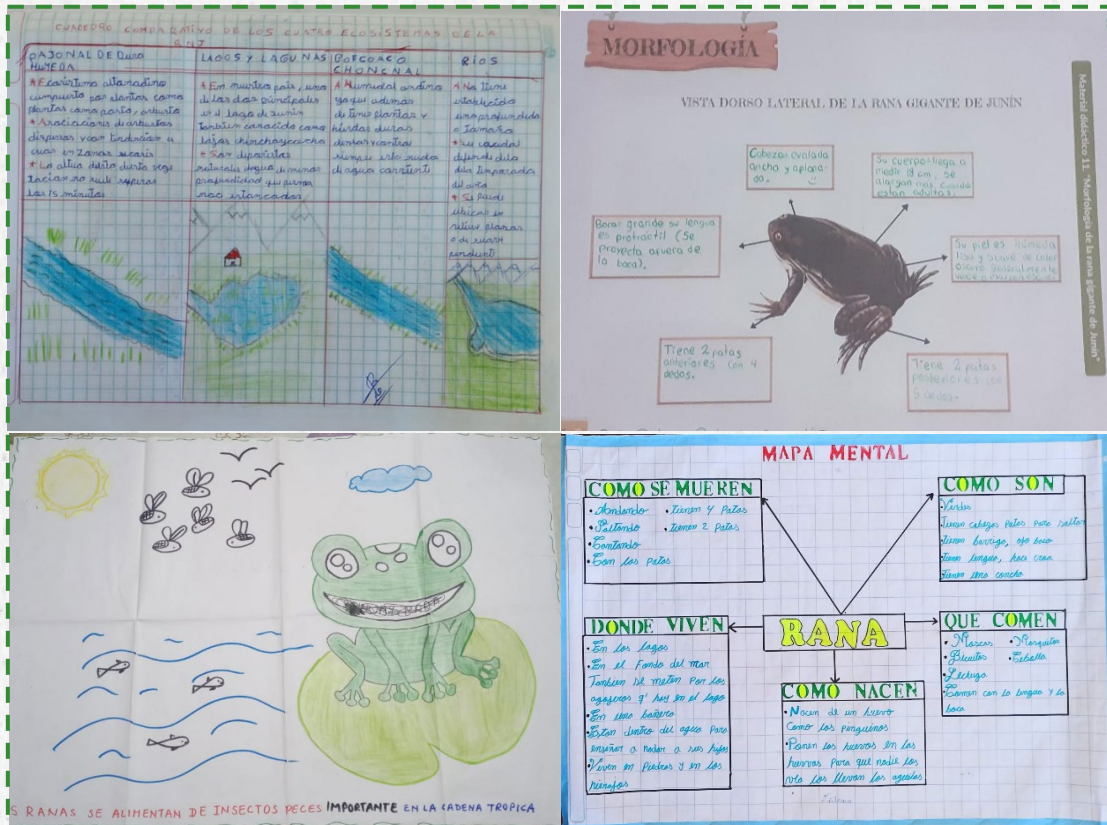


Note: Prepared by Grupo RANA

In the project, each registered teacher carried out 10 learning sessions in 2 learning experiences according to the pedagogical tool "Las ranas y yo: Ciencia y empatía ciudadana - Manual para educadores". Each teacher presented photographic evidence on the student's learning about the Junín National Reserve and the Lake Junin frog, that evidence was made in the classroom through a mind map, comparative chart, drawings or other pedagogical organizers according to the activity developed (Figure 22).

Figure 22. Evidence of learning sessions in 2022





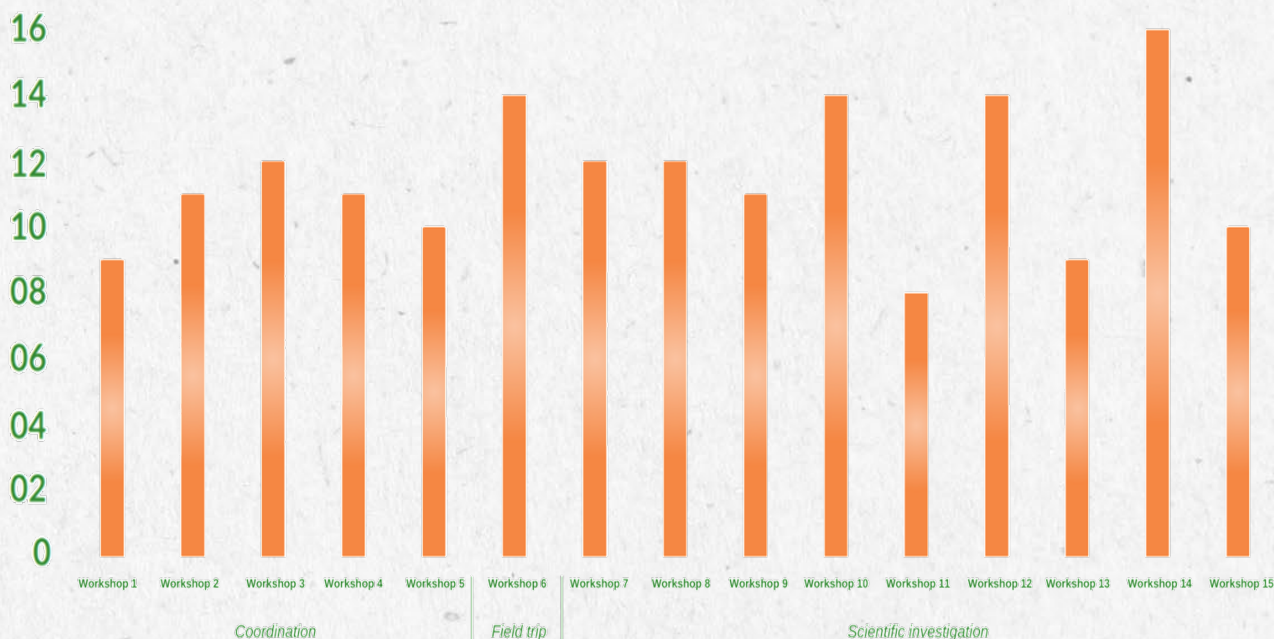
The research capacities of 16 teachers were reinforced through 9 theoretical-practical virtual workshops, 2 field trips on the biological monitoring of aquatic frogs and 1 virtual classroom in Google Classroom with access to 18 audiovisual materials on the explanation of the learning sessions and different digital support materials (Figure 23). In the case of teachers with difficulty accessing the Internet connection, the information was provided through the WhatsApp application.

