PREDISAN

Predictive Model for Food Security in Central America based on Surveys and Secondary Data

GIS4tech
Spin-Off of the University of Granada (Spain)

March 2024

OUTLINE

1. WHO ARE WE?
GIS, IA AND KNOWLEDGE TRANSFER

2. INTRODUCTION of the ISSUE
LACK OF DETAILED INFORMATION FOR DECISIONS OF DISTRIBUTION OF AID

3. METHODOLOGY of PREDISAN
PROCESS FOR PREDICTIVE MODEL FOR FOOD SECURITY

4. PREDICTIVE MODELS
REACHING BEYOND FOOD SECURITY FIELD DATA

5. FUTURE IMPROVEMENTS
REFLECTIONS AND AREAS FOR IMPROVEMENTS

6. DEPLOYMENT IN OTHER REGIONS
ADAPTING THE APPROACH TO OTHER REGIONS

7. CONCLUDING REFLECTIONS

1. WHO ARE WE?

GIS, AI, AND KNOWLEDGE TRANSFER.

1. WHO ARE WE?

Multiple data sources

LIBERALIZATION
MASSIVE DATA

Spatial component

GEOGRAPHIC
INFORMATION SYSTEMS

DATA

ANALYSIS
SPACE

STRATEGIC
VALUE

R&D

Decision making

SERVICES
INNOVATIVE

NEW TECHNIQUES

Artificial Intelligence
Machine Learning
SOM

UGR
Research Group:
Research Cluster on Territorial Synergies
(RNM 034)

ACCIÓN CONTRA EL HAMBRE

actionaid

European Union
Civil Protection and
Humanitarian Aid

USAID
FROM THE AMERICAN PEOPLE

aecid

Spin-Off
UNIVERSIDAD DE GRANADA

4tech IS

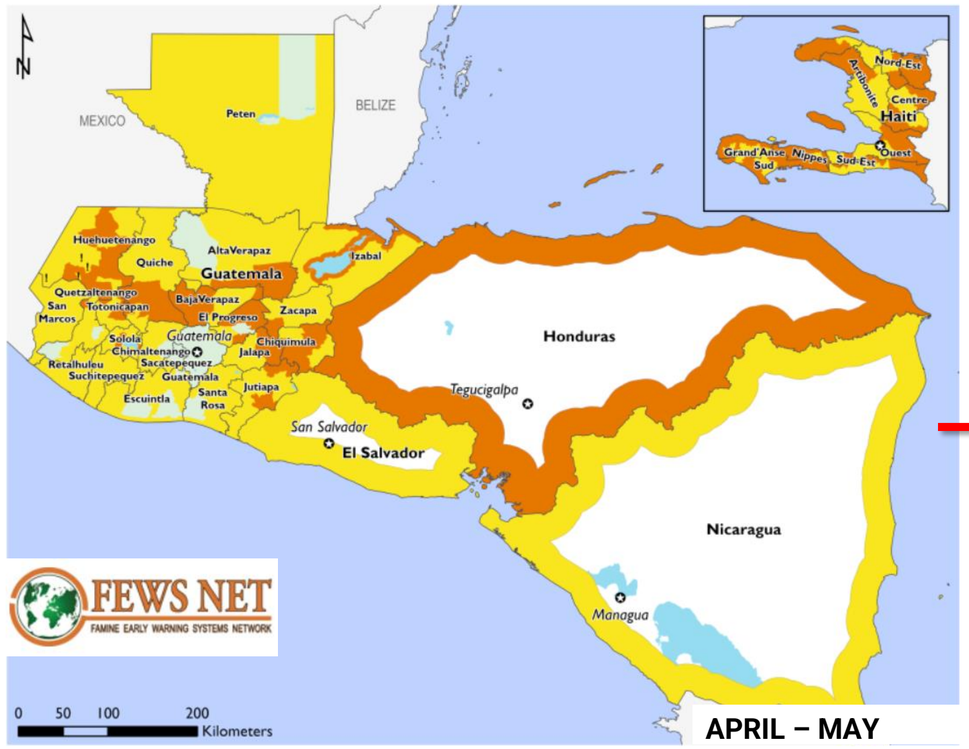
Spin-Off
UNIVERSIDAD DE GRANADA

2. INTRODUCTION of the THE ISSUE

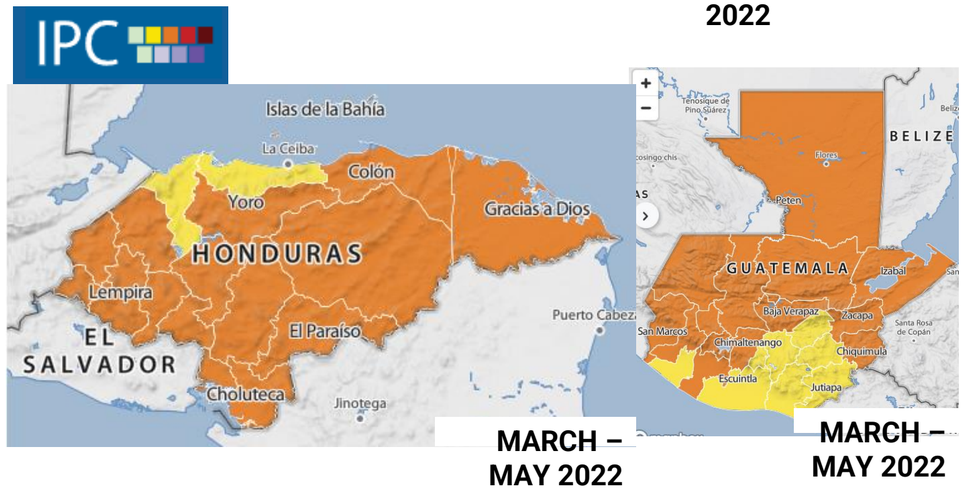
LACK OF DETAILED INFORMATION FOR DECISIONS OF DISTRIBUTION OF AID

2. INTRODUCTION. THE ISSUE

LACK OF DETAILED INFORMATION FOR DECISIONS OF DISTRIBUTION OF AID

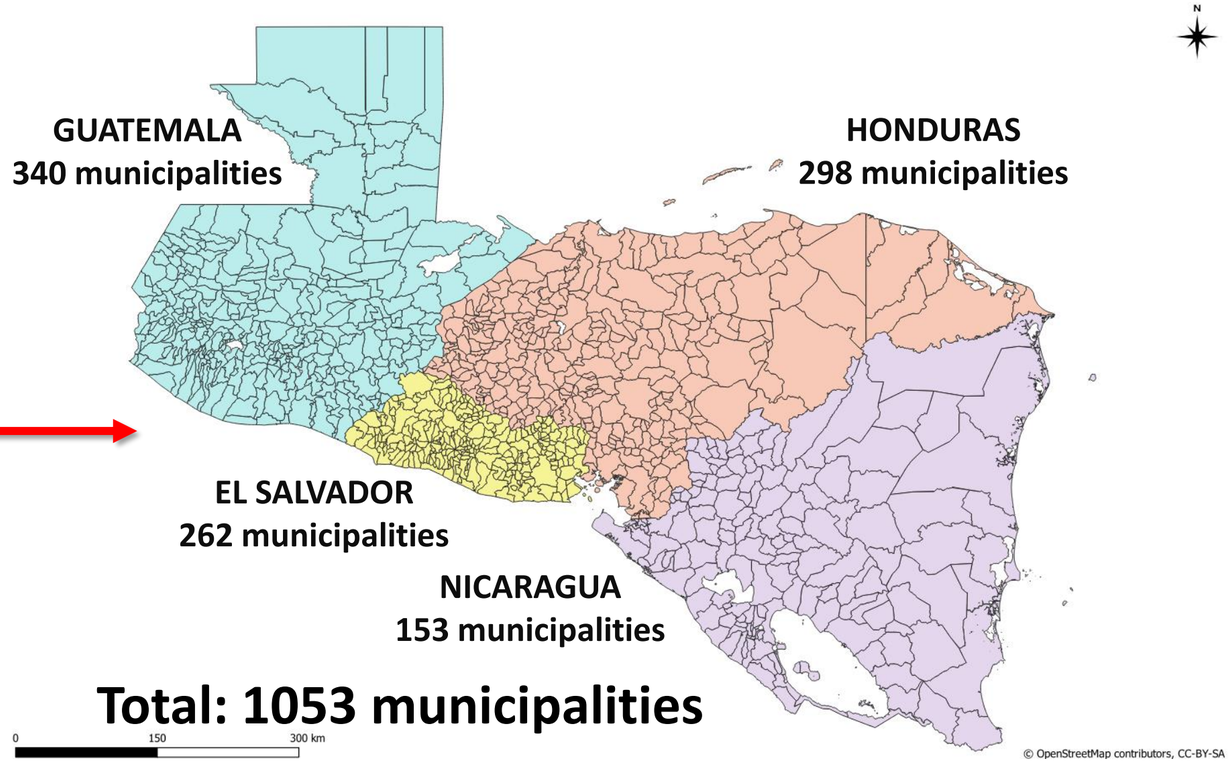


APRIL – MAY 2022



MARCH – MAY 2022

MARCH – MAY 2022

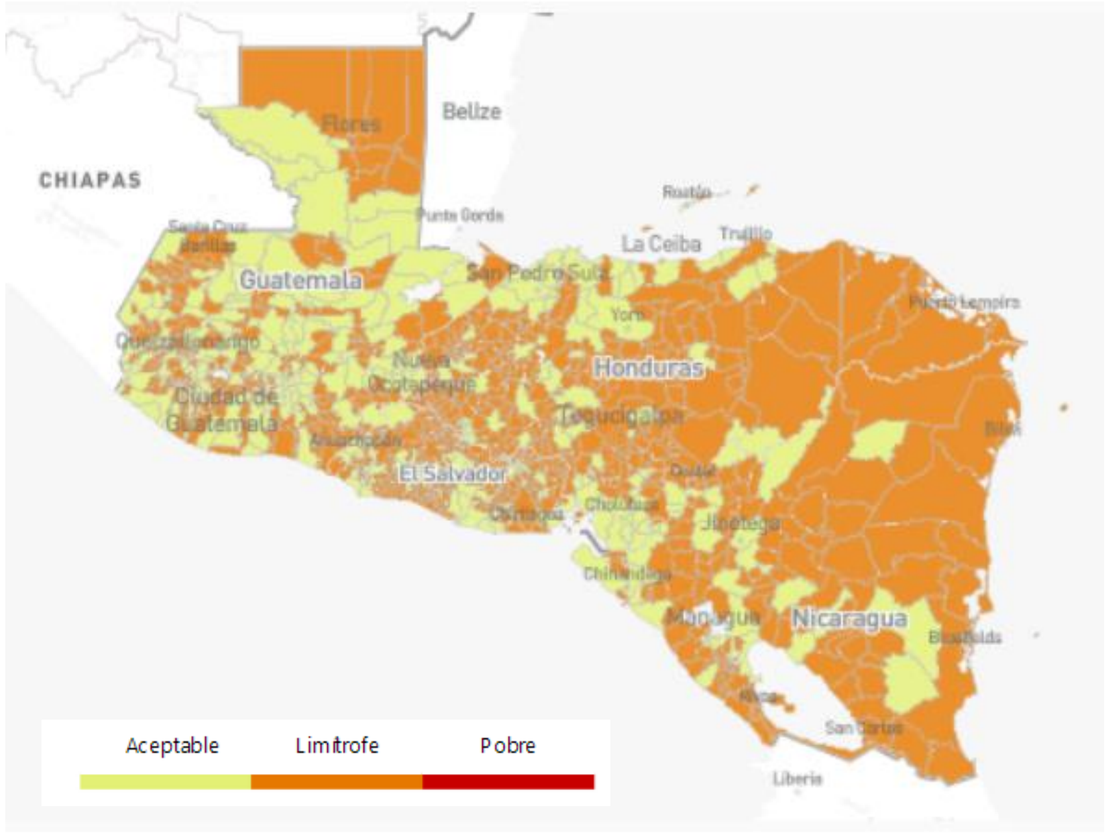


Sources: Vulnerability Indicators from FEWS NET and IPC.

2. INTRODUCTION. THE POINT

REACHING BEYOND FOOD SECURITY FIELD DATA

Predicciones Puntaje de consumo de alimentos (PCA)

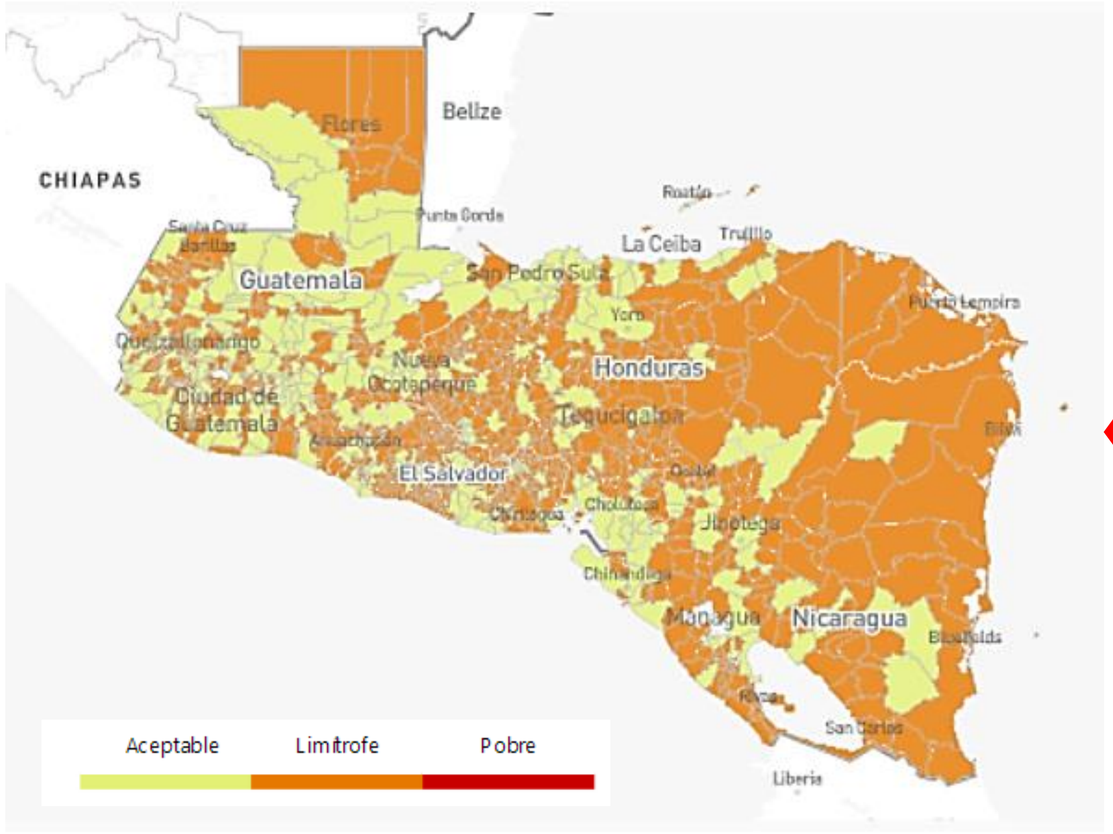


OBJECTIVE

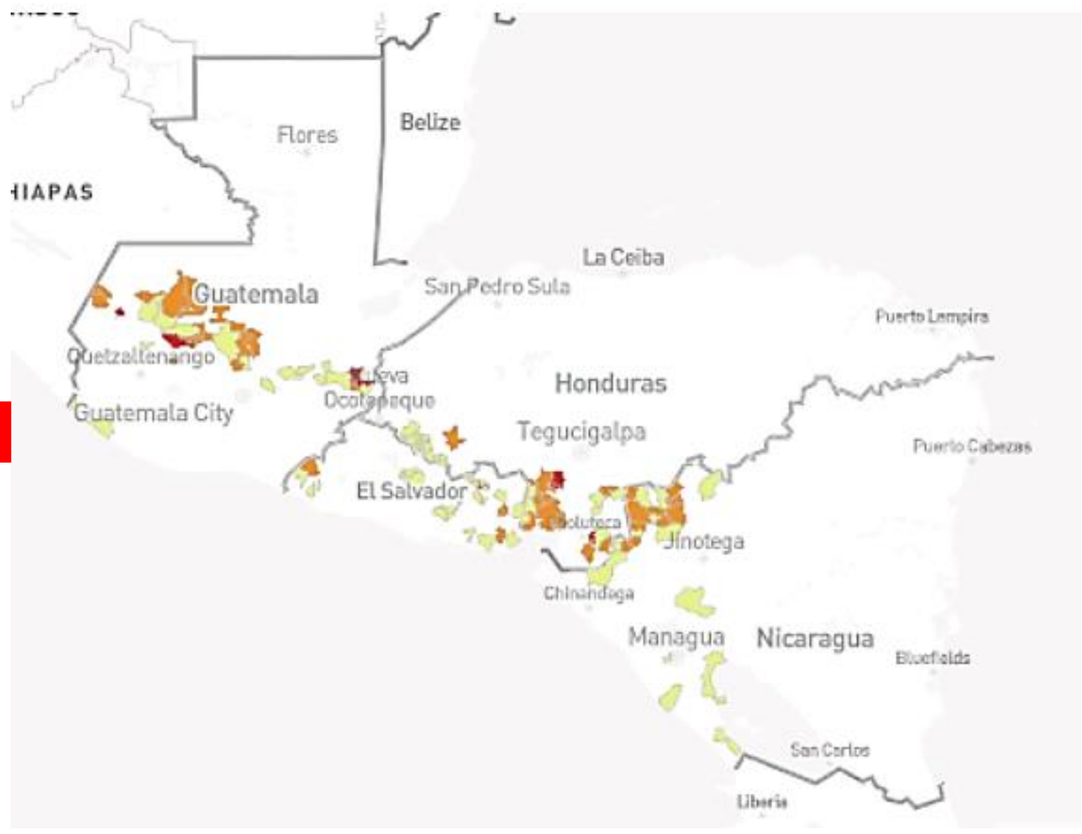
2. INTRODUCTION. THE POINT

REACHING BEYOND FOOD SECURITY FIELD DATA

Predicciones Puntaje de consumo de alimentos (PCA)



Puntaje de consumo de alimentos (PCA)



Source: PREDISAN. Food Consumption Score (FCS) October 2021

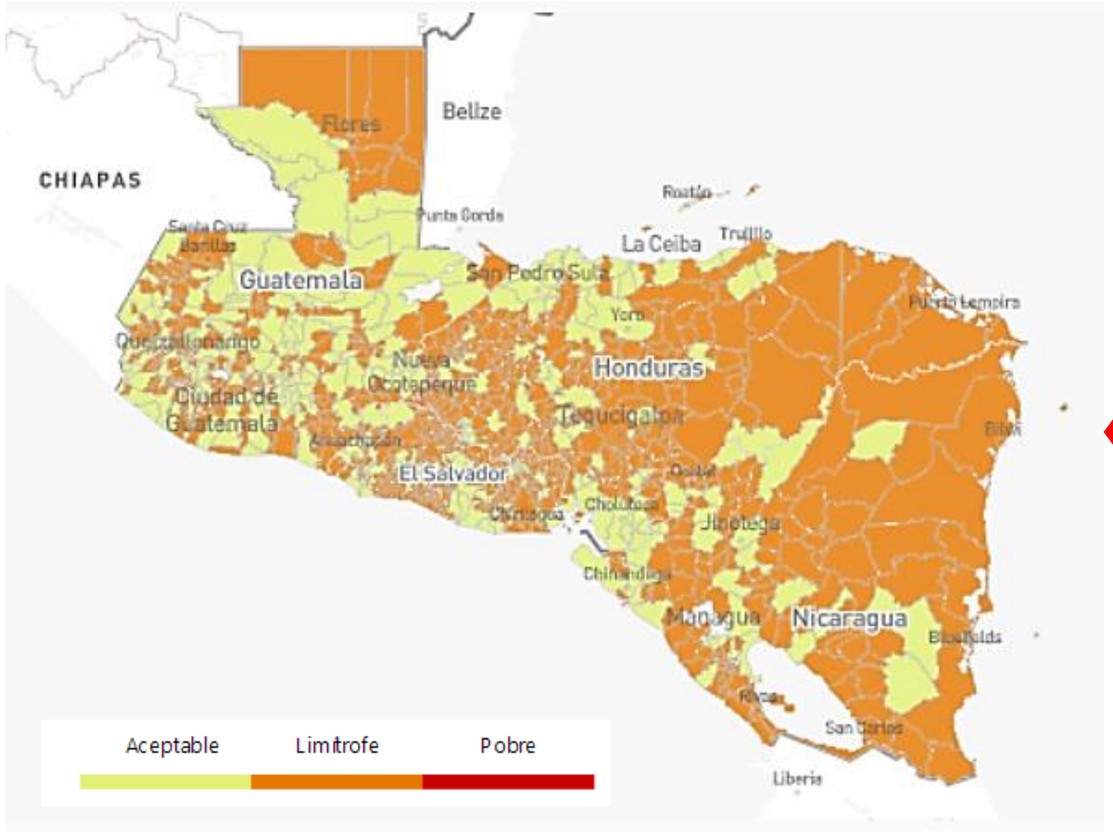
OBJECTIVE

BASIS

2. INTRODUCTION. THE POINT

REACHING BEYOND FOOD SECURITY FIELD DATA

Predicciones Puntaje de consumo de alimentos (PCA)



