REGIONAL CENTRE OF EXPERTISE
ON EDUCATION FOR
SUSTAINABLE DEVELOPMENT

ACKNOWLEDGED BY

UNITED NATIONS
UNIVERSITY

Localizing the UN SDGs through Education, Training & Regional Collaboration

Session 5:

Combined session - RCE Puerto Rico & RCE Atlanta

May 9, 2023

RCE Puerto Rico
REDeS
Red de Educación para el Desarrollo Sostenible

RCE
GREATER A

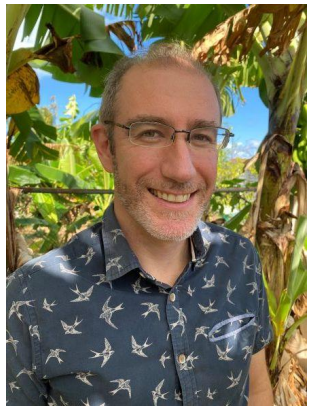
Part 1: Cross-sector collaborations for science education and sustainable natural resource management

RCE Puerto Rico
REDeS
Red de Educación para el Desarrollo Sostenible

Facilitators

Pablo A. Llerandi Román
USDA Forest Service - El Yunque National Forest
Pablo.Llerandi-Roman@usda.gov

Noelia Báez Rodríguez
Luquillo Long-Term Ecological Research Program
nbaez@ites.upr.edu



Christopher Nytch
University of Puerto Rico, Río Piedras
chris.nytch@ites.upr.edu

Daita Serghi
AASHE
daita.serghi@aashe.org
Tech Support

Outline

- Intro to RCE Puerto Rico-REDeS
- Perspectives from El Yunque National Forest -- El Portal and Watershed Program
- Luquillo LTER Schoolyard Program -- Data Jam & ITEST
- Small farm resilience -- collaboration with RCE Greater Burlington
- Interactive reflection

Related SDGs:

RCE Puerto Rico

REDeS

Red de Educación para el Desarrollo Sostenible

RCE

REGIONAL CENTRE OF EXPERTISE ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

ACKNOWLEDGED BY

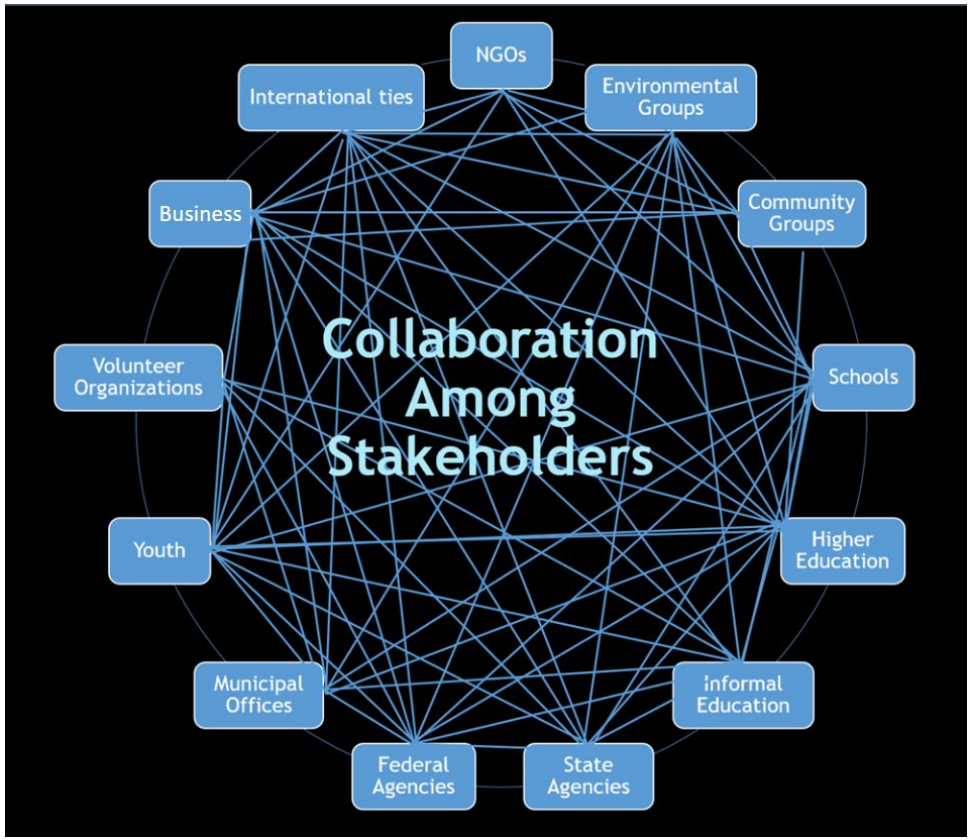
UNITED NATIONS UNIVERSITY

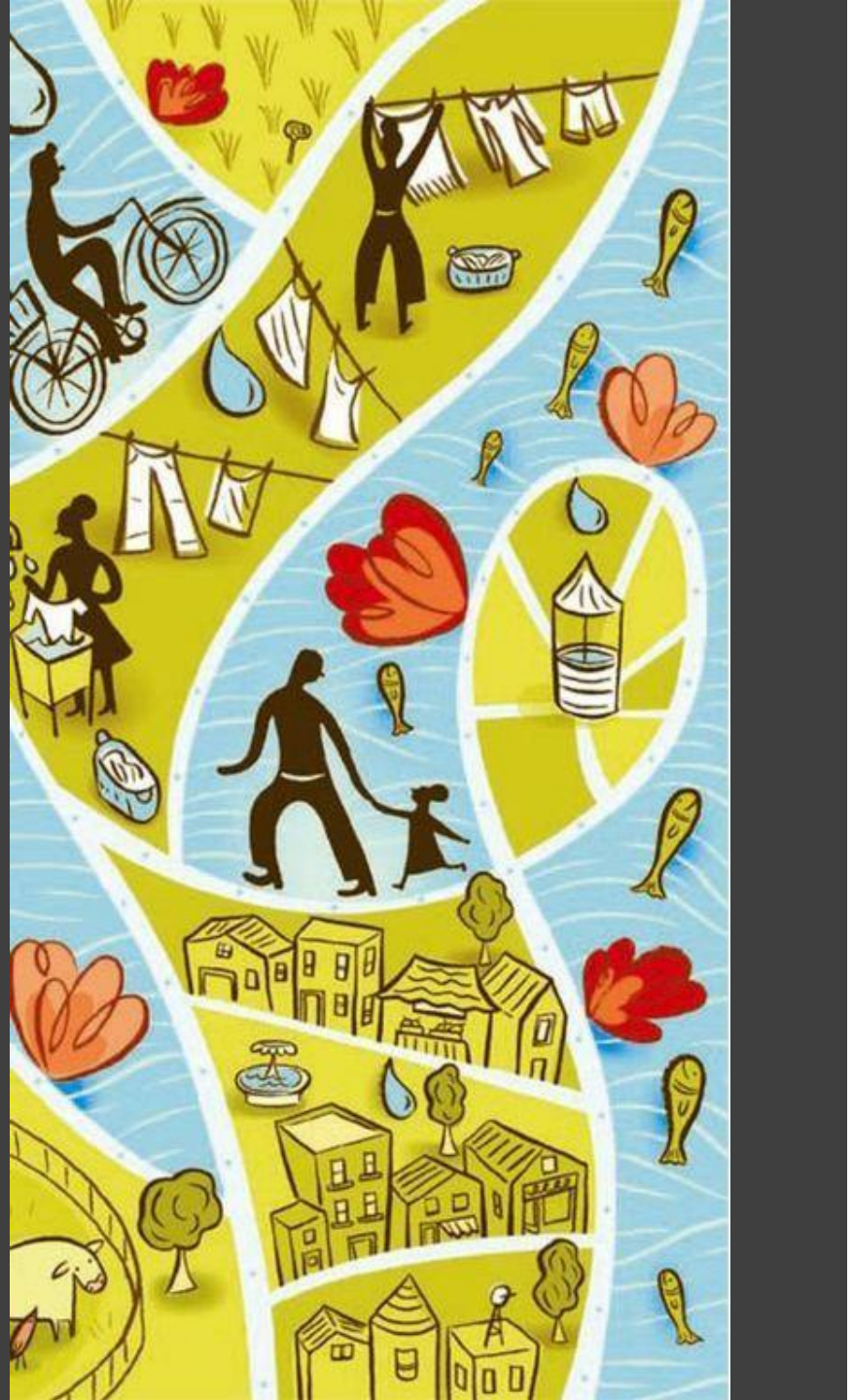
RCE Puerto Rico-REDeS

Sustainability Education Network

What do RCEs do?

- Bring together organizations and institutions → synergies
- Construct inclusive and innovative learning platforms
- Create an important knowledge base
- Facilitate knowledge transfer





RCEs promote local action that contributes to local and global sustainability

Regional Centres of Expertise on Education for Sustainable Development

REGIONAL CENTRE OF EXPERTISE ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

ACKNOWLEDGED BY

UNITED NATIONS UNIVERSITY

RCEs around the world

www.rcenetwork.org

RCE Puerto Rico

REDeS

Red de Educación para el Desarrollo Sostenible

Our MISSION is to construct a collaborative and inclusive network that promotes on-going education and strengthens the well-being of human communities and life-sustaining ecosystems.