Figure 23. Virtual classroom for teachers on the Classroom platform



The participation of the teachers was continuous and satisfactory in the 15 workshops in total during the year 2022 (Figure 24), of which five were coordination, one field trip and nine on scientific research. The scientific research workshops were carried out in conjunction with CAMBIO through Mg. Manuel Alejandro Silva Poma who has experience in scientific research in high Andean ecosystems of Peru.

Figure 24. Teachers in workshops in 2022



Note: Prepared by Grupo RANA

With the students, a total of 12 field trips were carried out within the scope of the Junín National Reserve with the application of the Biosafety Protocol for the prevention and control of COVID-19 in Peru and 10 learning sessions led by their own teachers from the Science and Technology area, who acquired the ability to support and investigate the habitats of *Telmatobius macrostomus*.

In the wet season, four field trips were carried out (Figure 25) with a total of 350 students from 12 educational institutions where the first session of learning and biological monitoring of aquatic frogs took place. It was carried out in the community of Huarmipuquio and Carhuamayo of the RNJ.

In the dry season, eighth field trips were carried out (Figure 26) with a total of 137 students from seven educational institutions where the collection of data and biological samples was carried out according to each scientific inquiry on the aquatic ecosystem of the Junín National Reserve. It was carried out in the community of Huarmipuquio, Carhuamayo and Huayre of the RNJ.

Figure 25. Field trip to explore the RNJ in 2022



Figure 26. Field trip for scientific research in 2022



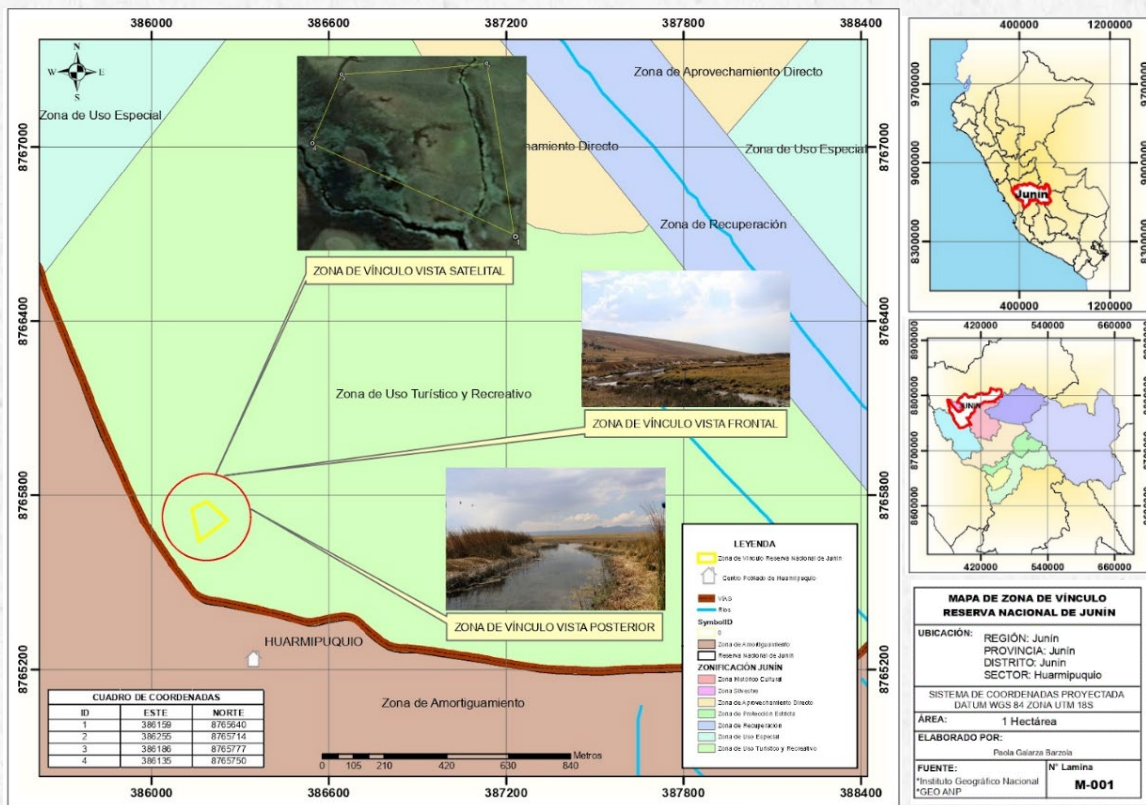
The elaboration of six scientific research (Table 7) was achieved under the theme of *T. macrostomus* and its habitat in the Junín National Reserve, presented to the XXXII FENCYT - Eureka 2022 where they occupied the first places in the contest. The teachers had personalized support that consisted of providing technical, logistical, and budgetary support for the second field trip, loan of materials and equipment, analysis of biological samples, advice on the preparation of research reports, and filming of the presentations of the students. This accompaniment was carried out with the teachers who fulfilled at least 70% of the tasks.

