



Food and Agriculture Organization  
of the United Nations

# Agriculture Stress Index System

*Monitoring Agricultural Drought  
with Remote Sensing Data*

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# FAO-ASIS

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A state-of-art, expert system for agricultural drought monitoring based on 10-day satellite data of vegetation and land surface temperature from METOP-AVHRR sensor at 1 km

2016  
GEOSPATIAL  
WORLD  
AWARDS

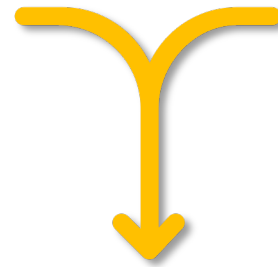
The logo for the Geospatial World Awards, featuring a stylized globe with a compass rose and a location pin, all enclosed in a circular border.

# THE CONCEPT

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Vegetation  
condition index

Temperature  
condition index



**Vegetation health  
index (VHI)**

←  
Low

→  
High

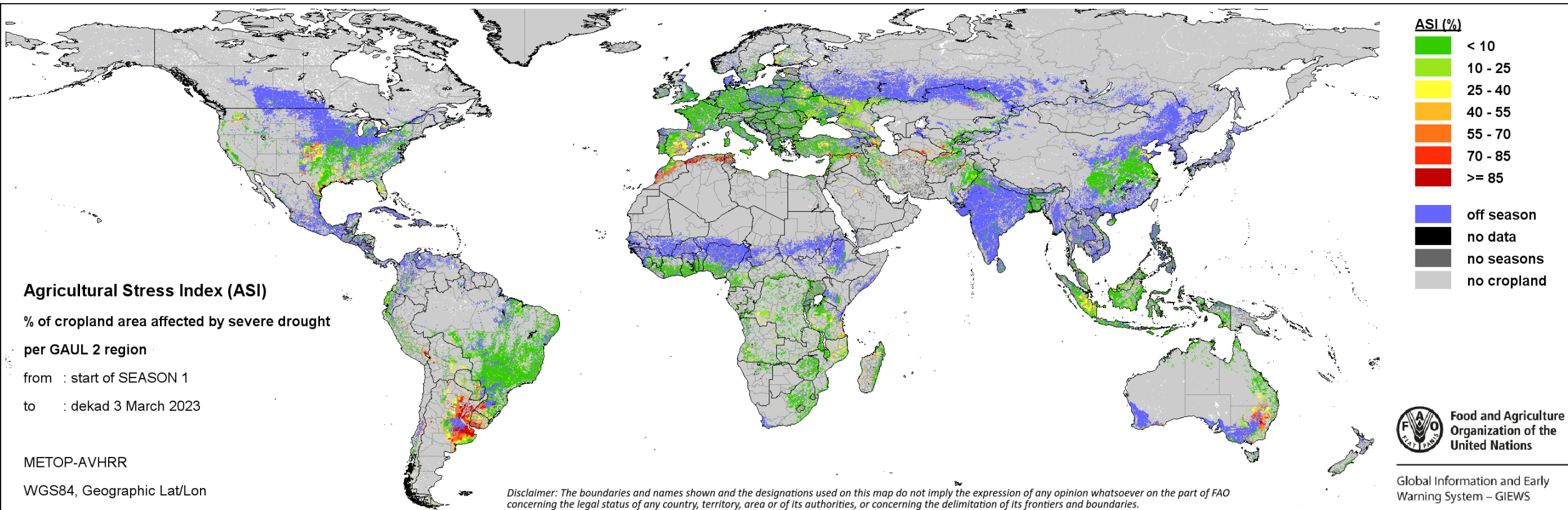




# GLOBAL-LEVEL ASIS

## Technical support to the Global Information and Early Warning System (GIEWS)

Agricultural area affected by drought



# COUNTRY-LEVEL ASIS

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## Country-level calibration



Land use  
maps



Sowing  
dates



Crop  
cycle



Crop  
coefficient

Accurate  
results

# THE CONCEPT

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*Duration*



*Intensity*



*Spatial extent*

Classification



Extreme

Severe

Moderate

Slight

# COUNTRY-LEVEL ASIS – AN INNOVATION

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Measured sensitivity to water stress at each phenological phase



