

## **2021 SBAA Societal Impact Award**

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## **WATER CONSERVATION PROJECT FOR THE CITY OF FLORENCE TO ADDRESS WATER SCARCITY PROBLEMS**

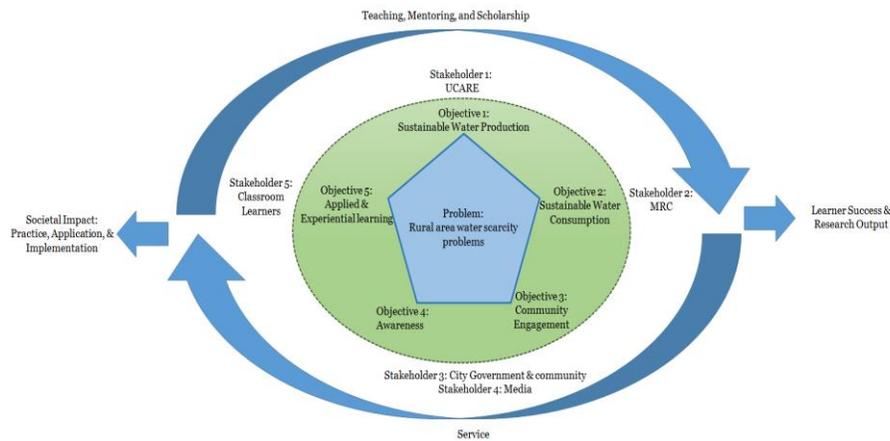
**Project definition:** In recent years, a small rural city in Central Texas named “Florence” faced significant water scarcity problems due to population growth, depleted aquifers, antiquated water supply networks, and high water purchasing costs from distant cities. The city government wanted to explore other economically feasible alternatives to reduce their water scarcity problems, and approached me at A&M – Central Texas to gauge my interest in conducting a study to the issue.

**Constraints:** Our initial discussions on the scope of the project indicated that the city lacked funds and resources to sponsor this research study; and hence an imminent need to develop an innovative strategy to take up the project to mitigate the problems to a considerable extent.

**Innovativeness of the Project as conceived by us:** In order to overcome this problem of insufficient funds and/or resources, we developed an innovative strategy to engage as many stakeholders as possible such that the funding and resource stress to the city management are minimized through diversification. More specifically, services and resources are obtained by assigning small chunks of task to a large number of stakeholders, thereby creating a “win-win” situation for all the participating stakeholders. Figure 1 presents our innovative strategy.

**Implementation of Strategy:** In this innovative strategy, the scope of the project, which is to mitigate the “water scarcity problem”, is divided into a set of small-scale objectives that include: (1) sustainable water production; (2) judicious water consumption; (3) community engagement; (4) creating awareness; and (5) applied learning and experiential learning. With these objectives, different stakeholders based on their expertise, resource, and service capabilities were identified and collaborative partnerships were developed. Table 1 presents the summary of different stakeholders, tasks conducted, and realized benefit to each stakeholder from the project.

**Societal impact of the Project:** It is imperative that the innovative strategy becomes a continuous and iterative loop of teaching, mentorship, scholarship, and service resulting in generating societal impact iteratively every time the loop is closed or complete. In the first phase of the continuous loop, new ideas are explored and studied by involving learners and experts who are trained and mentored on new tools, skills, and knowledge through experiential learning. In the second phase, a service is provided to the city government and community by dissipating appropriate research outputs to the city government and community through media resulting in creating a societal impact if practiced, and implemented by the city.



**Figure 1.** Innovative strategy of engaging as many expert stakeholders as possible.

**Table 1.** Summary of each stakeholder’s role and realized benefit from the project.

Stakeholder	Resources Provided	Tasks Conducted	Realized benefit to the stakeholder
UCARE	4 Graduate Assistants 1 Faculty Fellow	Analyzed Rainwater Harvesting as an alternative	Mentorship and experiential learning Research output: 1 Journal article, 4 conference presentations, 1 Student award
MRC	12 Students 1 Faculty expert	Marketing strategy	Experiential learning for undergraduate students
City Government & Community	Budget, assess to community and city related resources	Survey administration, city historical data on water, and community participation	Problem solution Community awareness of water problems

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Media	Reporters	Published two articles on the work to highlight the problem and potential solutions	Awareness to the community
Classroom Learners	Literature study and alternative ideas	Alternative solutions	Applied learning

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**Project outcome:** We believe that the project has resulted in three important societal impacts: (1) Project Completion; (2) Implementation of Marketing Strategy; and (3) Implementation of Rainwater Harvesting.

**Project Completion:** The successful completion of project itself can be considered as a remarkable achievement, given the lack of adequate funds and resources for the project at the start of the project. The successful completion of the project suggests that our strategy to diversify resources through collaboration and partnership works well if expert stakeholders are carefully selected and managed. This is clearly evidenced by the following statement from the City Mayor:

*We have needed to address the needs of our community and water conservation,” she noted. And we knew we didn’t have the budget it would take to fund a large-scale project.*

*“But when we discovered that A&M-Central Texas and Gonela could step in to help us, we were thrilled to partner with them, and even more thrilled with the results.” [1]*

**Measurable impact on Society:** The major societal impact of the project is the implementation of our marketing strategy by the city management in which the city regularly shares tips on water conservation to the residents through city’s public service announcements and website. We believe that this continuous process of providing tips to the city residents from time-to-time will result in creating a social norm in which residents will regularly implement water conservation

practices on a day-to-day basis. The following statement highlights the satisfaction expressed by the city mayor on the societal impact:

*“Not only did Dr. Gonela and the UCARE team accurately describe the situation and possible solutions,” she said, “they also developed an adorable cartoon character – a green guppy – who we have included in public service announcements and our website to introduce the community to water saving techniques. It’s a great first step in the right direction to a better future.” [1]*

**Implementation of Rainwater Harvesting:** The research study suggests that 36% of the city’s water requirements can be supplemented by rainwater harvesting if every household in the city participates. Here, rainwater harvesting involves collecting rainwater from rooftops during a rain event and using it some other time for domestic use purposes, especially gardening. Currently, a wine yard in the city of Florence has implemented rainwater harvesting program and have been actively considering increasing the rainwater harvesting in view of its benefits [2].

**Potential for Transferability:** This innovative strategy of networking as many expert stakeholders as possible and a “win-win” situation can be a model, and similar strategies can be applied to any project in other institutions. The following outlines the steps of the innovative strategy that can be universally applied: (1) Understand the current state of the problem; (2) Dissect the problem into manageable and measurable objectives; (3) Identify and assign the resources to expert functional areas through partnerships and collaborations, i.e., the goal is to create a win-win situation for all the stakeholders; and (4) Empower different functional areas to conduct project; and (5) Measure the societal impact.

#### **Documentations:**

[1] [https://kdhnews.com/news/education/a-m-central-texas-faculty-translates-research-into-real-life-for-florence/article\\_1dabae46-e6a5-11eb-a9cb-97943448c061.html](https://kdhnews.com/news/education/a-m-central-texas-faculty-translates-research-into-real-life-for-florence/article_1dabae46-e6a5-11eb-a9cb-97943448c061.html)

[2] <https://spectrumlocalnews.com/tx/south-texas-el-paso/news/2021/07/30/a-m-central-texas-partners-with-florence-to-create-water-conservation-strategies>