Table 7. Scientific investigation of "Las ranas y yo" in 2022

Educational institution	Title	Position
Libertador Simón Bolívar	Influence of the contamination of the Huarmipuquio river in the population of macroinvertebrates and its affectation to the Lake Junin frog	Third Place - UGEL Junín Stage
	Evaluation of the physicochemical parameters and aquatic macroinvertebrates as indicators of the ecological state of a transect of the Chacachimpa river	First Place - UGEL Junín Stage
La Victoria de Junín	Influence of chuño wells on the habitat of the Junín giant frog in the Huayre river	Sixth Place - UGEL Junín Stage
Santa Rosa	Evaluation of the impact of wastewater from the city of Carhuamayo on a tributary of Lake Chinchaycocha based on physicochemical variables and aquatic macroinvertebrates	Second Place - UGEL Junín Stage
Jorge Chavez Dartnell	Evaluation of water quality in the transects of the Chuiroc, Carhuamayo (upper part) and Huachac rivers based on benthic macroinvertebrates	Fourth Place - UGEL Junín Stage
Andrés Bello López	Comparison of the presence of fish in the Carhuamayo river in the month of August of the years 2021 and 2022	Seventh Place - UGEL Junín Stage

One hectare of territory has been delimited for research within the Junín National Reserve (Figure 27), which has been characterized with information on biodiversity and threats, and a study of the state of conservation, all with the participation of students, teachers, and specialists .

Figure 27. Map of the research area within the RNJ



Note: Prepared by Grupo RANA

The methodology for the delimitation of the territory consisted of an adaptation of the TiNi (Land of Girls, Boys and Youth) methodology, to the context of a protected natural area. The TiNi methodology has an affective, playful and intercultural approach that allows it to be adapted to various social, economic and cultural realities. It was carried out in conjunction with the Association for Children and their Environment (ANIA), SERNANP through the Junín National Reserve, UGEL Junín and the 6 de Agosto Educational Institution.

On December 20, 2022, the closing of the program was held to recognize the commitment of teachers in that year's edition and a feedback workshop on the project for its improvement in subsequent editions. There was the participation of 12 teachers of the secondary level of the area of Science and Technology (Figure 28).

The goals set for the project have been achieved and even exceeded, as evidenced by the fact that in December 2022, it achieved first place in "Category 3: Promotion of innovation and leadership to improve learning in the students" in the National Contest of Good Educational Management Practices (Figure 29 - <http://bit.ly/3RqKTYW>). Finally, we highlight that the UGEL Junín in December 2022 issued recognition resolution No. 01355-2022 UGEL Junín with which it congratulated all the parties linked to the project.

Figure 28. Closing with teachers in 2022



Figure 29. National Contest of Good Practices in Educational Management

🏠 Procesos Formativos
Asistencia Técnica
CoP de Gestión Educativa
Concurso BPGE
Gestión Descentralizada

Individual UGEL

Las ranas y yo

UGEL Junín (JUNÍN)

Presentación:
En el año 2019 los resultados de las evaluaciones censales en el área de Ciencia y Tecnología mostraron que el 45,9 % de estudiantes se encontraba en una situación inicial y el 33,8 % en proceso del logro de competencias del área. Asimismo, el 65 % de docentes no contextualizaba las sesiones propuestas y el equivalente no comprendía cabalmente los enfoques del área.

Objetivo:
Fortalecer las competencias indaga y explica del área de Ciencia y Tecnología en las II. EE. del primer grado de secundaria ubicadas alrededor de la Reserva Nacional de Junín y contribuir a la conservación de las ranas de la cuenca del lago Junín.

Here are some of the final messages given by the teachers that we hope will be an inspiration for the promotion of more citizen science projects at an educational level:

"Teachers, it is time to develop experiential research activities and even more so now that we have support such as the RANA Group."

Yudith Torres, School "Andrés Bello López"



"It is a fully active experience and I hope you continue the efforts on the research of our Junín and its frogs."

Alix Hilario, School "Santa Rosa"

"It is necessary to do research, it is necessary to go out into the field with our students and we did it thanks to Las ranas y yo."

Alejandra Gamarra, School "Libertador Simón Bolívar"



"The work carried out with the RANA Group is laudable for helping research studies and conservation of the frogs, an endangered species."

Luis Yantas, School "La Victoria de Junín"

The frogs and I: Science and citizen empathy – Manual for teachers

1. Description

Pedagogical tool aimed at teachers in the area of Science and Technology in the Educational Institutions of the first grade of secondary school located around the Junín National Reserve, designed in accordance with the Secondary Education Curricular Program approved by Ministerial Resolution No. 649-2016-MINEDU. It consolidates the three years of the educational project under a constructivist approach and contextualized to the local reality.

Its purpose is to strengthen the skills of "investigating through scientific methods to build knowledge" and "explaining the physical world based on knowledge about living beings, matter and energy, biodiversity, Earth and universe" in the educational system of the Junín region.

2. Objectives

- ❖ Prepare a manual for teachers validated in a participatory manner involving teachers from educational institutions, the Educational Management Unit of the province of Junín (UGEL) and SERNANP - Junin National Reserve and Chacamarca Historic Sanctuary.
- ❖ Institutional recognition of the manual for teachers by UGEL - Junín and its inclusion as a mandatory study plan for educational institutions in the province of Junín.

