

Design and Implement an Agriculture Website for the Sustainable Development Goals in Iraq

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Abstract: The Sustainable Development Goals (SDG) is a set of 17 goals; aim to do economic, environmental and social development, which meets the needs of the present without compromising the ability of future generations to meet their own needs. Iraqi agriculture is facing too many issues and challenges, SDG contains 9 goals related with agriculture sector and contributes in improving it, but there is a lack of awareness in importance of sustainable development and its goals. So the need raised to disseminate the concept of SDG in agriculture field. In order to meet this need created a first agriculture website in Iraq for SDG to disseminate the agriculture awareness of these goals besides that provide agriculture information by interactive Google map for all who interested in this field.

Keywords: web development, web design, Google map, sustainable development goals, SDG, agriculture.

I. INTRODUCTION

SDG were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that meet the urgent economic, environmental and social challenges facing the world without compromising the ability of future generations to meet their own needs. Since 01/January/2016, officially had started the 17 sustainable development goals for 2030. [1][2]

Iraqi agriculture is facing too many issues and challenges like climate change and water crisis that have a negative impact on food security in this region in spite of having many enablers to reach the sustainable agricultural development. [3]

Sustainable agriculture development is the production of food, fiber, or other plant or animal products using farming techniques that protect the environment, public health, human communities, and animal welfare without compromising future generations' ability to do the same. The essential benefits of sustainable agriculture development are:

- Environmental preservation
- Protection of public health
- Sustaining vibrant communities
- Upholding animal welfare [4]

Information and communication technology (ICT) could play a key role in accomplishing the sustainable agricultural development and food security if utilized for information, knowledge and experience share between farmer communities though the world. [5]

Website is one of the most common tools to disseminate information, the languages HTML, CSS, JavaScript and PHP used to build this website and create the interactive

Google map to display agriculture information for Iraqi governorates.

II. WEB DEVELOPMENT

Web development can range from developing the simplest static single page of plain text to the most complex web based internet applications, electronic businesses, and social network services. A more comprehensive list of tasks to which web development commonly refers, may include web engineering, web design, web content development, client/server side scripting, web server and network security configuration and e-commerce development. A true understanding of web development requires a realizing of multiple perspectives. The design and layout of a website closely related to the code and the database. The quality of the graphics related to the performance and configuration of the server, and the security of the system spans every aspect of development. [6]

A. Front-end Development

The front-end of a website is the part that users interact with it. Everything that have seen when navigate around the Internet, from fonts and colours to dropdown menus and sliders, is a combo of HTML, CSS, and JavaScript controlled by computer's browser.

Front-end developers are responsible for a website's user facing code and the architecture of its user activities. In order to execute those objectives, front-end developers must be adept at three main languages: HTML, CSS, and JavaScript programming. In addition to fluency in these languages, front-end developers need to be familiar with frameworks like Bootstrap, Foundation, Backbone, AngularJS, and EmberJS, which ensure good looking

content no matter the client device, and libraries like jQuery and LESS, which package code into a more useful, time saving form. [7]

B. Back-end Development

The back-end of a website consists of a server, an application, and a database, which makes the front-end of a website possible and store all data. A back-end developer builds and maintains the technology that powers those components that together, enable the user facing side of the website.

In order to make the server, application, and database communicate with each other, back-end developers use server side languages like PHP, Ruby, Python, Java, and .Net to build an application, and databases like MySQL, Oracle, and SQL Server to find, save, or change data and serve it back to the user in front-end code. [7]

III.GOOGLE MAPS

It launched in 2005 has revolutionized online mapping service applications on the World Wide Web. Based on Asynchronous JavaScript and XML (AJAX), a new type of client/server interaction introduced in Google Maps to maintain a continuous connection between the client and the server for immediate downloading of additional map information.

In addition, Google also provides programmers free access to its code in the form of an Application Programming Interface (API). The API consists of a set of routines, data structures, object classes or functions that can called by a programmer using JavaScript, PHP, or similar scripting language. [8]

Google Maps is a free web mapping service by Google that provides various types of geographical information. Using Google Maps can:

- Search for places or get directions from one place to another.
- View and navigate through horizontal and vertical panoramic street level images of various cities around the world.
- Get specific information like traffic at a particular point.
- Know the type of land.

A. Types of Google Maps

There are four types of Google Maps:

- **ROADMAP:** This is the default type. If haven not chosen any of the types, this will be displayed. It shows the street view of the selected region.
- **SATELLITE:** It shows the satellite images of the selected region.
- **HYBRID:** It shows the main streets on satellite images.
- **TERRAIN:** It shows the terrain and vegetation. [9]

IV.DESIGN AND IMPLEMENTATION

This website has built from scratch and the languages have used in, HTML, CSS, JavaScript and PHP. It has designed

to disseminate the concept of SDG in agriculture field and provide its information and news. The website consists of sub-pages and the main interface, the information gathering process includes collecting all the required information about the SDG and agriculture, writing the required needs and preparing all the necessary resources to build the website.

