

Water Conservation, Energy Efficiency and
Stormwater Pollution Prevention
Assessment on Food Services
Establishments, Beauty Salons, and
Automobile Maintenance and Repair Shops

Project Strategy, Technical Assistance and Training
Approaches

Project Narrative

- This project is a partnership between...
 - Puerto Rico Water Resources and Environmental Research Institute of the University of Puerto Rico at Mayagüez,
 - UPRM's Campus Verde initiative,
 - Puerto Rico Manufactures Association,
 - Rotary Club of Añasco, and
 - Municipality of Añasco.

Project Narrative

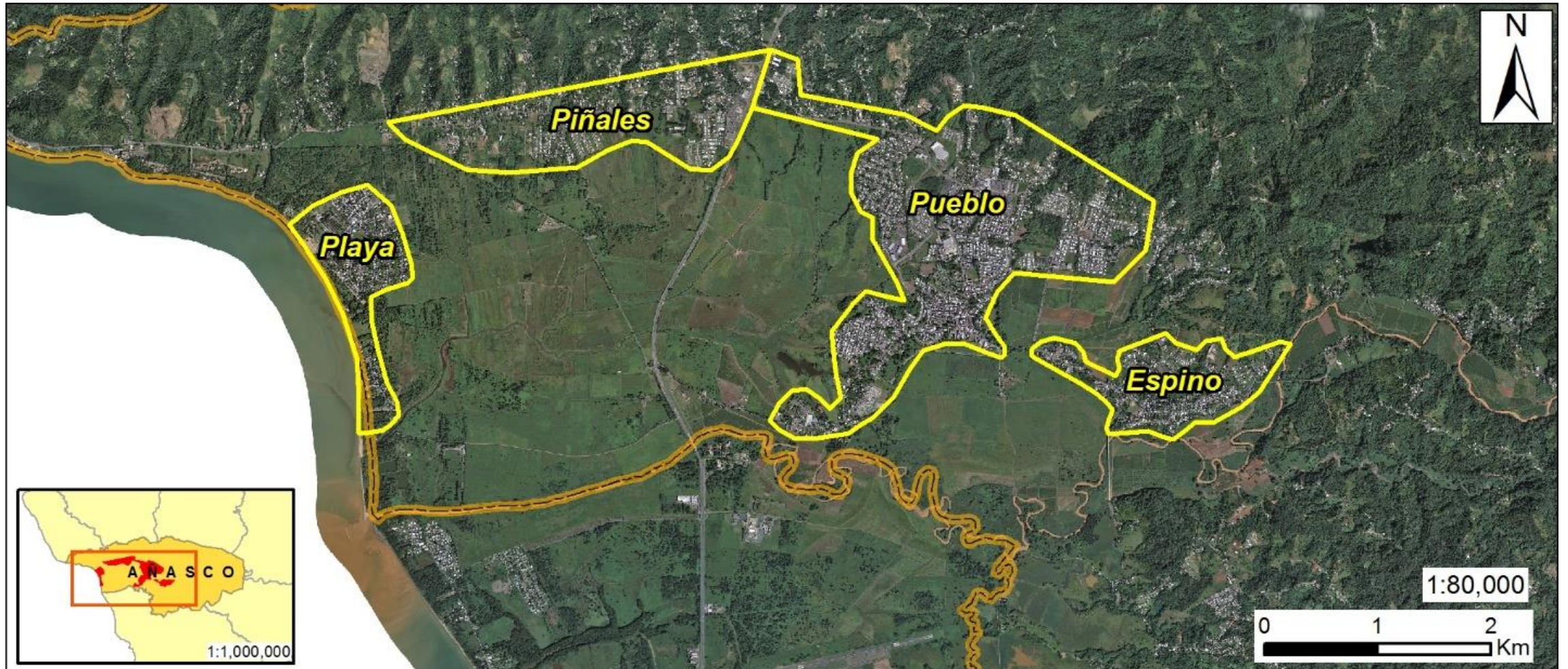
- The project seeks to promote the reduction of pollutant generation in small businesses in a coastal municipality in western Puerto Rico.
- Sustainability-oriented tools will be developed, which can be applied for continued work in Añasco and adapted for other municipalities in Puerto Rico.
- The project seeks to achieve measurable results in reducing greenhouse gases and pollution generation, conserving energy and water, and saving money for the small business sector.

