



Title: Modelling of a business intelligence system for indicator management in the stirring tilapia farming

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Agenda

Introduction

Methodology

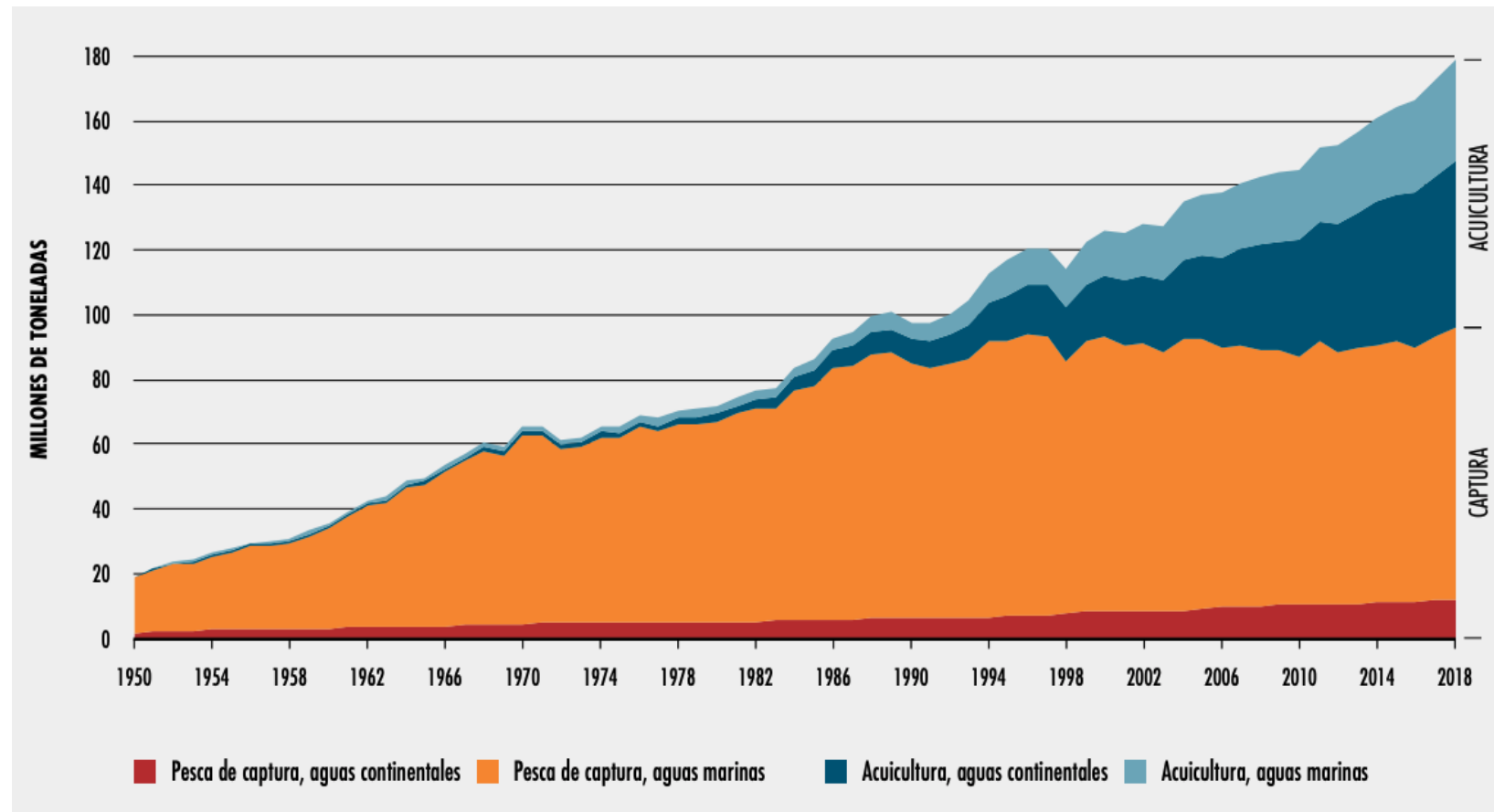
Results

Conclusions

References

Introduction

- Aquaculture is the farming of aquatic organisms in coastal and inland areas, where there's an intervention in the growth process to increase production.
- This activity has increased considerably in the last decades.



Global fish production. Source: FAO (2022)