A. Web Design

Web design has direct link to visual aspect of a website, effective web design is necessary to communicate ideas effectively, web designing is subset of web development.

1) Website Structure:

The structure of the web page must to be choose before considering the visuals. The information architecture used to describe the planning of a website's structure. There are two types of navigation structures wide and deep. In wide navigation, the main pages are all visible together and for small sites, and deep navigation simplifies the main navigation and groups related pages into categories, which selected for this website, because it is the optimal solution for large websites as shown in Fig. 1.

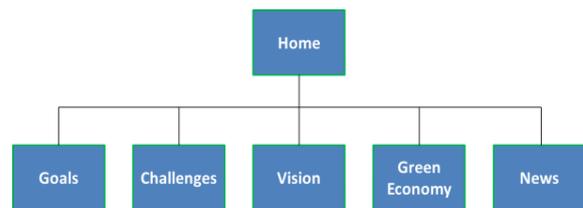


Fig. 1 Website Structure

2) Wireframe:

It refers to a visual guide to appearance of web pages. It helps to define structure of website, linking between web pages and layout of visual elements. Website wireframe shown in Fig. 2.

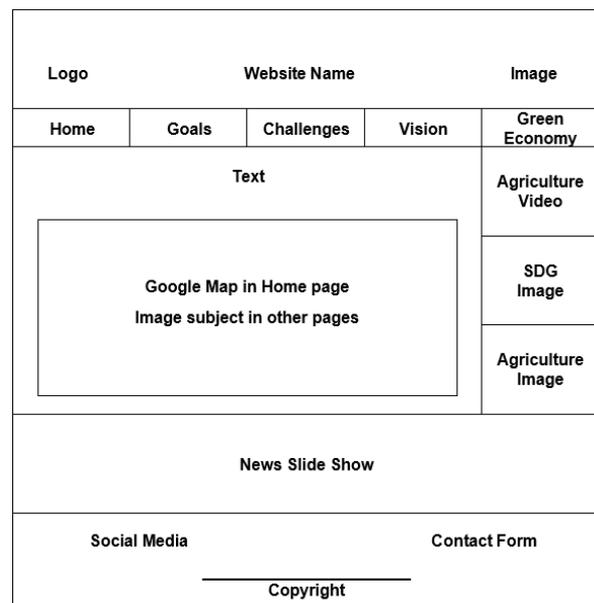


Fig. 2 Wireframe

B. Implementation

The main interface of this website designed by using HTML, CSS, JavaScript and PHP codes.

An interface includes several pages that show information and images.

HTML main table has created to include all components of this interface that explained below:

- Header: Designed by “Photoshop CC” and consists of, website name, logo and agriculture image.
- Navigation bar: Consist of links of these pages Home, Goals, Challenges, Vision and Green economy. Used unordered list in <nav> tag, in order to make the list display horizontally instead of vertically set this attribute in CSS (display: inline;) for all list elements.
- Page content: It differs from page to page according to page information. In Home page consist of text (brief summary of the SDG) and Google map; while in other pages consist of text and image subject. JavaScript has used in coding Google map because it provides less server interaction, immediate feedback to the users, increased interactivity and richer interfaces.
- Right column: Contains a three elements:
 - Video about the history of agriculture in Iraq, taken from Youtube as embedded link with quality 720p inserted in iframe.
 - Image of SDG that can maximize.
 - Image about agriculture recycling.
- News Slideshow: It’s a set of images of news animated on same position each of which has a brief text linked to its news page, this coded by JavaScript, set the animation time 5 seconds and animation type “fade”.
- Footer: It is the last part of the website, consists of:
 - Social media accounts links: Facebook, Twitter, Google+ and YouTube channel.
 - Contact Form: User can send a message to the email account of the website by this contact form, which contains 3 input fields (name, email address and message). coded by PHP used mail function to send message and used validation method in case the user insert wrong format of the input field, after click on send button an alert message will appear say if message sent successfully or not.
 - Copyright of the website.

In order to create a Google map needs to do these steps:

1. Create an HTML Page: Create a basic HTML page.
2. Load the API: Load or include the Google Maps API using the <script> tag in HTML head.

