

Plotting a Healthy Apiary Location using WebGIS

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ABSTRACT

Bees are among the most vital animals to people on Earth. These astounding bugs fertilize over 80% of all blossoming plants including 70 of the top 100 human food crops. Web-based GIS is used to display and analyze spatial data on the internet. It consolidates the benefits of both web and GIS. A GIS for the free internet, requires: overall access, free digital geodata and background maps for any area with great or deep spatial resolution. These lead to the use of Google Maps. These advantages, above all no license cost of data, offset disadvantages. The prospect for deploying an apiary in an area, within the Philippines, must have a positive appraisal outcome based on various matters. Managing and recording the findings of healthy apiary location would be flexible and reliable with the use of technology specifically google maps. This would save data on the cloud which would be helpful, as per data loss, compared to paper-based record. In this study, Google My Maps has been used to plot areas for Apiary deployment that are favorable, neutral or less-favorable. The google map link has been publicly shared. Also, the link was shortened to <https://tinyurl.com/GeoMappingApiaryLocation>. A WebGIS representing the evaluated viability of beekeeping industry in a particular community has been produced. Using Google My Map is fun-and-fast, also any other non-IT user would have no difficulties in using the platform.

CCS Concepts

- Information systems → Information systems applications
- Information Systems → Service discovery and interfaces

Keywords

GMGIS; GIS; GeoMapping; WebGIS; Google Maps; Beekeeping; Apiary Location.

1. INTRODUCTION

"If the bee disappeared off the surface of the globe, then man would have only four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man."

-Albert Einstein

Bees are among the most vital animals to people on Earth. These astounding bugs fertilize over 80% of all blossoming plants

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including 70 of the top 100 human food crops. One in three nibbles of nourishment that we eat is derived from plants pollinated by bees [2]. A Geographic Information System (GIS Software) is planned to store, retrieve, manage, display, and analyze all types of geographic and spatial data. GIS programming gives you a chance to deliver maps and other realistic displays of geographic information for analysis and presentation. With these abilities a GIS is an important instrument to visualize spatial data or to build decision support supportive networks.. A GIS stores information on topographical highlights and their characteristics [7]. **Web-based GIS**. Also known as 'Internet GIS'; is another innovation that is used to display and analyze spatial data on the internet. It consolidates the benefits of both web and GIS. It offers the public another way to get to spatial information without owning expensive GIS software [10]. GIS for the free internet, requires: overall access, free digital geodata and background maps for any area with great or deep spatial resolution. These requirements automatically lead to the use of Google Maps. Especially these advantages, above all no license cost of data, offset disadvantages such as: no cadastral data, often unknown and varying spatial actuality, neither building outlines nor other unique data and no guaranteed availability [5]. **Google Maps** (<http://maps.google.com>), is a web-based free service that provides maps for any location in the world. In addition to a map view, it gives an interface to view the chosen site in a web-based satellite image, or to open Google Earth in a machine that has the client loaded [3]. It is an extraordinary mechanical progression everywhere throughout the world that helps millions of its users in getting quality geological data for discovering ways, locations, places, distances, required time to travel at a specific place, furthermore, settling on sane choices for the benefit of provided information the [4]. After the initiation of Google Maps Technology millions of users are utilizing this technology on a daily basis for finding distinctive geological areas and lessen time-consuming tasks such as finding the path, the time required to reach the destination, add up to separate, travel, etc. by this technology.

2. REVIEW OF LITERATURE

Created maps in My Maps, can be seen in Google Maps. Google My Maps is a service launched by Google in April 2007 that allows users to create custom maps for subjective use or distribution [11]. Users can add points, lines, and shapes on top of Google Maps, using a WYSIWYG editor [12].

2.1 WebGIS with Google Maps

Geoweb applications offer us with a cybernetic thought level and is able for us to travel through the layers of three-D setting, something that normal maps have not been able to provide. This perspective used to be kept for scientific and political authorities it is now available to the public and adds thereby to the democratizing trend of digital culture. The individual information provided feeds into a network that provides socio-geographical information to a mass

spectators [13]. Google Maps delivers the updated and existing road formation. Also, this has the advantage on accurateness and coverage [14].

