Lebanese American University – LAU

Department of Computer Science and Mathematics

CSC 599: Capstone Project

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I. Abstract:

Sustainable Scape is a web-based platform designed to promote environmentally responsible practices in Lebanon, with a particular focus on addressing food insecurity and plastic pollution. The platform functions as a centralized hub that connects individuals and organizations with local food banks, donation centers, and recycling facilities, facilitating the donation of surplus food and plastic waste.

This project was developed using HTML, CSS, and PHP to create an intuitive, user-friendly interface that makes sustainable action accessible to a wider audience. By simplifying the process of locating nearby sustainability initiatives, *Sustainable Scape* empowers communities to actively engage in environmental preservation and social impact efforts.

The website aligns with key United Nations Sustainable Development Goals (SDGs), including Zero Hunger (SDG 2), Responsible Consumption and Production (SDG 12), and Climate Action (SDG 13). The final product serves not only as an educational tool but also as a functional platform for driving real-world change.

This project demonstrates the potential of digital solutions in addressing global challenges at a local level, and it contributes meaningfully to Lebanon's journey toward a more sustainable and equitable future.

II. 3. Table of Contents

- Auto-generated if possible (especially in Word or Google Docs).

III. Introduction:

Overview of the Project:

The project, titled **Regreen**, is a sustainability-focused website created to address two major environmental and social challenges in Lebanon: food insecurity and plastic pollution. It serves as a central platform that connects individuals and organizations with donation centers, food banks, and recycling facilities, enabling easier participation in sustainable and humanitarian efforts. The website promotes awareness about the United Nations Sustainable Development Goals (SDGs) and encourages active community engagement in solutions for a better future.

Background or Context:

This website was inspired by the growing environmental and social concerns in Lebanon, particularly the increasing rates of hunger and the accumulation of plastic waste. Recognizing the gap between those who want to help and the institutions that accept donations, the project was conceptualized as a digital solution to connect these efforts. It also stems from a desire to raise awareness about global sustainable practices and how local action can contribute to global goals like the SDGs.

Problem Statement

Lebanon faces ongoing issues with food waste and plastic pollution, even as many communities continue to suffer from food insecurity and environmental degradation. There is a lack of centralized platforms that inform citizens about where and how they can responsibly donate food or recycle plastic. This disconnect limits community participation and slows progress toward a cleaner, healthier, and more sustainable society.

Objectives of the Website

. To connect donors with local food banks and recycling centers through an accessible digital platform.
. To raise awareness about food insecurity and plastic pollution in Lebanon.
. To promote the United Nations Sustainable Development Goals, particularly those focused on hunger, climate action, and responsible consumption.
. To encourage individual and collective action toward a more sustainable and environmentally responsible society.
. To provide informative resources about sustainability and the impact of community-led initiatives.

Target Audience

The target audience includes:

- Individuals looking to donate excess food or recycle plastic waste.
- Non-governmental organizations (NGOs) and charities that manage food or recycling initiatives.
- Educational institutions and activists promoting sustainability and SDGs.
- General public interested in learning about sustainable development and environmental action in Lebanon.

Scope and Limitations:

Scope:

- The website offers information about food banks, recycling centers, and SDG awareness initiatives across Lebanon.
- It provides a user-friendly interface for locating donation centers and understanding how to get involved.
- It supports community engagement and collaboration through digital outreach.

Limitations:

- The platform currently focuses only on Lebanon, and does not cover global initiatives.
- It does not directly manage donations, but only connects users with existing organizations.
- It relies on external data sources or manual updates to keep donation center information accurate and current.
- Real-time communication between donors and centers is not built into the site.

IV. Background Research:

Related Works or Websites

Several websites and platforms around the world aim to promote sustainability by addressing food waste and plastic pollution. For example:

. **Too Good To Go** – A global app that connects users with restaurants and stores offering unsold surplus food at discounted prices to reduce food waste.

. **ShareTheMeal** – A UN World Food Programme app that allows people to donate meals to those in need around the world.

. **Recycle Lebanon** – A local initiative focused on recycling and waste management awareness in Lebanon.

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- While these platforms have made a significant impact in their respective domains, most of them address either food insecurity or environmental sustainability, but not both simultaneously. In addition, many lack localized features tailored to Lebanon's specific infrastructure and socioeconomic context.
- **Technologies Used (Comparison and Justification)**
  This website was developed using the following technologies:

- **HTML5 & CSS3** – For creating the structure and styling of the website in a responsive and accessible manner.
- **JavaScript** – For adding interactivity and dynamic content rendering.
- **PHP** – For server-side scripting and managing data interactions.
- **XAMPP** (for development) – A local server environment used for testing and running the PHP-based backend during development.