Project Narrative

- Three business types are targeted:
 - food service establishments,
 - beauty parlors and
 - auto repair and maintenance shops.
- These small business facilities were selected based on the main pollutants of concern previously identified in...
 - MS4 Stormwater Management Plan for the Municipality of Añasco,
 - information provided in the Integrated Report - 303(d) List of Water Quality Limited Segments and 305(b) Surface Water Quality Assessment of the Puerto Rico Environmental Quality Board (EQB).

Project Narrative

Location of the urbanized areas targeted



Project Narrative

- A preliminary survey showed...
 - 61 food manufacturing establishments (restaurants, coffee shops, cafeterias, and food bars),
 - 39 auto repair and maintenance shops (light mechanics, tire shops, auto parts and service, and oil and grease change services), and
 - 20 beauty salons.
- This survey needs updating – More exhaustive and more data.

- Project Narrative - Objectives

- The project proposes to develop educational material to tackle pollution generation at the source and reducing water and energy consumption and greenhouse gases emissions.

- Water - Pollution

- Chemicals
 - Solids
 - GHG
 - Other?

- Energy - Pollution

- GHG
 - Other?

- Water – Cost Reduction

- Chemicals
 - Solids
 - GHG
 - Other?

- Energy – Cost Reduction

- GHG
 - Other?

Project Narrative

- A “train-the-trainer” approach will be used to develop human resources to capacitate engineering and environmental science graduate and undergraduate students on how to conduct pollution prevention audits with emphasis on water and energy conservation and stormwater pollution prevention.
- The Team will develop a 2-day “Train the Trainer” workshop that covers stormwater pollution prevention, energy efficiency, and water conservation audits which will include wastewater management assessments where the facility is not served by centralized, public sewer.

Project Narrative

- The stormwater pollution prevention topics will include typical pollutants of concern for the three industry types, source reduction methods, and methods to reduce the exposure of pollutants to stormwater runoff.
- The energy efficiency topics will discuss the Energy Star Program implementation for small business.
- The water conservation topics will include commercial and industrial water use and conservation opportunities, WaterSense Initiative, wastewater source control, management and recycling.

Project Narrative

- In addition to the workshop material, a series of checklists and associated materials that the field audit staff can use while auditing each facility will be developed. The checklists will include specific questions and issues to consider for each audit type and for each of the three facility types.

Project Narrative

- Four experts will be conducting a 2-day regular classroom workshops and an additional 2-day field exercise to train field audit staff. The field exercise will include pre-arranged visits to several facilities to train staff on how to conduct the audit, what questions to ask, what issues to look for, and what documentation should be completed. In addition to training on water conservation, stormwater, and energy efficiency, the field exercise will also address audit procedures such as how to introduce and explain the audit to business owners, how to handle identified issues, and how to document their findings.

Project Narrative

- Field audits will be carried out on water and energy uses, as well as in business operations.
- These data will be analyzed and summarized in a report including technical recommendations on water conservation, energy efficiency, stormwater pollution prevention, and wastewater minimization.
- Tailored educational material targeting this specific business sector and a Pollution Prevention Training Series will be developed for the business owners and general community.

Project Narrative

- In summary, four 20-30 minute webcasts will be developed, one for each of the four main topic areas:
 - (a) Water conservation,
 - (b) Wastewater minimization & management,
 - (c) Stormwater pollution prevention, and
 - (d) Energy conservation.
- The webcasts will be presented live once in Spanish and recorded and archived for future reference. PowerPoint® presentations and training materials will be provided in both Spanish and English.

Staff Roles and Responsibilities

- Dr. Rivera-Santos will serve as the primary contact and principal investigator, providing administration and strategic direction of the project. He will coordinate all technical reporting efforts and collaboration with the partner institutions, and administrative offices at UPRM.
- Dr. Walter Silva-Araya will assist the director in the administration and strategic direction of the project. In addition, Dr. Silva will provide his knowledge as a water resources engineering for the development of educational material related to stormwater runoff pollution prevention. He will assist the supervision of students doing water conservation audit and subsequent data analysis.

Staff Roles and Responsibilities

- Dr. Sandra Cruz-Pol will be responsible for all energy conservation trainings and will train students to carry out energy audits at the businesses targeted in this proposal. She will contribute with energy conservation material for the educational and webcast videos.
- Dr. Moraima De Hoyos will provide strategic management and business operation audits support to the project. She will be responsible to develop the educational material, based on the business operation audits, and to train the trainer educational program on strategic management subjects to the targeted businesses and will coordinate training on strategic planning process for businesses in order to create a competitive advantage that will help them to reduce cost and maximize resources using P2 measures for water and energy conservation.