2.2 Data Set and Context of the Study

Data and information of this study were raised from the study "Rapid Appraisal for Community-Based Apiculture Enterprise in Region 1" by Pablo L. Masiong et. al. [8]. Stephan Kupsch, et.al mentioned that the difficulty of locating a healthy apiary habitat is one of the challenges and issues of the beekeepers and apiculturists of the Philippines [6].

3. FEATURES OF A HEALTHY APIARY LOCATION

The prospect for deploying an apiary in an area, within the Philippines, must have a positive appraisal outcome based on: **Area (vegetation, climatic condition)**. The area is apt for beekeeping. The vegetation provides ample sources of nectar and pollen, the weather/climatic conditions and the community farming system, are suitable for beekeeping. **Area Availability for bee foraging**. Area (bee pasture) is already available and adequate. **Beekeeping experience**. Beekeepers possess appropriate beekeeping technical skills. Beekeepers possess beekeeping technologies earned through training and/or actual beekeeping experiences. **Beekeeping technical assistance**. Technical assistance is readily available. There are several beekeeping technicians within the community who are ready to provide technical assistance in most aspects of the beekeeping cycle, at all times. **Community awareness and assistance**. Majority of the households are interested in beekeeping. More than half of the households have undergone intensive beekeeping training and are prepared to venture into beekeeping. **Road accessibility**. Access roads are paved-all weather. The roads leading to the community are cemented; access is possible any time of the year. **Transportation services**. Frequent trips available. The transportation to and from the community is available 24hours, every day. **Electricity services**. With electricity-no fluctuations. Electricity flowing within the community is stable and does not fluctuate. **Irrigation facilities**. Production area (Farms) has irrigation facilities/water system. The farm/area has access to irrigation facility or system, making water available all year round/access to water available to water is very easy. **Post-harvest facilities**. Post-harvest facilities are available and are near the area. The needed post-harvest facilities (honey extractor, containers, etc.) are available/existing in the area. The beekeepers can easily tap or rent the materials needed. **Community organizations**. With the working system, leaders and personnel. The community has a local organization (keepers associations) with strong and active leaders and members that can perform tasks/functions regularly. It has a functioning system that guide, monitor and document activities of the group. **Industry leaders**. Group has leaders with experience and are full time. The group leaders have experienced or are full-time beekeepers who can assist prospective beekeepers, at all time. **Organization legal identity**. The organization has a legal identity. The organization/association is registered in a concerned government agency, as a legal entity. These conditions were lifted from the Appraisal Evaluation Tool; Community-Based Beekeeping Enterprise which was used to assess the area at the municipality of Bacnotan, La Union, Philippines.

4. SIGNIFICANCE OF THE STUDY

The output of this study would profit the beekeepers and apiculturists. Managing and recording the findings of healthy apiary location would be flexible and reliable with the use of

technology specifically google maps. Moreover, this is the first to plot beekeeping information on a WebGIS specifically Google My Maps. This would save data on the cloud which would be helpful, as per data loss, compared to hand-written or paper-based record. This would also be accessible to any beekeepers who would like to know the status or readiness of an area for deploying apiary. This would also be the first use of the geo-mapping tool for the beekeeping industry.

5. METHODOLOGY

In this study, Google My Maps has been used to plot areas for Apiary deployment that are favorable, neutral or less-favorable.

