Article

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Website with thematic maps to consult agricultural production in Hidalgo State

Sitio web con mapas temáticos para consultar la producción agrícola en el Estado de Hidalgo

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Abstract

In Hidalgo State, agriculture is one of the main economic activities. In order that, in a large part of the territorial extension different types of crops are sown, among them and according to the volume of production 7 stand out, mainly: Green Alfalfa, grain corn, green forage oats, grain barley, green forage corn, maguey pulquero and orange. (SIAP, 2020). However, there is a need to promote commercialization due to the facts that ignorance of productivity prompts there are no suppliers interested in acquiring the different products, which generates losses, sales at very low prices and impacts the income of farmers. Due to the notable demand to publish the products that are grown in Hidalgo, the main objective of this project is to develop a tool that allows showing the agricultural production of Hidalgo State, through a website and thematic maps. As a result, a website was developed where production by municipality can be consulted and visualized on thematic maps.

Website, Thematic maps, Agriculture

Resumen

En el Estado de Hidalgo una de las principales actividades económicas es la agricultura, por lo que en gran parte de la extensión territorial se siembran diferentes tipos de cultivos, entre los cuales de acuerdo al volumen de producción destacan 7 principalmente los cuales son: Alfalfa verde, maíz grano, avena forrajera en verde, cebada grano, Maíz forrajero en verde, maguey pulquero y naranja. (SIAP, 2020). Sin embargo, existe la necesidad de impulsar la comercialización ya que en ocasiones debido al desconocimiento de dicha productividad no existen proveedores interesados en la adquisición de los diferentes productos lo que genera pérdida, ventas a muy bajo precio e impacta en los ingresos de los agricultores. Debido a la notable necesidad de hacer difusión de los productos que se cultivan en Hidalgo, la creación de este proyecto tiene como principal objetivo crear una herramienta que permita mostrar la producción agrícola del estado de Hidalgo, a través de un sitio web y mapas temáticos. Como resultado se desarrolló un sitio web en donde se podrá consultar la producción por municipio y visualizarlo en mapas temáticos.

Sitio web, Mapas temáticos, Agricultura

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Introduction

The purpose of this work is to develop a tool that serves as a means to consult the production volume of the main crops in Hidalgo State, as well as to show it on the thematic maps of the regions, in order to publish it.

The information that will be displayed on the website is consulted in the statistical data of the Agrifood and Fisheries Information Service SIAP (Servicio de Información Agroalimentaria y Pesquera) for the most recent year 2020.

The article has this structure: Section 2 presents the theoretical foundations. Section 3 describes the methodology. Section 4 shows the development, section 5 the results obtained represented in the thematic maps; and finally, in Section 6 conclusions.

Theoretical fundament

Starting the development of this research, it is necessary to verify the statistical data of the agricultural production of 2020 of the main crops of Hidalgo State, according to the SIAP the first seven places are the following: Green alfalfa, grain corn, green forage oats, grain barley, green forage corn, maguey pulquero and orange.

Below, the statistical data is presented, which represent the 7 main crops considering the volume of production.

In oder to obtain the amount of total crop production, the Excel file of the most current year (SIAP, 2020) was downloaded and the information was processed, filtering first by state and crop type, below is an example of the information processing.