Introduction

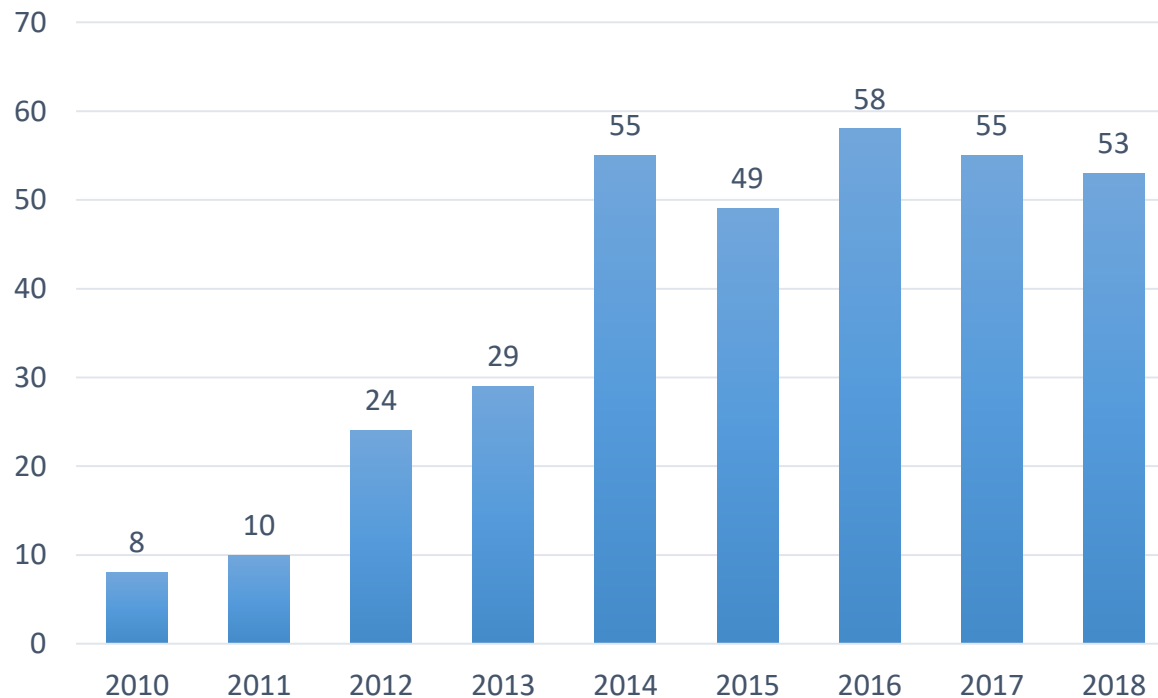
- In 2018, the tilapia was the 3rd most produced aquaculture product with more than 4.5 million tons.

Finfish	2010	2012	2014	2016	2018	Proportion of 2018
Grass carp	4 213.1	4 590.9	5 039.8	5 444.5	5 704.0	10.5
Silver tent	3 972.0	3 863.8	4 575.4	4 717.0	4 788.5	8.8
Nile tilapia	2 657.7	3 342.2	3 758.4	4 165.0	4 525.4	8.3
Common carp	3 331.0	3 493.9	3 866.3	4 054.7	4 189.5	7.7
...

Fishery products with the highest production. Source: FAO (2022).

Introduction

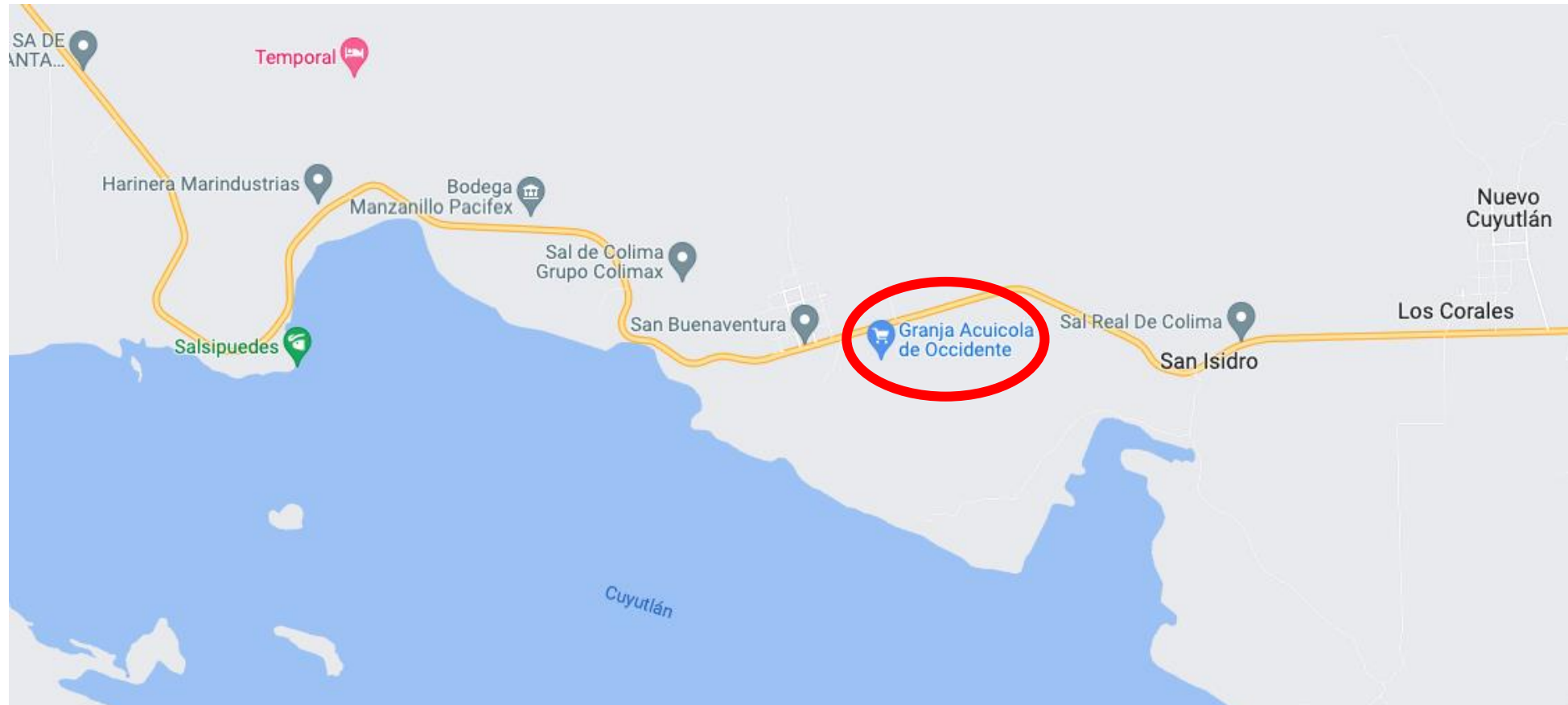
- In Mexico, tilapia aquaculture production increased considerably from 2010, where approximately 8 thousand tons were generated, up to 53 thousand tons in 2018.
- Among the factors for the increase in aquaculture production, can be mentioned the use of diverse and innovative technologies .