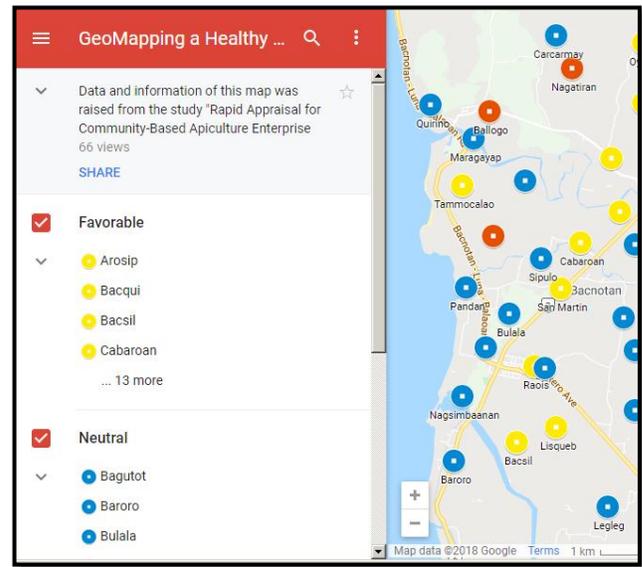


Figure 1. GeoMapping a Healthy Apiary Location

As seen in Figure 1, the google map displays the evaluated viability of the beekeeping industry in a particular community. The Yellow-pin represents the areas that are favorable, while the Blue-pin represents the areas that are neutral, and the Red-pin represents the areas that are non-favorable.

5.1 Fast-and-Fun with Google My Maps

The author has used Google My Maps, which can be visited at the link <https://mymaps.google.com> with a Google Account [1].

The working panel of Google My Map can be seen in Figure 2. The Add Layer button has been used to insert 3 Layers. **The favorable layer** which has the list of Barangays wherein the deployment of Apiary is satisfactory. This layer has been colored yellow. **The neutral layer** which has the record of Barangays wherein the implementation of Apiary could succeed given the appropriate apiculture management intervention. This layer has been colored blue. **Less Favorable Layer** which has the list of Barangays wherein the deployment of Apiary is challenging which means it needs intensive / heavy intervention. This layer has been colored red.

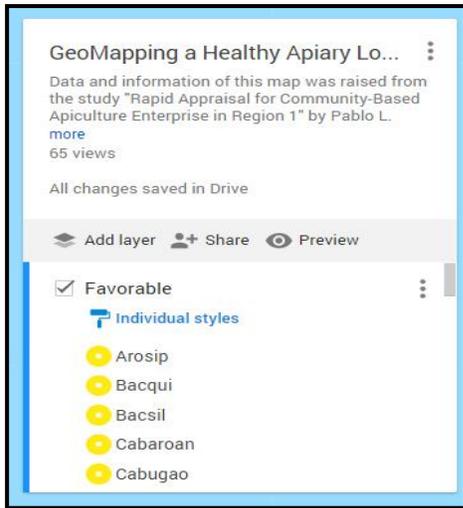


Figure 2.

Description of Google My Map has been revised by clicking its name and an Edit map Title and Description form was displayed as seen in Figure 3.

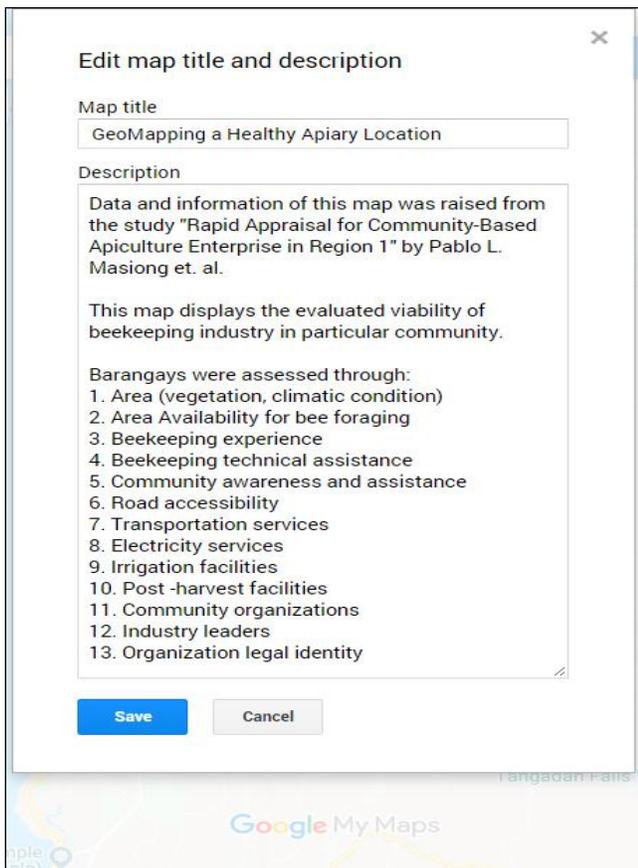


Figure 3.