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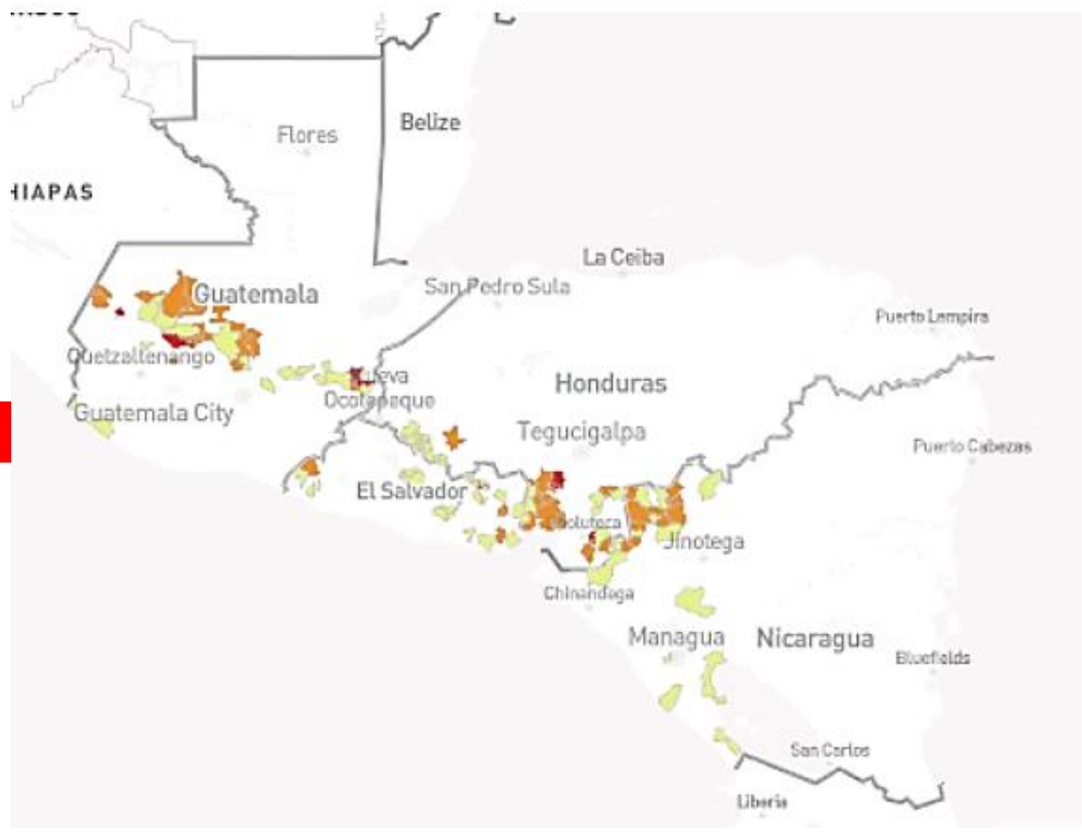


Source: PREDISAN. Food Consumption Score (FCS) October 2021

OBJECTIVE

1st. PREDICTIONS (**now**casting)

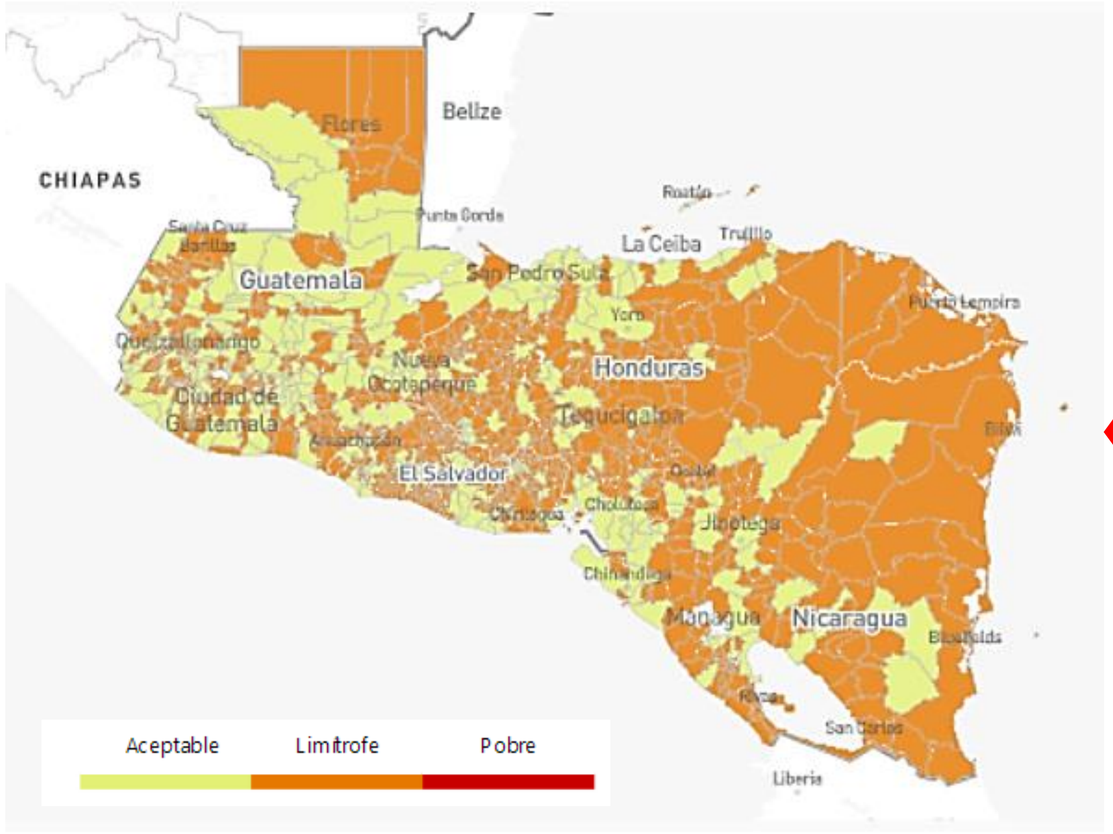
BASIS

REAL DATA (NGO's field surveys)

2. INTRODUCTION. THE POINT

REACHING BEYOND FOOD SECURITY FIELD DATA

Predicciones Puntaje de consumo de alimentos (PCA)



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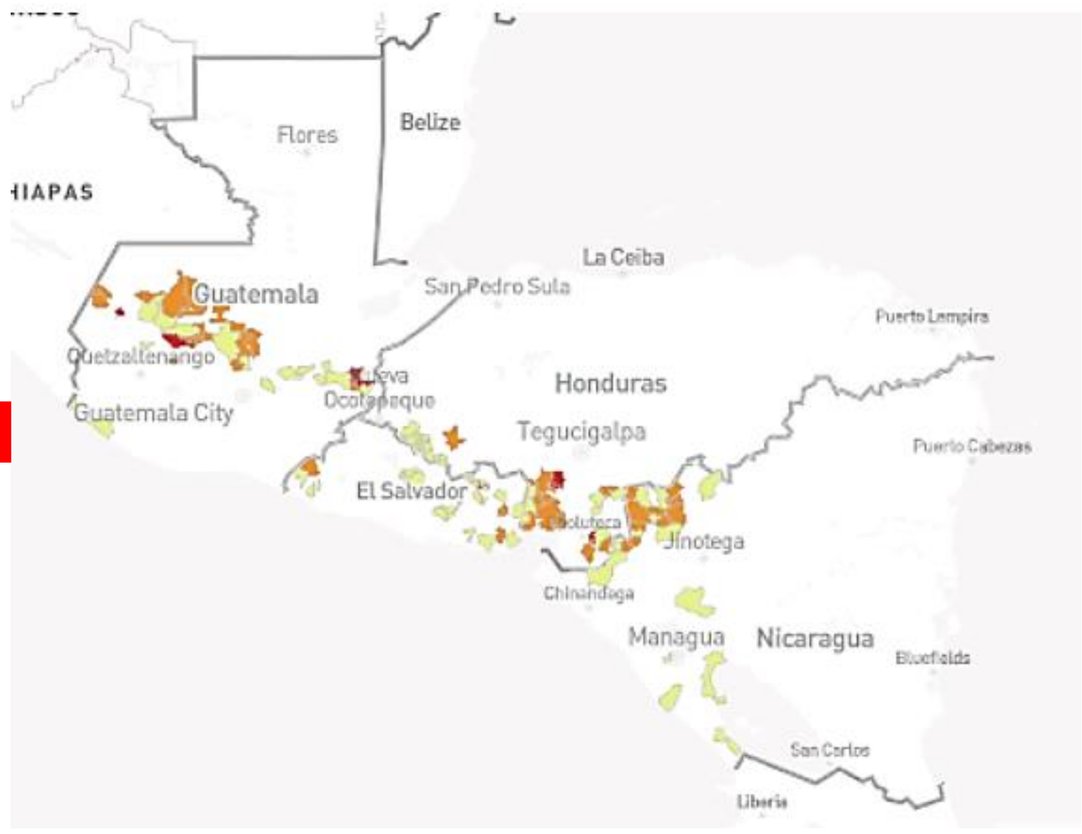


Source: PREDISAN. Food Consumption Score (FCS) October 2021

OBJECTIVE		BASIS
1st. PREDICTIONS (**now**casting)	⟸	**REAL DATA (NGO's field surveys)**
2nd. PREDICTIONS (**fore**casting)	⟸	**SCARCITY or NO REAL DATA**

3. METHODOLOGY of PREDISAN

PROCESS FOR PREDICTIVE MODEL FOR FOOD SECURITY

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

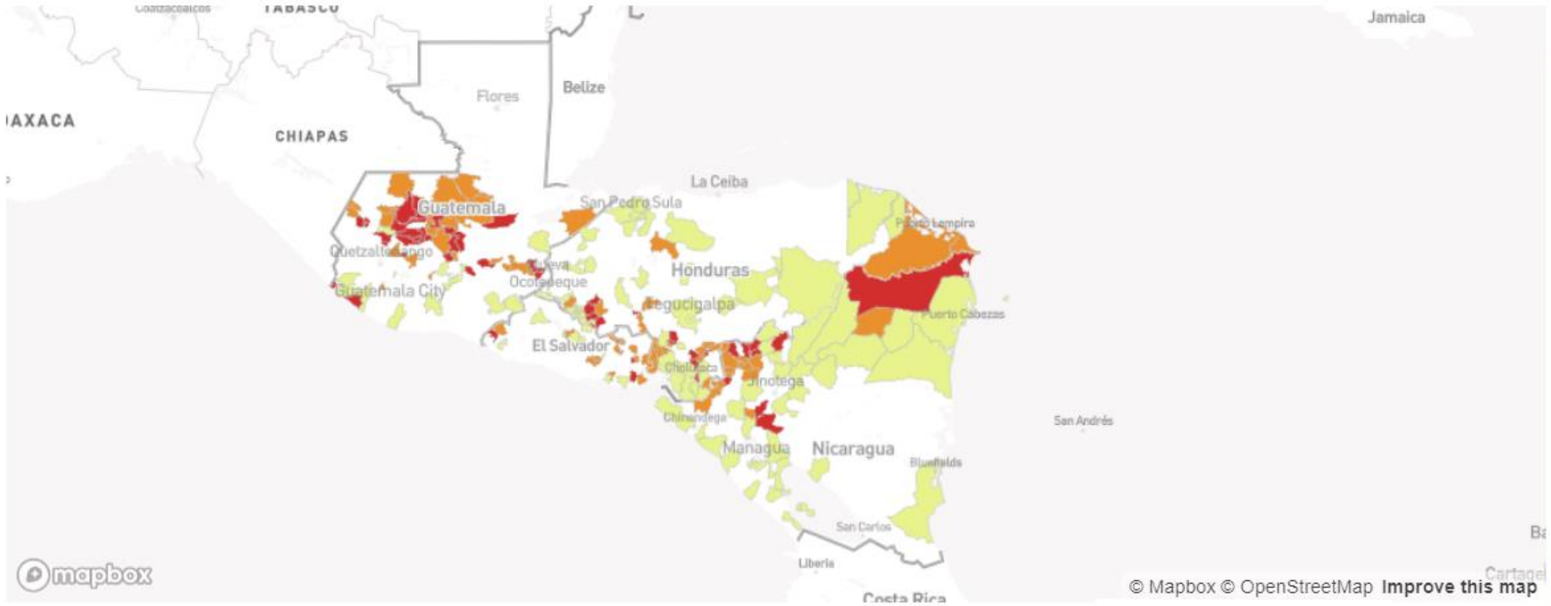
3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

FIELD SURVEYS

Food Consumption Score (FCS)

Descargar datos desde HDX



Aplicando la regla del 20% a la población la categoría es:

Limítrofe

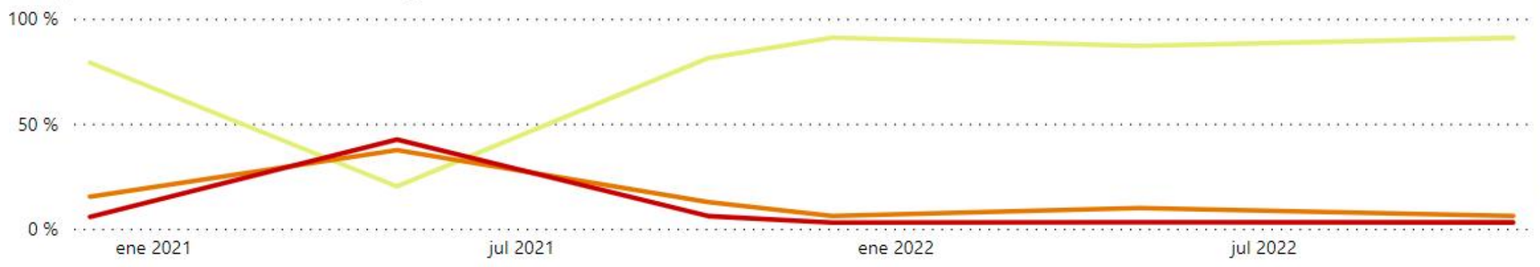
Fuente:
ACH

País
Todas

Departamento, Municipio
Todas

Fecha
Selección múltiple

Comportamiento histórico de categorías



Comportamiento según el período:

diciembre de 2020

Fases	Población	%
Aceptable	15.893.246	68,81%
Limítrofe	2.508.288	17,66%
Pobre	1.462.331	13,52%

Cantidad de personas en fase Limítrofe y Pobre:

3.970.619

SOURCE: ACH. Deployed at PREDISAN by the platform authors

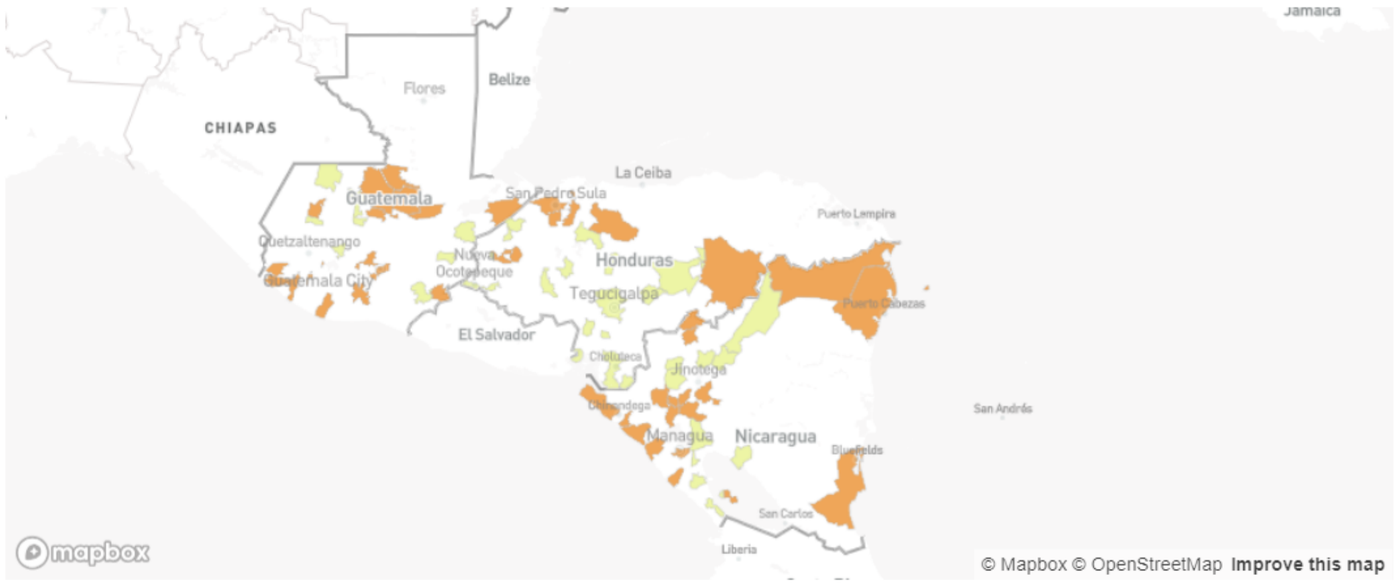
3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

FIELD SURVEYS

Household Hunger Scale (HHS)

Descargar datos desde HDX



Aplicando la regla del 20% a la población la categoría es:

Moderada incidencia

Fuente:
Consorcio de Organizaciones Humanitarias

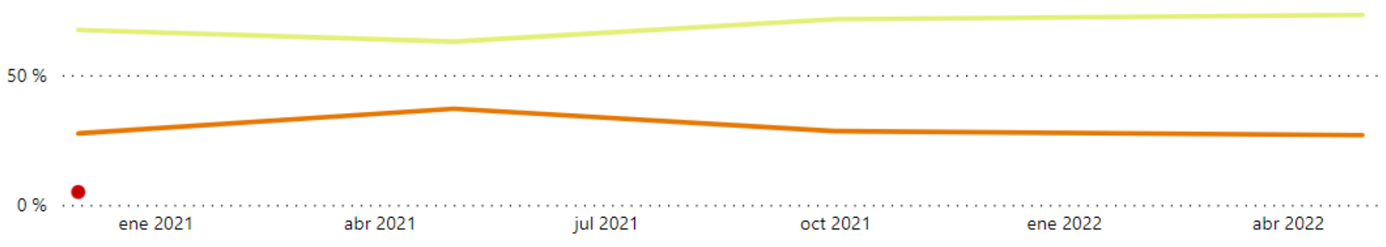
País:
Todas

Departamento, Municipio
Todas

Fecha
mayo de 2022

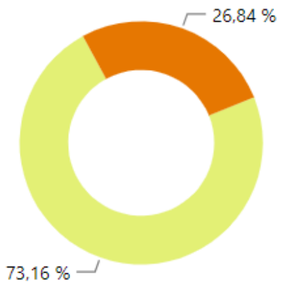
Poca Moderada Severa

Comportamiento histórico de categorías



Comportamiento según el período:

mayo de 2022



Fases	Población	%
1. Poca incidencia de hambre	6.969.098	73,16%
2. Moderada incidencia de hambre	2.964.702	26,84%

Cantidad de personas en fase Moderada y Severa:

2.964.702

SOURCE: Consorcio de Organizaciones Humanitarias (ACH and others)
Deployed at PREDISAN by the platform authors