Tilapia production in México. Source:
CONAPESCA (2021).

Introduction

- The case study is The Granja Acuícola de Occidente, located in the town of San Buenaventura, in Manzanillo, Colima, Mexico.
- The farm's producer has a technology called C-TRA, a web system where the values associates with each production process are recorded.



Introduction

- Despite this system, there is a lack of computational tools to process and exploit the recorded data.
- Additionally, productive efficiency is mostly calculated by applying a direct rule of three .

The screenshot shows a web application interface for 'ACUICOLA MARIA DEL CARMEN'. The user is logged in as 'HEMBER LERDO'. The main content area displays a table titled 'TANQUE-02' with the following data:

Usuario	Fecha y Hora	Cantidad (Kilogramos Porcion)	Nombre del Alimento
HEMBER LERDO MORALES	04/07/2022 12:00 AM	25	COMIDA
HEMBER LERDO MORALES	05/07/2022 12:00 AM	25	COMIDA
HEMBER LERDO MORALES	06/07/2022 12:00 AM	25	COMIDA
HEMBER LERDO MORALES	07/07/2022 12:00 AM	25	COMIDA
HEMBER LERDO MORALES	08/07/2022 12:00 AM	25	COMIDA
HEMBER LERDO MORALES	09/07/2022 12:00 AM	25	COMIDA
HEMBER LERDO MORALES	10/07/2022 12:00 AM	8	COMIDA
HEMBER LERDO MORALES	11/07/2022 12:00 AM	42	COMIDA
HEMBER LERDO MORALES	12/07/2022 12:00 AM	38	COMIDA
HEMBER LERDO MORALES	13/07/2022 12:00 AM	37	COMIDA

The interface includes a sidebar with navigation options: Actividades, Tanques, Usuarios, Clientes-Proveedores, Establecimientos, and Almacén. The table has a search bar and a pagination control showing 'Mostrando registros de 1 al 10 de un total de 114 registros'.

Feed view from
C-TRA.
Source: C-TRA
(2022).

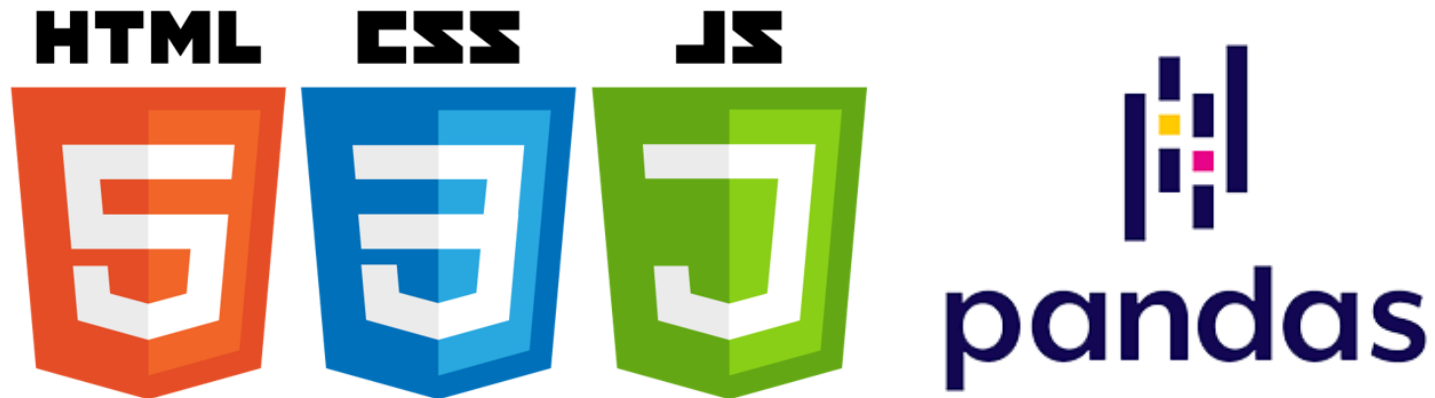
Introduction

- This work proposes to generate a system based on business intelligence, called the Intelligent System for Aquaculture Tilapia Management (SIGETA), which involves technologies for the design of data warehouses, ETL process, statistical calculation and generation of graphs and tables.