3. Create the Container: To hold the map, it has to create a container element; generally, the <div> tag (a generic container) used for this purpose. After create a container element should define its dimensions in CSS.
4. Map Options: Before initializing the map, it has to create a mapOptions object and set values for map initialization variables. A map has three main options: center, zoom, and mapTypeId.
 - center: Specify the location where should be the center of map. To pass the location, it has to create a LatLng object by passing the latitude and longitudes of the required location to the constructor. Has chosen Baghdad location coordinates because it is at the center of Iraq.
 - zoom: Specify the zoom level of the map. Chosen “6” because it fits with specified dimension of map container.
 - mapTypeId: Specify the type of the map required. Chosen “TERRAIN” to show vegetation, mountains, rivers, etc.
5. Create a Map Object: It created by the JavaScript class called Map (google.maps.Map). It has to pass an HTML container to hold the map and map options for the required map.

After map initialized, marker for each governorate with its location coordinates has created by create Marker object (google.maps.Marker), then created object of windows information (google.maps.InfoWindow) to fill with agriculture information for each governorate from data arrays.

When hover on any governorate marker, it will show the governorate name, then when click on, will display small window include the agriculture information of (total, arable and planted) area for selected governorate and its proportion to Iraq area, as shown in table 1.

TABLE I INFORMATION FIELDS

Area	Governorate (dunam)	Iraq (dunam)	The proportion of the Governorate to Iraq (%)
Total	Number	Number	Number
Arable	Number	Number	Number
Planted	Number	Number	Number

That information give a clear vision of the agriculture area in Iraq to determine the planted area and help in process the rate of desertification.

The information of each governorate will display as result of click event as shown in Fig. 3 below:

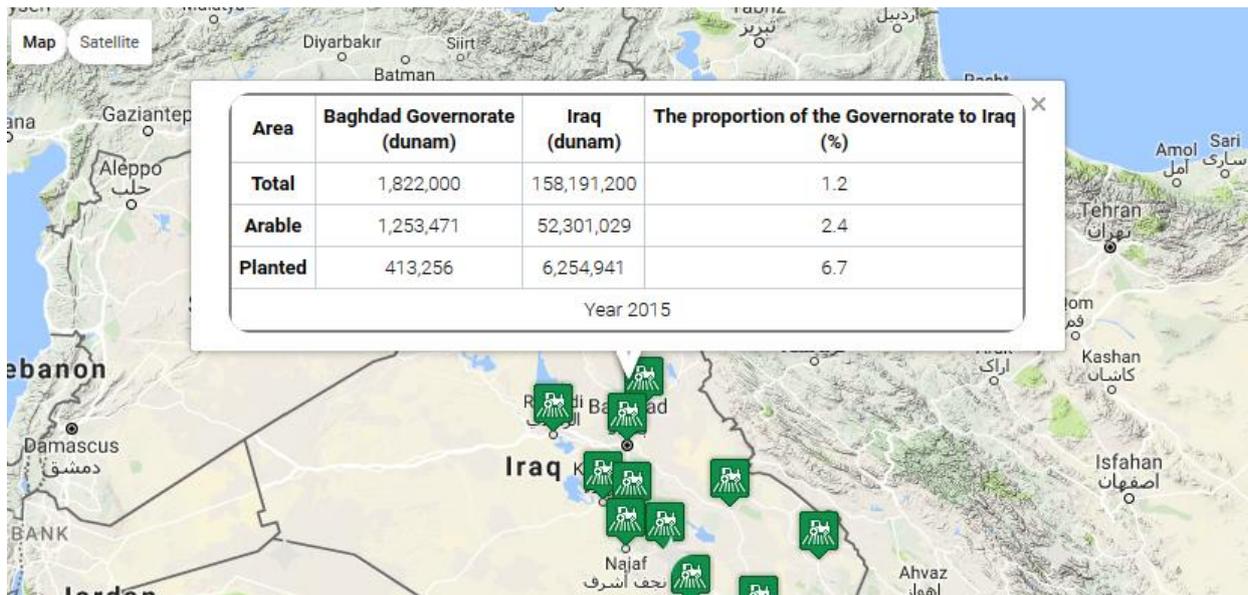


Fig. 3Window information

V. CONCLUSION

- Agriculture website has created for SDG, this website is the first one in Iraq that illustrates the concept of SDG in agriculture field for interested people and display the information about the agriculture situation in Iraq.
 - JavaScript has used to create Google map, which provides a very efficient mechanism to deliver digital cartographic information to the user with fast response time and user-friendly interaction. By use "TERRAIN" map type the user can see mountains, rivers and vegetation on map.
 - Also the user can get the information of agriculture area for each Iraqi governorate, by using JavaScript which it front-end programming language, the processing data done on the client side this reduced the response time than if use back-end programming language and till now there isn't another Iraqi site display information by Google map.
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