RCE Puerto Rico Goals

- **Develop a network of cross-sector alliances** that advances sustainability education in Puerto Rico.
- Improve **access to transformative education** focused on sustainability principles.
- **Educate and raise public awareness** about sustainability and resiliency concepts, and their relationship with social, economic, and environmental well-being.
- **Promote the sustainable management and conservation** of natural and cultural resources and the goods and services they provide society.
- **Strengthen food, energy and drinking water security** via sustainable economic development.

Collaborating Members of RCE Puerto Rico-REDeS

ALMA DE BAHÍA
SOUL OF BAHIA

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

CCP
CENTRO PARA LA CONSERVACIÓN DEL PAISAJE

Proyecto Raíces

DE
DEPARTAMENTO DE EDUCACIÓN
GOBIERNO DE PUERTO RICO

UNIVERSIDAD DE PUERTO RICO · RECINTO DE RIO PIEDRAS · 1903 ·

ESTADO LIBRE ASOCIADO DE PUERTO RICO
DRNA
DEPARTAMENTO DE RECURSOS NATURALES Y AMBIENTALES

CCPP
Comité Consultor para la Participación Pública de El Yunque

SAGRADO
Universidad del Sagrado Corazón

Love in Motion
20 17
FOUNDATION

Puerto Rico Science, Technology & Research Trust

AU AMERICAN UNIVERSITY
OF PUERTO RICO

ESTUARIO
Programa del Estuario de La Bahía de San Juan
PUERTO RICO

FUNDACIÓN Amigos de El Yunque

Learning 2B Global
EMPOWER YOUR ACTION

COOPERA

CORAZÓN LATINO

Génesis

UNIVERSIDAD INTERAMERICANA DE PUERTO RICO

UNIVERSIDAD ANA G. MÉNDEZ
UAGM
Recinto de Cupey

SIERRA CLUB
PUERTO RICO
EXPLORANDO, DISFRUTANDO Y PROTEGIENDO EL AMBIENTE

UNITED NATIONS ASSOCIATION OF THE UNITED STATES OF AMERICA
Puerto Rico Chapter

Additionally, there are several individuals who participate in RCE Puerto Rico-REDeS in a personal capacity.

For more information

- **EMAIL:** rcepuertorico@gmail.com
- **WEB SITE:** https://sites.google.com/view/rcepuertorico/
- **SOCIAL MEDIA**
  - **Facebook:** https://www.facebook.com/RCEPuertoRico/
  - **Instagram:** @rcepr_redes
  - **Twitter:** @RCEPR_REDeS

RCE Puerto Rico
REDeS
Red de Educación para el Desarrollo Sostenible

Photo courtesy of Ricardo Arzuaga, UNAUSA-PR

Perspectives from El Yunque National Forest

El Portal and Watershed Program

Pablo A. Llerandi Román, Ph.D.

Watershed Program Coordinator + Natural Resource Education Specialist

El Yunque National Forest, Puerto Rico

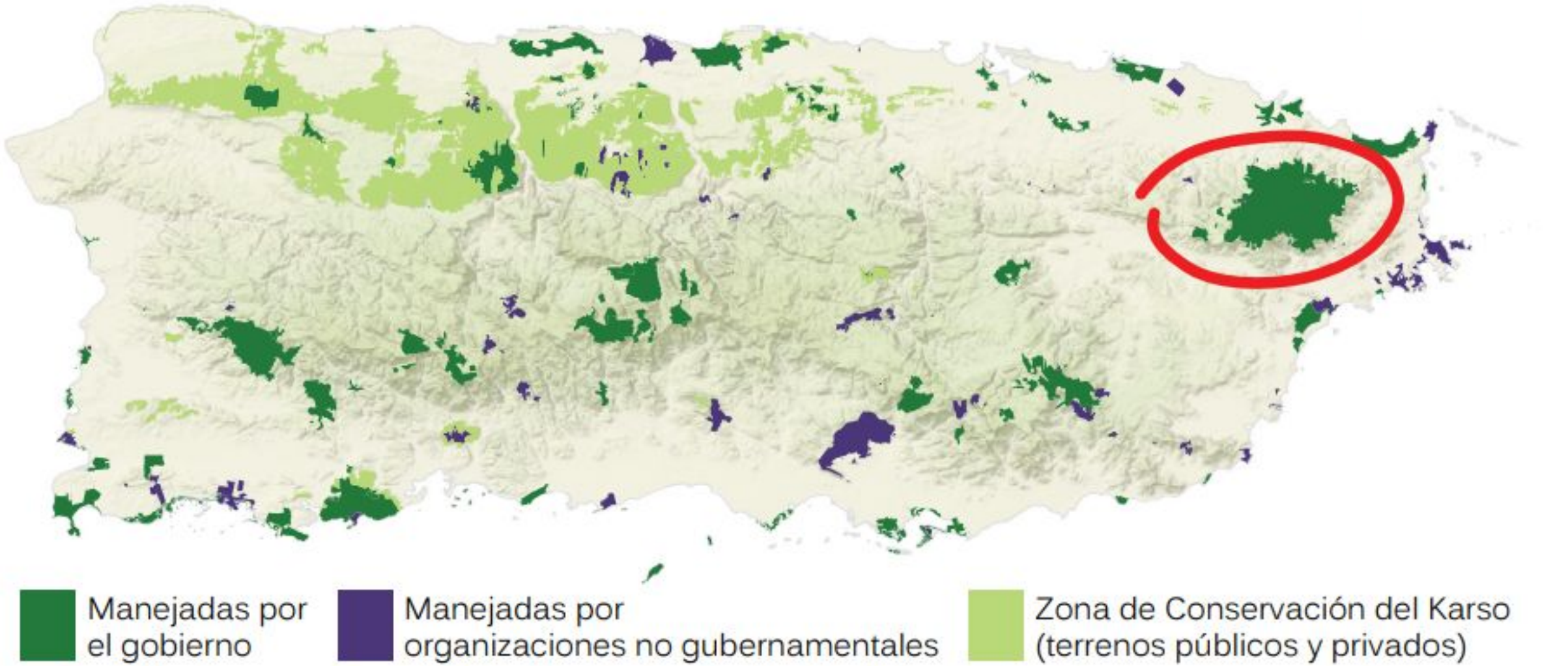
RCE Puerto Rico, UPR adjunct professor

Former Co-director of PR-LSAMP

Blog: Ciencias terrestres, geología y Puerto Rico http://geolpr.com

pablo.llerandi-roman@usda.gov

Picture: P.A. Llerandi Román



Áreas protegidas de Puerto Rico [6]

Atlas de El Yunque – Maya Quiñones et al. [IITF-USFS – RCE Puerto Rico Board Member]

El Yunque: A place where the original heroes lived, where puertorriqueñidad started its development

[Maldonado, Valdes Pizzini, Latoni (1999) Owning and contesting El Yunque: Forest resources, politics, and culture in Puerto Rico, Berkeley Journal of Sociology]