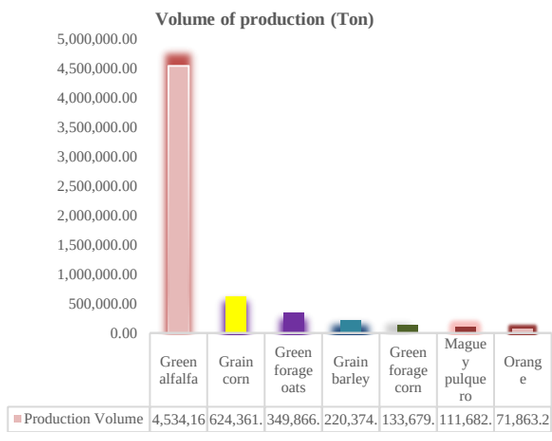
Year	State ID	State	City	Crop	Production Volume
2020	13	Hidalgo	Ixmiquilpan	Green Alfalfa	740110
2020	13	Hidalgo	Alfajayucan	Green Alfalfa	458338
2020	13	Hidalgo	Mixquiahuala de Juárez	Green Alfalfa	370220
2020	13	Hidalgo	Tezontepec de Aldama	Green Alfalfa	365170
2020	13	Hidalgo	San Salvador	Green Alfalfa	354120
2020	13	Hidalgo	Tasquillo	Green Alfalfa	264680
2020	13	Hidalgo	Francisco I. Madero	Green Alfalfa	261080
2020	13	Hidalgo	Tula de Allende	Green Alfalfa	231120
2020	13	Hidalgo	Actopan	Green Alfalfa	168896
2020	13	Hidalgo	Santiago de Anaya	Green Alfalfa	165528
2020	13	Hidalgo	Tlaxcoapan	Green Alfalfa	151410
2020	13	Hidalgo	Progreso de Obregón	Green Alfalfa	145808
2020	13	Hidalgo	Tlahuelilpan	Green Alfalfa	144560
2020	13	Hidalgo	Atitalaquia	Green Alfalfa	120190
2020	13	Hidalgo	Ajacuba	Green Alfalfa	106080
2020	13	Hidalgo	Tecozautla	Green Alfalfa	72115.3
2020	13	Hidalgo	Tulancingo de Bravo	Green Alfalfa	70189.6
2020	13	Hidalgo	Atotonilco de Tula	Green Alfalfa	68950
2020	13	Hidalgo	Tepetitlán	Green Alfalfa	67550

Table 1 Filter by state and crops of Hidalgo State
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020

Subsequently, the sum of the production volume column was made for each type of crop existing in Hidalgo State.

Product	Production Volume
Green alfalfa	4,534,168.82
Grain corn	624,361.92
Green forage oats	349,866.54
Grain barley	220,374.75
Green forage corn	133,679.04
Maguey pulquero	111,682.95
Orange	71,863.28

Table 2 Seven main crops in Hidalgo State, according to the volume of production
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020



Graphic 1 Seven main crops in Hidalgo State, according to production volume
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020.
http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php

With a view to obtain the value of the total production (Thousands of pesos) of the Huasteca Hidalguense per crop, the sum of the value defined by each city was made.

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Methodology to be developed

The methodology used for the construction of prototypes is appropriate since tests are applied during the design and development of the site, this allows deciding which is the most appropriate model, how to design the accesses and present operation progress, further it allows deliverables such as progress to be verified visually.

The methodology has the following stages:

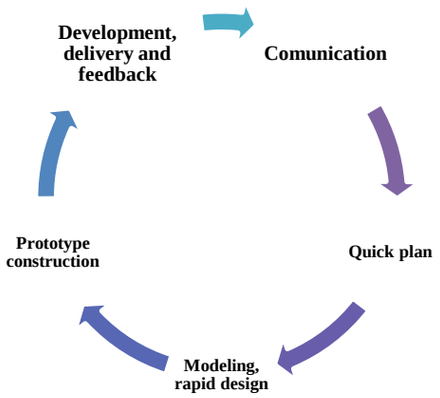

Figure 1 Prototype construction methodology
Source: Own elaboration

a) Quick plan: A preliminary investigation of the problem is carried out and a general idea of the solution is proposed.

b) Modeling, rapid design: System requirements definition, the developer interacts with the user to determine needs.

c) Prototype construction: A technical design is achieved; the interface design is generated.

d) Development, delivery and feedback: Programming and testing, in this stage possible changes in the design are identified and proposed to ensure its correct functionality, this stage is performed as many times as necessary.

e) Communication: Development operation, ensuring that it meets the needs of the final user.

Development

Quick plan: Statistical information collection on the SIAP site.