3. METHODOLOGY of PREDISAN

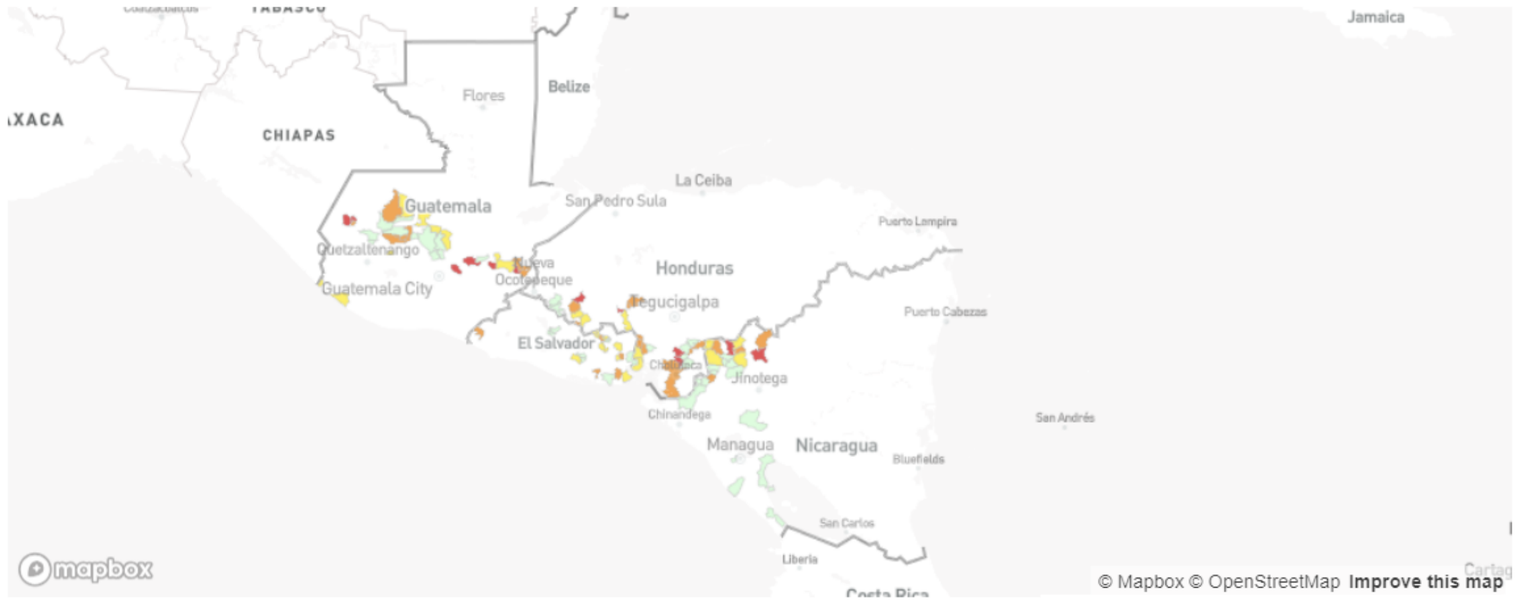
REACHING BEYOND FOOD SECURITY FIELD DATA

FIELD SURVEYS

Household Dietary Diversity Score (HDDS)

Descargar datos desde HDX

HDDS Nivel Departamental (FAO-DIEM)



Aplicando la regla del 20% a la población la categoría es:

Acentuada

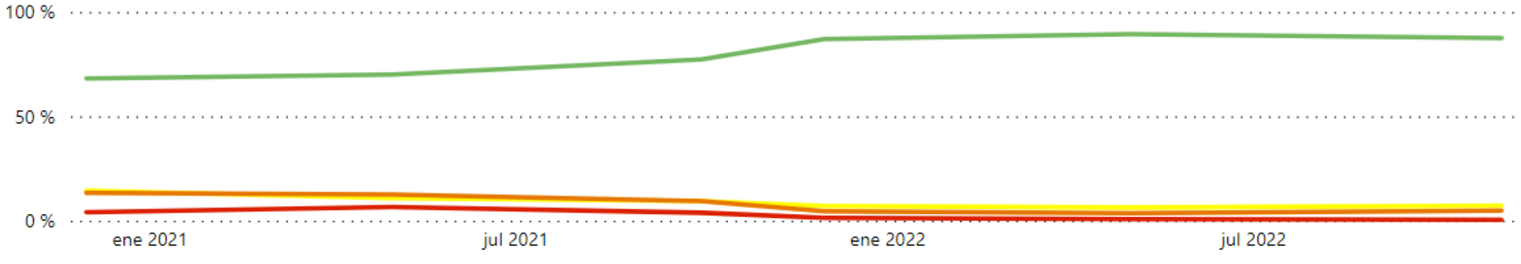
Fuente:
Consorcio de Organizaciones Humanitarias

País
Todas

Departamento, Municipio
Todas

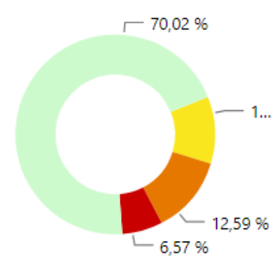
Fecha
mayo de 2021

Comportamiento histórico de categorías

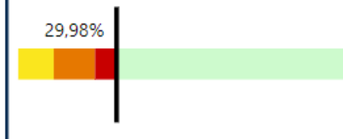


Comportamiento según el período:

mayo de 2021



Fases	Población	%
Fase 1. Ninguna	1.552.351	70,02%
Fase 2. Acentuada	315.423	10,83%
Fase 3. Crisis	301.615	12,59%
Fase 4. Emergencia	135.437	6,57%



Cantidad de personas en fase Acentuado, Crisis y Emergencia:

752.475

SOURCE: Consorcio de Organizaciones Humanitarias (ACH and others)
Deployed at PREDISAN by the platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

FIELD SURVEYS

Other features

RESULTADOS DE PRIMER NIVEL

- Puntaje de Consumo de Alimentos (PCA)
- Escala de Hambre en el Hogar (HHS)
- Índice de Estrategias de afrontamiento Reducido (rCSI)
- Puntaje de Diversidad Dietética en el Hogar (HDDS)
- Indicador de Estrategias de Afrontamiento de Medios de Vida (LCS)
- Escala de Experiencia de Inseguridad Alimentaria (FIES)
- Evolución Indicadores entre los grupos de población más excluidos

RESULTADOS DE SEGUNDO NIVEL

- Desnutrición aguda por MUAC
- Desnutrición aguda peso talla
- Desnutrición crónica
- Desnutrición Global
- Ayudas

+200 QUESTION SURVEYS

SOURCE: Consorcio de Organizaciones Humanitarias (ACH and others)
Deployed at PREDISAN by the platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD
SURVEYS

3. METHODOLOGY of PREDISAN

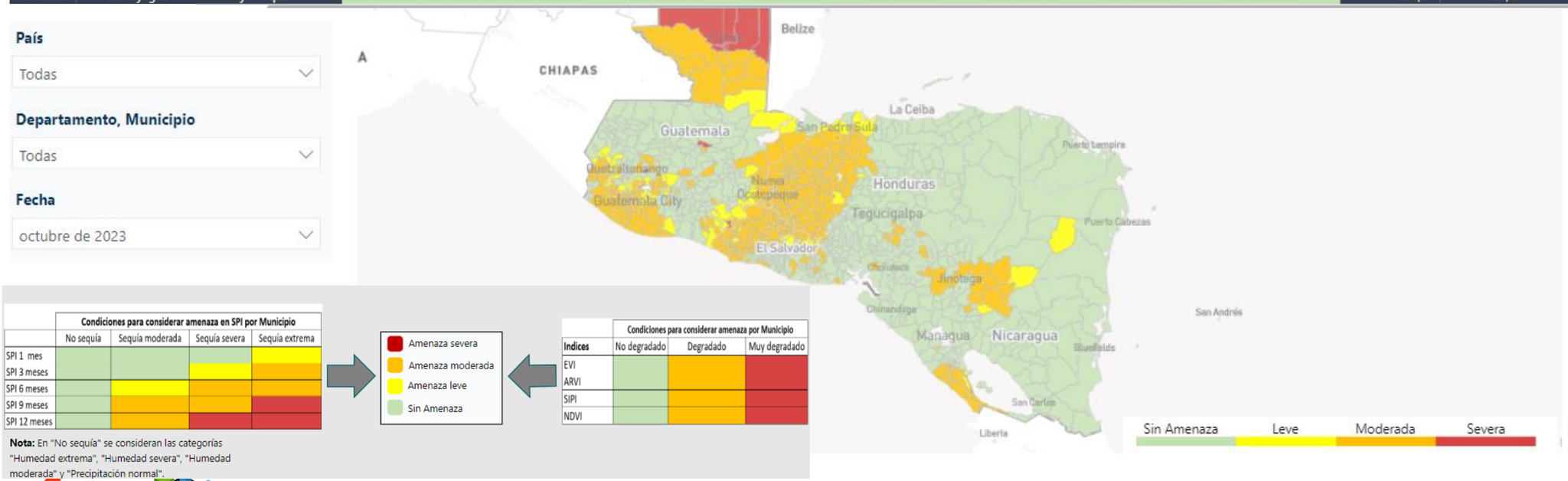
REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD SURVEYS

Agro-climatic Threats

PAÍS	DEPARTAMENTO	MUNICIPIO	SPI 1	SPI 3	SPI 6	SPI 9	SPI 12	EVI	ARVI	SIPI	NDVI	HÉCTAREAS DE CULTIVOS	HÉCTAREAS DE PASTO	NÚMERO DE HABITANTES	Amenazas Agroclimáticas globales
El Salvador	Sonsonate	Acajutla	Sin Amenaza	Sin Amenaza	Amenaza leve	Amenaza moderada	Amenaza moderada	Amenaza moderada	Sin Amenaza	Amenaza moderada	Sin Amenaza	964,17	1.336,83	52.359	Amenaza moderada
Guatemala	Chimaltenango	Acatenango	Sin Amenaza	Sin Amenaza	Amenaza leve	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	183,37	76,90	23.228	Sin Amenaza
Nicaragua	Leon	Achuapa	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Amenaza moderada	295,76	1.159,37	13.797	Sin Amenaza
Nicaragua	Chontales	Acoyapa	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	431,81	14.474,40	16.946	Sin Amenaza
Guatemala	Jutiapa	Agua Blanca	Sin Amenaza	Sin Amenaza	Amenaza leve	Amenaza moderada	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	905,02	354,91	16.353	Amenaza leve
El Salvador	Chalatenango	Agua Caliente	Sin Amenaza	Sin Amenaza	Amenaza leve	Amenaza moderada	Amenaza moderada	Sin Amenaza	Sin Amenaza	Amenaza moderada	Sin Amenaza	59,15	82,81	8.261	Amenaza moderada
Guatemala	Huehuetenango	Aguacatan	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	378,57	218,86	49.607	Sin Amenaza
Honduras	La Paz	Aguanqueterique	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	136,05	283,93	5.025	Sin Amenaza
El Salvador	San Salvador	Aguilares	Sin Amenaza	Sin Amenaza	Amenaza leve	Amenaza moderada	Amenaza moderada	Amenaza moderada	Sin Amenaza	Amenaza severa	Sin Amenaza	189,29	147,88	21.267	Amenaza moderada
El Salvador	Ahuachapan	Ahuachapan	Sin Amenaza	Sin Amenaza	Amenaza leve	Amenaza moderada	Amenaza moderada	Amenaza moderada	Sin Amenaza	Amenaza moderada	Sin Amenaza	1.129,80	674,33	110.511	Amenaza moderada
Honduras	Gracias A Dios	Ahuas	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	2.330,57	20.070,14	9.171	Sin Amenaza
Honduras	Comayagua	Ajuterique	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	Sin Amenaza	834,04	130,13	11.888	Sin Amenaza



	Condiciones para considerar amenaza en SPI por Municipio			
	No sequía	Sequía moderada	Sequía severa	Sequía extrema
SPI 1 mes				
SPI 3 meses				
SPI 6 meses				
SPI 9 meses				
SPI 12 meses				

Nota: En "No sequía" se consideran las categorías "Humedad extrema", "Humedad severa", "Humedad moderada" y "Precipitación normal".

- Amenaza severa
- Amenaza moderada
- Amenaza leve
- Sin Amenaza

	Condiciones para considerar amenaza por Municipio		
Indices	No degradado	Degradado	Muy degradado
EVI ARVI			
SIPI			
NDVI			

¿Qué estoy viendo?

Cultivos afectados

Descargar datos desde HDX

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD
SURVEYS

TERRITORIAL
PATTERNS

SOURCE: Prepared by PREDISAN platform authors

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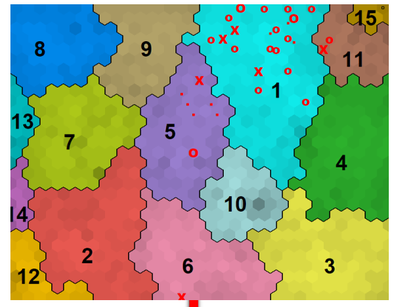
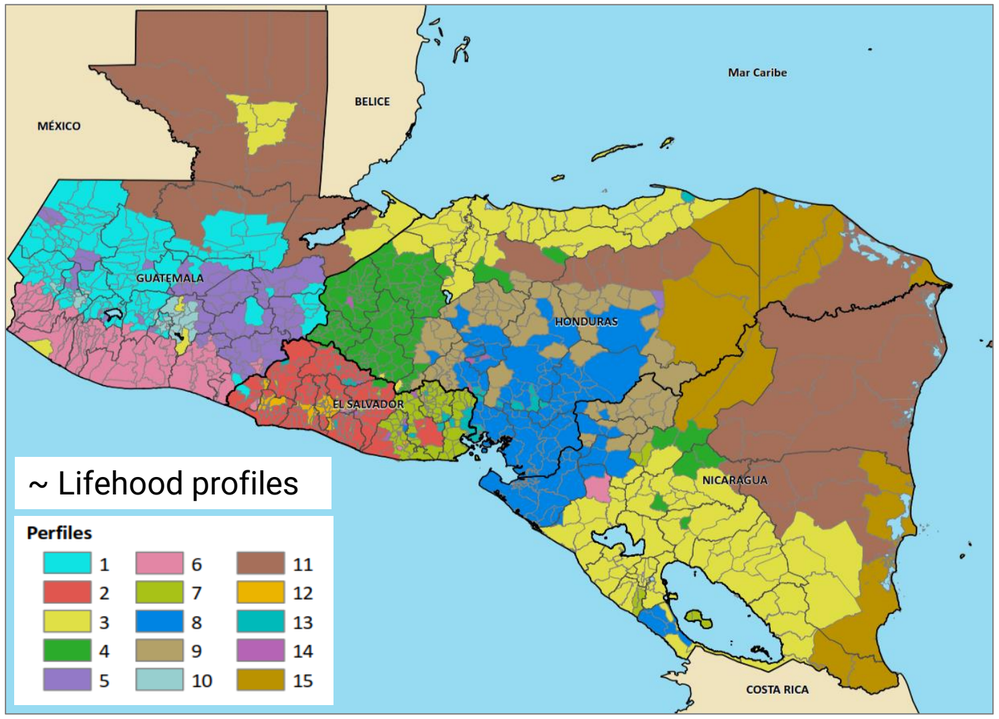
FIELD
SURVEYS

TERRITORIAL PATTERNS

APPROX.
200 VARIABLES
1053 MUNICIPALITIES





SAMPLING DESIGNS BASED ON DATA PROFILES

PROFILE-SPECIFIC PREDICTIONS

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

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SATELLITE IMAGERY
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AGRO-CLIMATIC MODEL

FIELD
SURVEYS

PUBLIC DATA
SOURCES

TERRITORIAL
PATTERNS

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AGRO-CLIMATIC MODEL

FIELD
SURVEYS

PUBLIC DATA
SOURCES

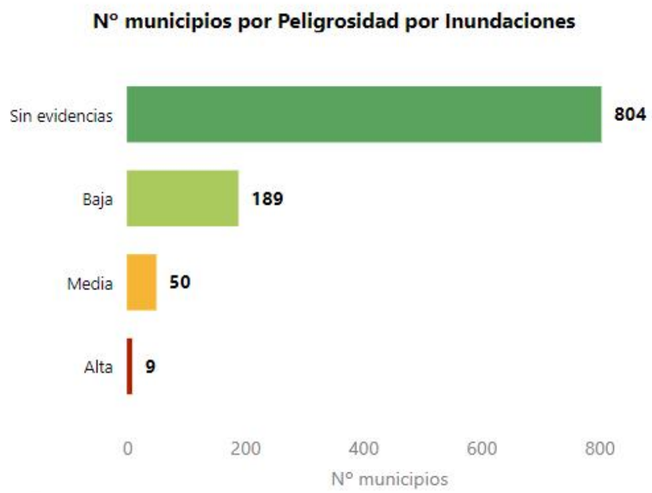
TERRITORIAL
PATTERNS

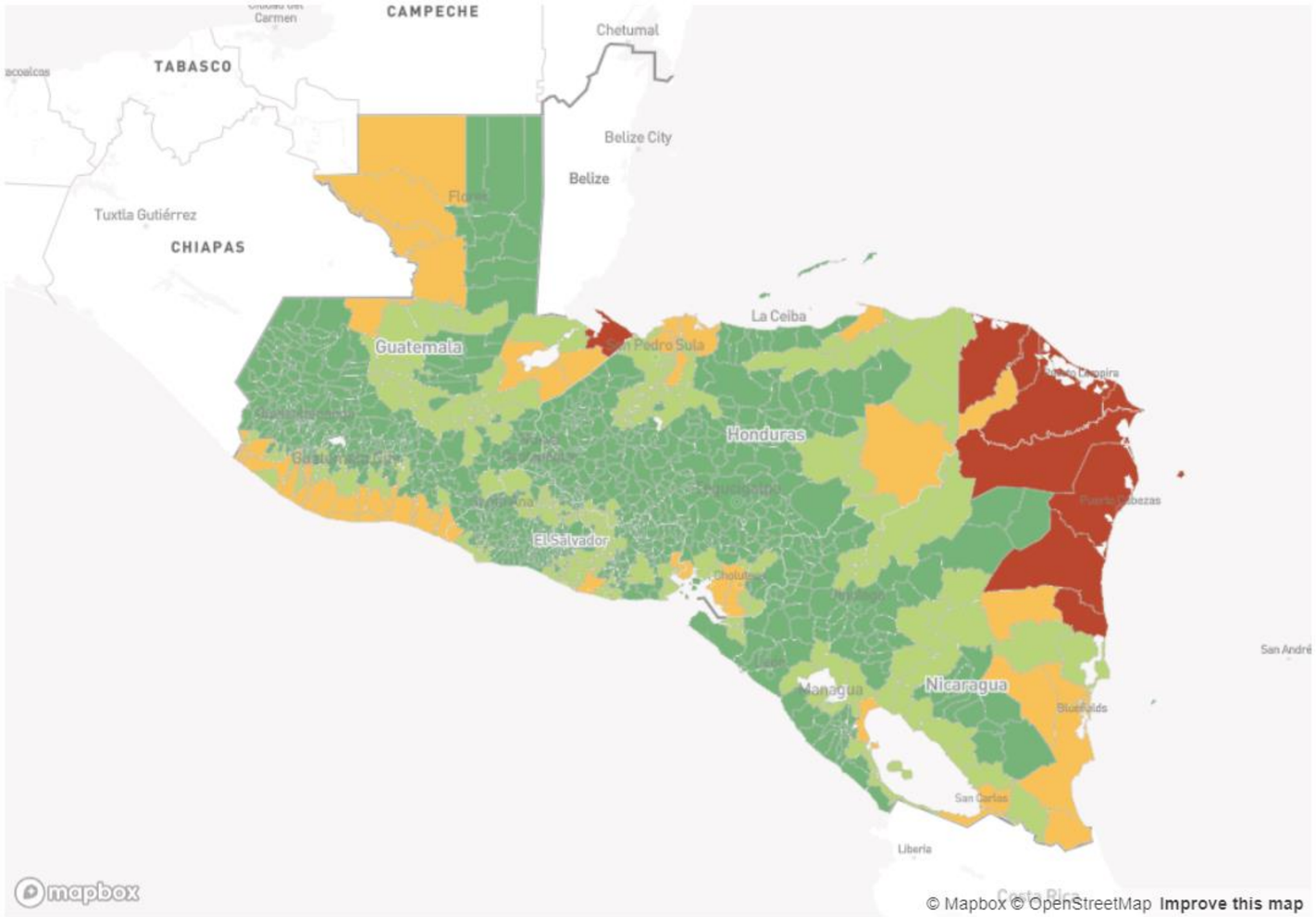
NATURAL HAZARD: FLOODINGS

Ir a Peligrosidad por eventos naturales

País
Todas

Departamento, Municipio
Todas





¿Cómo se calcula este indicador?