3. Methodology

Based on the three-year experiences of the educational project in the Junín National Reserve, the importance of continuously strengthening the skills of teachers and providing contextualized tools to the local reality is recognized. When carrying out the initial analysis on the elaboration of a manual for teachers and a manual for students, it was concluded to elaborate a manual only for teachers since a predetermined manual for students would not promote the constructivist approach. However, the need arose for said manual to include directed didactic materials for use in classrooms and encourage the use of field notebooks and logbooks by students. Likewise, due to the structure of the educational system in Peru, it was chosen to start through the regular basic education of the first year of secondary school.

To guarantee its institutional insertion in the annual planning, the structure of the manual was based on the didactic planning of the teaching and learning processes of the curricular area of Science and Technology of the first grade of secondary school according to the Curricular Program of Secondary Education approved by Ministerial Resolution. No. 649-2016-MINEDU.



The manual is aimed at teachers in the Science and Technology area, therefore it covers two of the three competencies in the area for the secondary level according to the Curricular Program for Secondary Education, competencies that have been addressed in the development of the workshops. The competences were addressed where the student "Research through scientific methods to build knowledge" and "Explains the physical world based on knowledge about living beings, matter and energy, biodiversity, earth and universe", and their respective capacities throughout two proposed learning experiences (Table 8).

Table 8. Description of two Science and Technology competencies

Competence	Capacity
Research through scientific methods to build knowledge	<ul style="list-style-type: none"> ❖ Problematize situations ❖ Design strategies to do research ❖ Generates and records data and information ❖ Analyze data and information ❖ Evaluate and communicate the process and results of your investigation
Explains the physical world based on knowledge about living beings, matter and energy, biodiversity, earth and the universe	<ul style="list-style-type: none"> ❖ Understands and uses knowledge about living beings, matter and energy, biodiversity, Earth and the universe ❖ Evaluates the implications of knowledge and scientific and technological work

4. Results and discussion

Figure 30. Cover of the manual for teachers



The manual for teachers of regular basic education in the first year of secondary school was called "Las ranas y yo: ciencia y empatía ciudadana - Manual para educadores" (Figure 30) published in January 2022. Prepared by Grupo RANA in collaboration with the UGEL - Junín, Denver Zoo Foundation, VICAM (Interdisciplinary Group of Vicuñas, Camelids and Environment Researchers of Argentina) and the Junín National Reserve. The Rufford Foundation, New England Biolabs Found and Mohamed Bin Zayed are responsible for its financing. Different actors with experience in pedagogy, environmental education, biology, environmental engineering, among others, have participated in its development.

The first learning experience is called "Knowing and valuing the Junín National Reserve" and has five learning sessions. It seeks to accompany the teacher with his students through the protected natural area around them, the Junín National Reserve. They talk about the ecosystems of the area and, specifically, about the one where the peculiar Lake Junin frog is found. The second experience, called "My own research", has five sessions through which it seeks to guide the development of inquiries into aquatic ecosystems of the Reserve. Through it, it seeks to promote the generation of new knowledge and attitudes in favor of the care and protection of the Lake Junin frog, and the ecosystems in which it lives (Table 9).

Table 9. Structure of the manual for teachers of "Las ranas y yo"

Learning experience	Learning session	Didactic activities
Knowing and valuing the Junín National Reserve	Exploring the Junín National Reserve	<ul style="list-style-type: none"> ❖ Field trip to observe and problematize the study of the RNJ. ❖ Initiate and plan data collection strategies for field research.
	Aquatic ecosystem of the Junín National Reserve	<ul style="list-style-type: none"> ❖ Describe the four ecosystems of the RNJ. ❖ Discuss the readings about the ecosystem services of the RNJ. ❖ Organize the information of the biotic and abiotic factors, and on the levels of the aquatic organization of the RNJ. ❖ Analyze a socio-scientific situation related to its context.
	Our environmental calendar of the Junín National Reserve	<ul style="list-style-type: none"> ❖ Socialize and systematize environmental and social data obtained in relation to the development of the environmental calendar. ❖ Support the environmental calendars prepared.
	Lake Junín frog	<ul style="list-style-type: none"> ❖ Describe morphology of the Lake Junin frog. ❖ Describe the stages of biological development of the frog.
	Ecosystem services of the Lake Junin frog	<ul style="list-style-type: none"> ❖ Carry out a reading of the ecosystem services of the Lake Junin frog. ❖ Analysis of the situational status of the Lake Junin frog.
My own research	Research idea	<ul style="list-style-type: none"> ❖ Propose research ideas. ❖ Filter research ideas. ❖ Choose the research idea.
	Problem Statement	<ul style="list-style-type: none"> ❖ Review sheets at the problem statement level. ❖ Determine the research question. ❖ Determine the objective of the RESEARCH. ❖ Determine the research hypothesis (only if applicable).

	Development of the theoretical framework	<ul style="list-style-type: none"> ❖ Present and explain the research topics. ❖ Develop a background sheet. ❖ Develop the key terms sheet. ❖ Discuss the proposals of the key terms.
	Methodology and data collection	<ul style="list-style-type: none"> ❖ Review the data sheets on methodology and data collection. ❖ Propose research methodologies. ❖ Determine the research methodology. ❖ Plan the field trip.
	Results, analysis and conclusions	<ul style="list-style-type: none"> ❖ Review the data sheets in the results, analysis and conclusions section. ❖ Organize and analyze the results obtained in the research. ❖ Write the results and conclusions of the research.