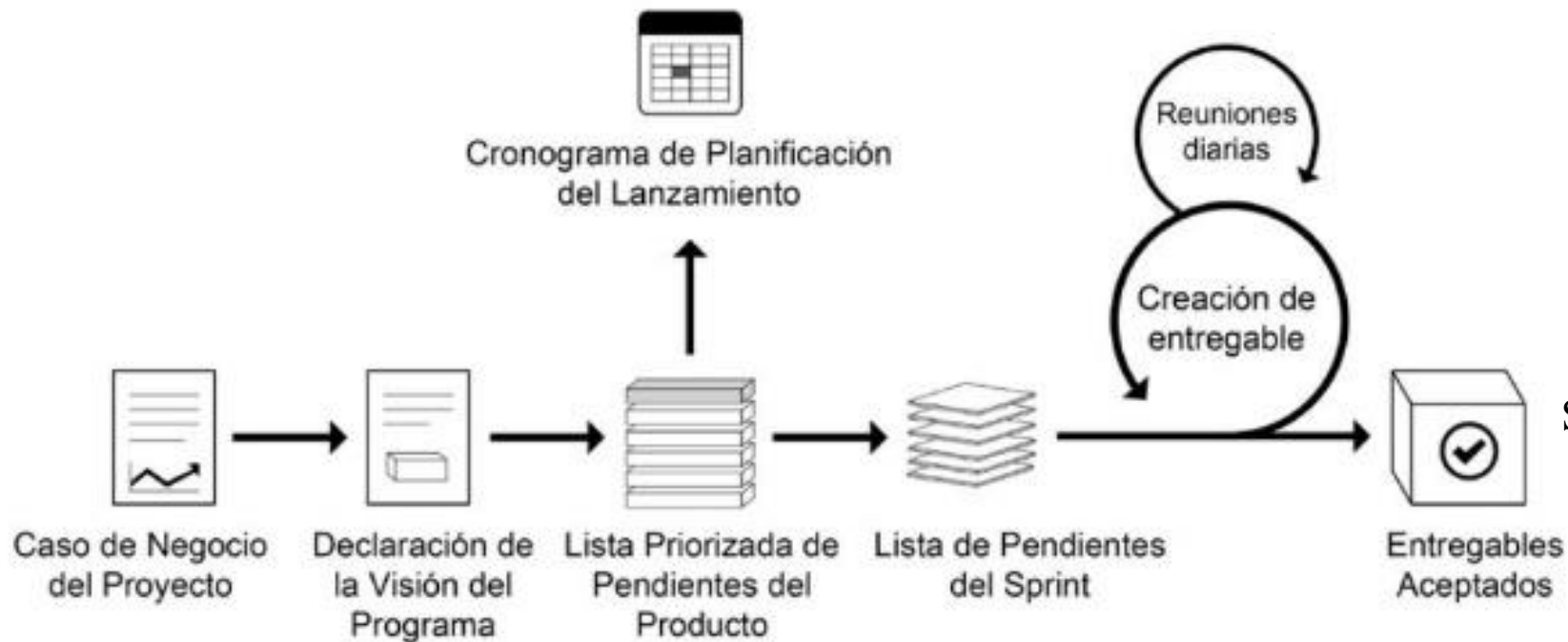
Methodology

- The case study is linked to the needs reported by the owner of the tilapia farm.
- As materials are the database and the same technologies that allows C-TRA to operate.
- Additionally, the Python Pandas library is used, which is focused on statistical analysis.



Methodology

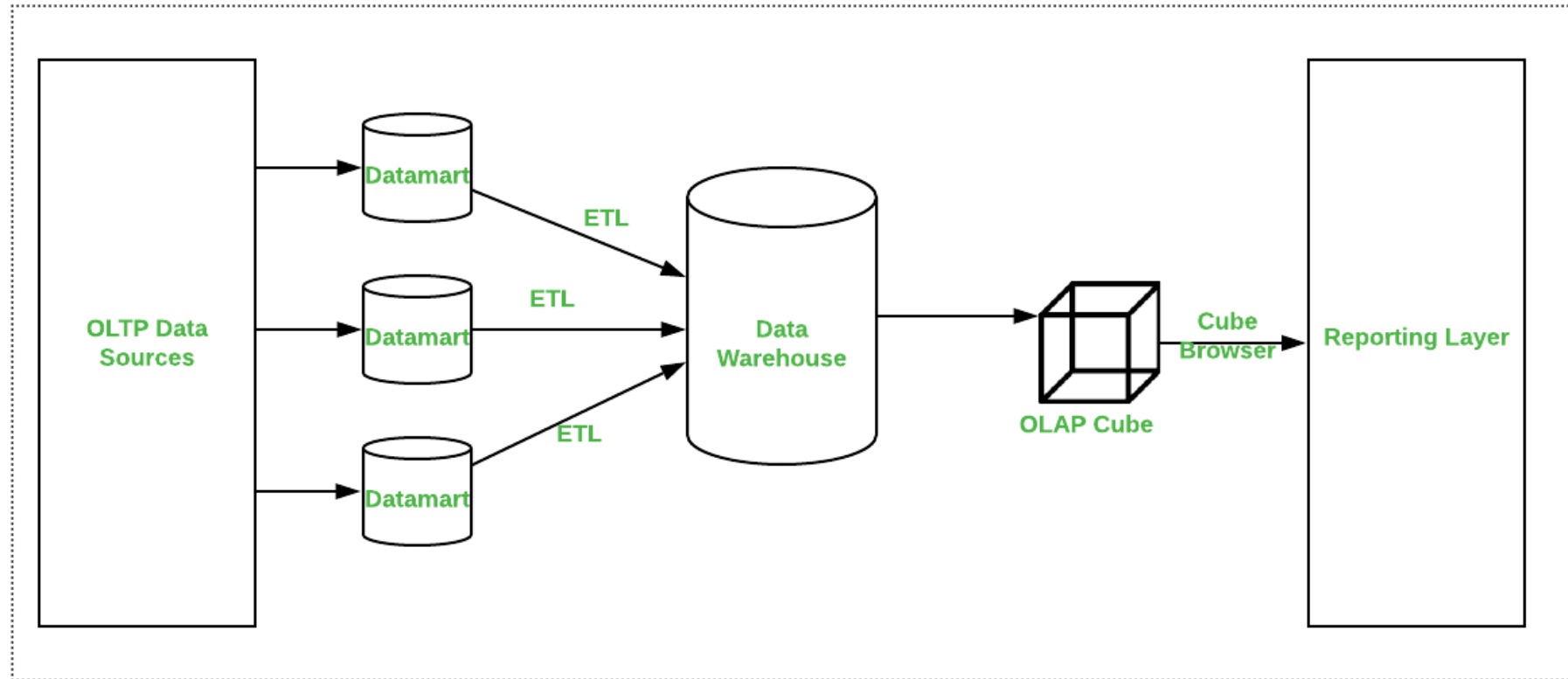
- As a development methodology in the management of the software engineering process, the agile methodology Scrum was followed.