HDX
Descargar desde HDX

Peligrosidad
- Sin evidencias
- Baja
- Media
- Alta

SOURCE: European Commission's Joint Research Centre Data Catalogue.
Deployed at PREDISAN by the platform authors

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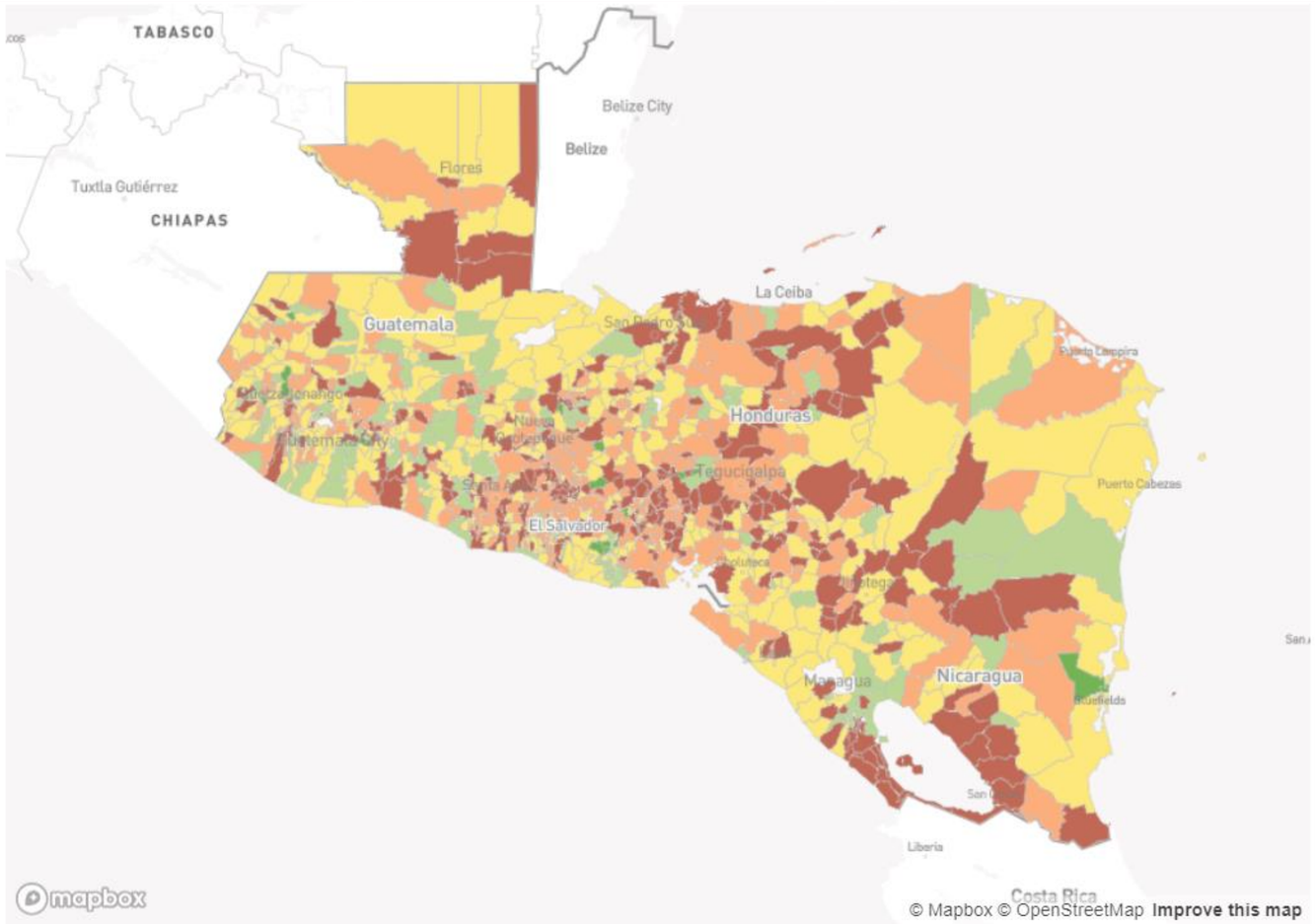
TERRITORIAL
PATTERNS

ECONOMY: Total capital stock in rural population



Información

HDX
Descargar
desde HDX

Stock total de capital en
población rural (MM
US$)
0 - 10.000 $
10.000 - 20.000 $
20.000 - 50.000 $
50.000 - 100.000 $
100.000 $ -

SOURCE: Public resources
Deployed at PREDISAN by the platform authors

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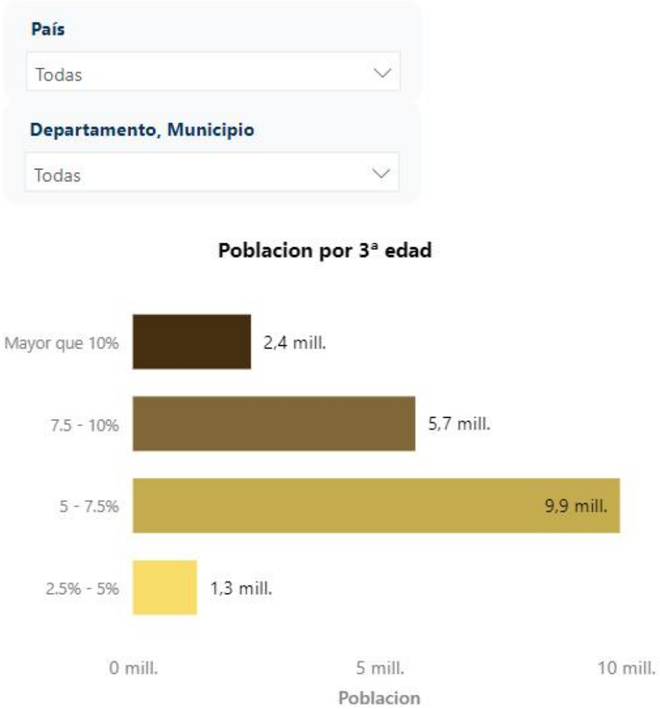
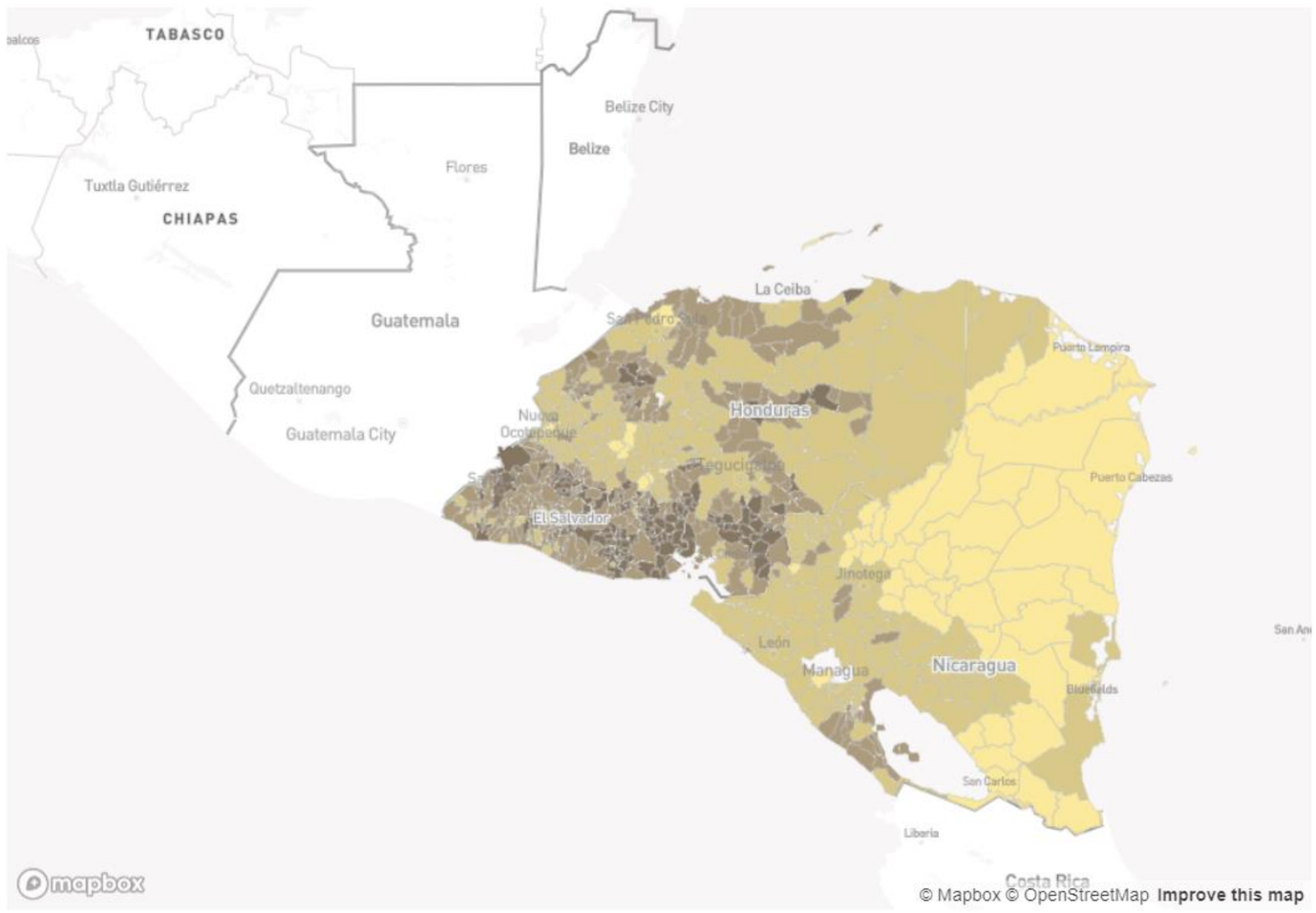
FIELD
SURVEYS

PUBLIC DATA
SOURCES

TERRITORIAL
PATTERNS

SOCIAL: Percentage of elderly people





Información

HDX
Descargar
desde HDX

Porcentaje de personas tercera edad según Facebook
0 - 2.5%
2.5 - 5.0%
5.0 - 7.5%
7.5 - 10.0%
10.0% -

SOURCE: Facebook
Deployed at PREDISAN by the platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS
BASED ON
PUBLIC DATA
SOURCES

TERRITORIAL
PATTERNS

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

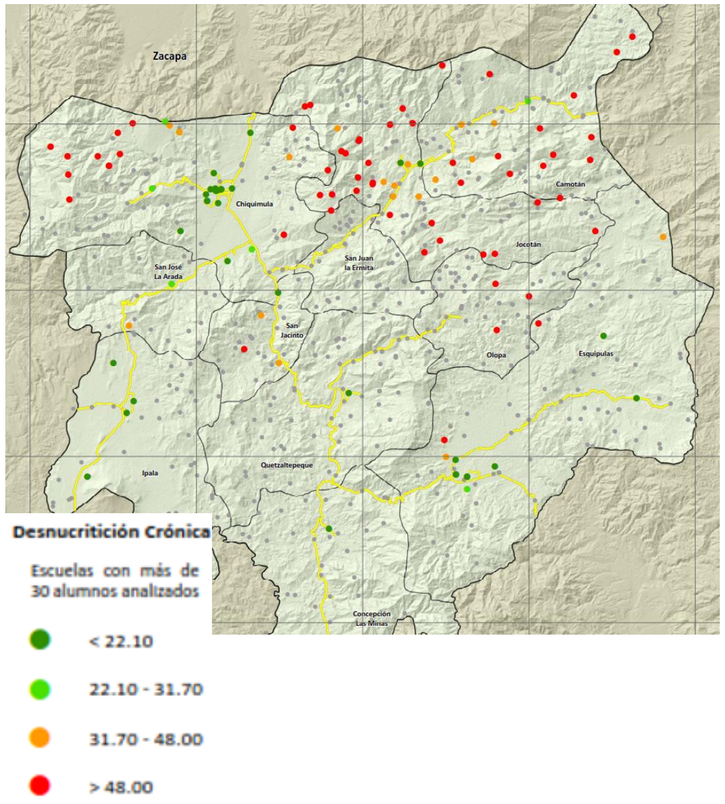
FIELD
SURVEYS

PUBLIC DATA
SOURCES

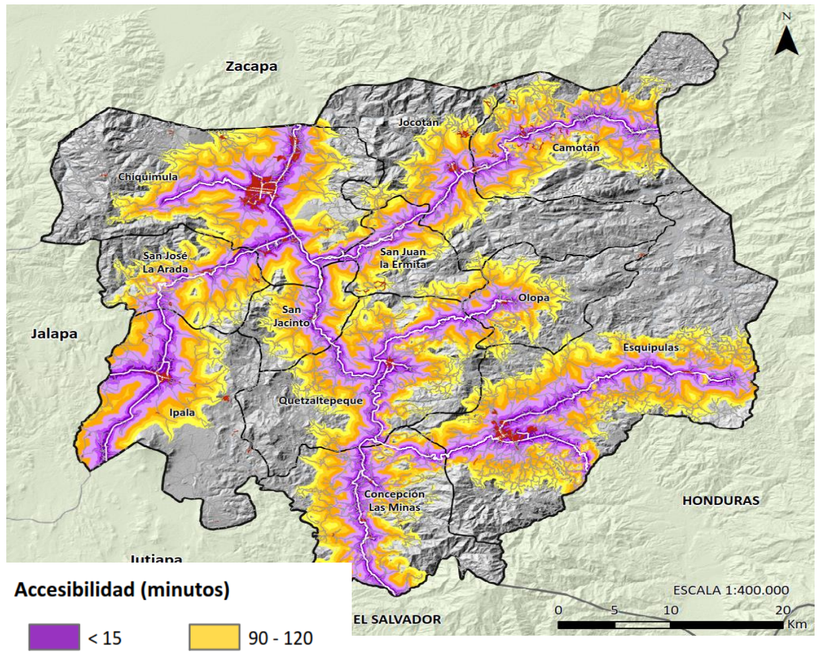
NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

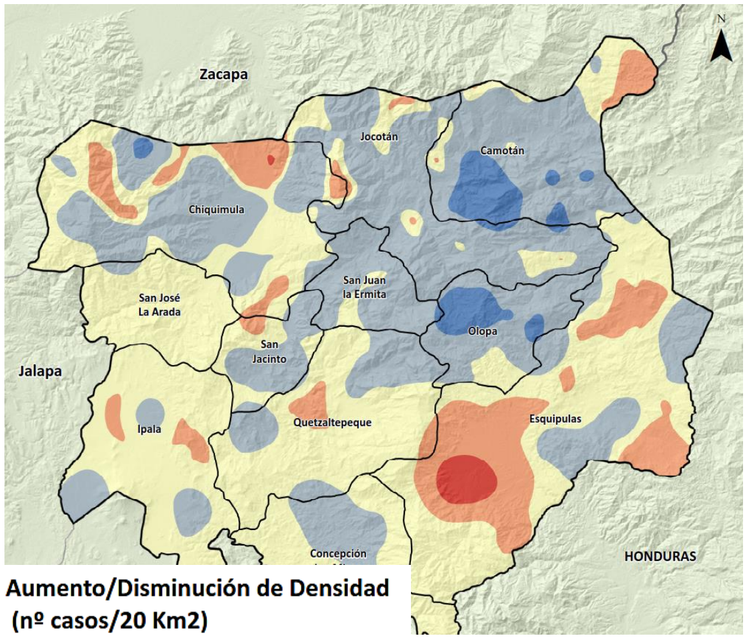
ACCESIBILITY



Correlation of Chronic Malnutrition and distance to main roads in Chiquimula (Guatemala)



Road accessibility in Chiquimula (Guatemala)



Spatial Evolution of Acute Malnutrition 2015-2018 in Chiquimula (Guatemala)

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

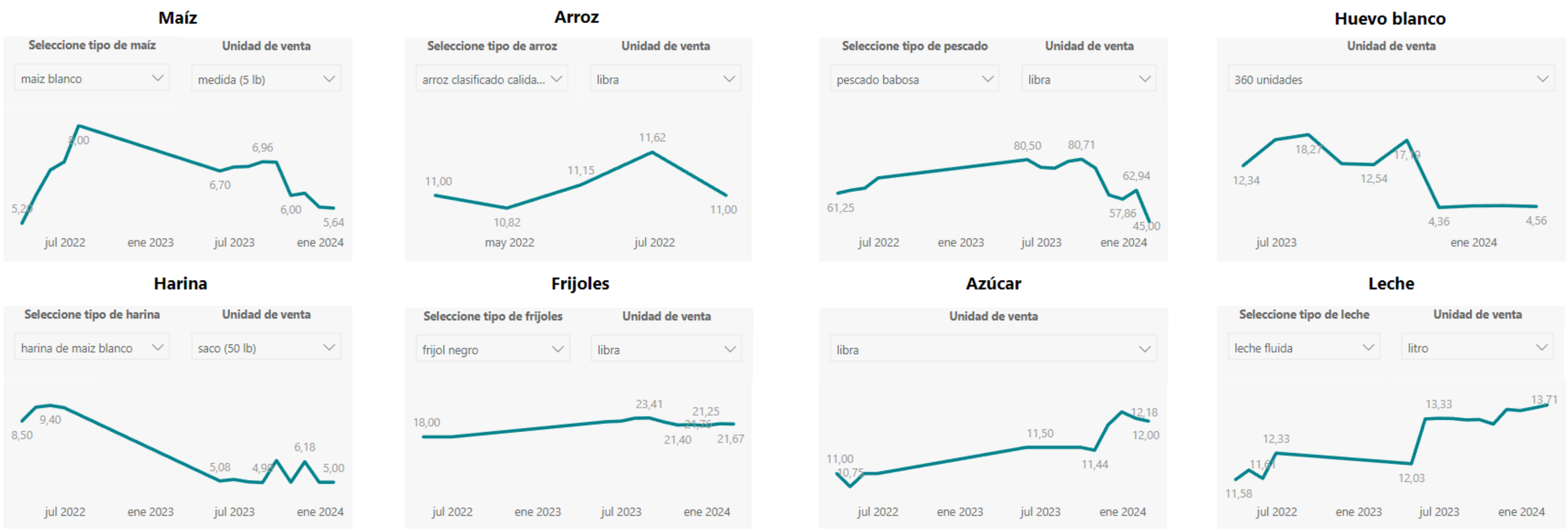
FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

FOOD PRICES



Food Price (in dollars) daily monitoring in markets and supermarkets in Honduras

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

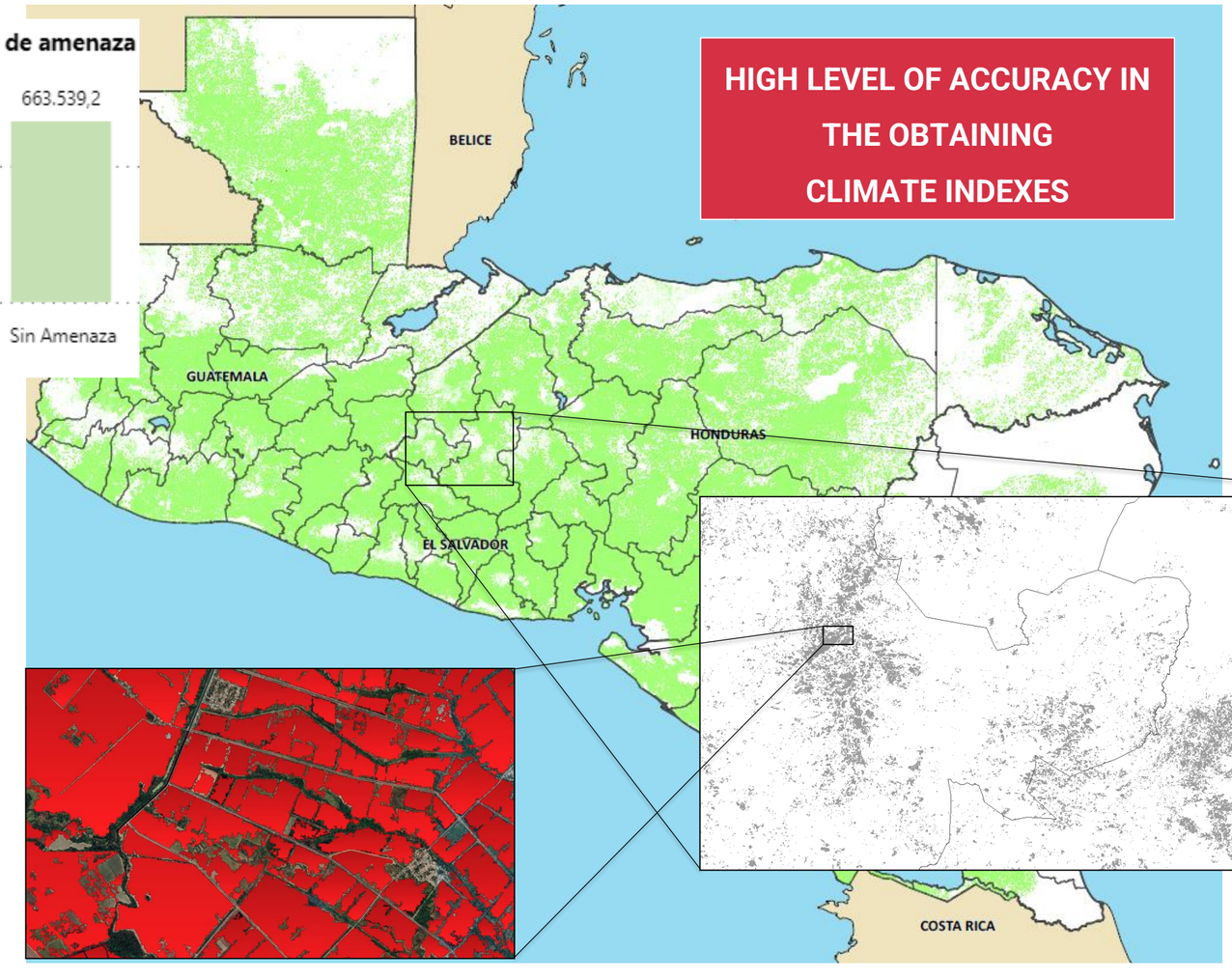
FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