El Yunque from Las Cabezas de San Juan

Foto por Pablo A. Llerandi Román ©

Community-centered programs, **co-management,** and education

Picture: P.A. Llerandi Román

Aquí comienza el océano

Gota de agua formada por condensación en Pico del Este

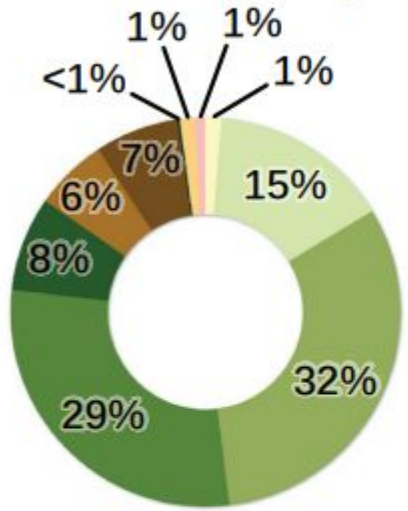
Todo se integra, todo se conecta

Foto: P. A. Llerandi Román

Complex ecological and geological dynamics

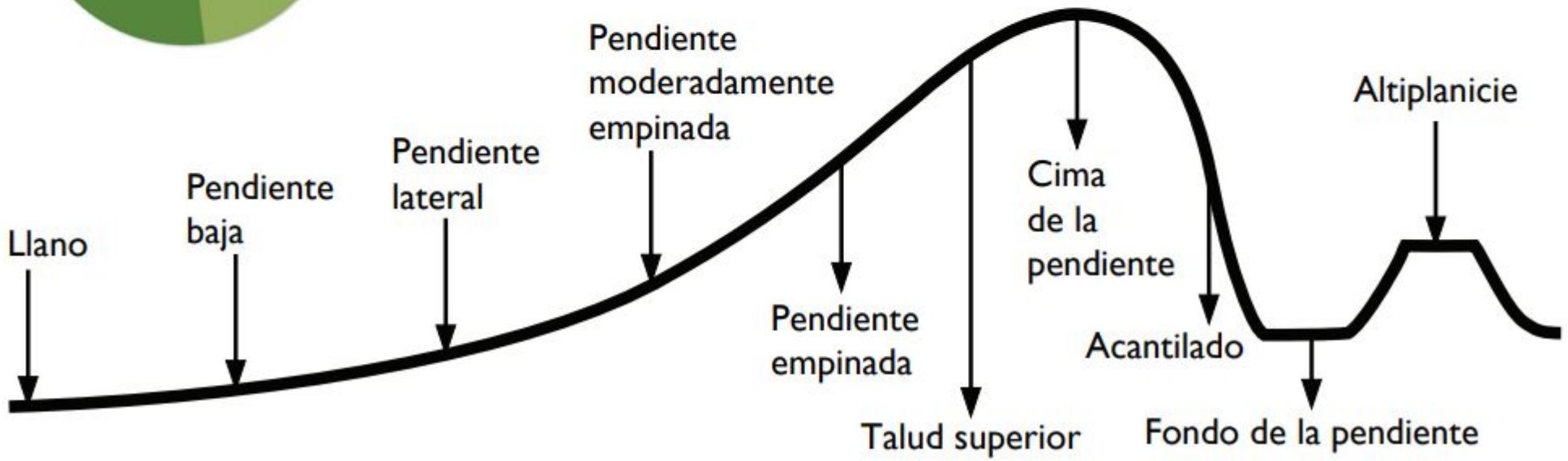
Picture: P.A. Llerandi Román

La distribución del relieve dentro de El Yunque



Llano
Pendiente baja
Pendiente lateral
Pendiente moderadamente empinada
Pendiente empinada
Talud superior
Cima de la pendiente
Acantilado
Fondo de la pendiente
Altiplanicie

Diagrama de las clasificaciones del relieve [15]



Atlas de El Yunque – Maya Quiñones (IITF-USFS, RCE Puerto Rico Board Member]

El Portal de El Yunque

"The embodiment of the Land Management Plan" (Paula García Almodóvar)

- Exhibit space
  - 100+ interpretive panels in more than 30 exhibits
  - Interactive – inviting
  - Themes – natural diversity, geology, biology/ecology, wayfinding and activities in the Forest, maps, culture, art, LEED/sustainability, calls to action
- Five art installations
  - 11 artists + 10 support personnel
- Café
- Colaboratorio
- Event space
- Two trails
  - Explora y descubre
  - Ciencia y conservación

Foto por Pablo A. Llerandi Román

WATER RESOURCES
Water extraction and use

Water for public consumption is an important service provided by El Yunque National Forest. Forest cover is associated with suitable water conditions for ecosystem processes and consumption, while bare ground and built-up areas increase sedimentation and flash floods, and contribute to lower water quality.[29]

The water that runs through El Yunque's rivers is documented as the cleanest on the island with high-quality conditions.[7,29] In 2014, Puerto Rico had 3.5 million inhabitants, of which about 20% depend on the water El Yunque National Forest supplies.[7,29]

DID YOU KNOW?

On a typical day, over half of all water flowing from the forest is extracted for municipal use and human consumption.[3] Based on the cost paid by consumers, the water extracted from the streams that flow from the Luquillo Mountains is worth about $25 million per year.[7]

Regulatory agencies[7]

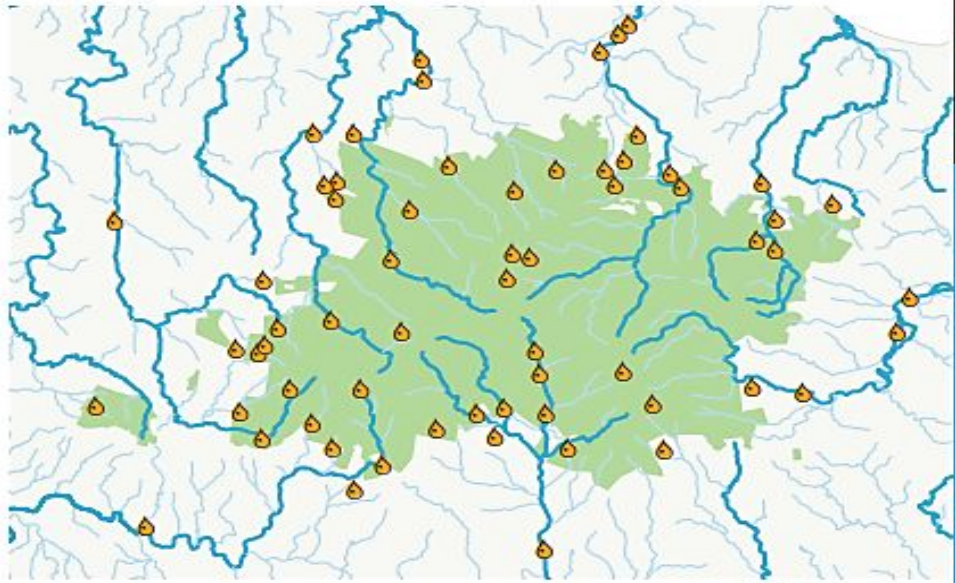
Water quality
- Puerto Rico Environmental Quality Board
- U.S. Environmental Protection Agency

Extraction (regulation)
- Puerto Rico Department of Natural and Environmental Resources

Extraction (monitoring)
- U.S. Geological Survey (USGS)

Water intakes

In 2004, there were 34 intakes withdrawing over 66 million gallons of water per day from the forest, compared to 51 million gallons in 1994.[30]

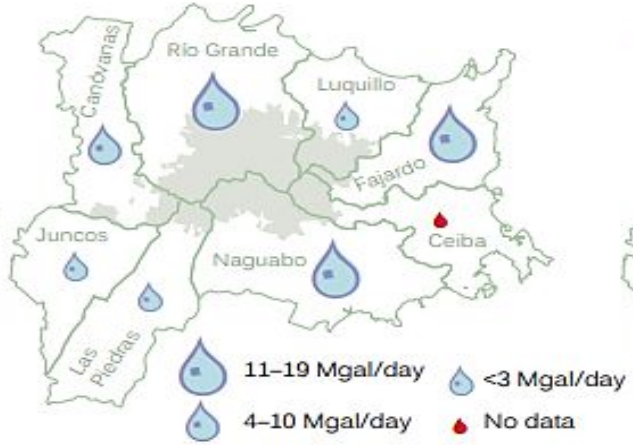



Freshwater shrimp, *Atya innocuous*
Photo by Omar Pérez-Reyes

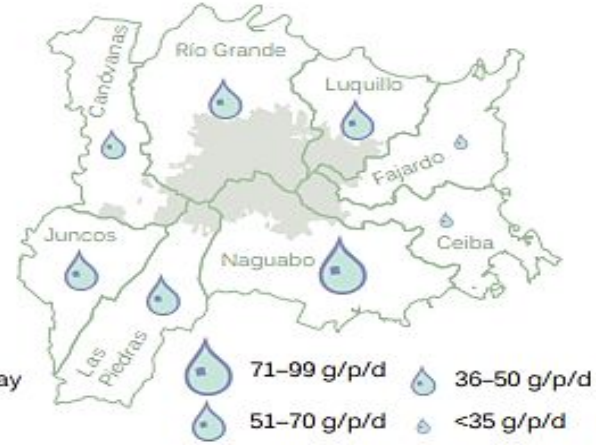
Freshwater Shrimp

Shrimp account for 95% of the biomass living in the rivers and streams of El Yunque.[32] These tiny crustaceans are important decomposers, breaking down leaves and algae and contributing to the health of aquatic ecosystems.[3,32] Shrimp migrate upstream to the Luquillo Mountains from coastal waters where they hatch. Dams and water intakes break stream connectivity, affecting shrimp migration. However, intakes like the one installed in Río Mameyes are especially designed to alter the river channel less than low-head dams and have minimal effect on migratory aquatic species.[3]

Water withdrawals in 2010[31]



Water for domestic use in 2010[31]



Water-use data for 2010 from the National Water Information System from the USGS[31] reports that water withdrawals in Puerto Rico totaled 677 million gallons per day (Mgal/day), of which 230 Mgal/day were for domestic use. In the municipalities that encompass El Yunque, withdrawals totaled 58 Mgal/day, while domestic use totaled 15 Mgal/day; domestic use ranged from 26–99 gallons per person per day (g/p/d).[31]

RCE Puerto Rico at El Yunque – supporting communities through science, education, and partnerships

Localizing the SDGs in Puerto Rico

K-12 STEM Education

Universidad de Puerto Rico

LUQUILLO Long Term Ecological Research

The Learning Partnership

DE DEPARTAMENTO DE EDUCACIÓN GOBIERNO DE PUERTO RICO

LUQ LTER SCHOOLYARD

FORWARDLEARNING

TERC

The authors were supported in part by National Science Foundation grants DRL-2049061, DRL-1821146, DRL-1813802, and BIO-1831952. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of NSF.