Scrum's project life cycle.
Source: SBOK Guide 3rd
edition. (2019)

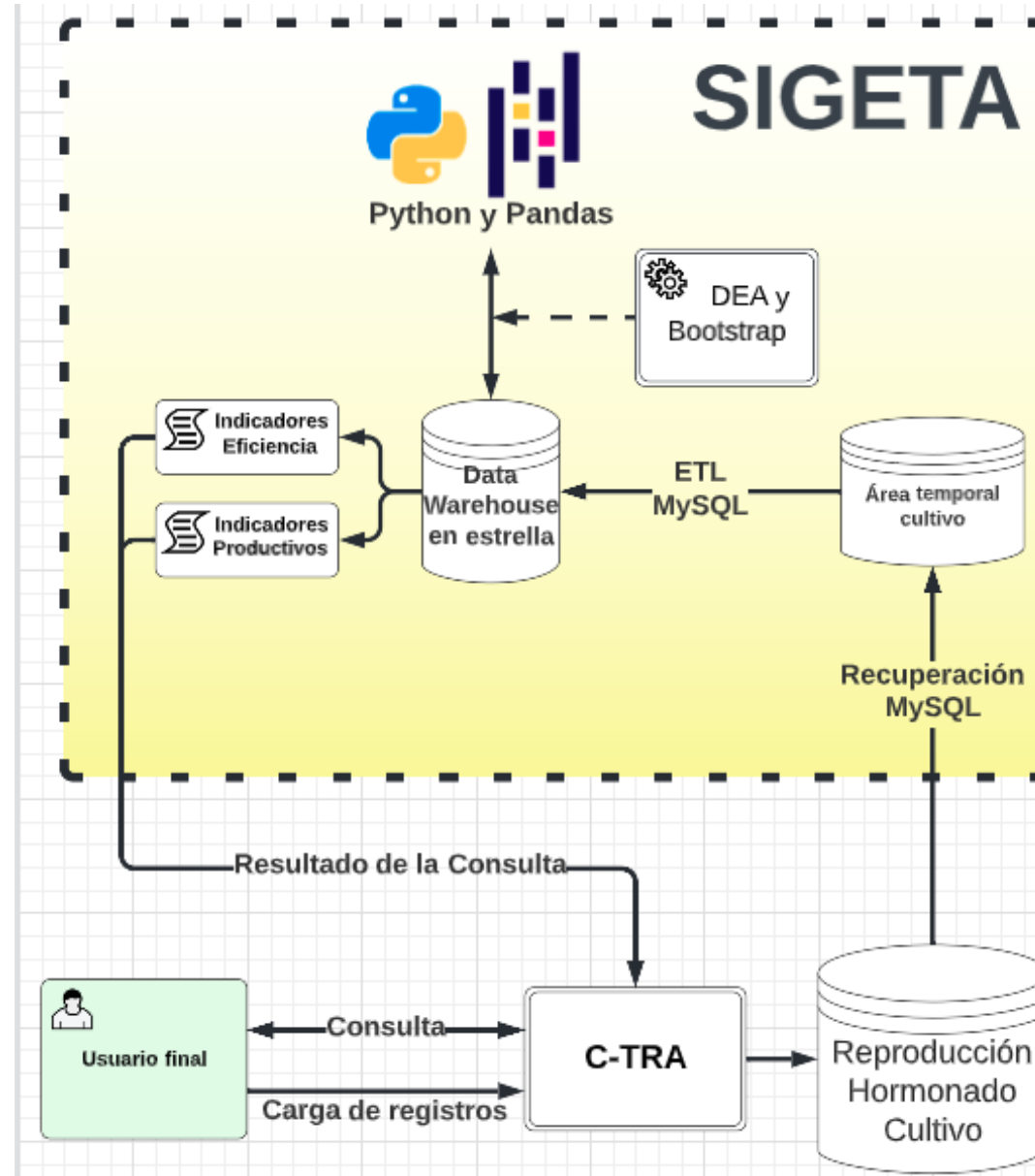
Methodology

- Also, this research incorporated the Kimball methodology for data warehouse modeling.



Conceptual model of the Kimball methodology. Source: Astera.
(2020)