ACTUAL CROPS ON EACH PLOT



CLASSIFICATION SUPERVISED

↓

PLOTS OF CROPS

↓

OBTAINING ACCURATE INDICES

Obtaining indicators at the level of the crop plot in Central America

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

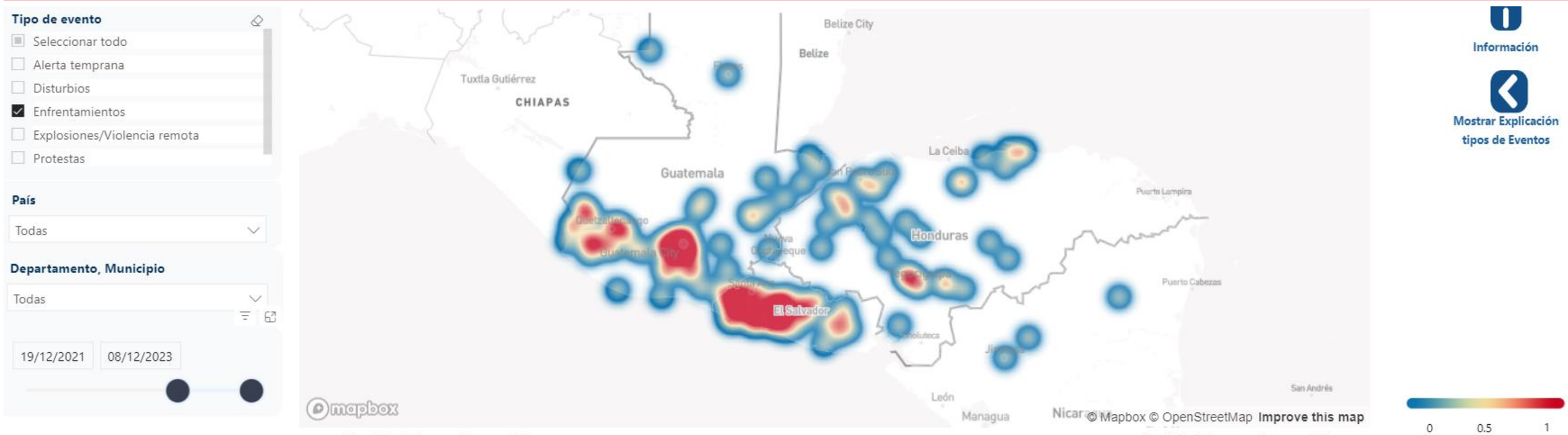
FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

VIOLENCE



Cantidad de eventos por Mes

Cantidad de eventos por País

Eventos	El Salvador	Guatemala	Honduras	Nicaragua	Total
Enfrentamientos	77	186	75	4	342
Total	**77**	**186**	**75**	**4**	**342**

Monitoring factors of violence in Central America

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
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AGRO-CLIMATIC MODEL

FIELD
SURVEYS

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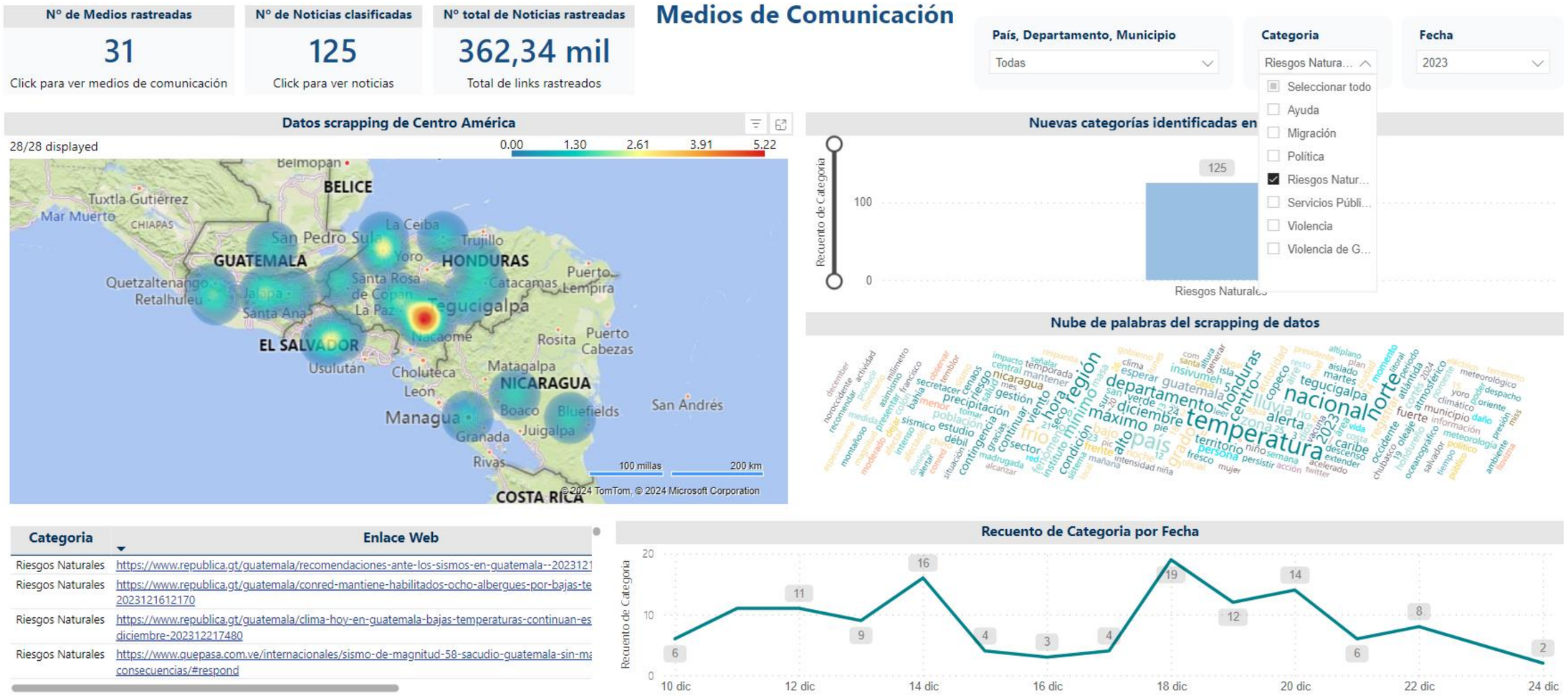
SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

MASS MEDIA



Categoria	Enlace Web
Riesgos Naturales	https://www.republica.gt/guatemala/recomendaciones-ante-los-sismos-en-guatemala--2023121
Riesgos Naturales	https://www.republica.gt/guatemala/conred-mantiene-habilitados-ocho-albergues-por-bajas-te 2023121612170
Riesgos Naturales	https://www.republica.gt/guatemala/clima-hoy-en-guatemala-bajas-temperaturas-continuan-es diciembre-202312217480
Riesgos Naturales	https://www.quepasa.com.ve/internacionales/sismo-de-magnitud-58-sacudio-guatemala-sin-ma consecuencias/#respond

Media monitoring in Central America

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

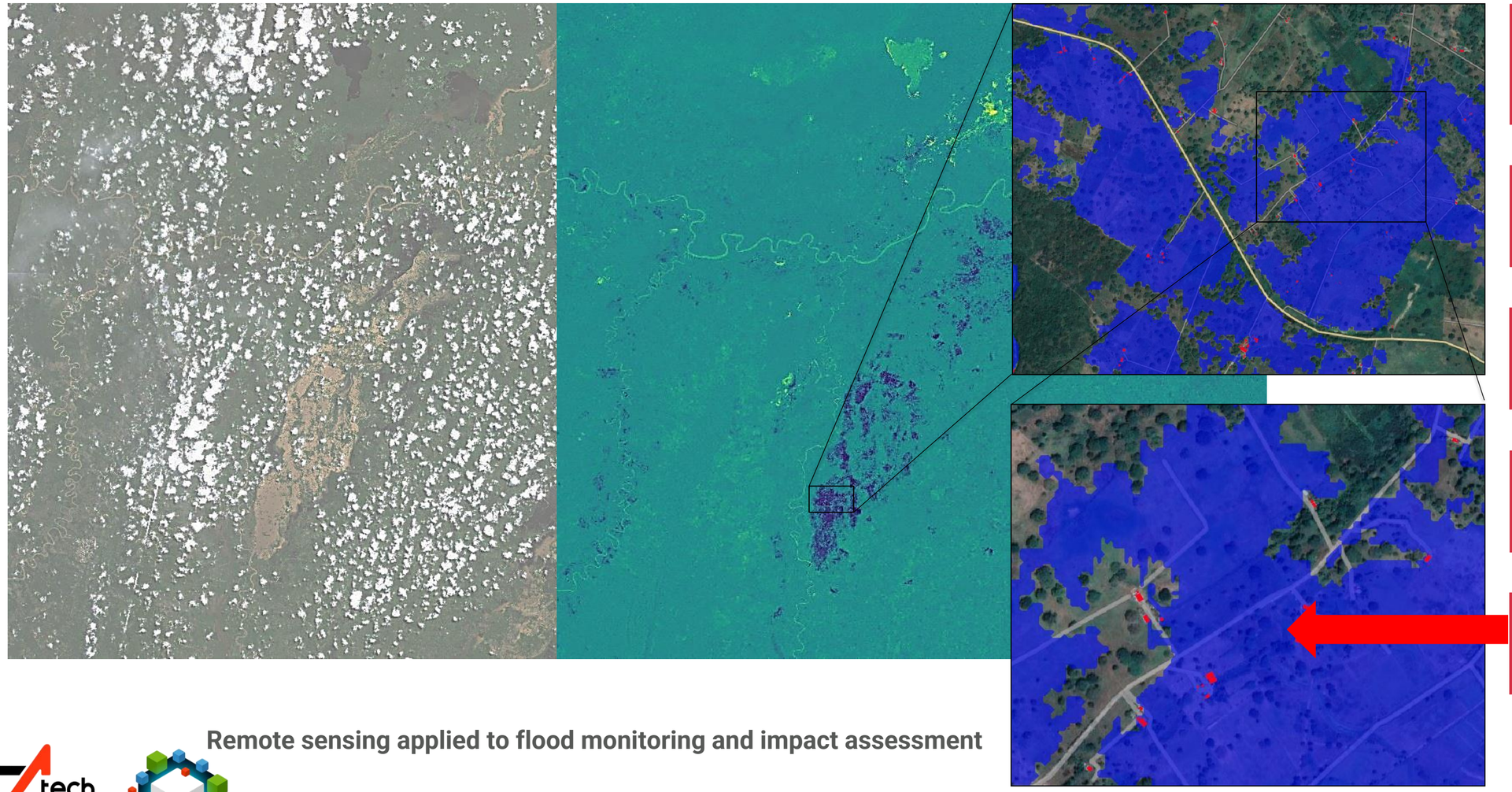
FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

WEATHER HISTORICAL EVENTS



INFORMATION SATELLITE / EVENTS HISTORICAL

↓

EVENT FILTERING AND PROCESSING

↓

ZONE DETECTION FLOODED

↓

EVALUATION OF IMPACT

↓

AFFECTED POPULATION

Remote sensing applied to flood monitoring and impact assessment

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

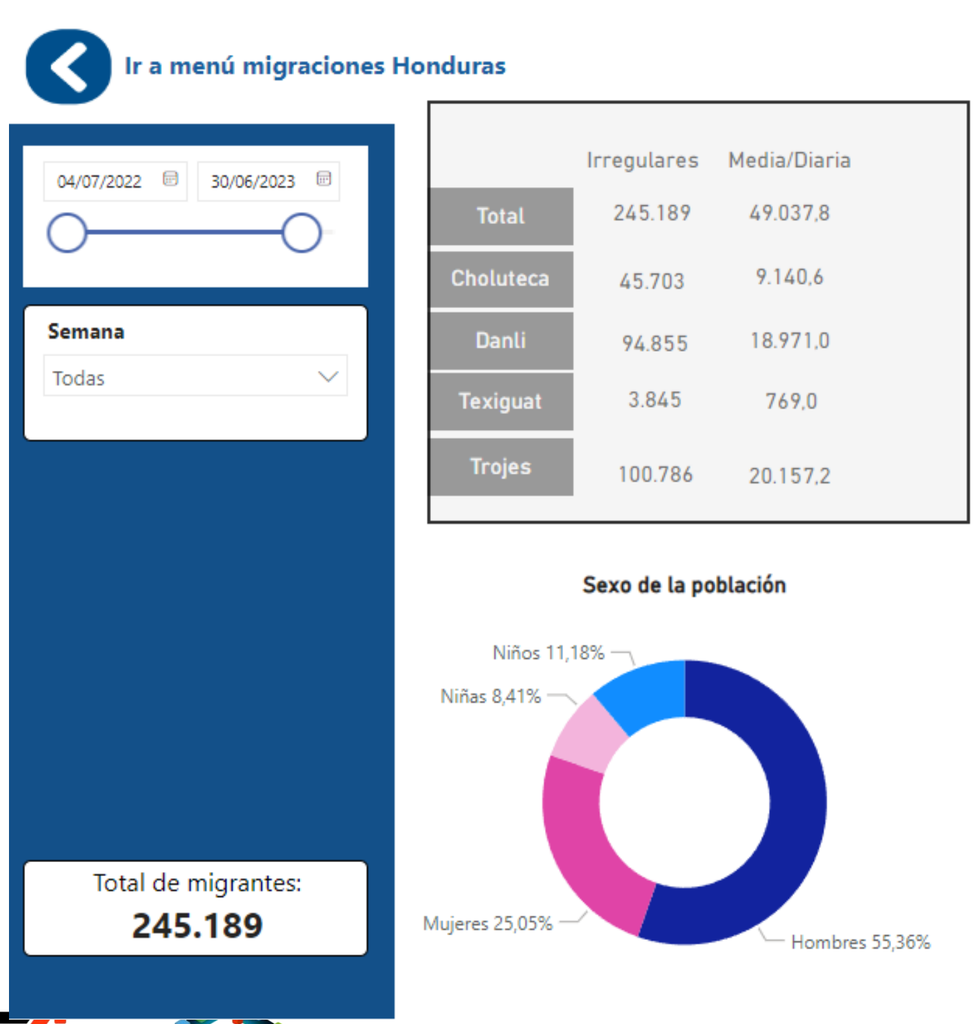
FIELD
SURVEYS

PUBLIC DATA
SOURCES

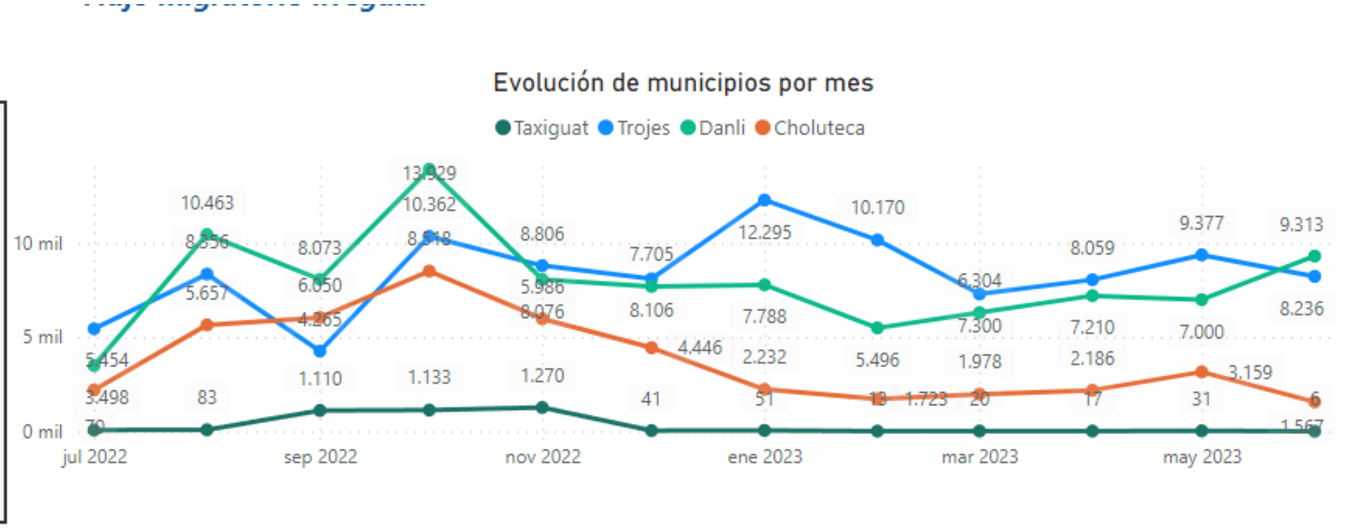
NEW LAYERS BASED ON PUBLIC DATA SOURCES

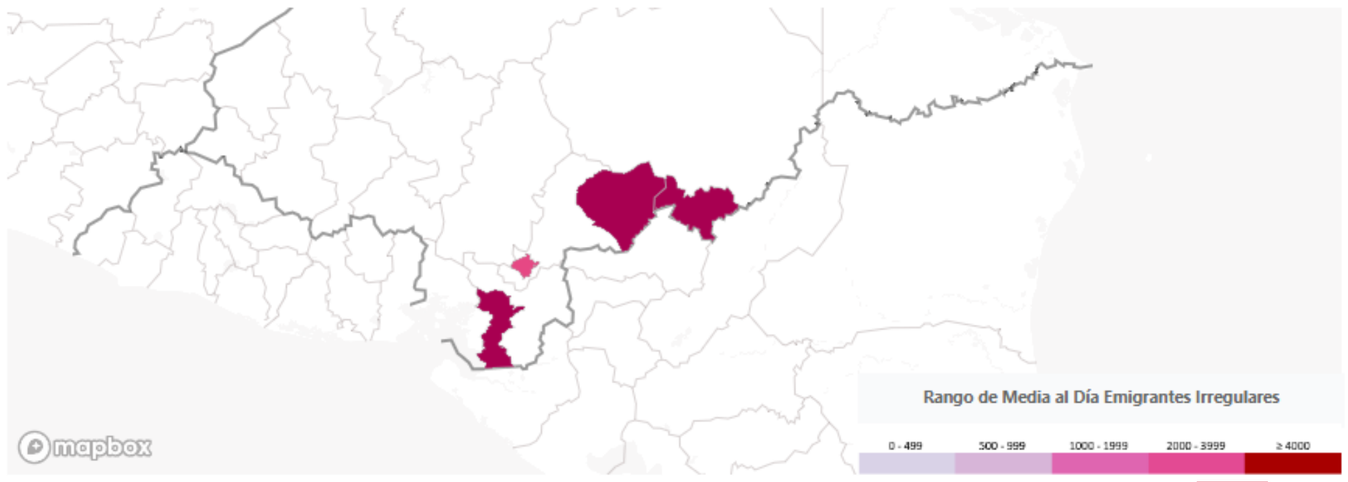
TERRITORIAL
PATTERNS

MIGRATIONS



	Irregulares	Media/Diaria
Total	245.189	49.037,8
Choluteca	45.703	9.140,6
Danli	94.855	18.971,0
Texiguat	3.845	769,0
Trojes	100.786	20.157,2





SOURCE: Surveys of ACH

3. METHODOLOGY of PREDISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

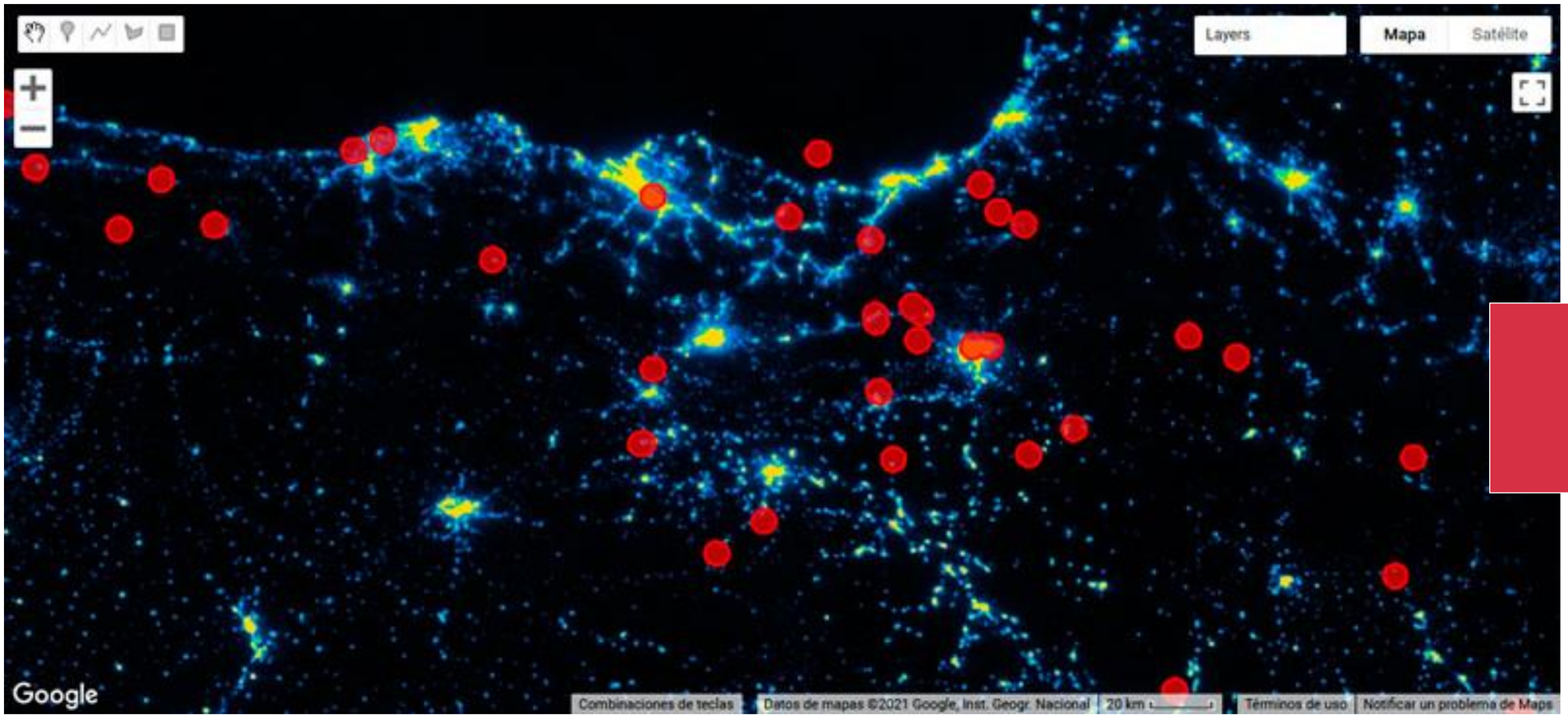
FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