- These technologies were selected due to their open-source nature, ease of integration, and community support. Compared to alternatives like WordPress or Wix, custom development using HTML/CSS/JS/PHP allows full control over the design, functionality, and scalability of the website, while keeping costs low and maintaining performance.
- **Existing Solutions and Their Drawbacks**
  Existing solutions in Lebanon tend to be fragmented — food donation platforms and recycling initiatives often operate independently without central coordination or a shared digital interface. Their main drawbacks include:

  - **Lack of integration** between environmental and humanitarian actions (e.g., separate apps for recycling vs food donation).
  - **Limited public awareness** due to poor online presence or outdated platforms.
  - **Non-user-friendly interfaces**, making it harder for ordinary users to participate.
  - **Inadequate mapping or location features**, which makes finding nearby donation or recycling centers difficult.

- The Regreen platform addresses these gaps by providing a unified, easy-to-use website that connects individuals and organizations with active food donation and recycling points across Lebanon, while also promoting awareness of the UN Sustainable Development Goals.

V. System Analysis and Design:

1- Functional Requirements

These define what the website is expected to do:

- Allow users to:
  - View and locate food donation centers.
  - View and locate plastic recycling facilities.
  - Read educational content about sustainability and SDGs.
  - Access event hosting information and learn how to get involved.

- Calculate their plastic footprint.
- Check recipes to reduce food waste.
- Explore sustainable businesses in Lebanon.
- Volunteer with foundations that address sustainability and recycling.

- Display static pages like:
  - Home, About Us, Contact Us, SDGs Info, Event Hosting, Volunteering, Calculator, recipes, and businesses.

2- Non-Functional Requirements

These define the overall quality and performance expectations:

- **Performance**: The website loads quickly and be responsive across devices (desktop, tablet, mobile).
- **Usability**: Interface is user-friendly and accessible to non-technical users; information should be clearly categorized.
- **Security**: Basic security practices are followed (no sensitive user data collected); future versions may use HTTPS and backend authentication for admins.
- **Maintainability**: Clean and modular code for easier updates and scalability.

3- Website Architecture

Pages Structure

. Home – Introduction and navigation to other sections.
. About Us – Mission, vision, what Regreen does.
. SDGs Page – Information on the 17 Sustainable Development Goals.
. Donation Centers – Location details of food banks and plastic recycling sites.
. Event Hosting – Community events and involvement opportunities.
. Contact Us – Contact form or contact details.
. Get Involved – Steps for contributing or partnering.

VI. Development Process

1. Tools and Technologies Used

The development of the *Regreen* website utilized a combination of front-end and back-end technologies:

- **HTML5**: For structuring all web pages.
- **CSS3**: For styling and layout, ensuring a responsive and visually appealing interface.
- **JavaScript**: For enhancing user interaction and dynamic content display.
- **PHP**: For server-side scripting, handling form submissions, and database communication.
- **MySQL**: As the backend relational database, used to store data like donation center information.
- **XAMPP**: A local development environment (Apache, MySQL, PHP, and Perl) used for testing the website on a local server.

2. Backend / Database Integration

The website is connected to a **MySQL database** using **PHP** to manage and retrieve dynamic content. Some core database-driven functionalities include:

- **Displaying donation center information**: Data is fetched from the database and displayed dynamically on relevant pages.
- **Handling form submissions**: Contact or event forms (if implemented) send data to the backend and store it securely.
- **Future scope**: Admin panel integration for editing database records without manually accessing the database.

Database tables were designed to store:

- Center names
- Locations
- Contact information
- Types (food bank or plastic recycling)
- Descriptions