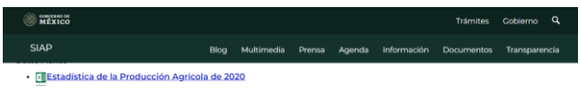

Figure 2 Statistics of agricultural production for 2020.
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020
http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php

Example of the information that is downloaded to extract only the report of Hidalgo State.

Year	State	City	Crop	Sown	Char vested	Sinister	Production volume
2020	Aguascalientes	Aguascalientes	Green forage oats	1175	1175	0	32571
2020	Aguascalientes	Aguascalientes	Broccoli	15	15	0	295.6
2020	Aguascalientes	Aguascalientes	Green forage oats	160	160	0	4352
2020	Aguascalientes	Aguascalientes	Broccoli	20	20	0	306.6
2020	Aguascalientes	Aguascalientes	Green chili	6.48	6.48	0	313.5
2020	Aguascalientes	Aguascalientes	Strawberry	5	5	0	230
2020	Aguascalientes	Aguascalientes	Green forage corn	3000	3000	0	193950
2020	Aguascalientes	Aguascalientes	Grain corn	620	620	0	4675
2020	Aguascalientes	Aguascalientes	Green forage sorghum	147	147	0	8264.34
2020	Aguascalientes	Aguascalientes	Red tomato (jitomate)	18	18	0	2471
2020	Aguascalientes	Aguascalientes	Green tomato	27	27	0	511
2020	Aguascalientes	Aguascalientes	Carrot	3	3	0	85.6
2020	Aguascalientes	Aguascalientes	Green forage oats	235	235	0	1997.5
2020	Aguascalientes	Aguascalientes	Bean	490	490	0	191.1
2020	Aguascalientes	Aguascalientes	Green forage corn	13120	13120	0	136448
2020	Aguascalientes	Aguascalientes	Grain corn	5105	5105	0	2654.6
2020	Aguascalientes	Aguascalientes	Green forage sorghum	120	120	0	1242
2020	Aguascalientes	Aguascalientes	Green alfalfa	1339	1339	0	129900.8
2020	Aguascalientes	Aguascalientes	Peach	12.5	10	0	166.3

Table 3 Statistics of agricultural production for 2020
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020
http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php

Modeling and rapid design: Analysis and design of the database and interface system.

Crop	Production volume
Green alfalfa	4,534,168.82
Grain corn	624,361.92
Green forage oats	349,866.54
Barley grain	220,374.75
Green forage corn	133,679.04
Maguey pulquero	111,682.95
Orange	71,863.28
Red Tomato (jitomate)	53,690.22
zucchini	32,847.74
Cherry coffee	31,422.55
Corn	18,075.70
Cauliflower	17,533.72
Green tomato	17,503.48
Bean	15,414.18
Tuna	14,483.88
Green chile	12,266.73
Rose	7,662.80
Nopal	6,265.76
Wheat grain	3,870.25
Avocado	3,558.15
Cucumber	3,328.51
Nut	3,178.34
Apple	3,073.89
Oatmeal	2,941.65
Lettuce	2,388.85
Peach	2,168.33
Lemon	1,845.98

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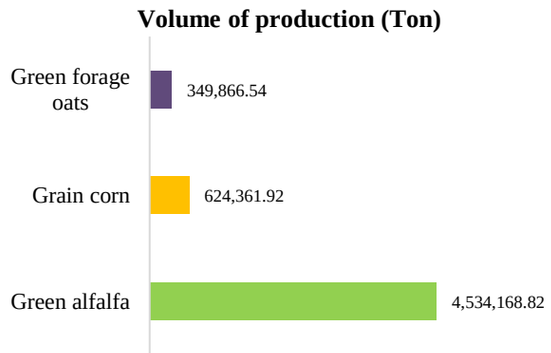
Onion	1,705.26
Grenade	1,501.36
Zempoalxochitl	1,217.91
Dried chili	1,037.00
Garlic	673.27
Brocoli	651.20
Mango	510.08
Potato	405.20
Grain sorghum	393.98
Guava	350.45
Pineapple	290.60
Tangerine	250.30
Pear	202.91
Banana	56.00
Asparagus	22.00
Chickpea grain	16.38
Blackberry	2.30
Total	**6,308,804.21**