Each learning session has support and didactic materials located in the final section of the manual that complement and reinforce the development of the sessions, while making them more dynamic. The support materials present organized and summarized theoretical information so that each teacher can delve into the different activities and topics. The didactic materials are resources that will be applied in each session to promote that the knowledge and attitudes of students are built from their previous knowledge, the interaction with their families and the creative systematization of the information about the Reserve, especially the aquatic ecosystems that it protects.

The manual is designed to be applied during the first months of the school year, so that each teacher can lead an research in time into the aquatic ecosystems of the Junín National Reserve where enigmatic species such as *T. macrostomus* inhabit and that, if they want, they can present it to the FENCYT. It is sought that these researches not only contribute to the generation of new knowledge about the species and the ecosystems in which it inhabits, but also to its revaluation and care.

With funding from UGEL Junín, 1,000 copies of the manual were printed in black and white for distribution in all the libraries of the Educational Institutions within the jurisdiction of UGEL Junín. On March 9, 2022, the UGEL Junín organized the Official Launch Ceremony of the manual for teachers "Las ranas y yo: Ciencia y empatía ciudadana" (Figure 31) with the assistance of the directors of the Educational Institutions as part of the delivery symbolism and presentation of the project at the institutional level.

Figure 31. Official launch ceremony of the manual for teachers



The methodology of use of the manual will be carried out through loan in the libraries by the teacher for the implementation of the proposed learning sessions. Likewise, the manual was published in digital format to facilitate access to the color manual at any time required. The manual was published through the Researchgate platform (Figure 32), access is through the following link:



https://www.researchgate.net/publication/359438811_Las_ranas_y_yo_ciencia_y_empatia_a_ciudadana_Manual_para_docentes

Figure 32. Manual for teachers digital version in Researchgate



Additionally, the color manual for teachers was printed to deliver copies to the National Library of Peru to complete the registration process in the Legal Deposit and ISBN Code as a public access publication.

The manual was provided in digital format to all registered teachers; likewise, editable formats of each learning session for adaptation according to the context of each Educational Institution. Likewise, it was distributed in physical format to all the libraries of the Educational Institutions within the scope of the UGEL Junín and the interpretation centers of the Junín National Reserve.

Monitoring of Chinchaycocha frogs

1. Description

Field trips for the scientific monitoring of high Andean frogs, *T. macrostomus* and *T. brachydactylus*, in the Junín National Reserve through citizen science with students from the Educational Institutions participating in the project "Las ranas y yo: Ciencia and citizen empathy to conserve the frogs of the Junín Lake basin".

The monitoring was carried out in the wet season (June) and dry season (September) for the collection of information on both species and their habitats, in areas of the Ayac, Chacachimpa and Carhuamayo River in the Junín region.

2. Objective

- ❖ Biological record of the presence of the species *Telmatobius macrostomus* and *Telmatobius brachydactylus* and the threats to their habitat within the Junín National Reserve in the wet and dry season.
- ❖ Fill information gaps on the species of *Telmatobius macrostomus* and *Telmatobius brachydactylus*, and their habitats.



3. Methodology

The search is carried out in 100 m transects in predetermined areas identified as optimal habitats for high Andean frogs and close to Educational Institutions, in this way the presence of *T. macrostomus* and *T. brachydactylus* species is determined both in season wet and dry season.

4. Results and discussion

The field trip corresponding to the wet season (Figure 33) took place on June 15, 17 and 18, 2021 in the Chacachimpa, Carhuamayo and Ayac river of the RNJ. The results obtained from biological monitoring are described below in Table 10.

Figure 33. Field trip corresponding to the wet season



Table 10. Record of biological monitoring of Workshop 2 of "Las ranas y yo"

Monitoring area	Zone 1	Zone 2	Zone 3
Date	15/06/2021	17/06/2021	18/06/2021
Hour	8:20 am	8:30 am	2:30 pm
Educational institution	San Juan	6 de Agosto y Libertador Simón Bolívar	Santa Rosa y Jorge Chávez Darnell
Site information	Río Ayac	Río Chacachimpa	Río Carhuamayo
Locality	Ondores	Junín	Carhuamayo
Distance (m)	100	100	100
Vegetation	Little	Much	Little
Threats to frogs	Solid waste	Solid waste, dead animals, sewage	Solid waste, dead animals (sheep)
Lake Junin frog reports	No	No	No
Tadpoles of Lake Junin frog reports	No	Yes (2)	Yes (2)
Metamorphs of Lake Junin frog reports	No	Yes (1)	No
Wanchas report	No	No	No
Tadpoles of Wanchas reports	No	No	Yes (10)
Metamorphs of Wanchas reports	Yes (1)	No	No
Eggs reports	No	No	No

In the field trip in the Ayac river on June 15, the San Juan Educational Institution participated, where a record of a metamorph of wanchas was found and solid waste was found as threats in the frog's habitat. In the Chacachimpa river on June 17, the Educational Institutions 6 de Agosto and Libertador Simón Bolívar participated, where two groups of Lake Junin frog and a metamorph of the same species were recorded, and solid waste, sewage and our animals were found. The last field trip corresponding to the wet season in the Carhuamayo river on

June 18, was the monitoring with the highest presence of amphibians, where ten groups of wanchas and two groups of Lake Junin frogs were recorded.

The field trip corresponding to the dry season (Figure 34) took place on October 30, 2021 in the community of Huarmipuquio of the RNJ.

Figure 34. Field output corresponding to the dry season



On November 7, 2021, a BioBlitz was carried out in Huarmipuquio in the morning, recording species belonging to the taxonomic groups: birds, amphibians and flora. In the development of the activity, 14 students from the Educational Institutions 6 de Agosto and Libertador Simón Bolívar participated. The biological inventory data corresponding to the taxonomic group of amphibians are shown below in Table 11.