3. Challenges and Solutions

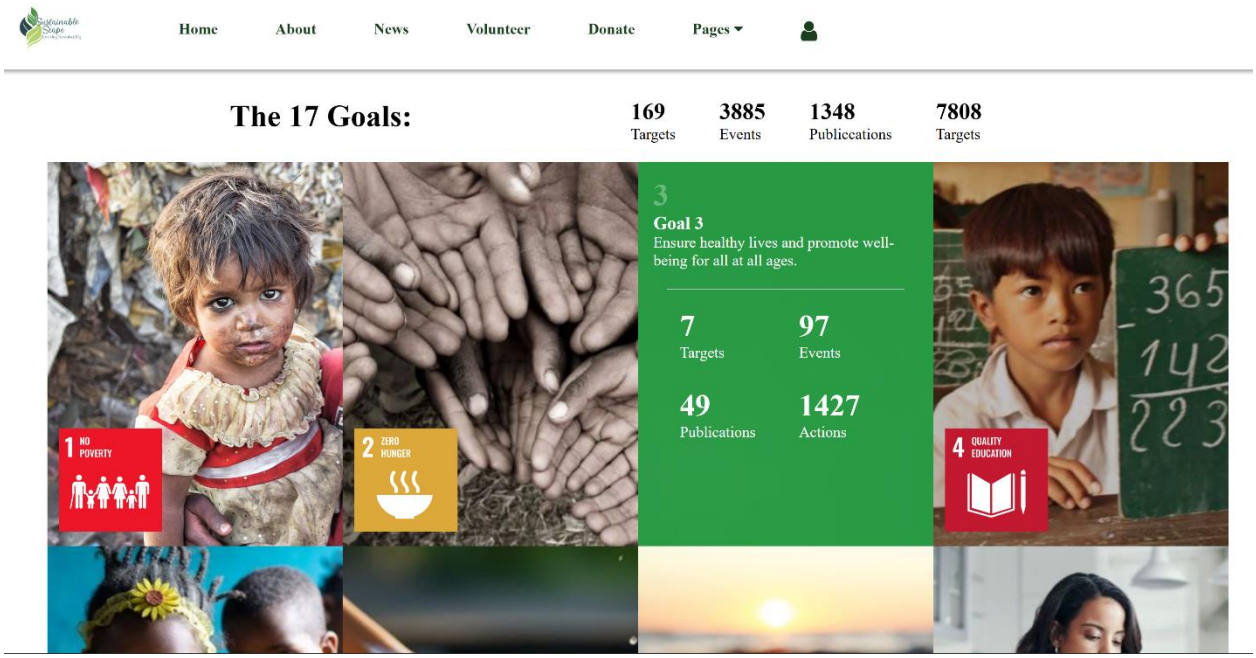
- **Challenge**: Setting up the PHP-MySQL connection securely in a local environment.
  Solution: Used prepared statements and XAMPP for reliable development and testing.
- **Challenge**: Ensuring mobile responsiveness and clean layout for multiple sections.
  Solution: Applied responsive CSS techniques like flexbox and media queries.

- **Challenge**: Managing database consistency and avoiding code duplication. **Solution**: Modularized the PHP code and created reusable components for database access.

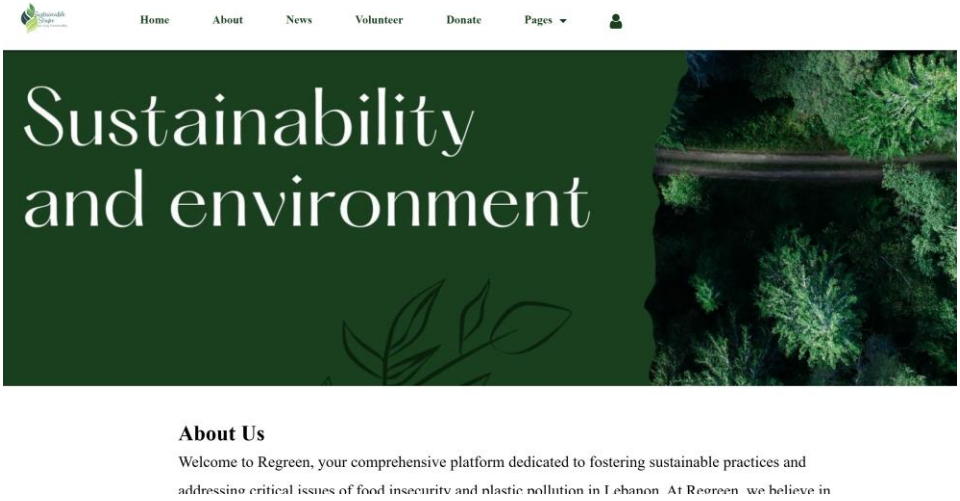
4. Key Pages and Features (Descriptions)

Here are the highlights of the site's main components:

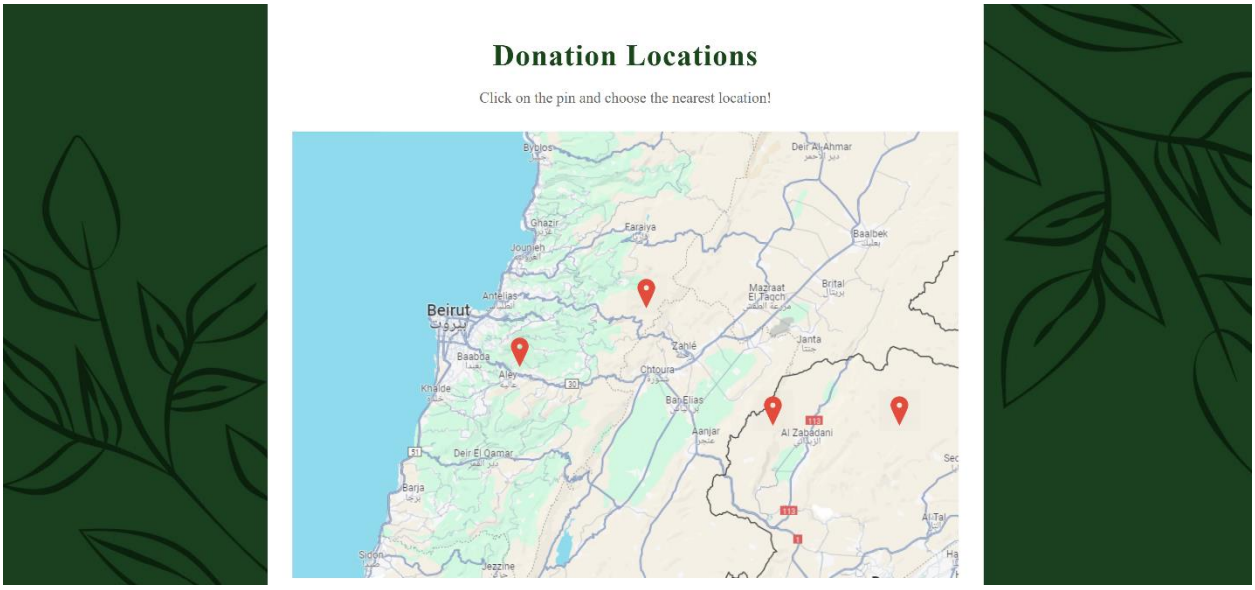
- **Home Page**: Welcomes users and introduces the platform's dual mission (food and environment).



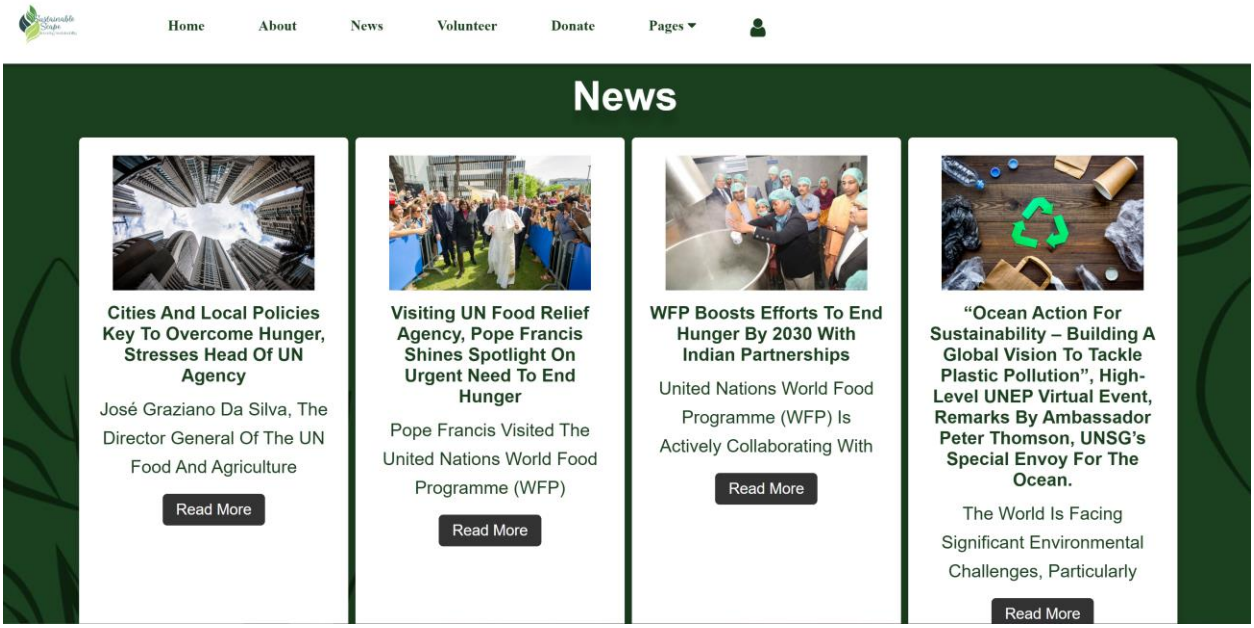
- **About Us**: Explains the vision, goals, and the SDGs the site aligns with.