Engagement Model

Middle school curriculum
Using LTER data and models

Elementary storybook
to spark interest

Journey to El Yunque

LUQ-LTER
DATA JAM

Middle School / High School
Program for Data Analysis
Using LTER data sets
Using Data visualizer CODAP

LUQUILLO
Long Term Ecological Research
Field Protocol Workshops

Data Jam graduates are
invited to participate
in Field protocols at LUQ-LTER
To collect and analyze data

Teacher
pathways

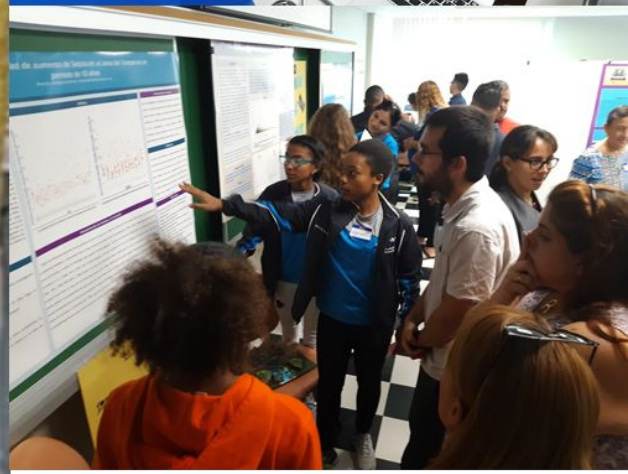
Environmental Data Initiative

The Data Science
Fellowship

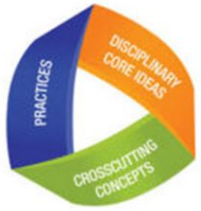
NSF Research Experience for TEACHERS (RET)

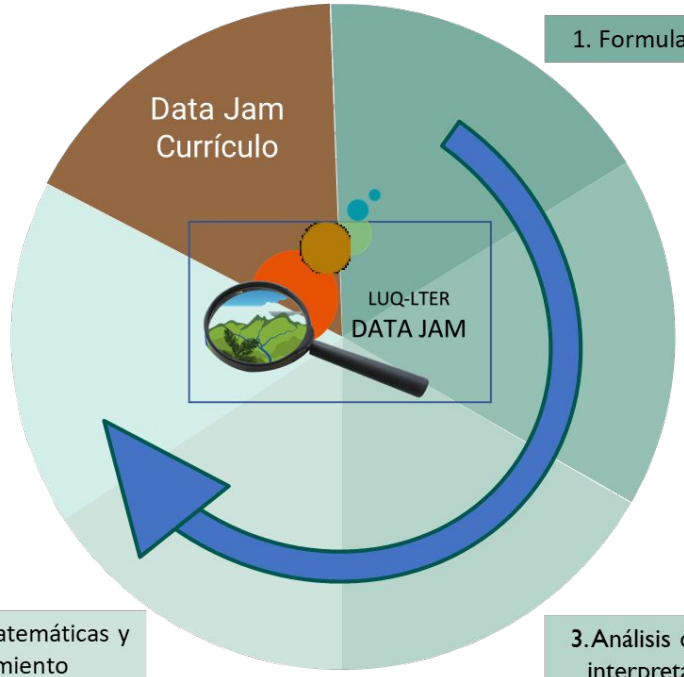
Data Jam

Mechanism to enhance teacher and student Data Literacy skills by working with long-term data sets.



Scientific Practices - Alignment with Next Gen Science Standards





1. Formular preguntas

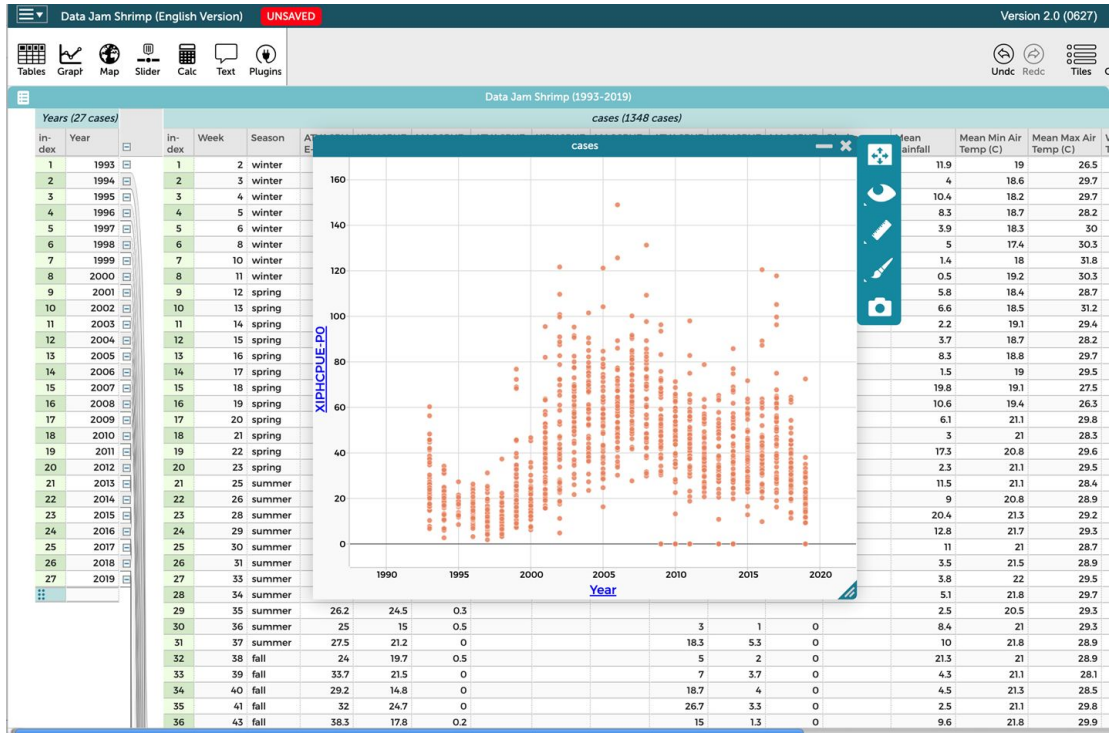
2. Planificar y llevar a cabo investigaciones

3. Análisis de datos e interpretación de gráficas

4. Uso de matemáticas y pensamiento computacional

5. Plantear un argumento a partir de evidencias

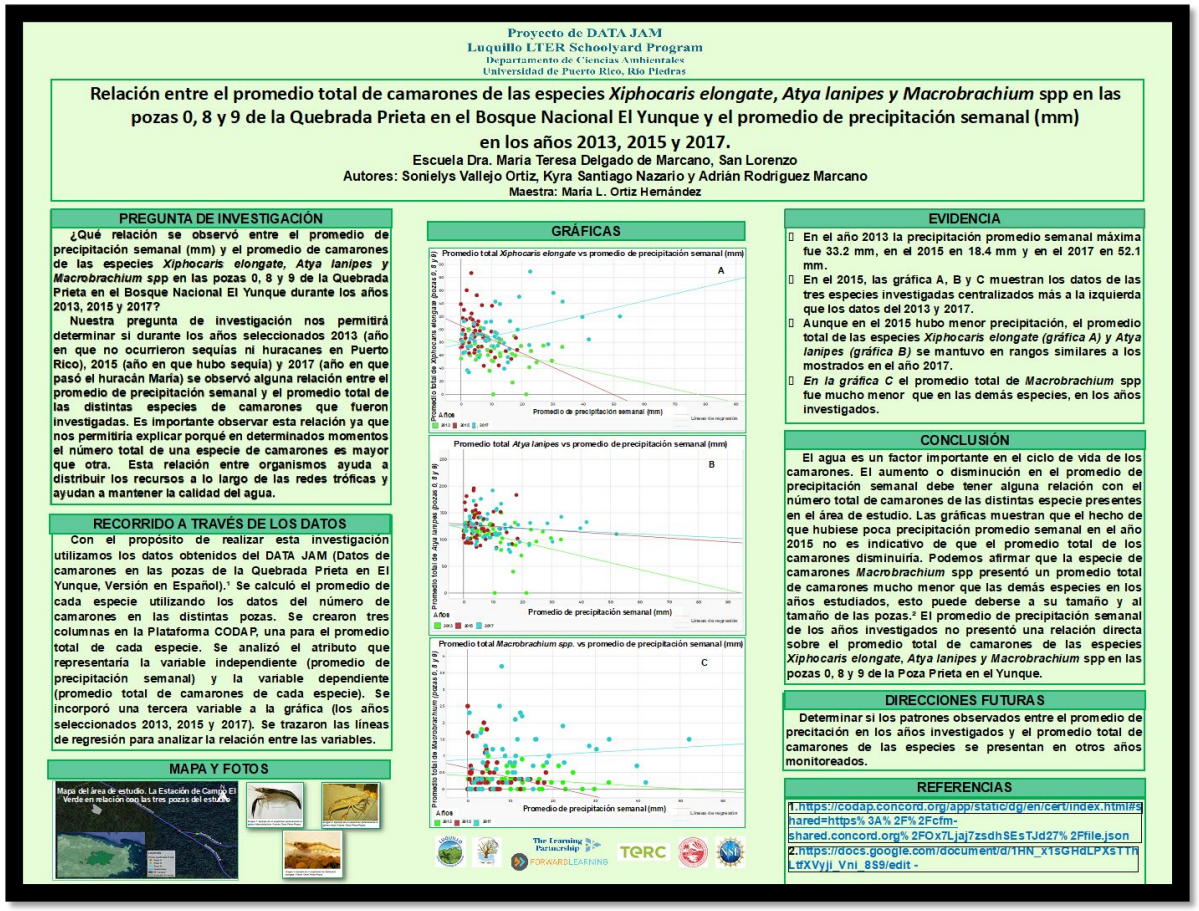
The Concord Consortium



CODAP

Common Online Data Analysis Platform

Venues of communication: Students Symposia



Proyecto de DATA JAM
Luquillo LTER Schoolyard Program
Departamento de Ciencias Ambientales
Universidad de Puerto Rico, Río Piedras

Relación entre el promedio total de camarones de las especies *Xiphocaris elongate, Atya lanipes y Macrobrachium* spp en las pozas 0, 8 y 9 de la Quebrada Prieta en el Bosque Nacional El Yunque y el promedio de precipitación semanal (mm) en los años 2013, 2015 y 2017.

