

INSPIRATIONAL CASES |  WINNER 2023 |  PERU

#ENVIRONMENT

Students use organic products to improve rural production in their population center

The result of research in science and technology is a natural, nutritious, and economical solution to control pests and overcome deficiencies in crops, as a final product.

TEACHER

Norca Yesenia Espirilla Salazar

COMMUNITY/CITY

Socos population center in the Lambras district (Tayacaja, Huancavelica)

STEM AREAS

Science, Technology, Engineering and Mathematics

STUDENTS

Bryan Sebastián H. Paucar
Yhosselin Ramirez Medina
Mayte Edith R. Saavedra

SCHOOL

Victor Raúl Haya de La Torre

OTHER AREAS OF KNOWLEDGE

Environmental education

PROJECT NAME

Organic Sulcac

In a rural area of Peru, a teacher and three students identified that using a sulfocalcium broth (made with sulfur and calcium oxide) can be much more effective and sustainable than commercially available chemical pesticides. Through testing and guidance from agriculture and technology professionals, the result was that it is possible to improve the production of avocados, one of the main means of subsistence in the population center (administrative subdivision in Peru) of Socos, where they live. In addition to helping the population, this initiative was the winner of the 10th edition of Solve for Tomorrow Peru.

“Sulcac Orgánico” (or Organic Sulcac, in English) is the name of this project from the Victor Raúl Haya de La Torre State School. The population center of Socos is in the Department of Huancavelica and is a region where the majority of people make their living from agriculture. The students are often children of rural producers and live in nearby towns, needing to travel for an hour or more (by walk or van) to get to class.

This is also the reality of the students involved in the project, who are 16 and 17 years old and are in the fourth grade of secondary education, that is, the penultimate year of compulsory schooling. The mediator teacher, Norca Salazar, is also from nearby, within the Lambras district,

and by living in this region, she became sensitive to the difficulties of farm workers.



The team perceived the opportunity to use Science to improve local agricultural production

The educator teaches Science and Technology lessons and already has experience developing this type of project in other schools. When she started at the Victor Raúl school, she proposed that they dedicate themselves to programs like Solve for Tomorrow. “I saw that sometimes the community members went to the city searching for work and there they had more needs. And I asked myself: why don’t they improve production to be able to compete with other larger companies that are dedicated to export avocados?” the teacher questioned.

With this reflection in mind, Salazar discussed with the three students who offered to participate in the project and together they began to try to discover what was missing for local production to grow and become 100% organic. “A student said that here there were many red mite that attack the plantations and so we investigated more to understand why this was happening and how we could combat it without degrading the environment,” she recalls.

Fieldwork and allies were crucial

The first step was to visit plantations in the community, especially one from a friend of one of the young people, someone who became an ally. It was there that they did most of the testing, examining what could keep the spiders away and frequently observing the effects of the products on the avocado trees.

SAMSUNG

Meanwhile, they will talk with fifth-grade high school students about how bio-controllers, which are the natural enemies that combat pests, are disappearing, and what the effects that crops suffer from climate change.



Students putting their knowledge into practice to develop the broth.

The group even gained one more ally, an engineer, a friend of one of the student's parents. "He came predisposed to school, he even gave talks to the entire high school about environmental pollution and the importance of using organic products. He told them about the sulfocalcium broth and that was our starting point," said the teacher.

Added to this orientation was an in-depth research on natural alternatives to agrochemicals. After testing other types of organic compounds, sulfocalcium broth proved to be the best alternative: it affects the nervous and respiratory system of the red mite and is therefore a very effective form of control.

The broth is produced with two basic components: sulfur, which is purchased in the district, and lime (calcium oxide) which the equipment itself produces from limestone, a type of sedimentary rock that is easily found locally. The amounts of each element vary according to the type of use, but the bottle of this natural solution is much cheaper than one of the common pesticides, reaching 40 times cheaper.



Eureka moment!

In addition to being an agricultural defensive product, the team perceived in the tests an unexpected result that further enhanced the final product: the preparation helps provide nutrients for the growth, flowering, and fruiting of the plants. “We applied the broth and observed how the plantation reacted over time,” says the teacher.



“The leaves of the avocado trees that have a lot of red mites turn brown and we realized that they had changed color. Now the brown ones fell and were born again green, healthy”,

she explains.

This indicated that they had managed to control the pest after a few doses of application and that the [prototype](#) was approved by testing. Another benefit discovered is that the sediment (generated when the broth was boiled) can be used to make grafts when pruning, with the function of healing the plants.

Greater confidence in young people

As they live in a rural area that is difficult to access, the students of “Sulcac Orgánico” initially thought that they would not be able to compete with larger schools in urban contexts. But they persevered, with the teacher’s constant motivation, and now that they have won the Solve for Tomorrow program, they feel much more confident and willing to dedicate themselves to [scientific research](#). “They are eager to continue studying and do more for the community,” Salazar highlights.

Now they continue with new ideas. “The students are excited; they plan to improve the prototype and perhaps join other teams from other projects. They are already investigating, for example, how to replace the bottles used to package the solution,” reveals the professor. The goal is also to expand visits and work in neighboring communities and cities.




Focus on practice!

Take a look to the teacher's guide on how to develop a class project that provides a natural and effective solution to pests.




Empathy

 The idea arose from a provocation by the teacher, who observed that in her community there was a lack of technical knowledge and better use of natural resources to increase rural production, especially avocado trees, which are the main food grown. Speaking with the students, who are also part of this rural community, they did the exercise of thinking about the main [challenges](#) that farmers face.




Definition

 In the reflection moment with the class, one of the students pointed out that there are many red mites in the avocado plantations according to his perception at home. But to better understand the challenges, the team went to some rural properties to interview local producers. One of them specifically became an ally, receiving the group several times for testing on their cultivation.




Ideation

 While doing fieldwork, the students did bibliographic research to discover possible causes and solutions to combat red mites sustainably, without harming the environment. The response should also be effective and economical, using natural resources. For the idea to become a reality, team effort was essential. At school, the internet connection does not always work and the students had to split up, each one going after some information after class time. Then, when they met, they could share their searches.




Prototype

 It was through another alliance, with an engineer, that they discovered some chemical formulas that they could test in the cultivation of avocados. After a series of tests, they concluded that sulfocalcium broth was the best solution, using lime available in the community and sulfur purchased from a nearby location. The amounts of each element vary according to the type of use. More information about this compound [here](#).



Testing

 The solution was received positively and with enthusiasm by the local producers who participated in this testing phase. The broth worked, it was easy to produce and inexpensive. In addition, they perceived that the preparation helps provide nutrients for the growth, flowering, and fruiting of plants. Now, the idea is to continue improving the project and expand to other neighboring communities and cities.