The description contains a short explanation about the Google My Map. Also, the means of assessment of the barangays as per Healthy Apiary Location is mentioned.

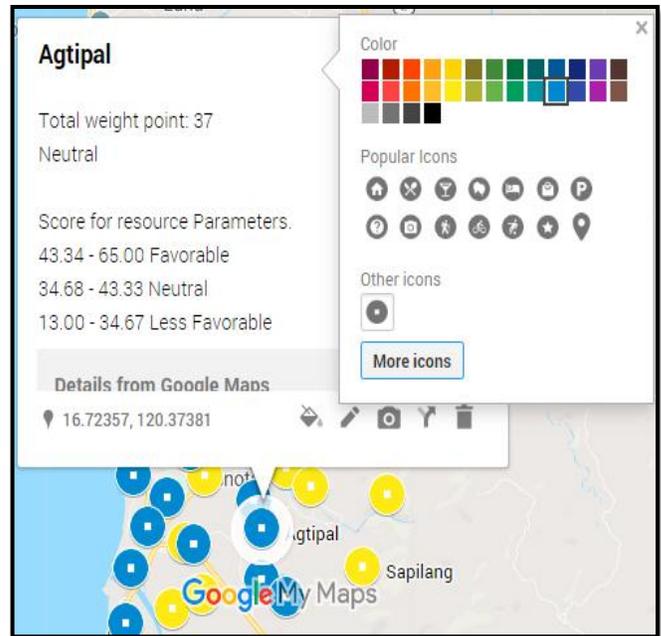
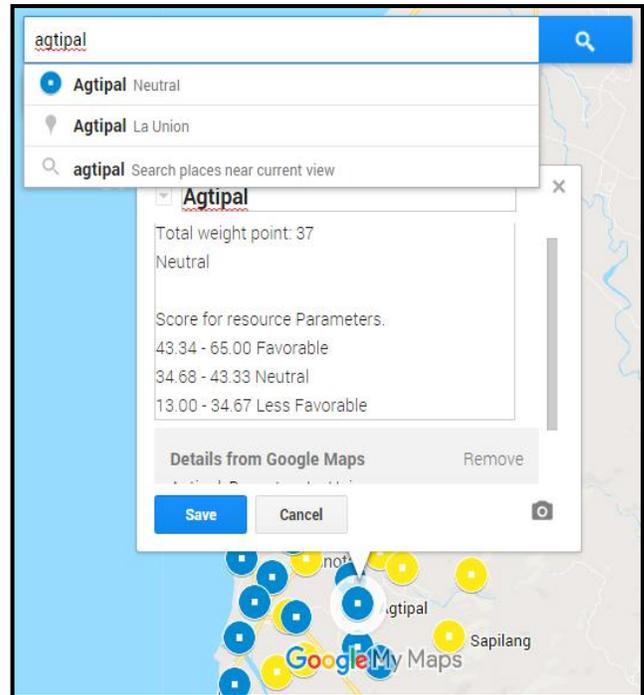


Figure 4.

Inserting a pin can be seen in Figure 4. The name of a Barangay was searched and inserted. After which, the description of its assessment is placed. Likewise, pin colors have been chosen as per its valuation.