Escuela Dra. María Teresa Delgado de Marcano, San Lorenzo
Autores: Sonielys Vallejo Ortiz, Kyra Santiago Nazario y Adrián Rodríguez Marcano
Maestra: María L. Ortiz Hernández

PREGUNTA DE INVESTIGACIÓN

¿Qué relación se observó entre el promedio de precipitación semanal (mm) y el promedio de camarones de las especies *Xiphocaris elongate, Atya lanipes y Macrobrachium spp* en las pozas 0, 8 y 9 de la Quebrada Prieta en el Bosque Nacional El Yunque durante los años 2013, 2015 y 2017?

Nuestra pregunta de investigación nos permitirá determinar si durante los años seleccionados 2013 (año en que no ocurrieron sequías ni huracanes en Puerto Rico), 2015 (año en que hubo sequía) y 2017 (año en que pasó el huracán María) se observó alguna relación entre el promedio de precipitación semanal y el promedio total de las distintas especies de camarones que fueron investigadas. Es importante observar esta relación ya que nos permitiría explicar porqué en determinados momentos el número total de una especie de camarones es mayor que otra. Esta relación entre organismos ayuda a distribuir los recursos a lo largo de las redes tróficas y ayudan a mantener la calidad del agua.

RECORRIDO A TRAVÉS DE LOS DATOS

Con el propósito de realizar esta investigación utilizamos los datos obtenidos del DATA JAM (Datos de camarones en las pozas de la Quebrada Prieta en El Yunque, Versión en Español).[1] Se calculó el promedio de cada especie utilizando los datos del número de camarones en las distintas pozas. Se crearon tres columnas en la Plataforma CODAP, una para el promedio total de cada especie. Se analizó el atributo que representaría la variable independiente (promedio de precipitación semanal) y la variable dependiente (promedio total de camarones de cada especie). Se incorporó una tercera variable a la gráfica (los años seleccionados 2013, 2015 y 2017). Se trazaron las líneas de regresión para analizar la relación entre las variables.

MAPA Y FOTOS

GRÁFICAS

EVIDENCIA

- En el año 2013 la precipitación promedio semanal máxima fue 33.2 mm, en el 2015 en 18.4 mm y en el 2017 en 52.1 mm.
- En el 2015, las gráfica A, B y C muestran los datos de las tres especies investigadas centralizados más a la izquierda que los datos del 2013 y 2017.
- Aunque en el 2015 hubo menor precipitación, el promedio total de las especies *Xiphocaris elongate (gráfica A) y Atya lanipes (gráfica B)* se mantuvo en rangos similares a los mostrados en el año 2017.
- *En la gráfica C* el promedio total de *Macrobrachium* spp fue mucho menor que en las demás especies, en los años investigados.

CONCLUSIÓN

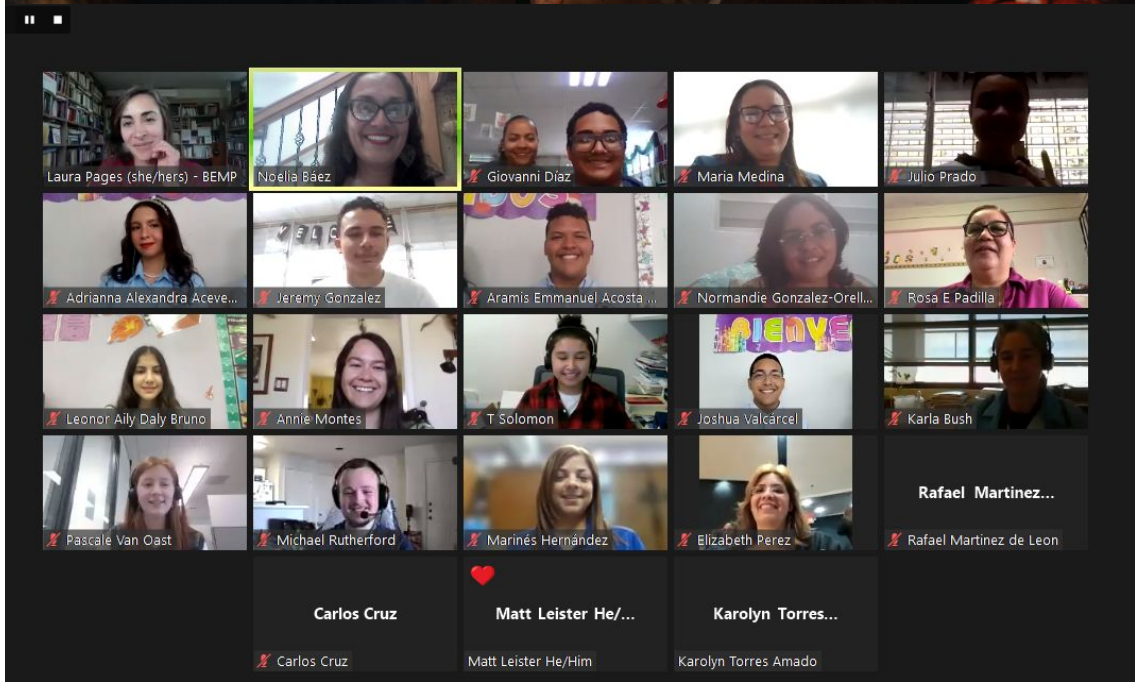
El agua es un factor importante en el ciclo de vida de los camarones. El aumento o disminución en el promedio de precipitación semanal debe tener alguna relación con el número total de camarones de las distintas especie presentes en el área de estudio. Las gráficas muestran que el hecho de que hubiese poca precipitación promedio semanal en el año 2015 no es indicativo de que el promedio total de los camarones disminuiría. Podemos afirmar que la especie de camarones *Macrobrachium* spp presentó un promedio total de camarones mucho menor que las demás especies en los años estudiados, esto puede deberse a su tamaño y al tamaño de las pozas.[2] El promedio de precipitación semanal de los años investigados no presentó una relación directa sobre el promedio total de camarones de las especies *Xiphocaris elongate, Atya lanipes y Macrobrachium* spp en las pozas 0, 8 y 9 de la Poza Prieta en el Yunque.

DIRECCIONES FUTURAS

Determinar si los patrones observados entre el promedio de precitación en los años investigados y el promedio total de camarones de las especies se presentan en otros años monitoreados.

REFERENCIAS

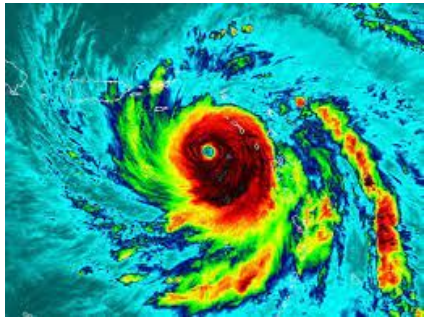
1. https://codap.concord.org/app/static/dg/en/cert/index.html#shared=https%3A%2F%2Fcfm-shared.concord.org%2FOx7Ljaj7zsdhSEsTJd27%2Ffile.json
2. https://docs.google.com/document/d/1HN_X1SGHdLPXSTTnLtfXVyji_Vni_8S9/edit -