Methodology



Conceptual model of SIGETA.
Source: Own elaboration

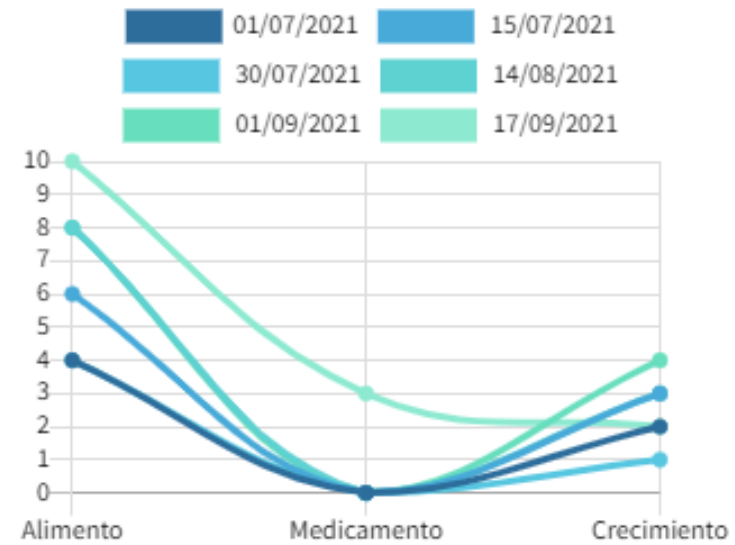
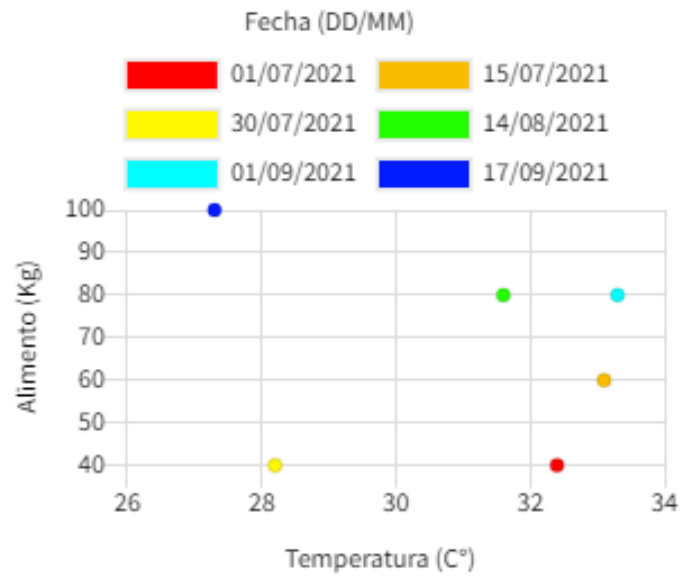
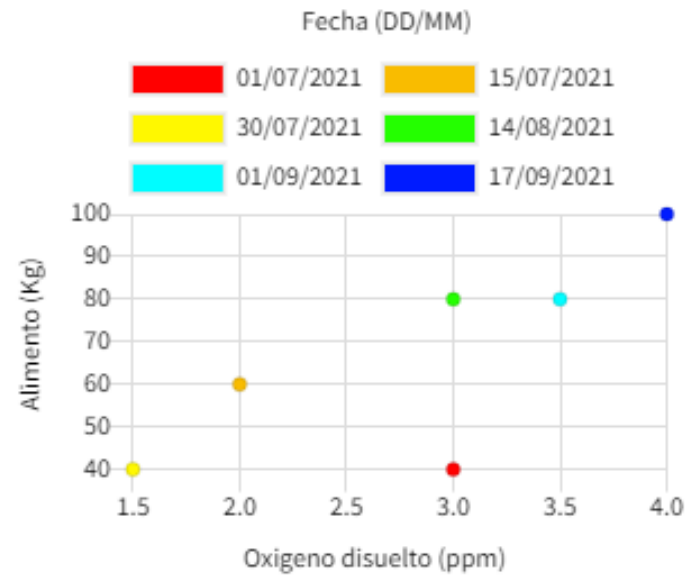
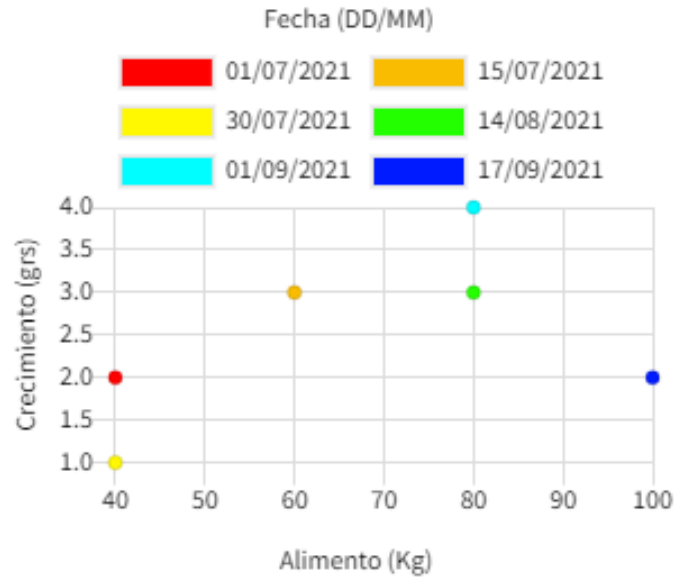
Results

- The modeling of the SIGETA system was obtained, which includes the data warehouse on which it operates, as well as the views that compose it.