Staff Roles and Responsibilities

- A hired private environmental engineering consulting firm will be responsible for developing and conducting the Train the Trainer Program to capacitate a team of 3 engineering graduated students, 3 undergraduate students (1 business administration and 2 engineering students) and 3 municipal employees. In addition, the Contractor will collaborate with the University of Puerto Rico staff in analyzing the data gathered while conducting the pollution prevention audits to provide recommendations of Best Management Practices to be implemented by the Business owners and the general community, and to develop the On-Line Educational Tools on Water Conservation, Wastewater Generation Pollution Prevention, and Stormwater Pollution Prevention.

Proposed Strategy - Task 1

- Develop a 2 days “Train-the-Trainer” Educational Program to capacitate 3 graduate students, 3 undergraduate engineering or environmental science students and 3 municipal employees on Stormwater Pollution Prevention, Energy Efficiency, and water conservation audits, which will include wastewater audits where the facilities are not served by Puerto Rico Aqueduct and Sewer Authority (PRASA) centralized conventional sewer system.

Proposed Strategy - Task 1

- The Train-the-Trainer course will consist of a 2-day classroom session and 2-day field visit workshops.
- A team composed of consultants with expertise in stormwater, wastewater, and water conservation and university faculties with expertise in energy efficiency audits will be in charge of developing the training material and conducting the trainings.
- The training material will also include checklists that the students will use while conducting the field audits, both during the field workshops and during subsequent fieldwork.

Proposed Strategy - Task 1

- Businesses owners will be trained by Campus Verde of UPRM on environmental and energy practices aimed at reducing greenhouse gas emissions. Since energy consumption is common to any business, the adoption of energy conservation and efficiency practices will be encouraged.

Proposed Strategy – Task 2

- Conduct the field audits in the four urbanized areas of the Municipality of Añasco (Espino, Pueblo, Piñales, and Playa; see Figure 1).
- UPRM students visited the areas to make an estimate of the number and type of businesses located in those wards, and approximately 120 (automobile maintenance/repair shops, beauty salons and food service establishments) were identified. These data will be supplemented with information available in the Municipal Business Patents office.

Proposed Strategy – Task 2

- A four-people team, composed of three-student and a municipal employee, will conduct the water, energy, and business operation audits.
- The water use audits will provide the water use patterns and quantity used for each business type. Possible pollutant generation will be noted and source identified.
- Engineering undergraduate students will be trained to perform energy audits so that they can perform on-site audits to business and develop a report on recommended measures to reduce energy consumption.

Proposed Strategy – Task 2

- When energy conservation and efficiency practices are implemented among established businesses a 20% reduction in energy consumption is expected.
- We will calculate the reduction of greenhouse gases resulting from energy savings as a result of P2-counseling.
- Further opportunities for greenhouse gas reductions will depend upon equipment and processes at the specific business.

Proposed Strategy – Task 2

- P2-counselors will seek opportunities to recommend actions resulting in emission reductions of methane, carbon dioxide, nitrous oxide and fluorinated gases.
- Such reductions and gains in energy efficiency will encourage other business to obtain similar outcomes.
- These reductions will be measured in metric tons of carbon dioxide equivalent reduced (MTCO₂Eq).

Proposed Strategy – Task 2

- As part of the audits, trained students will collect data about the operation of the business. This information will be used to analyze business operation efficiency and a correlation to P2 measures will be established.
- Recommendations for implementing P2 measures that will increase long-term incomes will be identified and explained.
- It is expected that one audit per day will be conducted depending on student availability.

Proposed Strategy – Task 3

- Field data will be statistically analyzed by the students with the guidance of the consulting and professors team.
- Water and energy use patterns will be identify and educational material developed accordingly.

Proposed Strategy – Task 4

- A Water Conservation, Energy Efficiency and Stormwater Pollution Prevention Report will be developed including recommendations for each one of the business sectors (beauty salons, food services establishments, and automobile maintenance and repair shops).

Proposed Strategy – Task 5

- One business of each one of the 3 categories will be selected to implement a pilot demonstration project that will serve as an example and guidance for other business in this and other municipalities.

Proposed Strategy – Task 6

- Four Pollution Prevention On-line Webcast Trainings will be developed based on the audits and recommendations report. This training will be provided to the small business owners in the different regions of Puerto Rico and then will be available on-line in Spanish.
- An online webcast training will be coordinated and the 78 municipal recycling and MS4 SWMP implementation coordinators will be invited to attend.