TERRITORIAL
PATTERNS

NIGHT LIGHTS (MEASURE HUMAN ACTIVITIES)

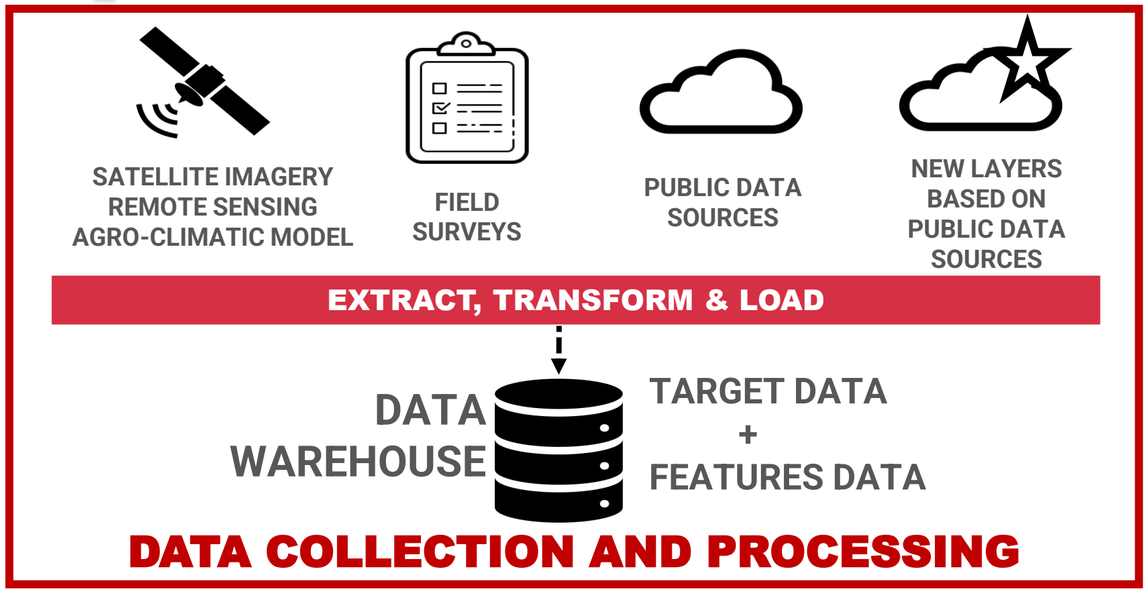


WORKING IN PROGRESS

SOURCE: Prepared by PREDISAN platform authors

3. METHODOLOGY of PRESISAN

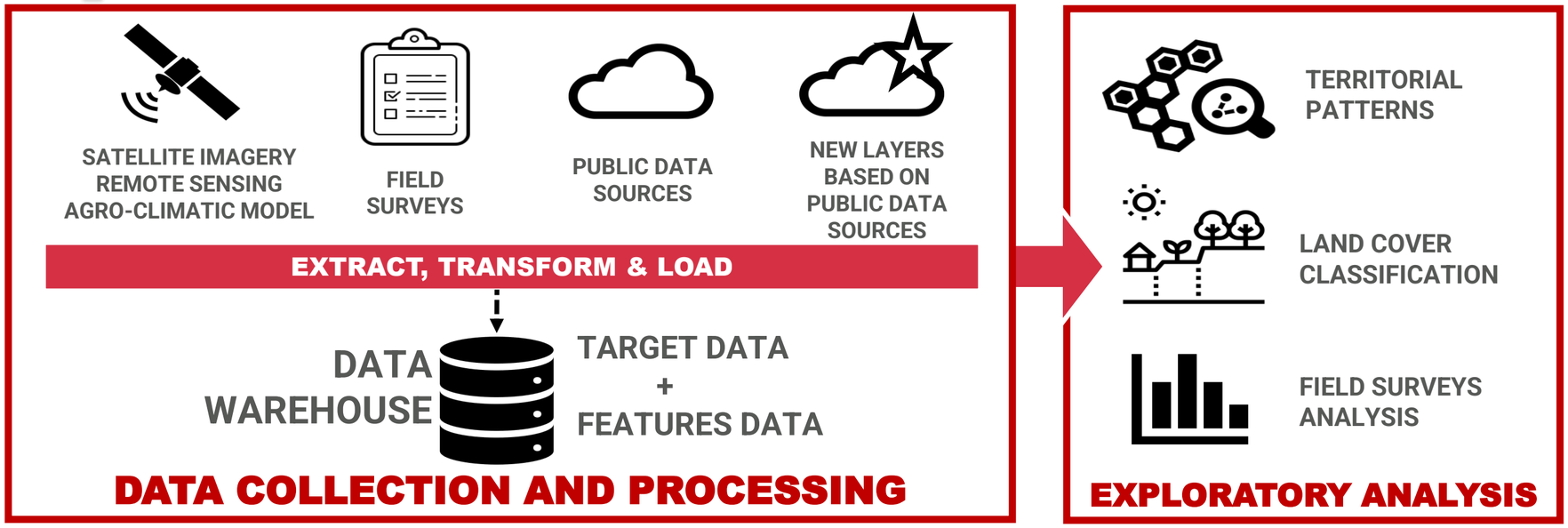
REACHING BEYOND FOOD SECURITY FIELD DATA



TERRITORIAL
PATTERNS

3. METHODOLOGY of PRESISAN

REACHING BEYOND FOOD SECURITY FIELD DATA



3. METHODOLOGY of PRESISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS
BASED ON
PUBLIC DATA
SOURCES

EXTRACT, TRANSFORM & LOAD

DATA
WAREHOUSE

TARGET DATA
+
FEATURES DATA

DATA COLLECTION AND PROCESSING

TERRITORIAL
PATTERNS

LAND COVER
CLASSIFICATION

FIELD SURVEYS
ANALYSIS

EXPLORATORY ANALYSIS

TRAINING

VALIDATION

**ITERATION /
OPTIMIZATION**

% SUCCESS

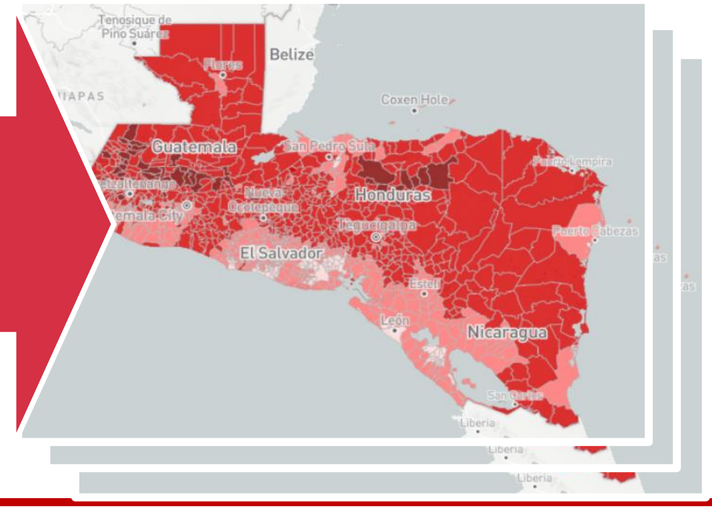
**CONTINUOUS
VALIDATION
(AVOID
OVERFITTING)**

PREDICTION

TARGET DATA

1. Food Consumption Score (FCS)
2. Household Hunger Scale (HHS)
3. Household Dietary Diversity Score (HDDS)

nowcasting **forecasting**



PREDICTIVE MODELING

3. METHODOLOGY of PRESISAN

REACHING BEYOND FOOD SECURITY FIELD DATA

SATELLITE IMAGERY
REMOTE SENSING
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TERRITORIAL
PATTERNS

LAND COVER
CLASSIFICATION

FIELD SURVEYS
ANALYSIS

EXPLORATORY ANALYSIS

DEVELOPMENT OF DATA
VISUALIZATION TOOLS

https://predisan.gis4tech.com/CA4

MONITORING PLATFORM

PREDISAN

TRAINING

VALIDATION

**ITERATION /
OPTIMIZATION**

% SUCCESS

**CONTINUOUS
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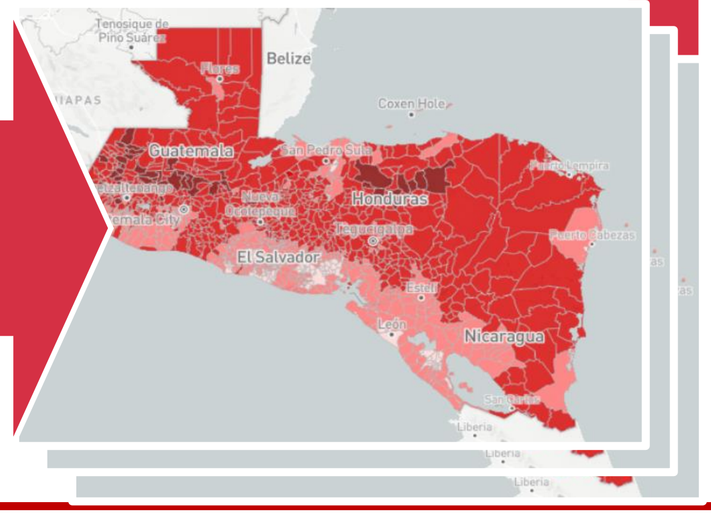


PREDICTIVE MODELING

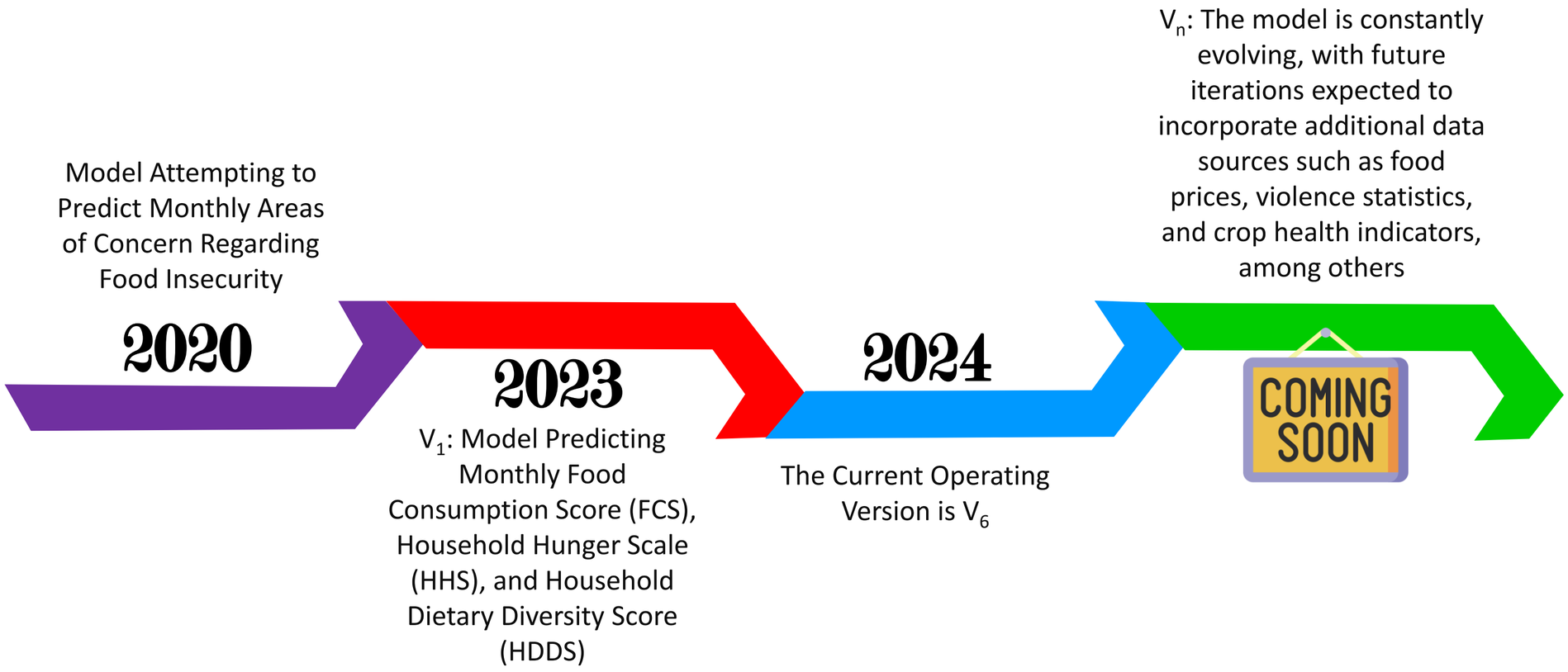
4. PREDICTIVE MODELS

THE MODEL IN DETAIL

4. PREDICTIVE MODELS

VULNERABILITY MODEL EVOLUTION

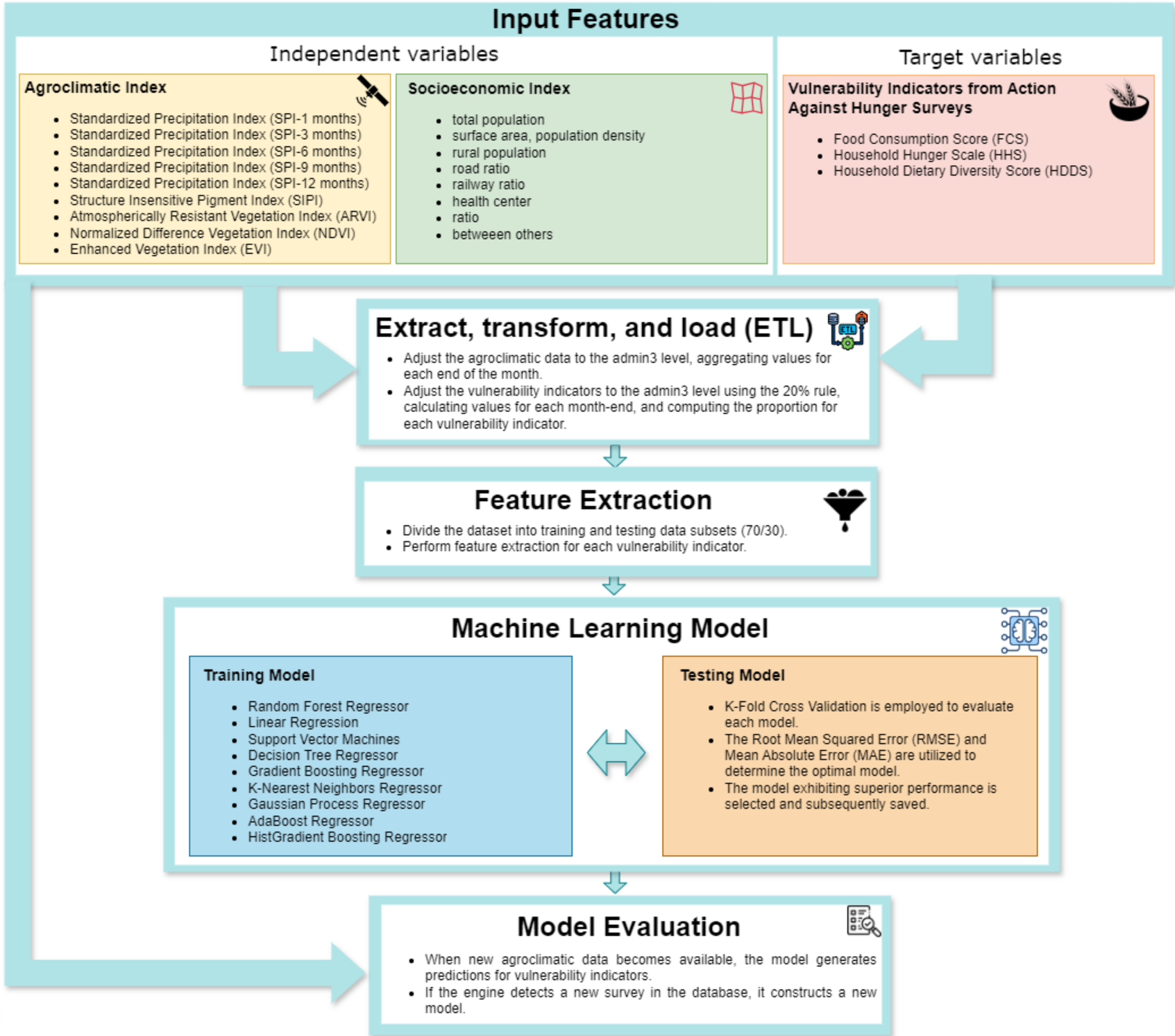
The machine learning model has evolved through iterative learning and feedback received from humanitarian organizations. Since 2020, the model has undergone several modifications, as illustrated in Fig. X, to enhance its effectiveness and performance.



Timeline Depicting the Evolution of the Machine Learning Vulnerability Model Over Time

4. PREDICTIVE MODELS

CURRENT MODEL WORKFLOW

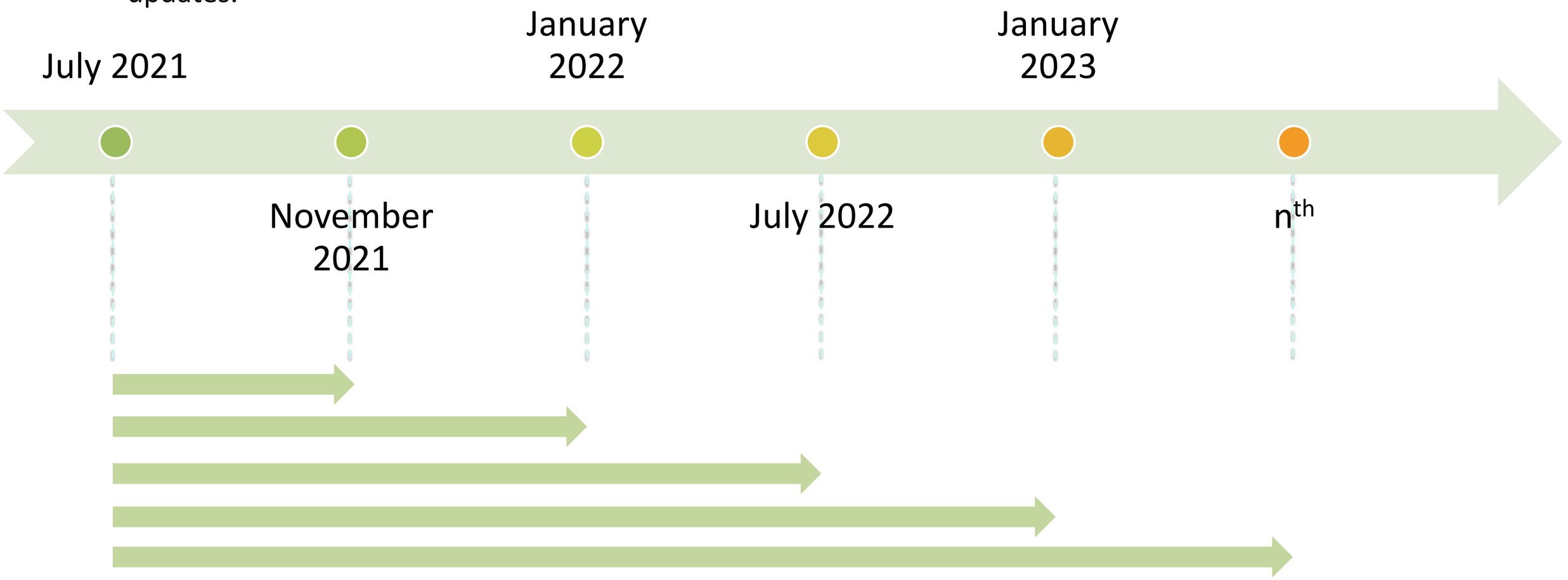


Streamlined Workflow for Machine Learning Model

4. PREDICTIVE MODELS

MACHINE LEARNING MODELS STRUCTURATION

The machine learning pipeline engine was developed with an additive approach, where it constructs a new model upon detecting a new survey in the databases, enabling predictions. Conversely, when the model identifies solely new agroclimatic data, the pipeline engine utilizes the most recent model to generate predictions. This process operates automatically, constantly monitoring for new surveys or agroclimatic data updates.