Table 11. Record of biological monitoring in Huarmipuquio

Taxonomic group	Biologic register	Comments
Amphibians	1 Lake Junin frog	Female
	2 Lake Junin frog juvenils	Female
	10 tadpoles Lake Junin frog	Good health

In Huarmipuquio, a total of one Lake Junin frog was recorded in its adult stage, two juvenile frogs and 10 tadpoles. It should be noted that said biological monitoring record corresponds to the dry season.

On November 5 and 6, we participated in the First Bi-regional Census of High Andean Frogs carried out in Junín and Pasco in conjunction with Denver Zoo, SERNANP through the leadership of three natural protected areas and local organizations.

Participation in events and dissemination

1. Description

Participate in local events such as fairs in the Junín region, national and international events in order to bring the general population closer to the conservation of high Andean frogs in the Junín National Reserve.

Likewise, to generate interest among the local and non-local population for the conservation projects led by the NGO Grupo RANA.

2. Objectives

- ❖ Disseminate information on the current situation of the high Andean frogs of the Junín National Reserve.
- ❖ Disseminate information about the projects led within the framework of the conservation of high Andean frogs.
- ❖ Increase knowledge of the situational status of both species of high Andean frogs, *T. macrostomus* and *T. brachydactylus*.

3. Results and discussion

On September 16, 2022, a field trip was carried out to share scientific research experiences where the results and conclusions of the scientific research carried out by each educational institution were exchanged in a playful way. This activity had a professional filming team through our partner Denver Zoo Foundation who were recording the activities of conservation projects in Peru (Figure 35).

Figure 35. Sharing of scientific research experiences in 2022



On December 3, 2021, we participated in a fair in Carhuamayo at the invitation of the Andean Ecosystems Association - ECOAN, where information was disseminated on the current situation of high Andean frogs and their conservation in the Junín National Reserve (Figure 36).

Figure 36. Participation in the Carhuamayo fair in 2021.



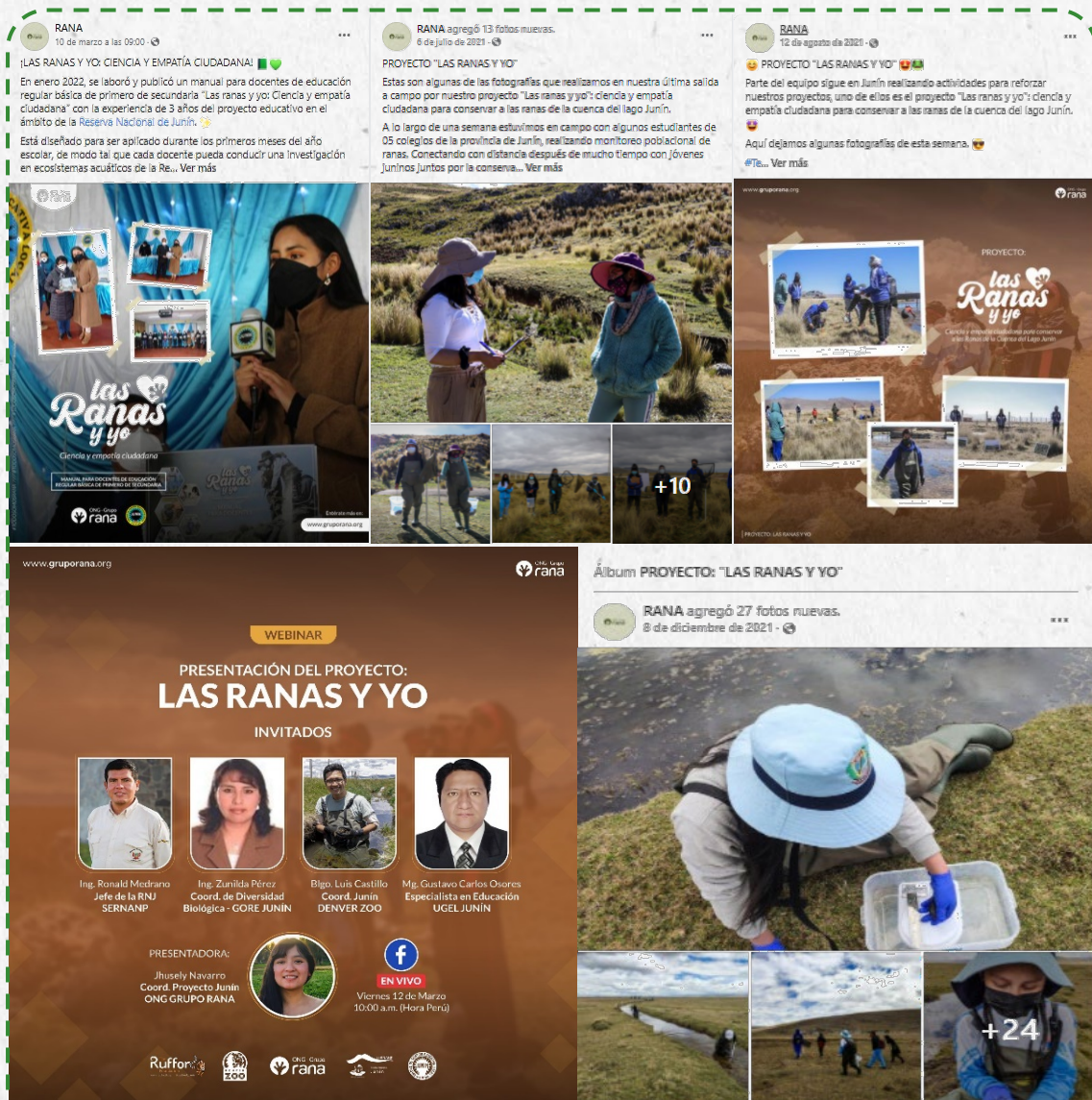
The scientific research of the Science and Technology Club of the Jorge Chávez Dartnell Educational Institution, in the Carhuamayo district, achieved the fourth National stage of the XXXI National School Fair of Science and Technology (FENCYT) Eureka Virtual 2021. That achievement to educational institutional level in collaboration with the UGEL Junín was published in the local newspaper "La Primicia" (Figure 37).