Field Protocols: Vegetation, Stream Ecology and Soil Characterization Workshops

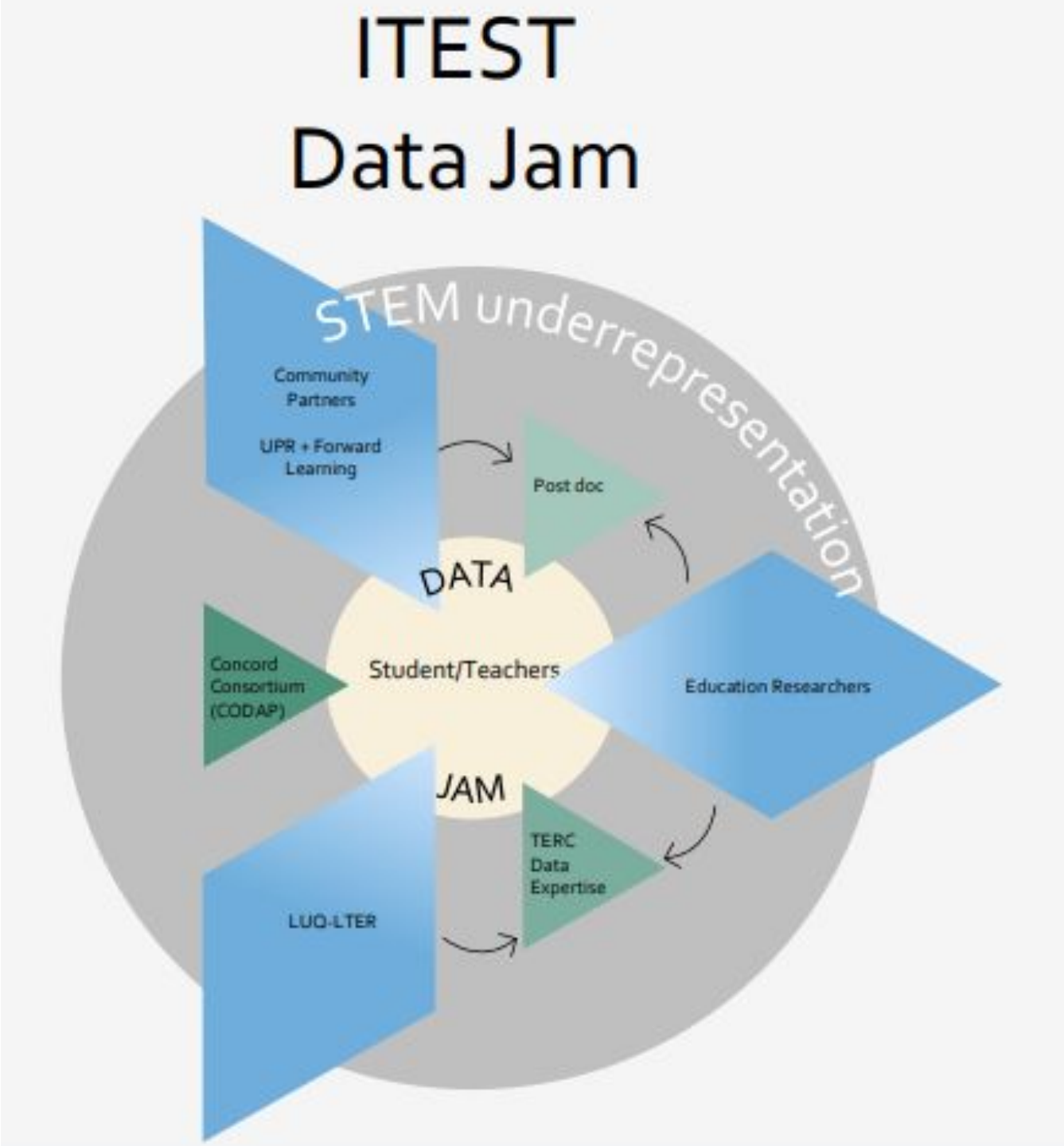
Challenges

Program Capacity	Program implementation	Disturbance
Personnel time	NGSS adaptability	Hurricanes
Conditions of the field station	Computer and internet access	Earthquakes
Funding and Resources	Regional limitations	Fiscal Crisis



Partnerships

- **The heart and soul of partnerships**
  - **What are mutual long-term goals**
  - **Dynamic and iterative**
  - **Understand what each partner uniquely brings**
  - **Practice humility, trust and perseverance**



A cross-cultural, participatory approach for measuring and cultivating resilience on small and medium farms

RCE Greater Burlington

Walter Poleman, Aura M. Alonso-Rodríguez, Hans Estrin, María A. Juncos-Gautier & Ethan Thompson

RCE Puerto Rico

Christopher J. Nytch & Edgardo González

- University of Vermont, Rubenstein School of Environment and Natural Resources
- University of Vermont Extension
- Vermont Vegetable and Berry Growers Association
- Centro para la Conservación del Paisaje
- USDA Caribbean Climate Hub
- Many individual farmers and their families located Vermont and Puerto Rico

Funding provided by: UVM Agricultural Research Service Center for Food Systems Research

Background

- Extreme climatic events such as droughts and hurricanes are expected to increase in frequency and intensity due to global climate change.
- Small-scale farmers' vulnerability to these hazards depend on the level of exposure and sensitivity, the intensity of the shock, and their capacity to respond to it.
- In 2020, farmers were faced with a new challenge. COVID-19 not only threatened their health, but also their livelihood and food security.
- It is imperative to understand and help build farmers' resilience against these varied shocks and stressors, and how they contribute to long-term sustainability of local farm systems.

Study questions

What resilience capacities do farmers consider most important for their resilience against both natural disasters and the COVID-19 pandemic?

How can we measure these resilience capacities rapidly and effectively to help small-scale farmers increase their resilience over time and lead to long-term sustainability of the local farm system?

Conceptual frameworks that guided our work

- Agroecology Principles
- Positive Deviance
- Participatory Action Research (PAR)
- Cross-cultural Diversity
- SDGs

Several Sustainable Development Goals related to food systems

Project Workflow

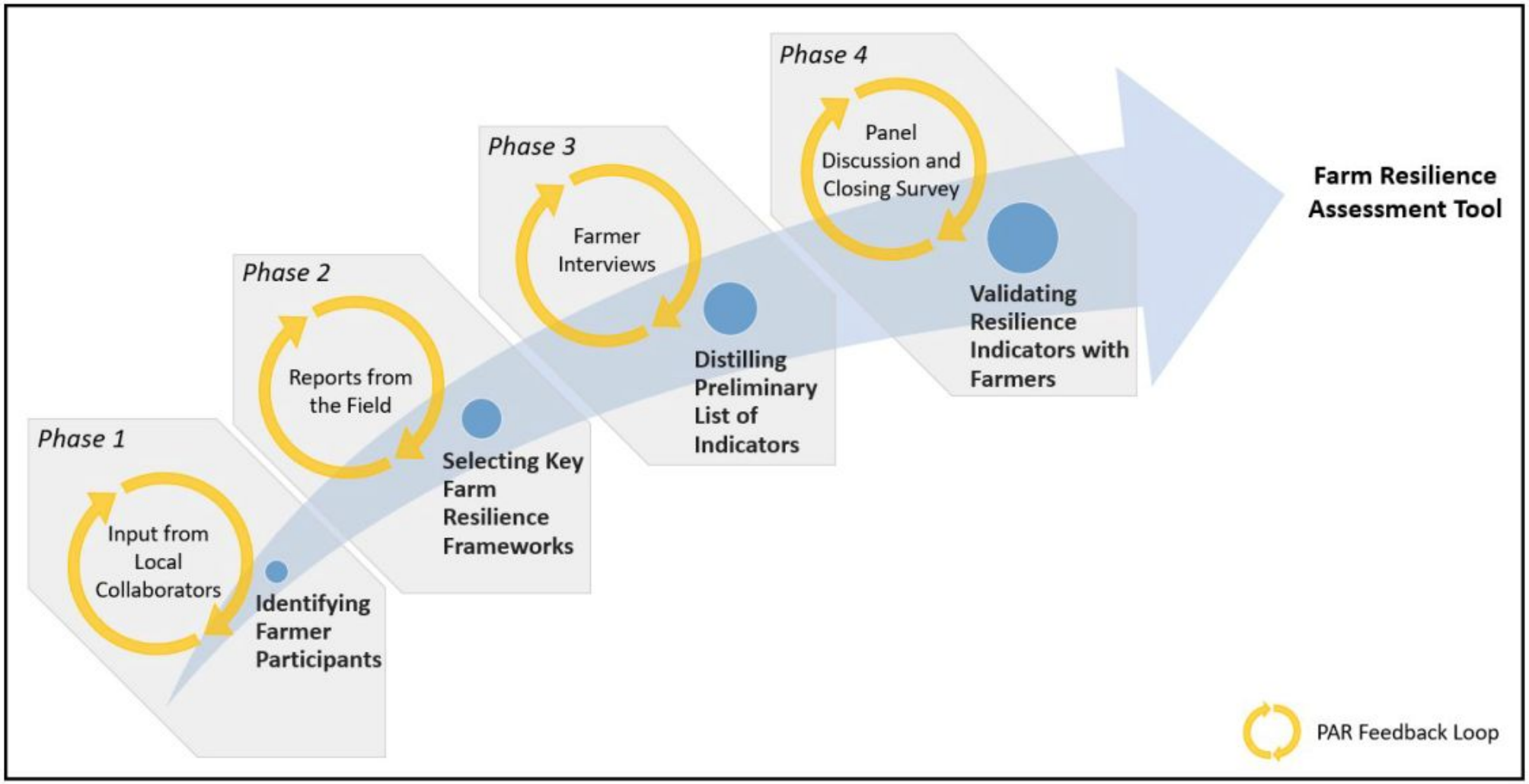
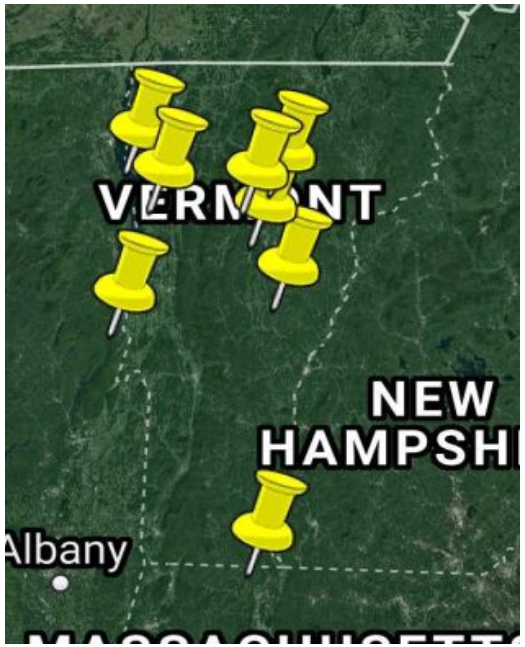


Figure 1. Research process showing four main phases (blue circles) and ongoing PAR interactions (orange loops). See text for additional explanation.