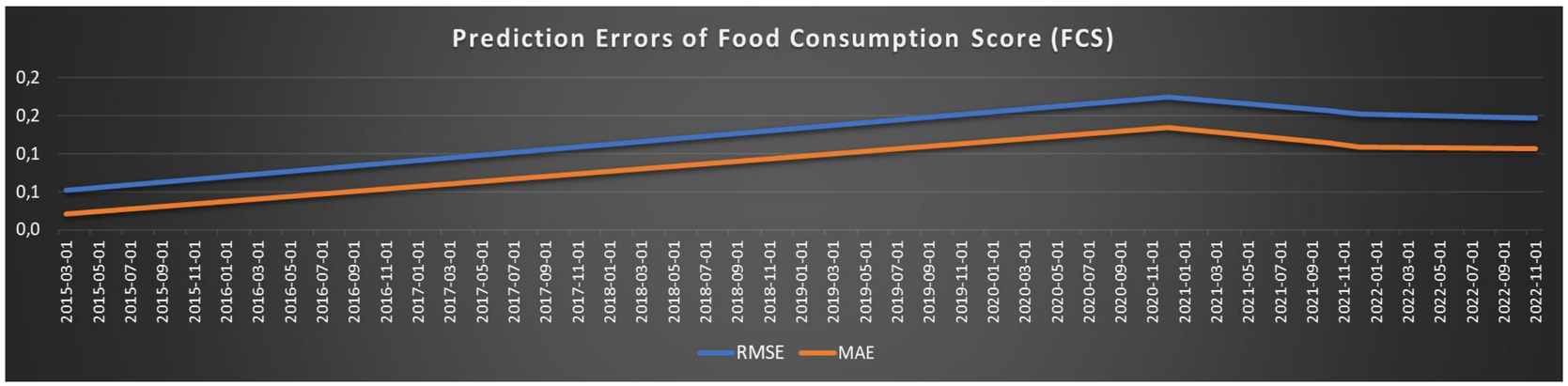


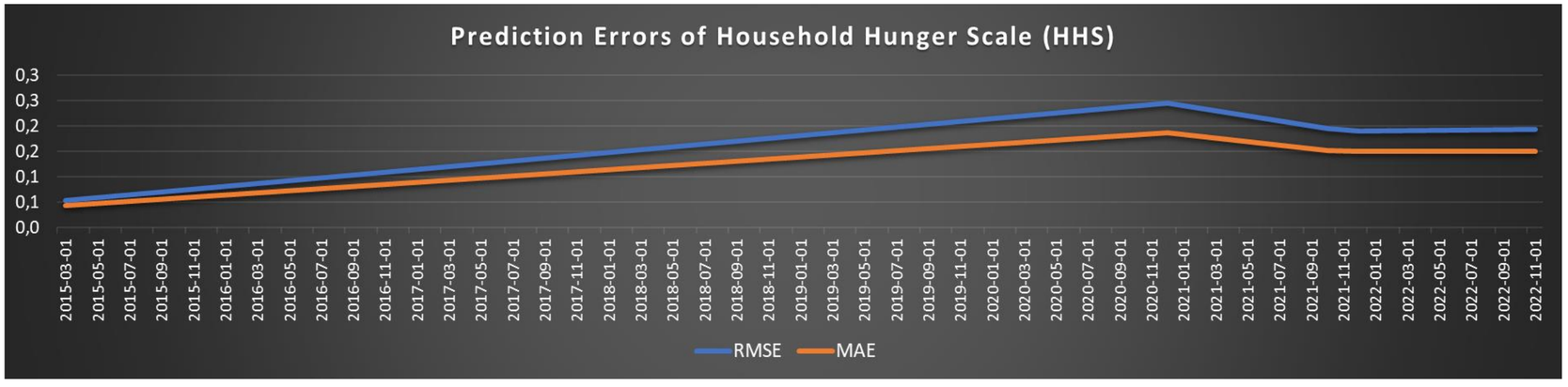
Streamlined Workflow for Machine Learning Model

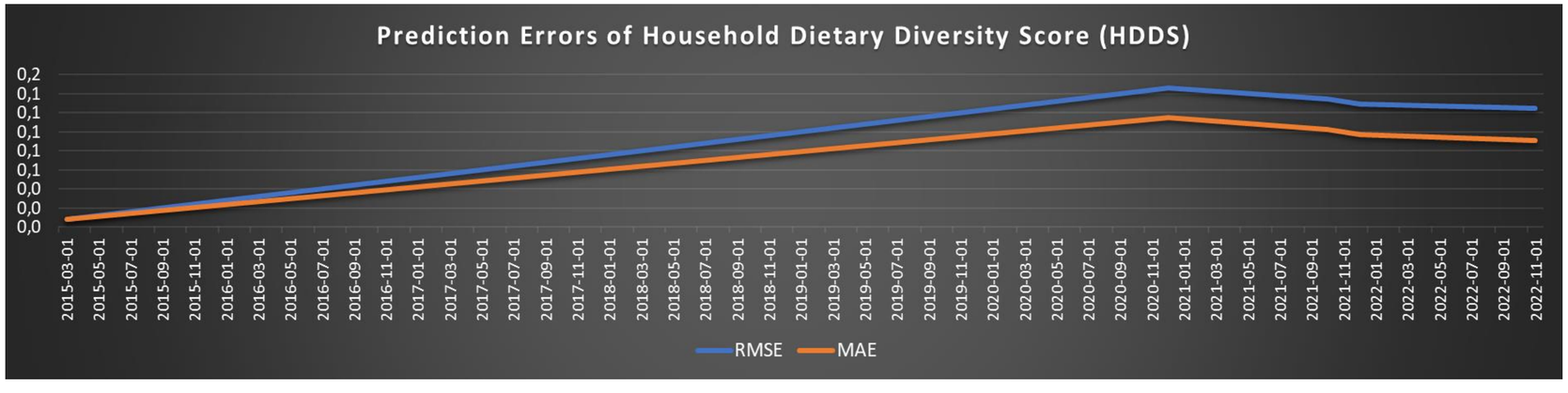
4. PREDICTIVE MODELS

PERFORMANCE EVALUATION OF MACHINE LEARNING MODELS

Based on the results obtained, the models exhibit RMSE and MAE ranging between 0.008 and 0.246. The HHS_2 Model yields the highest error, while the HDDS_1 model demonstrates the lowest error.





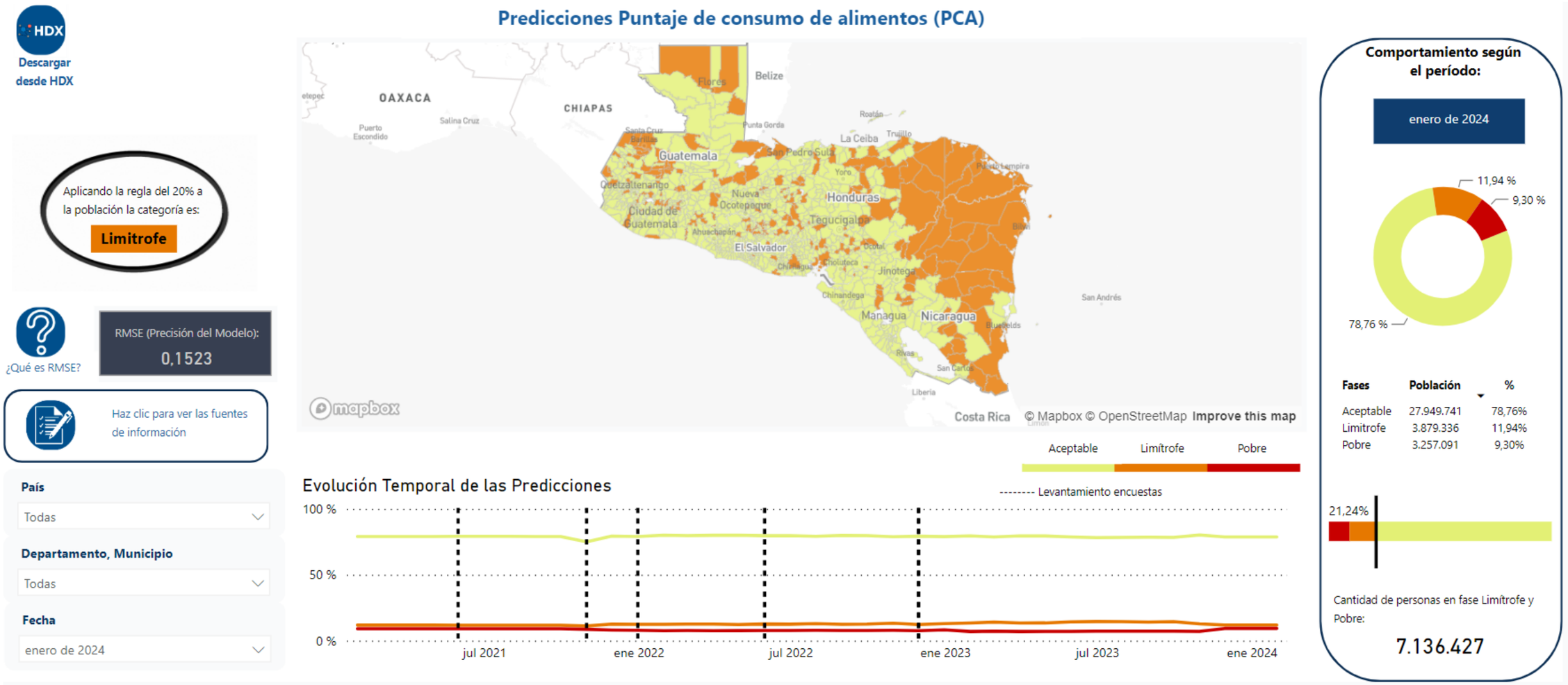


Error Analysis: RMSE and MAE Fluctuations Over Time

4. PREDICTIVE MODELS

PREDISAN PUBLIC DASHBOARD

The model predictions are contingent upon the availability of agroclimatic data. As a result, the model can be categorized as Now-casting, with a monthly periodicity. Predictions for the Food Consumption Score (FCS), Household Hunger Scale (HHS), and Household Dietary Diversity Score (HDDS) are displayed on a dashboard (https://www.predisan.gis4tech.com/ca4) and accessible online 24/7.

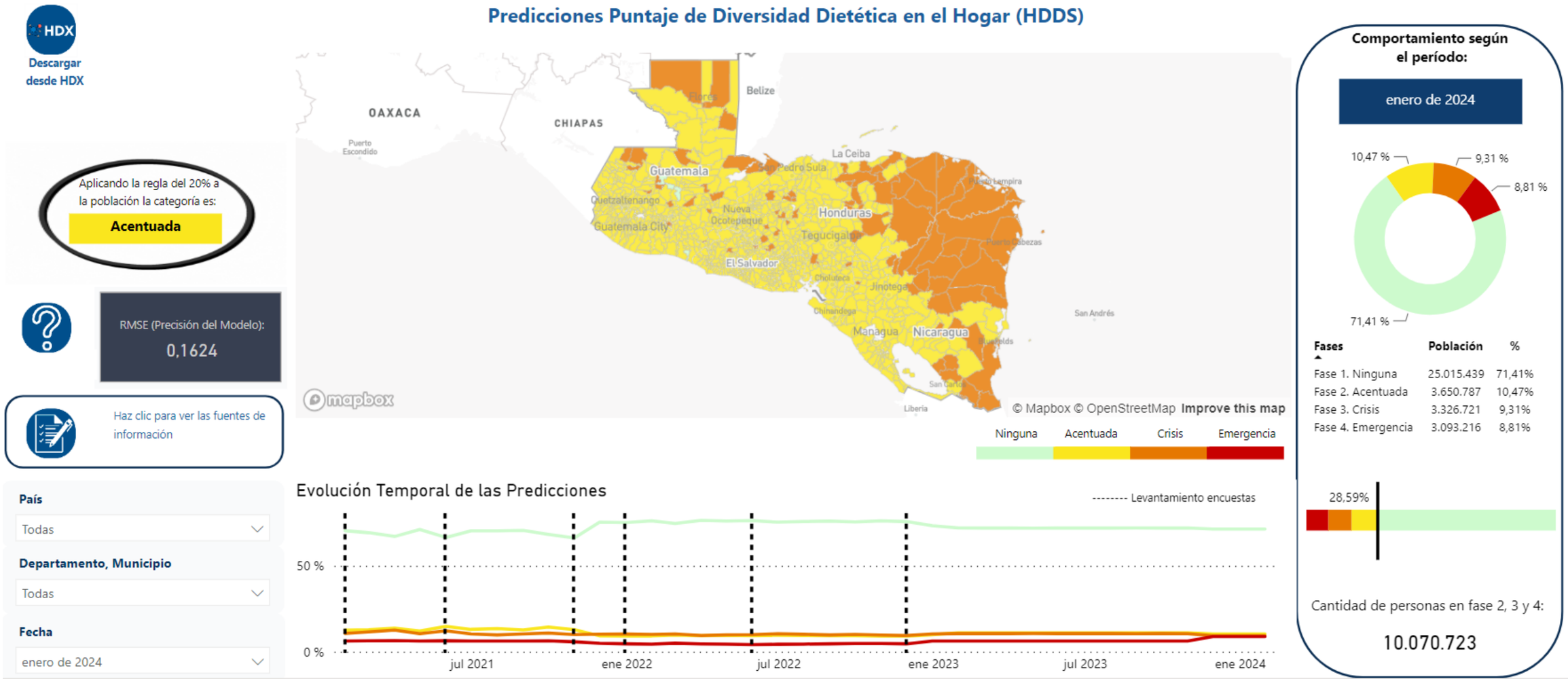


The image displays the predictions of Food Consumption Score (FCS) for the most recent months with available data

4. PREDICTIVE MODELS

PREDISAN PUBLIC DASHBOARD

The dashboard displays the vulnerability category for each municipality based on the selected indicator. Categories are assigned using the 20% rule. Additionally, temporal trends of predictions can be viewed at the bottom, while the left side provides insights into the population distribution across different vulnerability categories and the number of individuals classified under each.



The image displays the predictions of Household Dietary Diversity Score (HDDS) for the most recent months with available data

5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS

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5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD
SURVEYS

PUBLIC DATA
SOURCES

NEW LAYERS
BASED ON
PUBLIC DATA
SOURCES

EXTRACT, TRANSFORM & LOAD

DATA
WAREHOUSE

TARGET DATA
+
FEATURES DATA

DATA COLLECTION AND PROCESSING

TERRITORIAL
PATTERNS

LAND COVER
CLASSIFICATION

FIELD SURVEYS
ANALYSIS

EXPLORATORY ANALYSIS

DEVELOPMENT OF DATA
VISUALIZATION TOOLS

MONITORING PLATFORM
PREDISAN

TRAINING

VALIDATION

**ITERATION /
OPTIMIZATION**

% SUCCESS

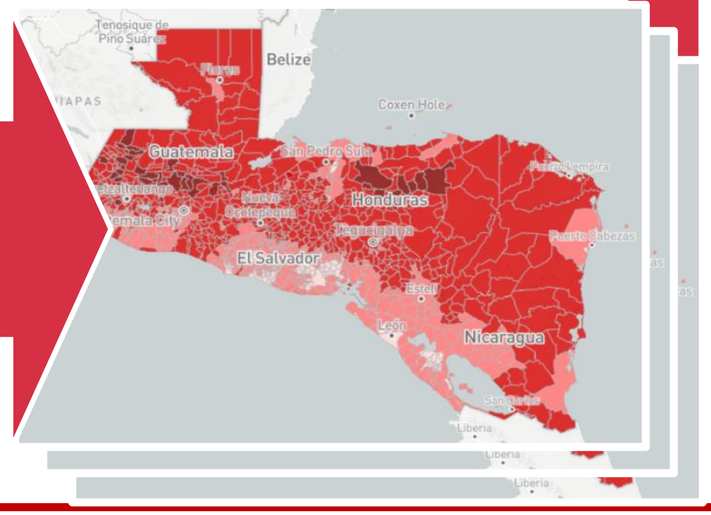
**CONTINUOUS
VALIDATION
(AVOID
OVERFITTING)**

PREDICTION

TARGET DATA

1. Food Consumption Score (FCS)
2. Household Hunger Scale (HHS)
3. Household Dietary Diversity Score (HDDS)

nowcasting | **forecasting**



PREDICTIVE MODELING

5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS

5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD SURVEYS

PUBLIC DATA SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

EXTRACT, TRANSFORM & LOAD

DATA WAREHOUSE

TARGET DATA
+
FEATURES DATA

DATA COLLECTION AND PROCESSING

TERRITORIAL PATTERNS

LAND COVER CLASSIFICATION

FIELD SURVEYS ANALYSIS

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DEVELOPMENT OF DATA VISUALIZATION TOOLS

MONITORING PLATFORM
PREDISAN

TRAINING

VALIDATION

ITERATION / OPTIMIZATION

% SUCCESS

PREDICTION

CONTINUOUS VALIDATION (AVOID OVERFITTING)