Table 4 Production volume per crop
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020. http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php



Graphic 2 Three main crops in Hidalgo State, according to production volume
Source: Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020. http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php

Database design

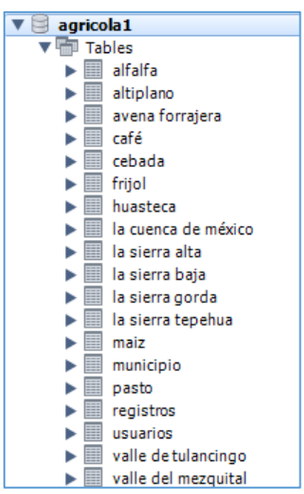


Figure 3 Database
Source: Own elaboration

Interface, definition of colors

Figure 4 Interface design
Source: Own elaboration

Prototype construction: The prototype design was accomplished.

Website landing page

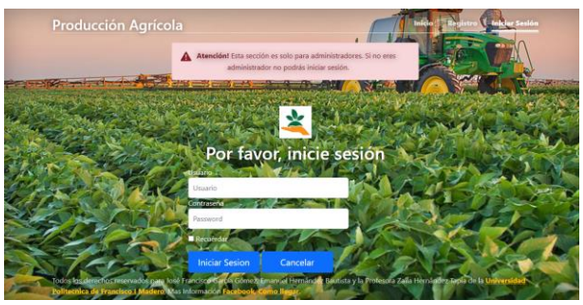


Figure 5 Login page
Source: Own elaboration

It is recommended the register form, for users who wish to access the site, in order to have the number of people interested in the information.

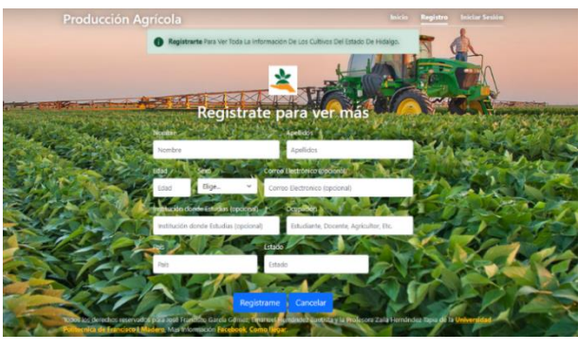


Figure 6 Registration page
Source: Own elaboration

Example of how the query of a crop will be displayed within the website through the thematic map.

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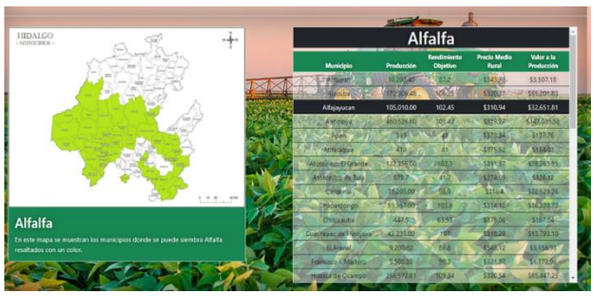

Figure 7 Alfalfa production
Source: Design-Own elaboration
Source: Data- Servicio de Información Agroalimentaria y Pesquera (SIAP), year 2020
http://infosiap.siap.gob.mx/gobmx/datosAbiertos_a.php

Development, delivery and feedback: The functionality of the website and the presentation of the information are verified.

Results

The website was developed in an effort to show the production volume of the main crops of Hidalgo State, to publicize it.

Conclusions

Using different tools such as: Xampp, PhpMyAdmin, MySQL Workbench and Atom, the development of the website was possible and it will allow to know the main crops of Hidalgo State, likewise, it will be possible to consult the production volume of each city or region. In future, more information will be attached in the research such as: Sown area, harvested area, rural price average, production value, among other data.

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