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## Development of web application for organic farming service system in Warangal region

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### Abstract

Environmental protection is the major concern all over the world from the past few decades. This can also be subjected to agriculture due to the direct and indirect food consumption that directly affects human health. Conventional farming practices based on pesticides and chemical fertilizers usage creates various problems like degradation of land, pollution of the environment, logging of water, decreasing groundwater table levels, multiplication of pests and their increase in resistance towards the chemicals. The necessity of creating a network of organic farmers to encourage organic farming for achieving a healthy India must be addressed. With the development of Web-GIS platform, it is possible to create a smart user-interface to enable the communication between organic farmers and regional help centers and Retailers. This practice helps in creating a Web application interface using ArcGIS Online where web Application Builder is used which contains various widgets for analysis of data through which the farmers can- locate, know the surrounding crop details, get the help from regional training & development centers, and marketing facilities. With the combination of field and open source satellite data, a Web-GIS platform has been developed to visualize the attribute-based information that can be queried and enables to update whenever required.

**Keywords:** ArcGIS online, database, GIS, spatial, web appbuilder

### Introduction

Protecting the environment is the need of the hour. This should be mainly focused on agriculture as if directly or indirectly effects health and food consumption. The economy also to be considered while changing farming practices. Process of cultivation of land using organic farming practices is advantageous compared to the conventional type of farming. Organic farming does not use any chemical fertilizers and totally depends on organic sources for crop nutrition and husbandry. To develop a sustainable agriculture system is the main objective of this system, which in turn conserves the environment, maintain the fertility of the soil and ensures adequate production of food <sup>[1]</sup>.

An Information System is an integrated set of software and hardware components that are used for collection, organization, storage, processing, and communication of information among the users. A Geographical Information System (GIS) is an information system that consists of hardware, software, data, and the users which allows capture, storage, visualization, manipulation, query, analysis, and interpretation of spatial data when and as required. Web GIS is one such technology which combines the capabilities of web technologies and GIS.

For the successful implementation of WebGIS, it is required to implement as a process rather than a step considering the application requirements along with the latest available technology <sup>[2]</sup>.

There is no need for any programming skills for the creation of a web GIS-based application using this methodology <sup>[3]</sup>. Using WebGIS we can get our queries answered about the facilities and located resources around <sup>[6]</sup>.

ArcGIS Online is an analysis and mapping solution based on the cloud. It is used to share, analyses collaborate data along with making maps from it. Data and maps stored here are secured and can be configured as per user requirements <sup>[4]</sup>. Planning the Story map focusses data management Creation of metadata; tags and descriptions uploading and storing data using ArcGIS Online <sup>[5]</sup>.

Web AppBuilder for ArcGIS is an extraordinary application that allows the user to build 3D and 2D web applications where user need not write any code. It is provided with tools that can configure HTML applications <sup>[7]</sup>.

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Web AppBuilder assists to create web and mobile-friendly interactive GIS applications. It is a rapid application tool which provides various templates and ready to use configurable widgets which adds diverse functionality in the application.

**Methodology**

The methodology followed for the development of web application is shown in Figure 1. The first part of the methodology deals with the process of data collection and preparation. Spatial and non-spatial data of the organic

farmers of the village along with the data of retailers and training service centers are collected and processed to obtain data in a usable format. This involves the collection of data, data conversion and correction if needed. The second part that involves in development of Web Application interface development. In the processes of developing the Web Application interface with an initial layout is to be prepared which helps in identifying where different elements of the application have to be situated. Based on the layout that is prepared the interface developed using WebApp Builder from ArcGIS Online.



**Fig 1:** Methodology

**Study area and database**

The study area selected is the rural administration area considering nine villages Ontimamidipalli, Thirumalyapelli, Dhammannapet, Thimannapeta, Gannaram, Upparapelli, kadirigudem, Laxmipuram, Singaram villages. These villages are from Warangal rural and urban districts of Telangana State.

The data collected consists of spatial and non-spatial data of organic farmers (Name of farmer, Lat-Long location of field, Address, Contact, family members, types of crops grown, area of land, yield of crops etc, retailers (name, Lat-Long, address, contact details, working hours), and training organization (Name, Lat- long, address, contact).The data is collected by various means from google maps and authorized organizations

topographic base map. Zoom tool (Zoom in and Zoom out), search toolbar, home, and my location tools are by default provided for the app by Web AppBuilder.