Farmer participants in Puerto Rico & Vermont



Variable	Range	Average
Farm size (hectares)	0.4–145	39
Years of farming	4–47	12
Number of family members on farm	1–6	3
Number of non-family employees	0–50	7
Farm products grown/ produced	mixed greens, root vegetables, ornamental flowers, medicinal plants, herbs and spices, berries, fruit trees (e.g. guava, avocado, papaya, bananas, cacao, citrus), coffee, honey, Chrismas trees, livestock, (e.g., dairy cattle and goats), poultry, fish (farm raised and wild caught)	

- Actively employ agroecological principles in their farm
- Cultivate a diversity of crops and products
- At least 50% of their income comes from their agricultural activities

20 preliminary resilience capacities/strategies, divided into 4 categories

- Review of resilience frameworks and indicators in the literature
- Semi-structured interviews (in both languages) with the farmers

GROWTH MINDSET	SUSTAINABLE FARMING PRACTICES
Open attitude	Build healthy soil
Flexible	Protect natural resources and biodiversity
Interest in learning	Diversify farm products
Passion for farming	Minimize external inputs
	Water-use efficiency
STRONG RELATIONSHIPS	**SUSTAINABLE BUSINESS MANAGEMENT**
Dependable business networks	Effective planning and monitoring
Community ties	Cultivating a healthy workplace
Reliable crew	Diversifying markets and venues
Family support	Financial leeway and capacity
Responsive government	Appropriate equipment and infrastructure
	Focusing on recurrent customers

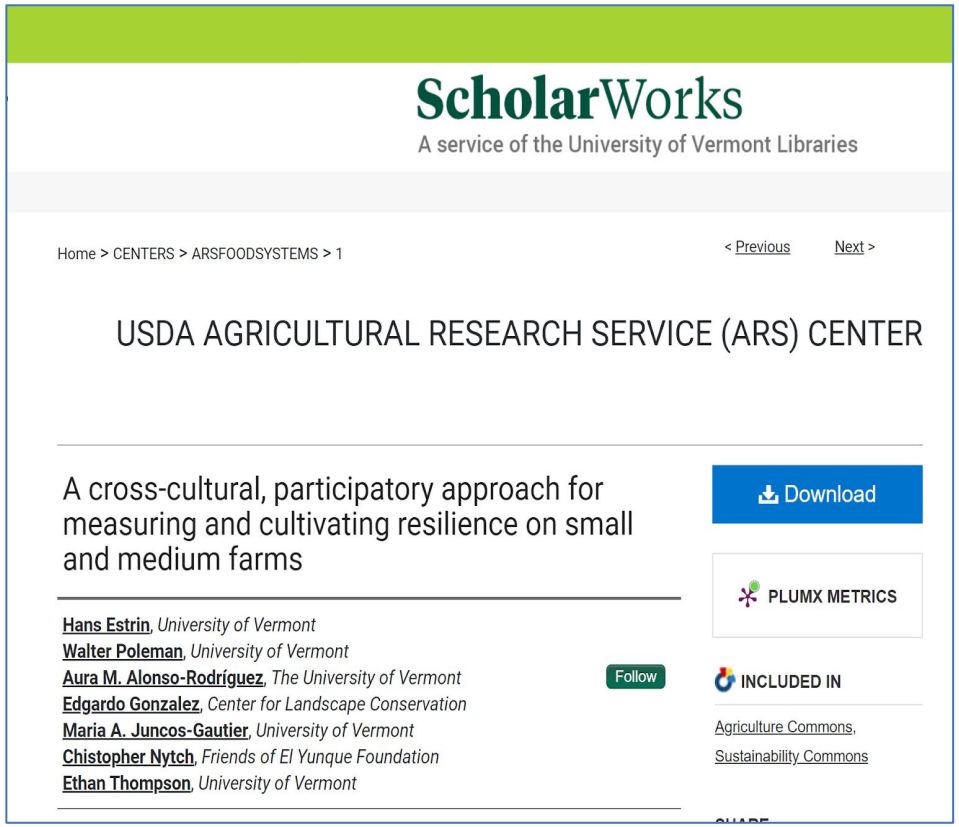
Assessing validity & relative importance

- All 20 indicators received more than 50% votes as “very important”
- Flexibility and passion for farming were amongst the most important, as well as strong relationships with family and the community.
- Building healthy soil was the most important sustainable farming practice.

Ranking of resilience indicators by top three most important for farm resilience (all farms, n=14). Orange = Growth Mindset indicators, Blue = Strong Relationships indicators, Green = Sustainable Farming Practices indicators, Purple = Sustainable Business Management indicators.

Order of importance	Resilience Indicators	Farm votes
1	Build healthy soil	43%
2	Flexible	36%
3	Passion for farming	29%
4	Community ties	29%
5	Family support	29%
6	Financial leeway and capacity	21%
7	Open attitude	14%
8	Reliable crew	14%
9	Protect natural resources and biodiversity	14%
10	Water-use efficiency	14%
11	Effective planning and monitoring	14%
12	Dependable business networks	7%
13	Diversify farm products	7%
14	Minimize external inputs	7%
15	Cultivating a healthy workplace	7%
16	Diversifying markets and venues	7%
17	Appropriate equipment and infrastructure	7%
18	Interest in learning	0%
19	Responsive government	0%
20	Focusing on recurrent customers	0%

White paper & farm resilience assessment tool



ScholarWorks
A service of the University of Vermont Libraries

Home > CENTERS > ARSFOODSYSTEMS > 1

< Previous Next >

USDA AGRICULTURAL RESEARCH SERVICE (ARS) CENTER

A cross-cultural, participatory approach for measuring and cultivating resilience on small and medium farms

Download

PLUMX METRICS

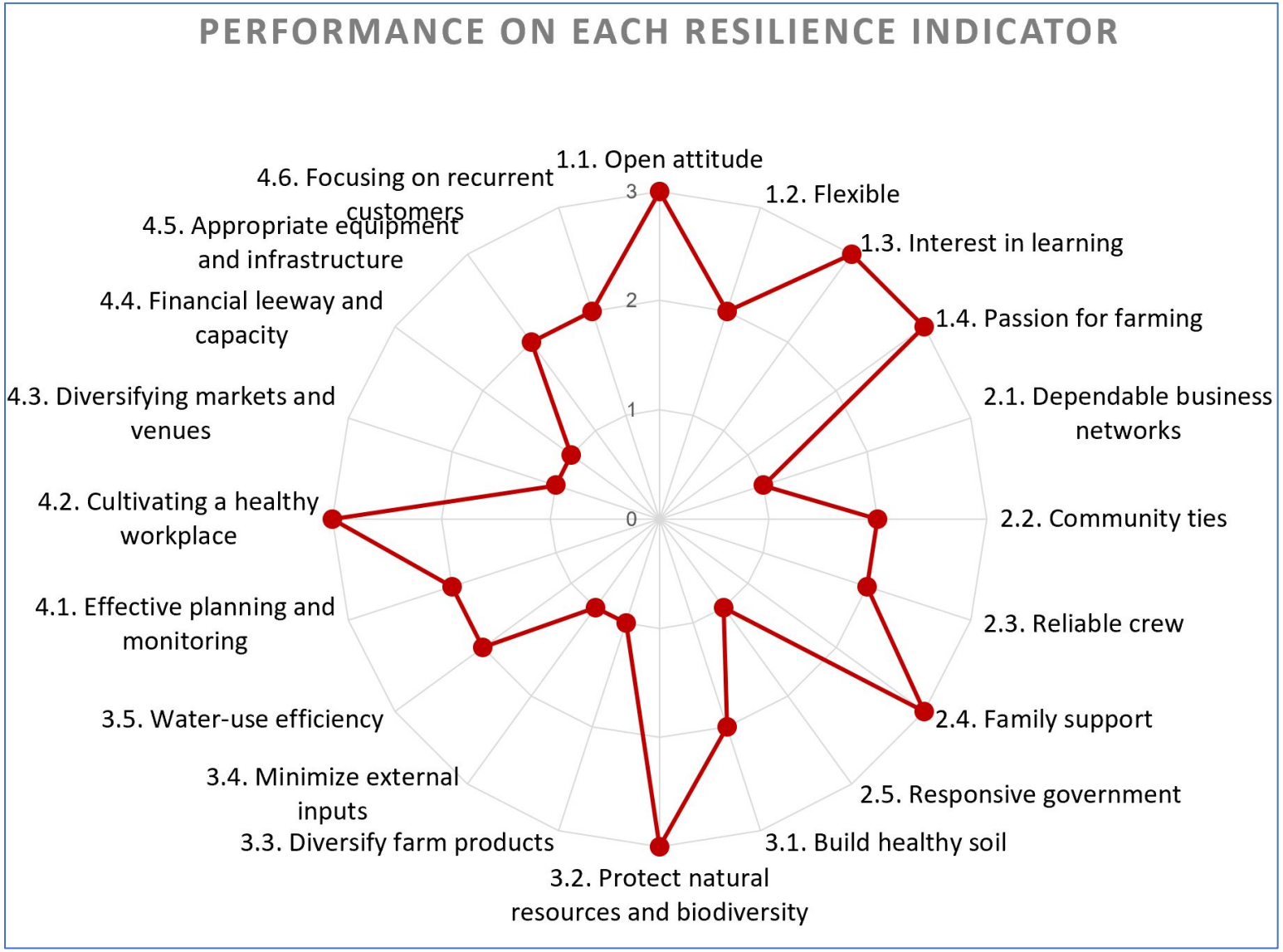
Hans Estrin, *University of Vermont*
Walter Poleman, *University of Vermont*
Aura M. Alonso-Rodríguez, *The University of Vermont*
Edgardo Gonzalez, *Center for Landscape Conservation*
Maria A. Juncos-Gautier, *University of Vermont*
Chistopher Nytch, *Friends of El Yunque Foundation*
Ethan Thompson, *University of Vermont*