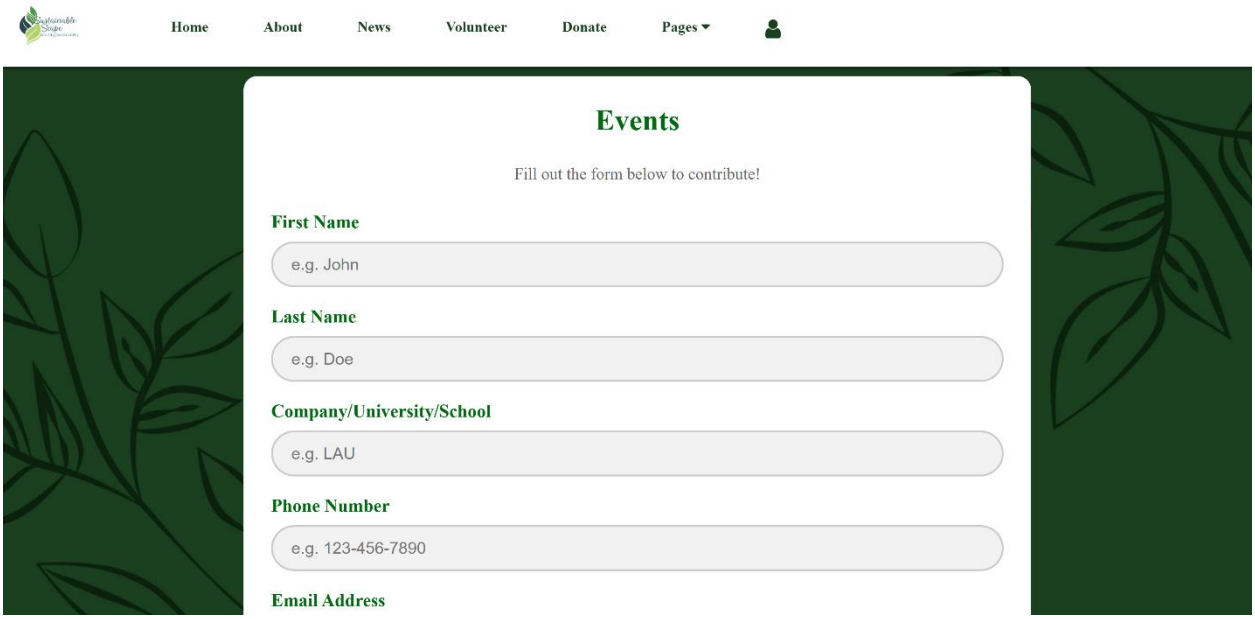
- **Donation Centers Page**: Pulls real-time data from the MySQL database to show food donation and recycling center details.



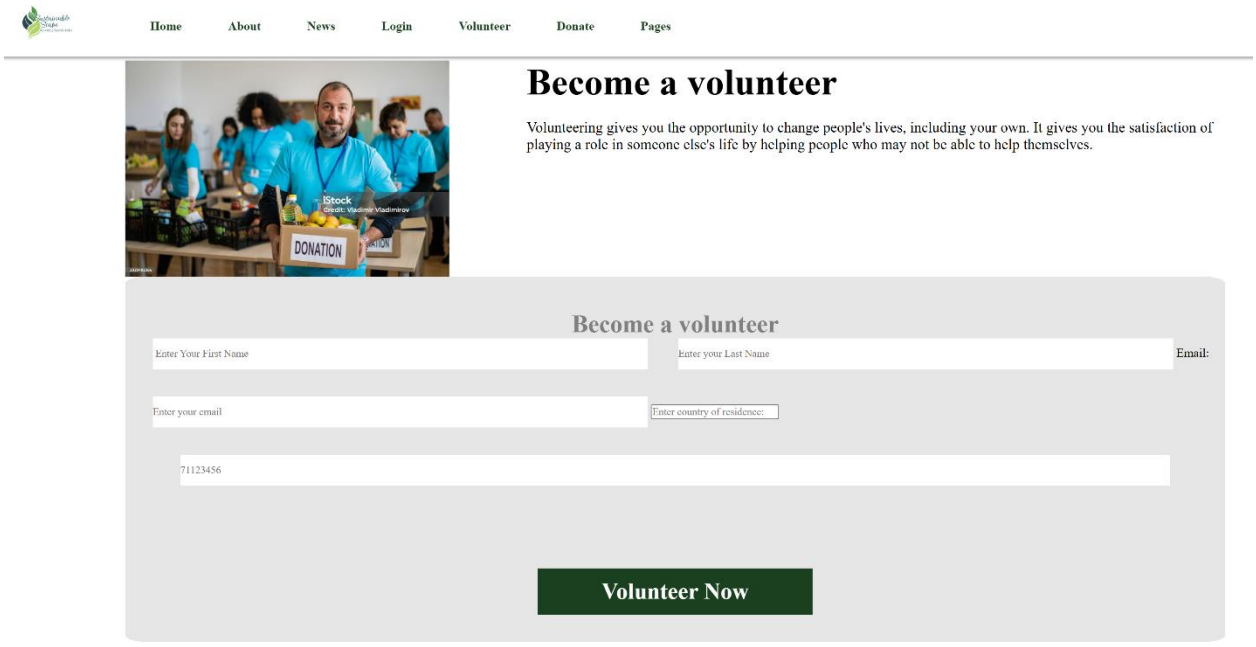
- **News Page:** Introduces the user to the worldwide news.