Results



Results



Results

Estanque 2

Periodo

Inicio

20 Jul 2016

Fin

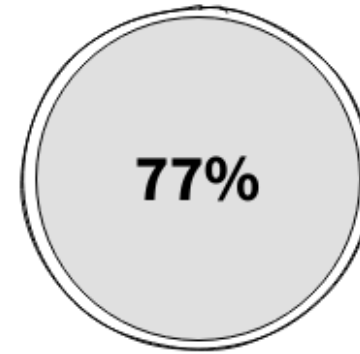
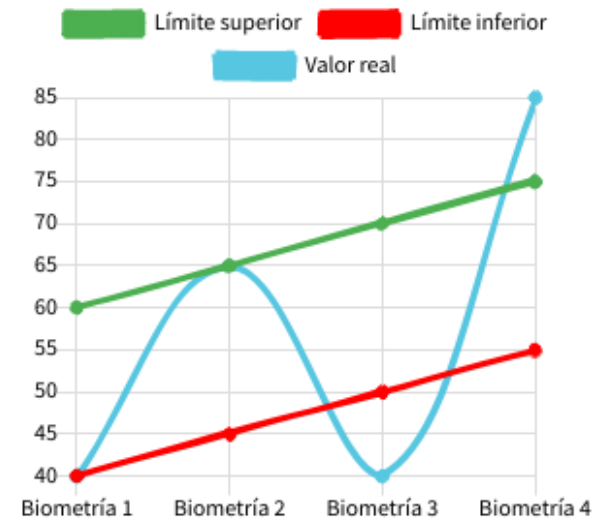
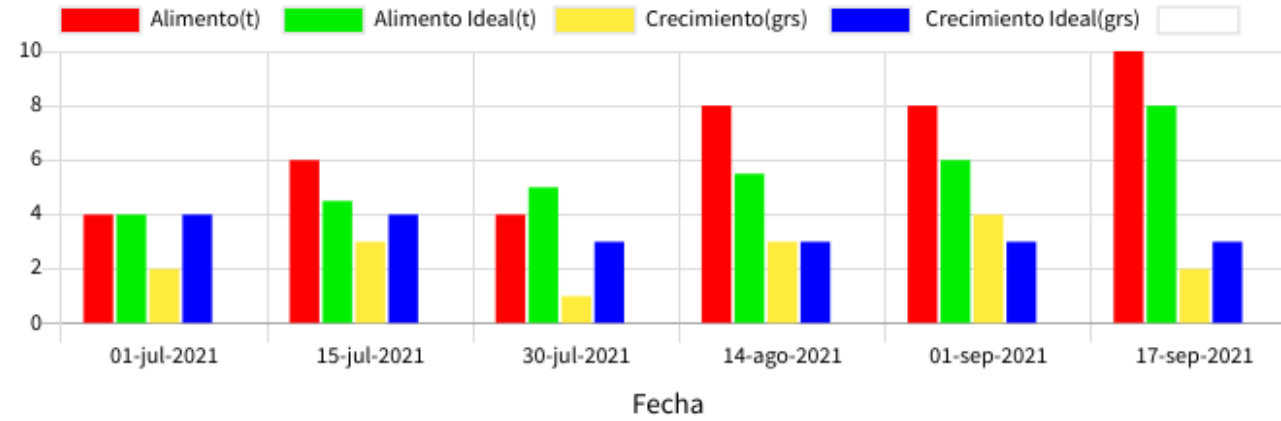
26 Jul 2016