Follow

INCLUDED IN

Agriculture Commons, Sustainability Commons

https://scholarworks.uvm.edu/arsfoodsystems/1/



https://docs.google.com/spreadsheets/d/1MAvNa5OPXypsucZtm4hJhfsE7nBA_jFR/edit?usp=sharing&ouid=109779721807097653724&rtpof=true&sd=true

Key relationships between resilient farm systems and the SDGs

Upcoming UNU book chapter on SDG 12

Vegetable production at Ananda Gardens in Vermont, United States.

Chapter Americas

A Cross-Cultural Participatory Approach for Measuring and Cultivating Resilience on Small and Medium-Sized Farms

RCE Puerto Rico and RCE Greater Burlington

Situation

The focal communities of this project were in Vermont – a state in the northeast continental United States – and in Puerto Rico – an archipelago of the Greater Antilles in in the eastern Caribbean. Vermont's climate is temperate while Puerto Rico's is sub-tropical. Communities within the two regions span urban, peri-urban, and rural areas in coastal, forested, and mountain ecosystems with diverse socio-economic characteristics. However, both regions are typified by numerous small to medium-sized farms. There are approximately 6,800 farms in Vermont, averaging 71 hectares in size, with almost 60% having annual sales values of less than 10,000 USD/year. In Puerto Rico there are more than 8,200 farms averaging 24 hectares in size, with 67% having annual sales of less than 10,000 USD/year (United States Department of Agriculture National Agricultural Statistics Service, 2019; 2020).

Issue/s

One of the greatest leverage points in fostering the transition to sustainability can be found in the realm of food systems. The COVID-19 pandemic brought into sharp focus the critical importance of small and medium-sized farms, which often employ innovative and adaptative strategies for building economic, social, and ecological resilience. While larger agri-business floundered during the pandemic, smaller scale farms were able to innovate and provide for surrounding communities when supply chains were disrupted. The questions the project sought to address were: what bolsters resilience in smaller farms to sustain themselves during times of economic, geo-climatic, and socio-political unrest? And what indicators can be used to take the pulse of that resilience and track it through time?

Responses/Actions Taken

With funding from the Agricultural Research Service (ARS) Center for Food Systems Research at the University of Vermont, in 2020 RCE Puerto Rico and RCE Greater Burlington set out on a seven-month research endeavour to explore the role of small farms in promoting sustainable agriculture in distinct geographical and cultural environments. The aims of this research was three-fold: (1) to investigate the diversity of ecological and social factors that impact farm vulnerability and resilience; (2) to incorporate farmers' experience and knowledge into the academic literature on sustainable agriculture to enrich understanding of food systems sustainability; and (3) to develop an indicator tool for evaluating farm resilience that builds farmer capacity to assess their local farm system as well as implement and document change over time. A Participatory Action Research (PAR) framework was utilised to emphasise the inclusion and action of the farmers themselves in the research. Collaborating partner organisations from both RCEs organised the project into four phases: (1) identifying farmers to be participants; (2) selecting key resilience frameworks; (3) disseminating a preliminary list of indicators; and (4) validating these indicators through surveys, interviews, and online group discussions. Twenty farmers participated in the project, representing 14 farms, with a roughly equal number of women and men.

Region: Americas

Country: **Puerto Rico** and **United States**

SDG(s): Zero Hunger, Quality Education, Responsible Consumption and Production, Life on Land

Theme(s): Disaster Risk Reduction, Agriculture, Plants & Animals, Forests/Trees

Target audience(s): Community

Ecosystem(s): Agricultural, Coastal, Forest, Freshwater, Mountains, Urban/Peri-Urban

GAP / ESD for 2030 Priority Action Areas: 2, 5

Language(s) of project: English, Spanish

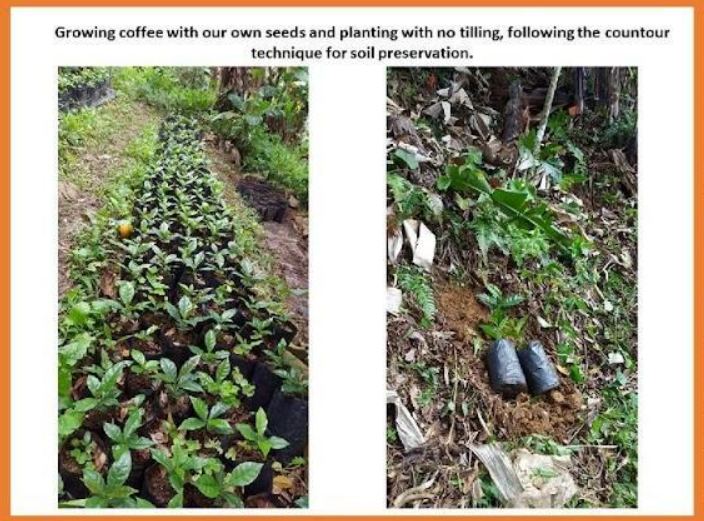
Contributing organisation(s):
- Centro para la Conservación del Paisaje
- University of Vermont Extension
- University of Vermont Rubenstein School of Environment and Natural Resources
- Shelburne Farms
- USDA Caribbean Climate Hub
- Vermont Vegetable and Berry Growers Association
- Individual Farmers and their Families located in Vermont and Puerto Rico

Linkages to education and/or sustainable development policies:
- National – US Food and Drug Administration Food Safety Modernization Act
- Subnational – Vermont Agriculture and Food System Strategic Plan
- Subnational – US Department of Agriculture Northeast & Caribbean Climate Hubs

Duration of project: June 2020 – January 2021

Important take-aways from this study

- Farm resilience and sustainability encompass a **mix of social and ecological strategies**
- Across geographies and cultures **there are more similarities than differences** between farmers, and resilience is important for all.
- The **PAR process and integrating positive deviants** were key to developing nuanced understanding and identifying resilience strategies, and facilitating farmer-to-farmer knowledge sharing.
- Having a diverse group of farmers enabled local and global thinking about the nature of resilience and food system sustainability.
    - RCE Network was key in facilitating this interaction



Thank you!

christopher.nytch1@upr.edu

Reflection about localizing the SDGs in your work

Please complete a row or put your thoughts in the chat.

1) Name a project/program you are working on or would like to develop and incorporate the SDGs	2) What SDGs are linked (or would you like to integrate) in the project?	3) What are some of the institutional and organizational challenges that limit your ability to integrate SDGs in your work?	4) What are some opportunities and resources available to overcome these challenges and achieve SDG integration?

Reflection about localizing the SDGs in your work

Please complete a row or put your thoughts in the chat.

1) Name a project/program you are working on or would like to develop and incorporate the SDGs	2) What SDGs are linked (or would you like to integrate) in the project?	3) What are some of the institutional and organizational challenges that limit your ability to integrate SDGs in your work?	4) What are some opportunities and resources available to overcome these challenges and achieve SDG integration?
SDG # 4. My goal is to create equity-minded course syllabi			

RCE Puerto Rico

REDeS

Red de Educación para el Desarrollo Sostenible