**Layer list widget**

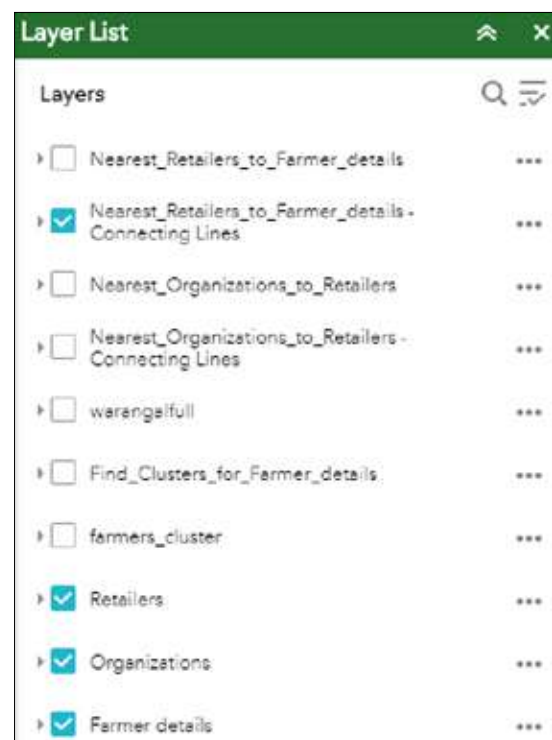
Layer List widget lists the layers that are imported and analyzed using ArcGIS. We can visualize each individual layer by checking the box on and off. Warangal shapefile, Farmers, retailers and Training organization shapefiles are added directly along with other operational data.



**Fig 2:** Location Map of the study area

**Web application development**

Create an account in ArcGIS website. After logging in go to the dashboard. Select new web map in ArcGIS online. Import the necessary data after making corrections using the Add data option. (We can only add Shapefile (in a Zipped format), CSV, GPX and GeoJSON formats). Save the web map giving title and tags and any description if necessary. Selected web map opens a map view that displays all the data loaded into ArcGIS Online database. By default, the background of the web map will be displayed as a



**Fig 3:** Layers used in App

**Legend widget**

Legend Widget helps to view the layers present on the map along with their symbol representations (Point, line, and polygon).



Fig 4: Various legends used

Now share the web map and give permission for the end-users to access the map and data then create a web app using Web AppBuilder start building app in web AppBuilder. Select a suitable theme, style, and Layout for the application to be developed. Choose the default map that should be used in the background. Import all the necessary widgets into the application and perform analysis. Some of the widgets and their analysis is shown below.

**About widget**

Configure the widget and set the widget to open automatically when eve the app starts.



Fig 5: About the application

**Basemap gallery widget**

This widget helps to select a gallery of maps as your base maps for your data.

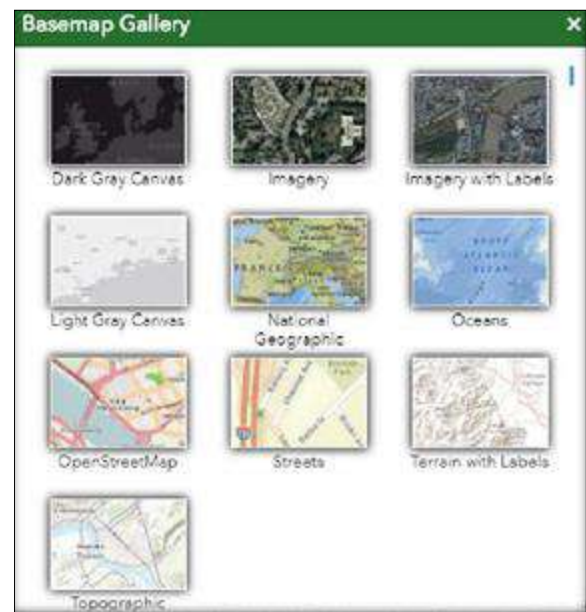


Fig 6: Types of Basemaps

**Directions widget**

This widget helps to know the directions and the time is taken for origin and destinations in 8 different types as per the requirement of the user (Kinds of walking and driving distance measures and travel time calculations).