Figure 37. "Jorge Chávez" in the National stage of the EUREKA Fair 2021

The activities carried out during the execution of the project were published on the social networks of the NGO Grupo RANA. Likewise, to promote interest in the conservation of high Andean frogs in the Junín National Reserve (Figure 38).

Figure 38. Diffusion in social networks



The dissemination of these activities is also carried out through the local radio "Ondas del Chinchaycocha", a space where interviews were conducted on the progress of the project within the Junín region. Likewise, promote the dissemination of projects to local actors.

Finally, in March 2022, a diagnostic visit to the Junín National Reserve was carried out with the Executive Commission of the RNJ Management Committee, this space allowed promoting communication and dissemination with strategic allies and local authorities regarding the project and its activities carried out in 2021 (Figure 39). Likewise, the NGO Grupo RANA is an official member of that

Executive Commission, which allows it to have a voice and vote within decision-making in the field of the protected natural area where the project was included in the Management Plan Official of the Junín National Reserve.

Figure 39. Executive Committee of the RNJ Management Committee



The dissemination in the year 2022 was carried out throughout the project at different times through radio media, social networks and participation in conferences, we took our initiative to COP 15 on Biodiversity in Montreal, Canada exposing our achievements at SIDE EVENT "Children and Biodiversity: Youth-led Biodiversity Education Projects for Children".

On December 2, 2022, we participated in the Fauna Fest 2022 held at the Faculty of Medicine and Veterinary Medicine of the Universidad Nacional Mayor de San Marcos, where conservation activities and projects were disseminated in favor of the Lake Junín frog. Likewise, disseminating the situational status of the species to motivate university students to carry out scientific research.

All of the above has given rise to the preparation of the first local student magazine with the summaries of the six collaborative research finished in the framework of the project.

Project team

Our team is made up of different actors at the organizational and local levels of Junín. In Table 12 we presented the people involved in the development of the projects by the NGO Grupo RANA.

Table 12. Work team of the NGO Grupo RANA in 2021 and 2022

Cargo desempeñado	Equipo del proyecto
President 2022 Project coordinator Junín 2021	Jhusely Danesy Navarro Patiño
Project coordinator Junín 2022 Volunteer assistant 2021	Milagros Gertrudes Rojas Lock
Field assistant 2022 Volunteer assistant 2021	Katherine Celica Taramona Zevallos
Volunteer assistant 2021	Paola Velissa Galarza Barzola
Volunteer assistant 2022 Volunteer 2021	Deysi Tronet Ricapa Morales
Volunteer 2021 y 2022	Karol Adriana Gallardo Rodríguez
Volunteer 2021	Carlos Daniel Roque Rengifo
Project supervisor 2021 y 2022	Oscar Jesús Damian Baldeon
Research advisor 2021 y 2022	Luis Castillo Roque Manuel Silva Poma Lenin Chumbe Nolasco
Specialist in Science and Technology of the UGEL Junín 2021 y 2022	Gustavo Iván Carlos Osorio
Chief of the Junin National Reserve	Ronald Medrano Yanqui
Specialist of the Junin National Reserve	Juan Carlos Hurtado Valerio
Park ranger of the Junin National Reserve	Kuennen Duanne Martinez Cóndor Eduardo Elías Nuñez Juan Carlos Cardenas
Graphic designer of Grupo RANA NGO	Margory Sigueñas Tavera

Achievements

- ❖ Curricular insertion in local formal education through the recognition provided by the Local Educational Management Unit - UGEL Junín, allowing 13 educational institutions, 16 teachers and 362 students to be part of the project in 2022, and to implement it within their regular class schedule.
- ❖ The project "Las ranas y yo" through its application as UGEL Junín obtained first place in Category 3: Promotion of innovation and leadership to improve student learning in the National Contest of Good Management Practices Education, organized by the Ministry of Education of Peru.
- ❖ The signing of the "Inter-institutional cooperation agreement between the Junín Local Educational Management Unit and the Grupo RANA Association" that ensures collaboration with the UGEL Junín to continue the execution of the project for 2 years, strengthening the development of research and research skills in students and teachers from the districts of Ondores, Carhuamayo, Junín and Ulcumayo.
- ❖ Strengthening of the capacities, competences and research skills of the 16 teachers participating in the project through 9 theoretical and practical training in scientific research, 2 field trips within the framework of biological monitoring of frogs, granting of a citizen science pedagogical resource in physical and digital version, and one virtual classroom in Google Classroom.
- ❖ The elaboration of ten scientific research that had continuous support until their presentation at the XXXI National School Fair of Science and Technology (FENCYT) Eureka Virtual 2021 and 2022, and obtained the first places in the second stage UGEL Junín. The scientific research of the Science and Technology Club of the Jorge Chávez Dartnell Educational Institution achieved the pass to the fourth National stage in 2021.
- ❖ The publication of the pedagogical tool "Las ranas y yo: ciencia y empatía ciudadana - Manual para educadores" in January 2022 in a physical version distributed in the libraries of the Educational Institutions of the UGEL Junín and in a digital version through Researchgate.
- ❖ Execution of 14 field trips within the scope of the Junín National Reserve with a total of 428 secondary level students and 20 teachers from the Science and Technology area of 13 Educational Institutions in the Junín province during the year 2021 and 2022, where developed sessions of learning and biological monitoring of aquatic frogs through citizen science.