Eficiencia

Información general

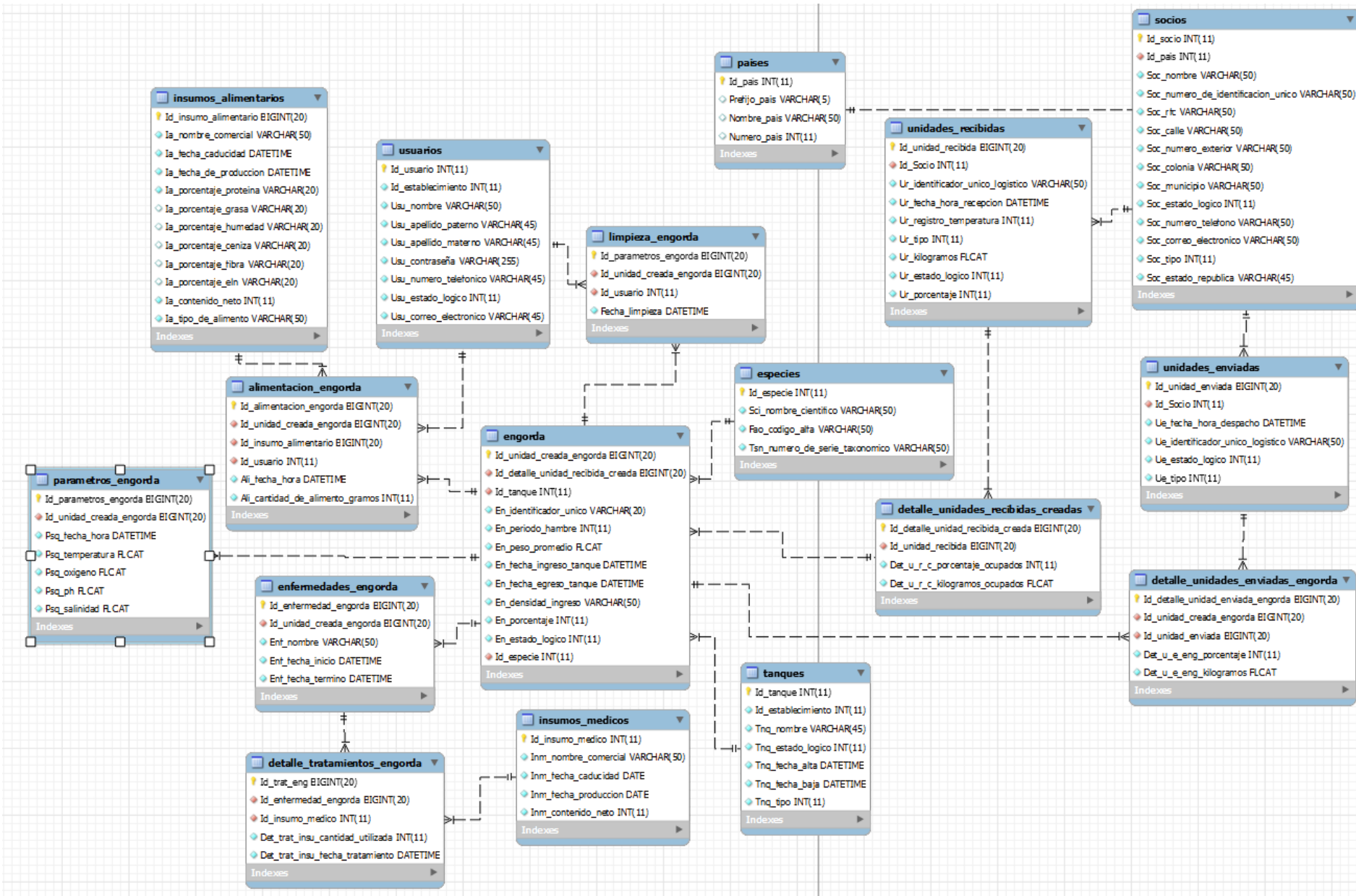
Relación

Biometría

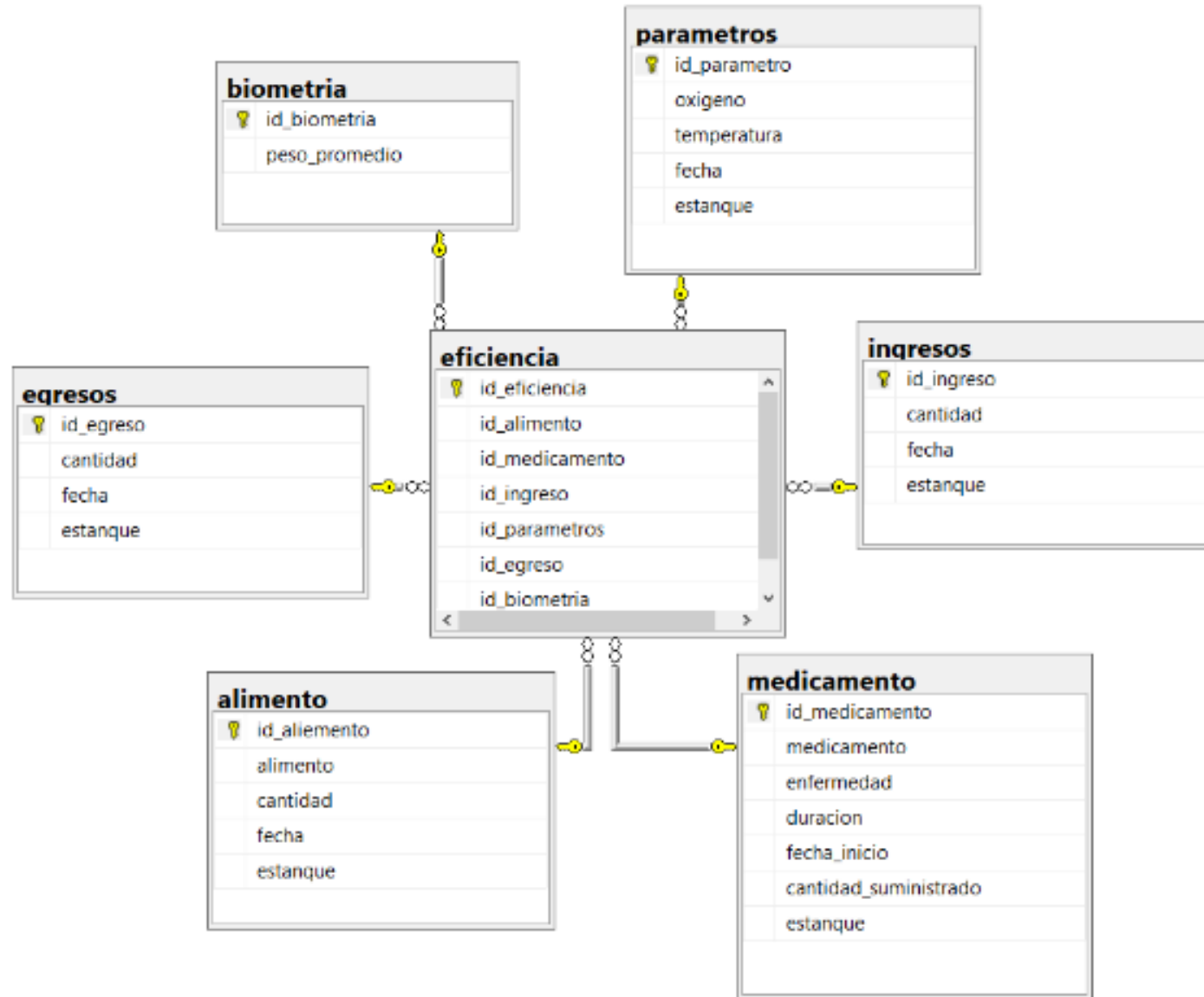


Eficiencia aproximada

Results



Results



Conclusions

- This modeling proposes a solution to the problems of the aquaculture farm owner and the C-TRA system, allowing the generation of information through graphs that support decision making
- SIGETA combines statistical calculations of efficiency with management, using computational technologies. In addition, the use of this system will clarify uncertainties in the face of complications substantiating the empirical knowledge of the workers
- The views work for the analysis and management of data produced during the tilapia aquaculture farming stage, taking advantage of the fact that the producer has records of tilapia culture monitoring
- The impact of the system is to provide an opportunity for the producer to know the behavior of each pond
- Represents direct benefits for the producer, since at any moment of the farming he can relate the productive variables, looking for situations that can cause affectations and act on the basis of what has been observed

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