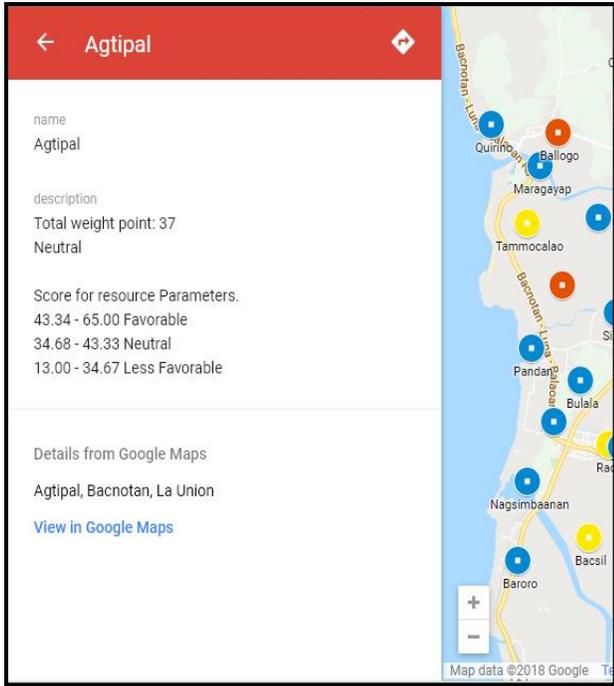


Figure 5.

Figure 5 shows how information would be seen by the viewers.

5.2 Sharing Google My Map; GeoMapping Apiary Location

The produced Google My Map as seen in Figure 6, GeoMapping a Healthy Apiary Location, has been shared with the public. Beekeepers may now have a glance on where a location is viable for Apiary Deployment [1].

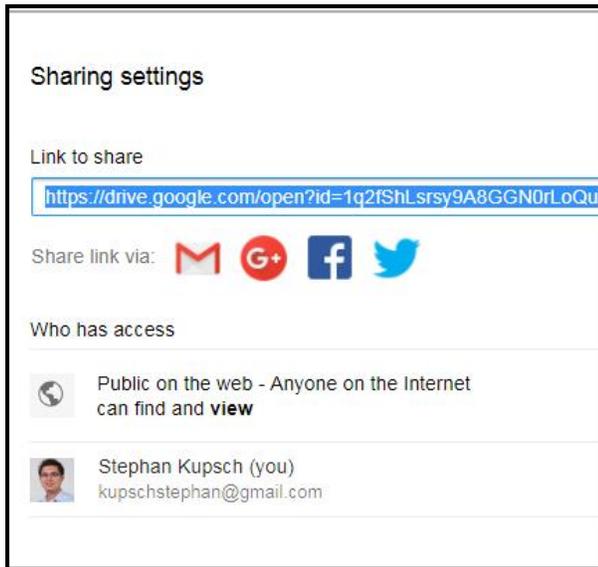


Figure 6.

For the society who wants to view the Map, the google map link has been publicly shared as displayed in Figure 7. Also, the link was shortened to

<https://tinyurl.com/GeoMappingApiaryLocation> using tinyurl.com [9].

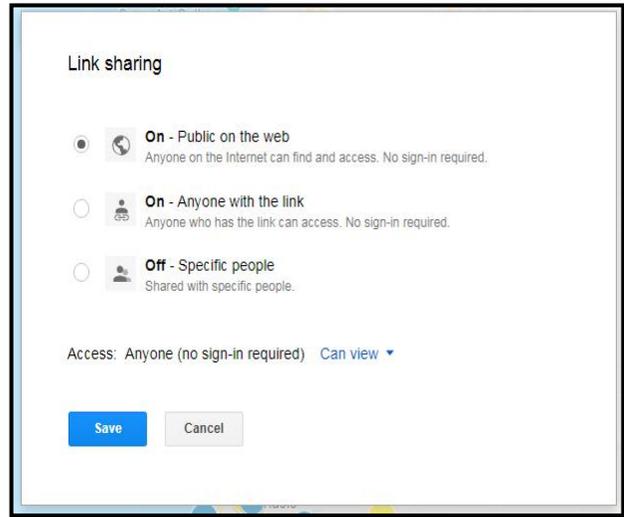


Figure 7.

6. RESULTS AND RECOMMENDATIONS

As a result, a WebGIS representing the evaluated viability of the beekeeping industry in a particular community is produced. Using Google My Map is fun-and-fast, also any other non-IT user would have no difficulties in using the platform. In the future, other beekeeping challenges and issues may be plotted using WebGIS, particularly Google My Map. Furthermore, future researchers may supplement additional information through the WebGIS. This study may also broaden as to national or international scope extent.

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