More precise classification



Crop specific analysis throughout more than two seasons



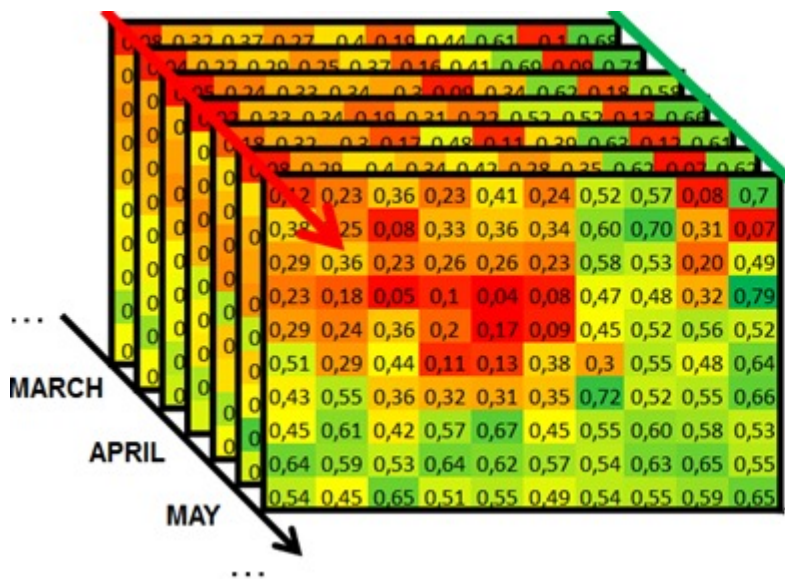
Selected analytical units



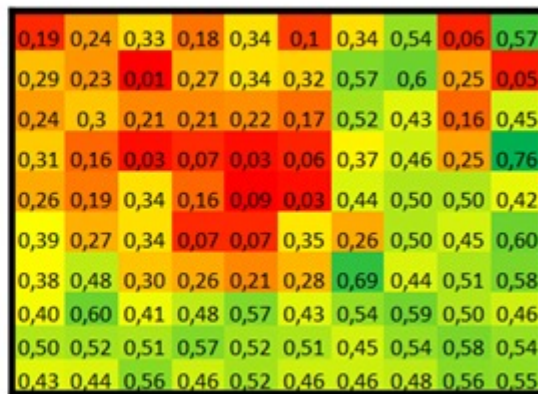
Historical archives with over 30 years information records



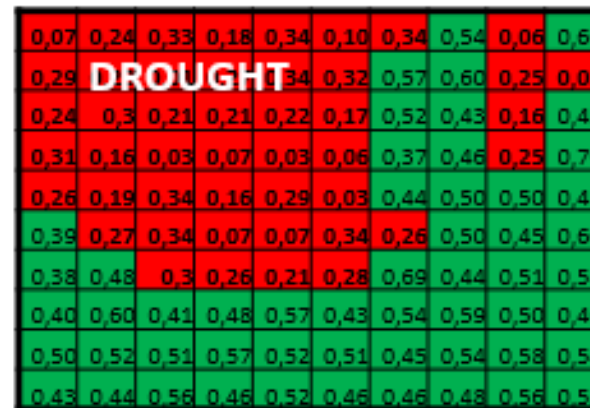
$wVHI = VHI \times kc$



Mean wVHI over the crop season (SOS, EOS)

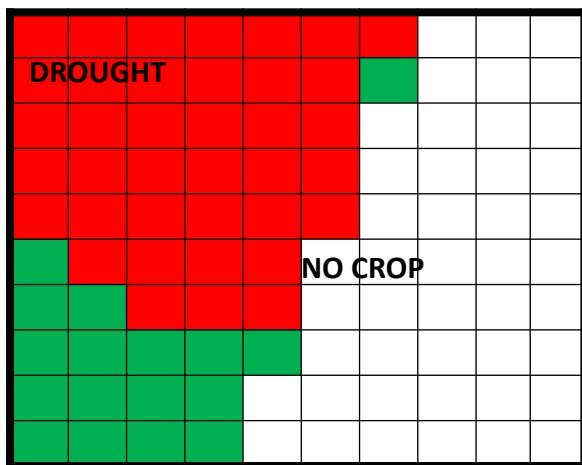


Drought pixel (wVHI < 0.35)



1. TEMPORAL INTEGRATION

Crop mask 2. Spatial integration



ASI value for the Administrative Unit = 70%

$$\frac{\text{\#drought pixels (38)}}{\text{\#total crop pixels (55)}} = \pm 70\% \text{ of crop area affected by drought}$$



SHORT DEMO [https://drive.google.com/file/d/1SlzFXZwAVp-4ZKjQj\\_sA92xQIEF8gyPD/view?usp=share\\_link](https://drive.google.com/file/d/1SlzFXZwAVp-4ZKjQj_sA92xQIEF8gyPD/view?usp=share_link)

El Salvador <http://asis.marn.gob.sv/>

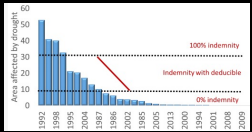
Guatemala: <http://svsa.insivumeh.gob.gt/>

Honduras: <http://asis.infoagro.hn/>

Ecuador: <http://asis.agricultura.gob.ec>

# Potential Applications

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- a monitoring and early warning system for agricultural droughts;
- a trigger for implementation of mitigation activities, at national drought plans;
- a trigger for payment of indexed agricultural insurance;
- an independent variable to build yield forecast models;
- a tool for the probabilistic prediction of areas to be affected by drought;
- a tool for carrying out specific studies regarding the El Niño phenomenon, or to guide public investments.



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Thank you for the  
attention