TARGET DATA

1. Food Consumption Score (FCS)
2. Household Hunger Scale (HHS)
3. Household Dietary Diversity Score (HDDS)

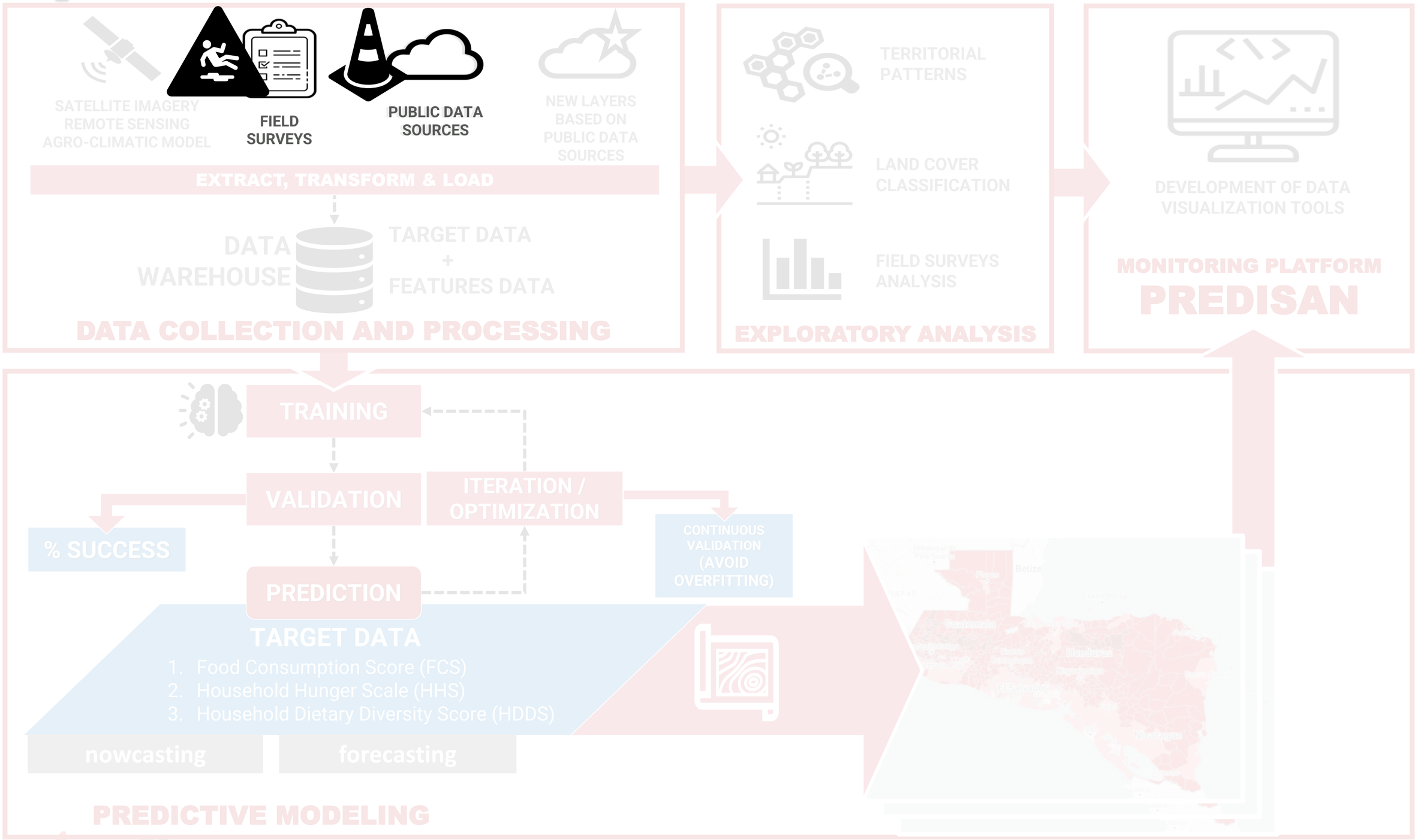
nowcasting

forecasting

PREDICTIVE MODELING

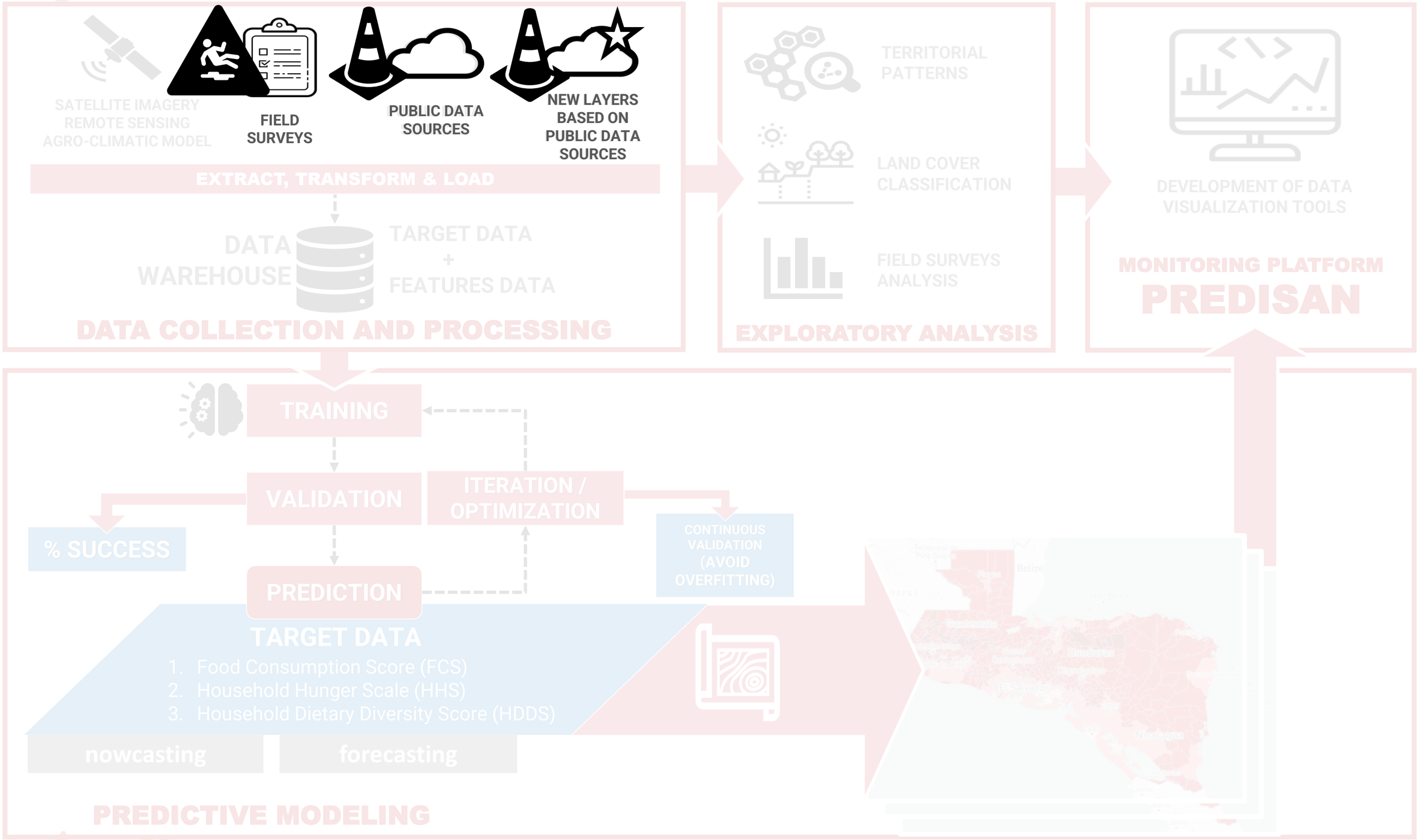
5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS



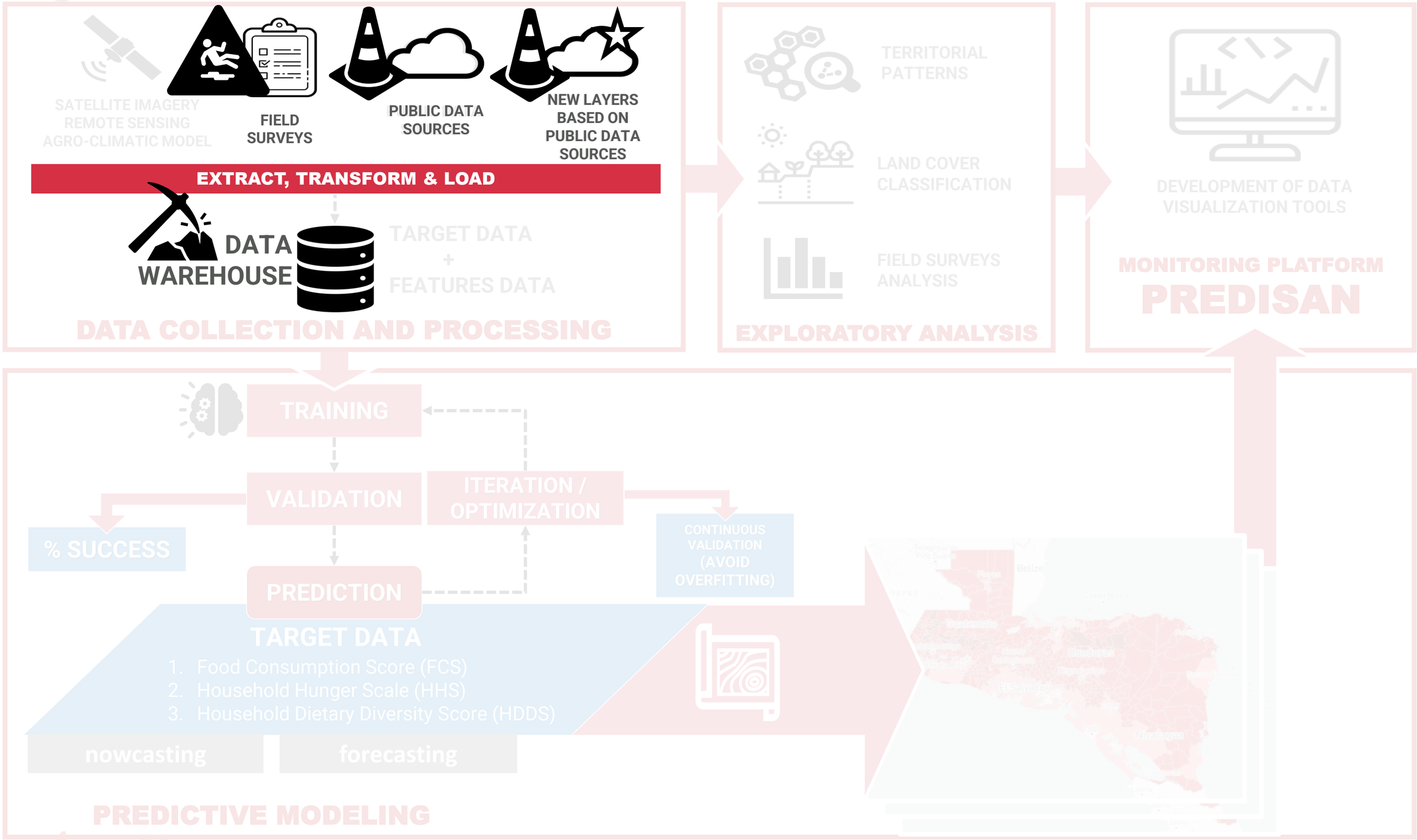
5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS



5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS



5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD SURVEYS

PUBLIC DATA SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

EXTRACT, TRANSFORM & LOAD

DATA WAREHOUSE

TARGET DATA
+
FEATURES DATA

DATA COLLECTION AND PROCESSING

TERRITORIAL PATTERNS

LAND COVER CLASSIFICATION

FIELD SURVEYS ANALYSIS

EXPLORATORY ANALYSIS

DEVELOPMENT OF DATA VISUALIZATION TOOLS

MONITORING PLATFORM
PREDISAN

TRAINING

VALIDATION

ITERATION / OPTIMIZATION

% SUCCESS

PREDICTION

CONTINUOUS VALIDATION (AVOID OVERFITTING)

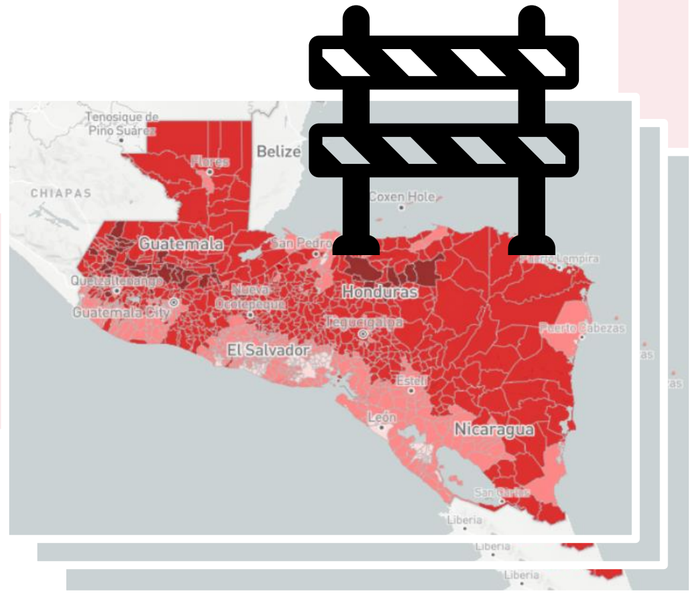
TARGET DATA

1. Food Consumption Score (FCS)
2. Household Hunger Scale (HHS)
3. Household Dietary Diversity Score (HDDS)

nowcasting

forecasting

PREDICTIVE MODELING



5. FUTURE IMPROVEMENTS

REFLECTIONS AND AREAS FOR IMPROVEMENTS

SATELLITE IMAGERY
REMOTE SENSING
AGRO-CLIMATIC MODEL

FIELD SURVEYS

PUBLIC DATA SOURCES

NEW LAYERS BASED ON PUBLIC DATA SOURCES

EXTRACT, TRANSFORM & LOAD

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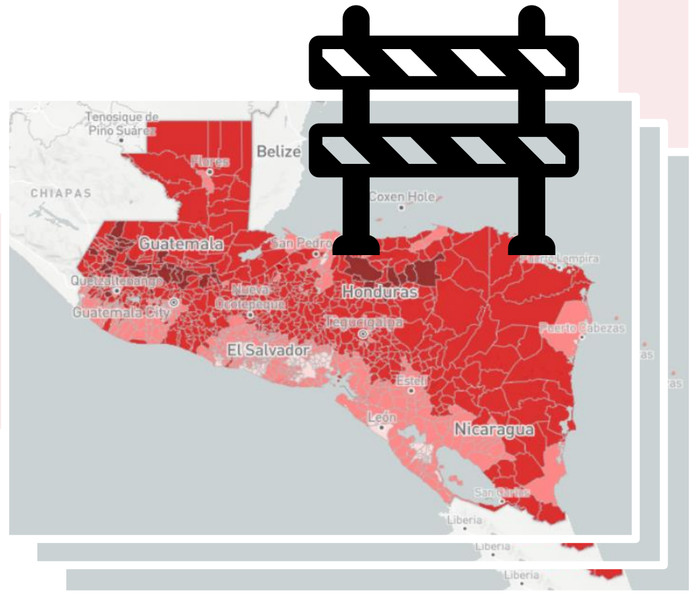
PREDICTIVE MODELING



6. DEPLOYMENT IN OTHER REGIONS

ADAPTING THE APPROACH TO OTHER REGIONS

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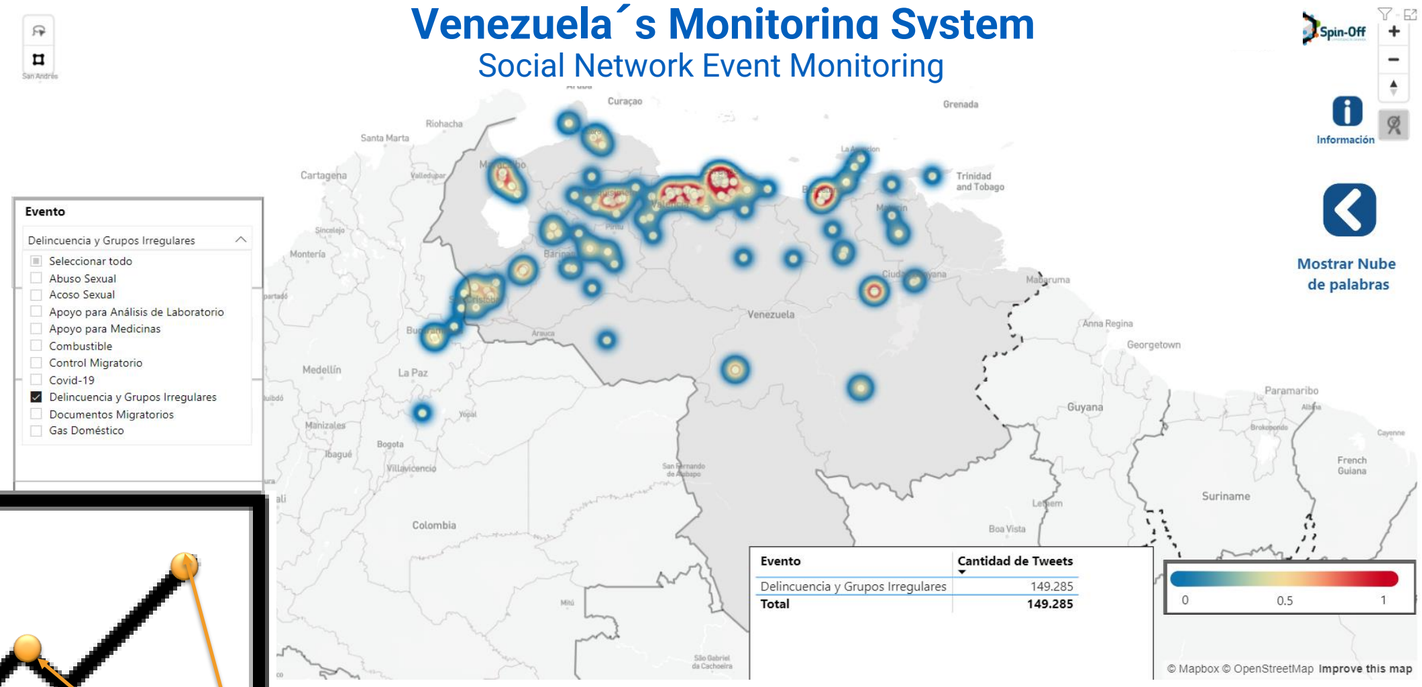
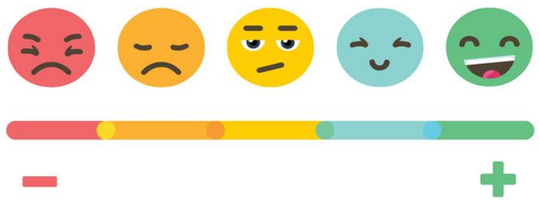
ADAPTING THE APPROACH TO OTHER REGIONS

PREDISAN VENEZUELA





We are going to try to predict how the violent event affects the food security

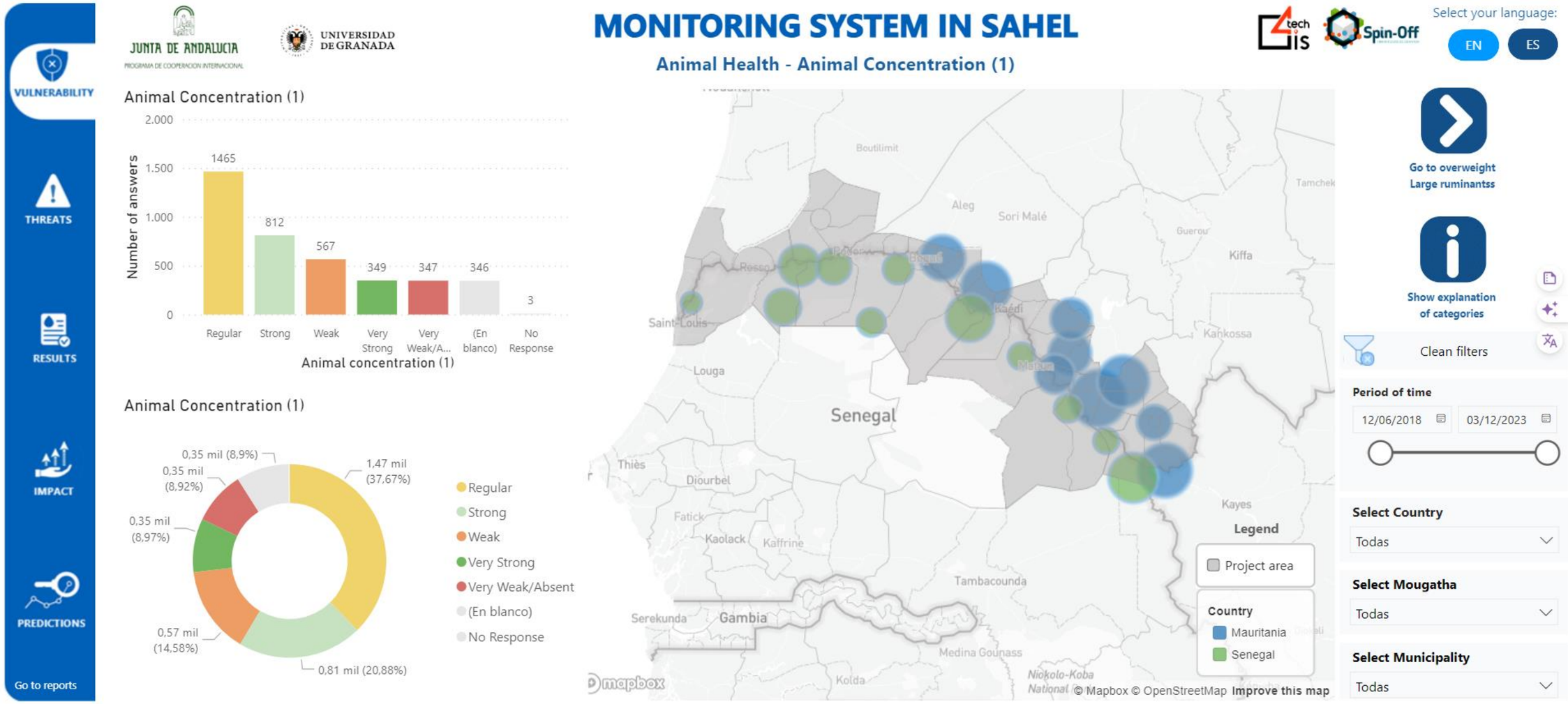
Using information from social network we can try to extract feeling polarity

https://predisan.gis4tech.com/venezuela

6. DEPLOYMENT IN OTHER REGIONS

ADAPTING THE APPROACH TO OTHER REGIONS

PREDISAN SAHEL



https://predisan.gis4tech.com/sahel

7. CONCLUDING REFLECTIONS

7. CONCLUDING REFLECTIONS

- Predictions for food security indicators have room for improvement.
- Despite challenges, the predictions show logical trends consistent with expert knowledge.
- Incorporating high-quality data and contextual secondary information (e.g., violence indicators, food prices) is necessary.
- The PREDISAN platform provides historical data at the municipality level, including key indicators like Food Consumption Score (FCS), Household Hunger Scale (HHS), and Household Dietary Diversity Score (HDDS).
- Our proposed model uses nowcast modeling techniques to predict food insecurity situations 24/7.
- While our study case focuses on Central America, the model can be adapted for use globally.

THANK YOU SO MUCH FOR YOUR ATTENTION

YOU CAN SEND YOUR INQUIRIES TO US, USING THE FOLLOWING CHANNELS:

ADDRESS
CETIC-UGR
Oficina 3, Planta Baja
Granada (España)

PHONE
(+34) 600 513 682

E-MAIL
info@gis4tech.com

WEB
https://www.gis4tech.com/