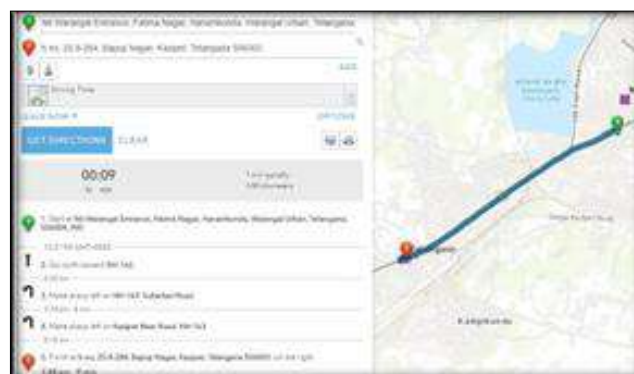
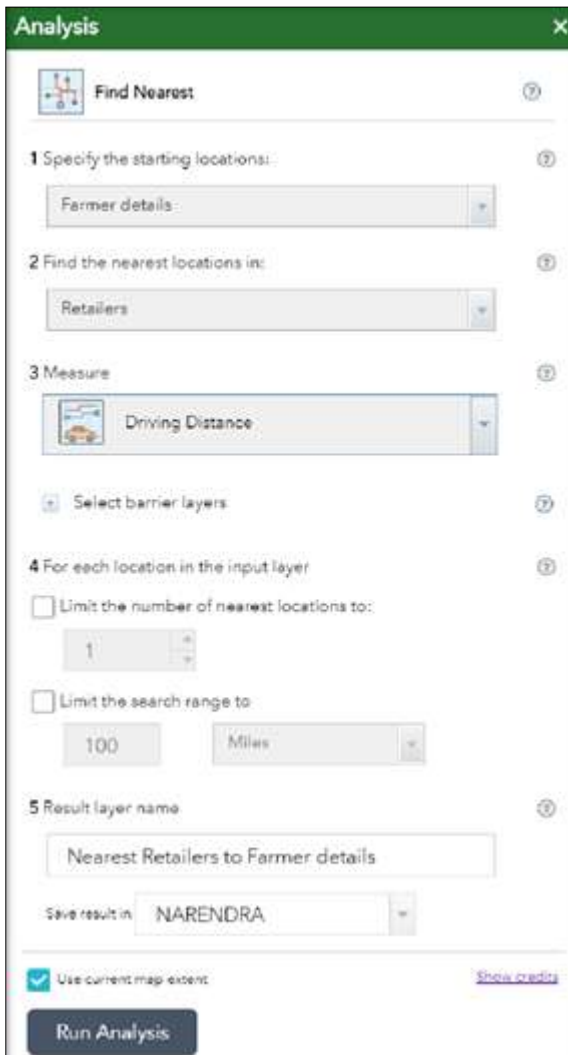


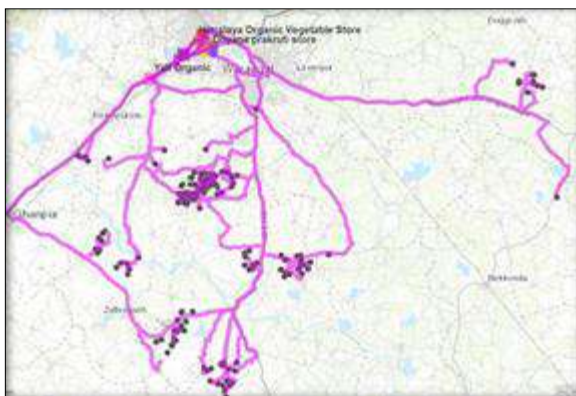
Fig 7: Directions and time between 2 locations

**Analysis widget**

This widget contains 25 tools. Configure the necessary tools for the development of your application. Here the analysis is done to find out the nearest route between each individual farmer and the retailers.