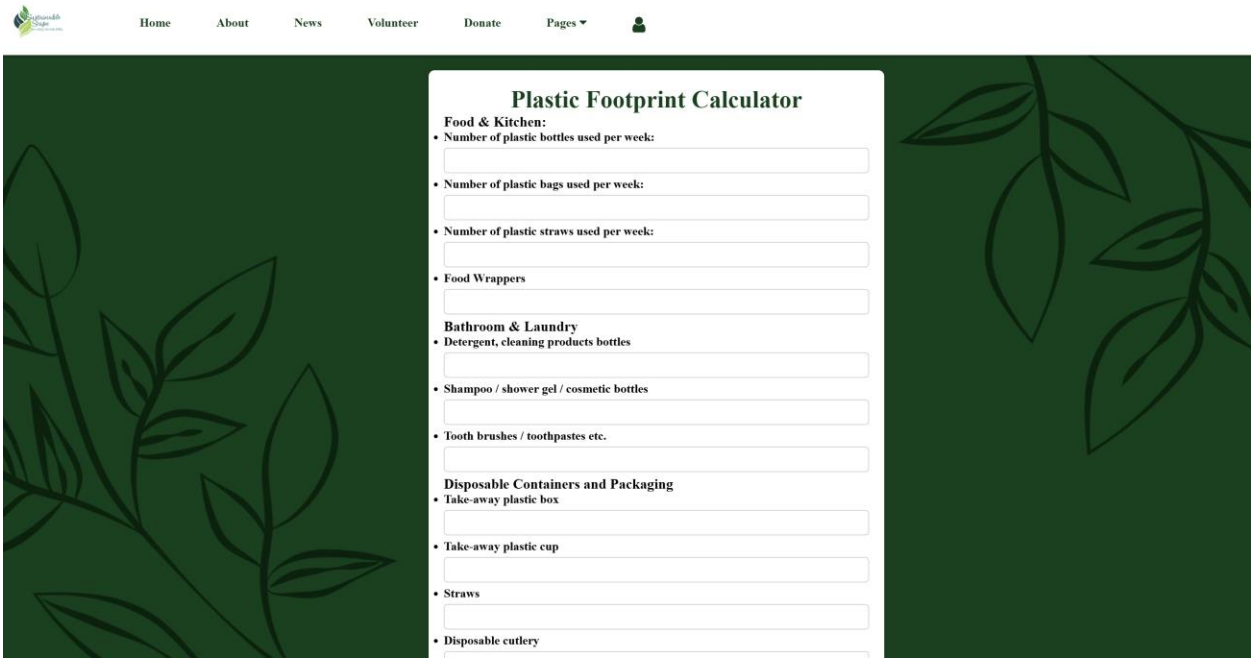
- **Event Hosting Page**: Encourages community engagement through sustainability events.