- ❖ Records of biological monitoring in the area of the Junín National Reserve with the students of the Educational Institutions of the region in the wet season (June) and dry season (September) for the collection of information on the species *T. macrostomus* and *T. brachydactylus*, and their habitats in areas of the Ayac River, Chacachimpa and Carhuamayo.

Learned lessons

- ❖ Due to the health emergency context of COVID-19, it was necessary to redesign the implementation strategies of the project in order to provide access to students and adapt to the change in modality of the educational system to the virtual modality.
- ❖ The migration to the virtual modality revealed large gaps in the Junín region regarding access to internet services and adequate electronic equipment for the development of learning sessions. Therefore, the student audience was reduced due to these difficulties.
- ❖ Field trips generate more interest in participation and involvement by students and teachers, on the other hand, virtual workshops generate a certain rejection compared to face-to-face meetings.
- ❖ Identifying the main interests of the allies allows the execution of a more strategic alliance for both parties.
- ❖ To achieve the curricular insertion of a pedagogical tool, it is necessary to identify specialist allies in the structure of the current educational system and provide the greatest facilities to the beneficiaries to increase their acceptance.
- ❖ Linking the planned activities with new initiatives allows magnifying the results and achievements obtained by involving a greater public active in the project,
- ❖ A responsible, empathetic and motivated work team is essential to continuously promote project activities and overcome the challenges that arise throughout its execution.
- ❖ Ensure the prominence of local actors such as students, teachers, authorities, park rangers, volunteers and specialists, and recognize their importance in the development of the project.

Next steps

- ❖ The continuity of the project has as next steps to achieve the curricular insertion in the first year of secondary school with the support of the UGEL Junín throughout the year 2023 through the monitoring of the implementation and feedback of the manual in the classrooms and advice to the Educational Institutions that carry out research related to the conservation of the Chinchaycocha frogs.
- ❖ By the end of 2023, we hope to have at least 12 new collaborative research, which in their construction process have allowed the strengthening of the research capacities of teachers, students, as well as the research topic being open to topics that go further *T. macrostomus* and its habitats.
- ❖ The execution of the program "Las ranas y yo - Edición 2023" as the main protagonist for teachers will allow in the future to generate a new pedagogical tool prepared by the NGO Grupo RANA for future new editions that will include the second year of secondary school.
- ❖ By the end of 2025, the project proposes to position itself at the level of the Junín region as a successful citizen science experience with institutional support and sustainability through curricular insertion for the development of collaborative research contextualized to conservation, which has strengthened and will continue to strengthen skills. student and teacher research.

Conclusions

- ❖ The program "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín lake basin - 2021" was developed in five Science and Technology Club of Educational Institutions, and finished 37 students from four of the Educational Institutions.
- ❖ The program "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín lake basin - 2022" was developed by 13 educational institutions in Junín, 16 teachers from the Science and Technology area, and 362 high school students.
- ❖ The program "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín Lake basin - 2021" carried out 61 workshops distributed in 44 virtual workshops, four in person graduation ceremonies and 13 field trips in rivers from the Junín National Reserve.

- ❖ The program "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín lake basin - 2022" carried out 10 learning sessions in each educational institution, 5 virtual workshops, 9 scientific research training sessions and 14 field trips in rivers of the Junín National Reserve.
- ❖ The program "Las ranas y yo: Science and citizen empathy to conserve the frogs of the Junín Lake basin - 2021" managed to prepare four scientific investigations, three of which had continuous support until their presentation at the XXXI National School Fair of Science and Technology Eureka Virtual 2021. The investigations obtained the first four places in the second stage UGEL Junín and the scientific research of the Science and Technology Club of the Jorge Chávez Dartnell Educational Institution achieved the pass to the fourth National stage.
- ❖ The program "Las ranas y yo: Ciencia y empatía ciudadana para conservar las ranas de la cuenca del lago Junín - 2022" achieved the elaboration of six scientific investigations of which they had continuous accompaniment until their presentation at the XXXII National School Fair of Science and Technology Eureka Virtual 2022. The investigations obtained the first seven positions in the second stage UGEL Junín.
- ❖ Preparation of a manual for teachers of regular basic education in the first year of secondary school called "Las ranas y yo: ciencia y empatía ciudadana - Manual para educadores" published in January 2022 in physical and digital version.
- ❖ Biological monitoring carried out in the wet season (June 2021) in the Ayac, Chacachimpa and Carhuamayo rivers with students from four Educational Institutions recorded a total of five individuals of *Telmatobius macrostomus* (Lake Junin frog) of which 4 were tadpoles and one metamorph; and 11 *Telmatobius brachydactylus* (wanchas frog) of which 10 were tadpoles and one metamorph.
- ❖ The biological monitoring carried out in the dry season (November 2021) in the Huarmipuquio river recorded a total of 13 individuals of *Telmatobius macrostomus* of which 1 adult, 2 juveniles and 10 tadpoles.
- ❖ The project "Las ranas y yo" through its application as UGEL Junín obtained first place in Category 3: Promotion of innovation and leadership to improve student learning in the National Contest of Good Management Practices Education, organized by the Ministry of Education of Peru.
- ❖ Dissemination of the project in local and regional spaces at a radio and in person level, achieving communication of the project activities to the local community and decision makers to promote their inclusion in educational strategies, with projection to the Junin department.

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