**Fig 8:** Find Nearest analysis tool

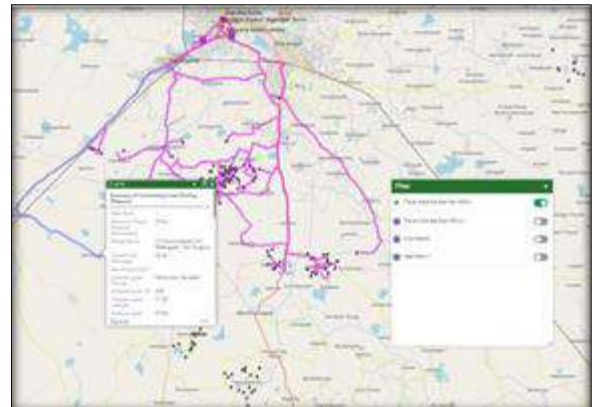


**Fig 9:** Nearest routes between farmers and retailers

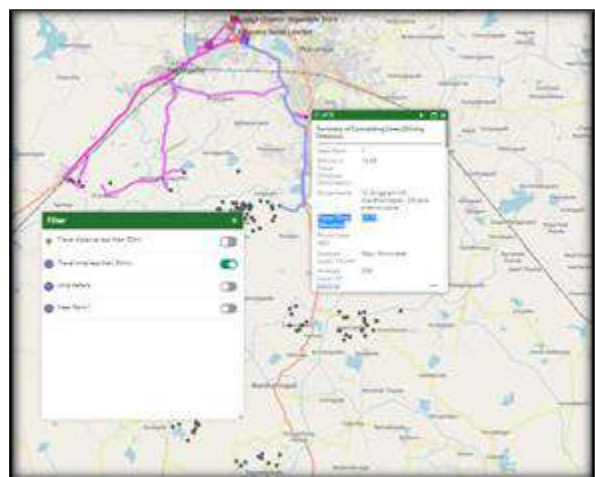
**Filter widget**

This widget is used to view or limit the features that we

need to filter. We need to give expressions based on the requirement. According to the given expressions the filtering operations are carried out and the results are displayed.



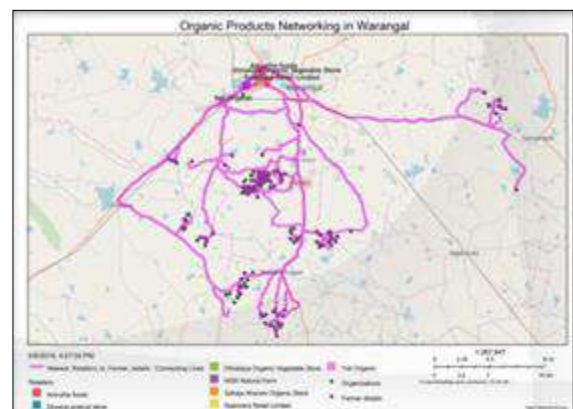
**Fig 10:** Filter Applied (Travel distance<30km)



**Fig 11:** Filter Applied (Travel time<30min)

**Print widget**

This widget is very helpful to make the necessary layout and print them in 8 different formats (JPG, PDF, GIF, PNG, etc) and 8 different layouts (A3 and A4 landscape and Portrait)