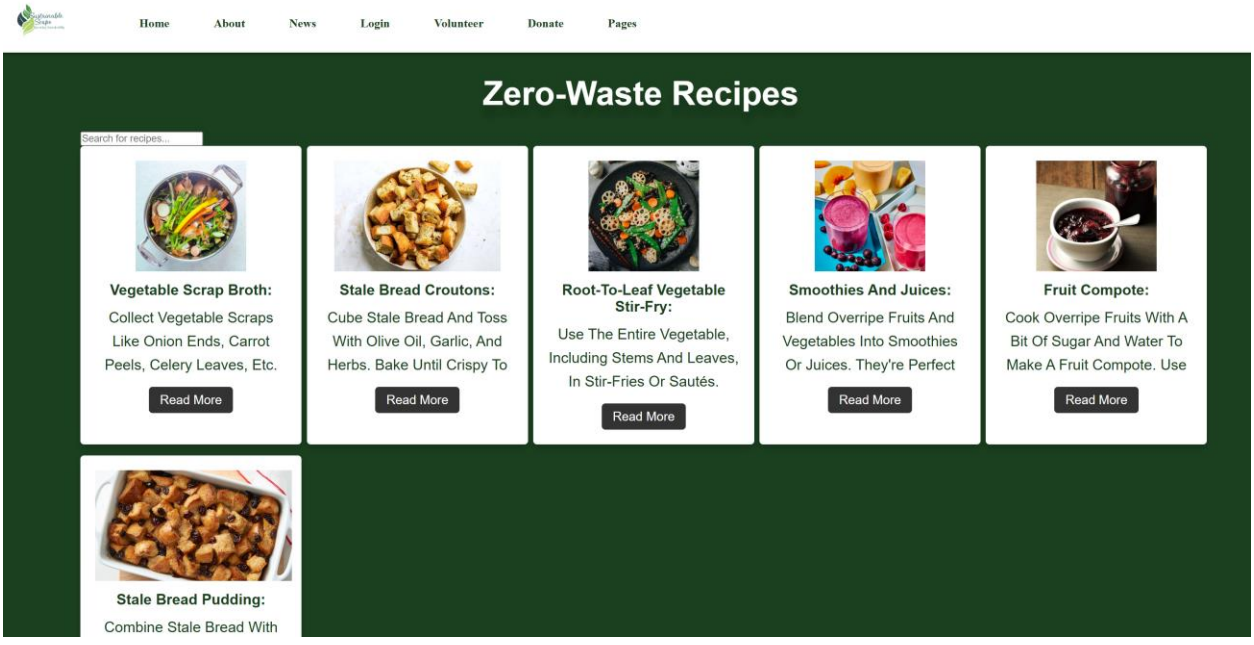
- **Volunteering**: Allows users to reach out—data handled using PHP.



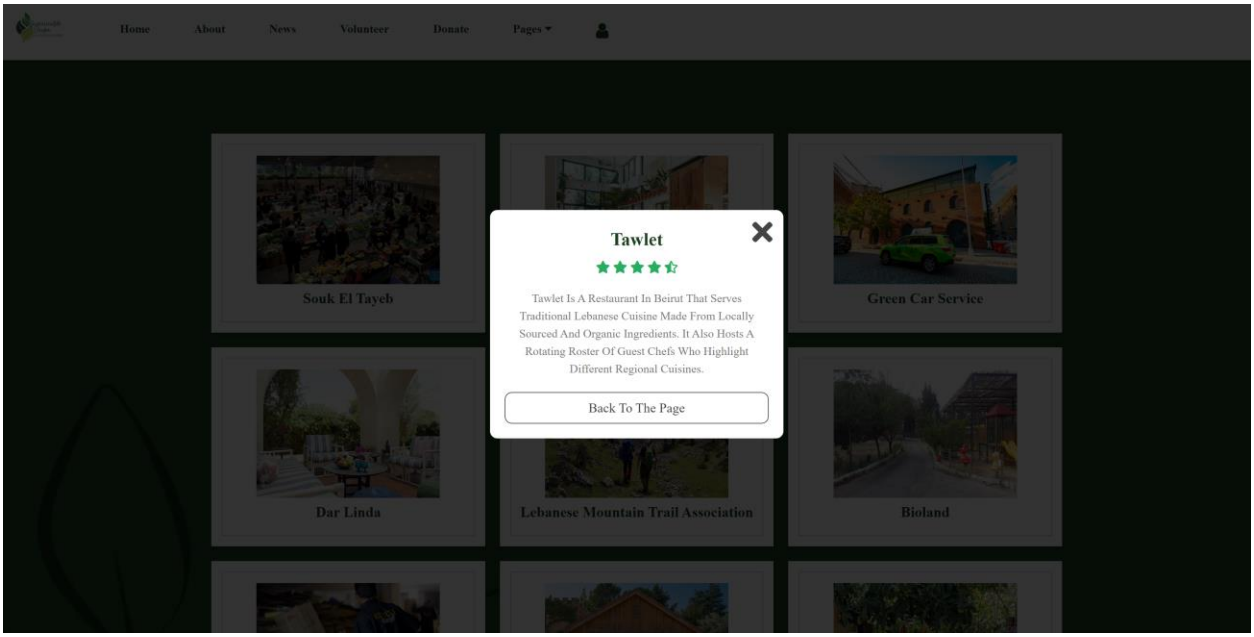
- **Plastic Footprint Calculator**:



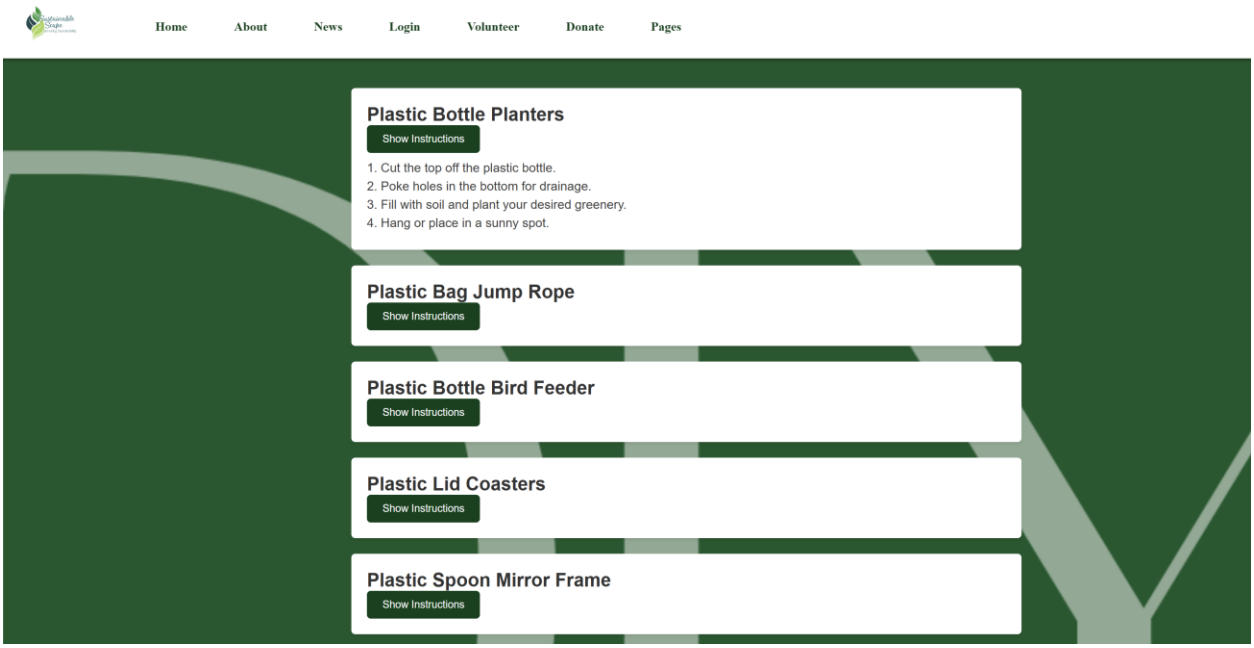
- **Zero-waste Recipes:** This page includes a search engine and allows the user to upload image of their recipes that will be uploaded to the database.



- **Green Businesses in Lebaon**:



- **DIYs for recycling**:



VII. Conclusion

1. Summary of What Was Achieved

The *Regreen* website successfully delivers a platform that raises awareness and encourages action toward solving two urgent issues in Lebanon: food insecurity and plastic pollution. Through clear navigation, a user-friendly interface, and integration

with a MySQL database via PHP, the site provides users with real-time access to donation centers and recycling initiatives. The project aligns with the United Nations Sustainable Development Goals (SDGs), particularly those focusing on zero hunger, responsible consumption, and environmental protection.

2. Lessons Learned

Throughout the development process, several key lessons were learned:

- The importance of **clean code structure and modular design**, especially when combining front-end and back-end technologies.
- How to **connect PHP to a MySQL database** securely and efficiently.
- The value of **planning website architecture** early to ensure a smooth user experience.
- The necessity of **testing across different devices** to ensure responsiveness and accessibility.

  This project also highlighted the power of combining technology with social impact, reinforcing how digital platforms can support sustainable development.

3. Future Improvements or Expansions

While the current version of *Regreen* fulfills its core goals, there are several opportunities for future enhancement:

- **Admin Dashboard**: Implement a secure admin panel to allow real-time content updates and management without accessing the database directly.
- **Interactive Map Integration**: Add a dynamic map using APIs (e.g., Google Maps) to display donation center locations.
- **User Accounts**: Enable users to register/log in to track their donations or register events.
- **Multilingual Support**: Provide content in both Arabic and English to expand accessibility.
- **Data Analytics**: Incorporate analytics features for tracking user engagement and optimizing the site's impact.

VIII. References

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