**Fig 12:** Road Network of routes between retailers and farmers

**Configuring attribute**

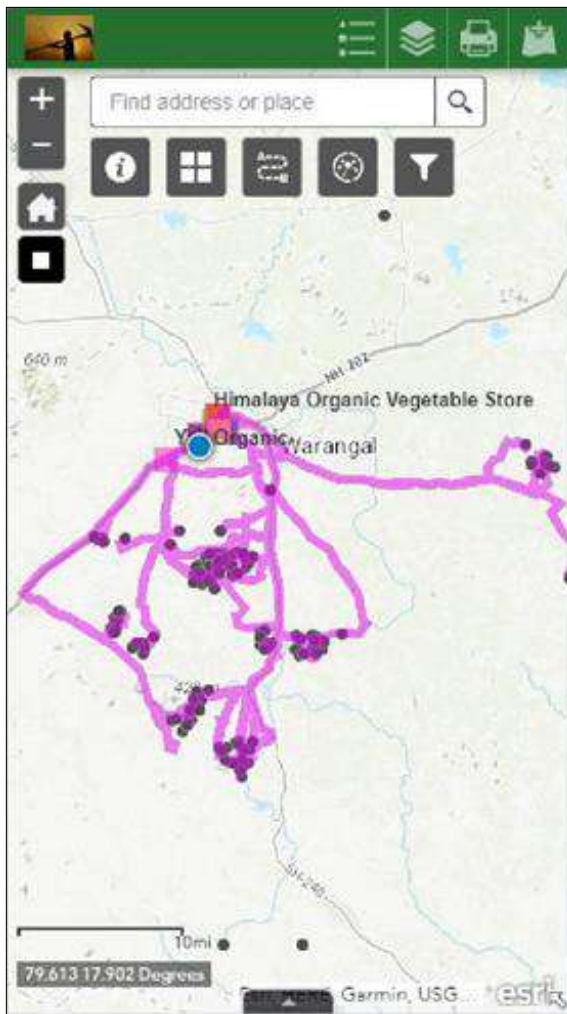


Fig 13: Mobile View of the Application

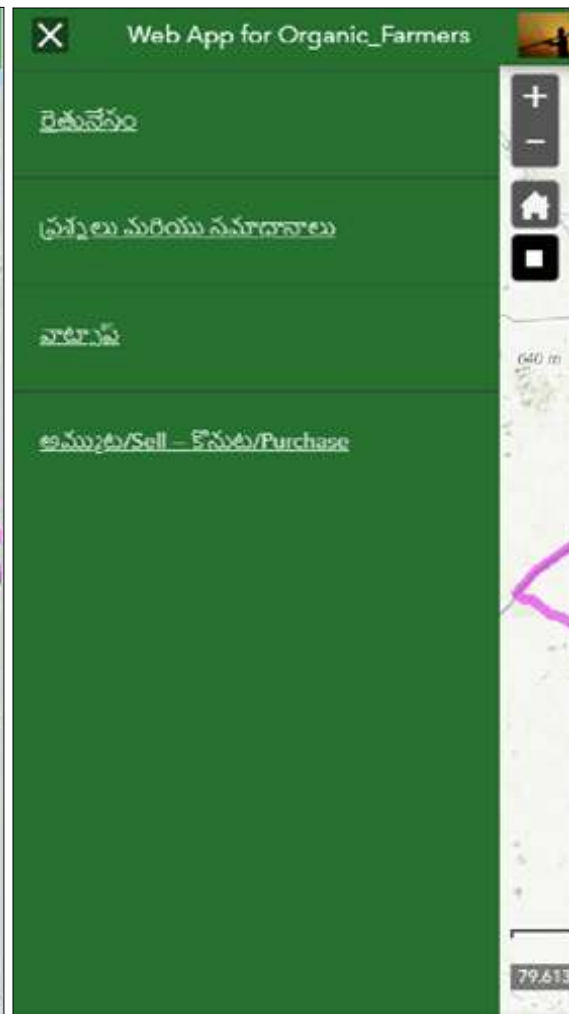


Fig 14: Mobile View of the Attributes

Here we can assign a logo and name of the Application along with a subtitle required. Add necessary links and specify their title along with the URL. We can assign the title in any local language (here it is given in Telugu). Each link created here directs directly to the URL. Here 4 links were created (YouTube channel based on farming, webpage for queries, WhatsApp group and purchase and selling platform).

**Conclusions**

The primary objective is to develop a Web app for Organic farming service system to make the process of maintaining the spatial information easier and to make it widely accessible for the use of farmers and other administrators. The goal was achieved by preparing the Geospatial data of the features which can be updated as and when required. The secondary objective which involved the development of spatial querying which enables the users to retrieve the data effectively by creating attribute-based query tools through which the users can make it visible on a map interface.

**References**

1. Singh A. Organic farming- The need of the hour for the conservation of natural resources and maintenance of ecological balance, 2015.
2. Alesheikh AA, Helali H. Web GIS : Technologies and its applications Table of contents Table des matières Index des auteurs, 2015.

3. Bhatia TS, Remote P, Centre S, Litoria PK, Remote P, Centre S. Web GIS Development using Portal for ArcGIS, ArcGIS Server and Web AppBuilder for ArcGIS, 2019.
4. Introduction to ArcGIS Online [Online]. Available: <https://doc.arcgis.com/en/arcgis-online/reference/what-is-ago1.htm>[Accessed: 01-May-2019]
5. Horswell M, West H. Professionalizing assessment using ArcGIS Online, 2017.
6. Varsha PB, Reddy KV, Navatha Y. Development of Webgis Based Application for Tourism, 2016, 1-8.
7. Web AppBuilder for ArcGIS. [Online]. Available: <https://doc.arcgis.com/en/web-appbuilder/create-apps/what-is-web-appbuilder.htm> [Accessed: 03-May-2019].