DEFEAT MALNUTRITION WITH AI

3 March 2021

Anna Ziolkovska, Hassan Ali Ahmed, Louise, Mwirigi, Douglas Jayasekaran

GLOBAL NUTRITION CLUSTER
Technical Alliance

Global **NUTRITION** CLUSTER

Lack of timely malnutrition data to organize aid

Access challenges

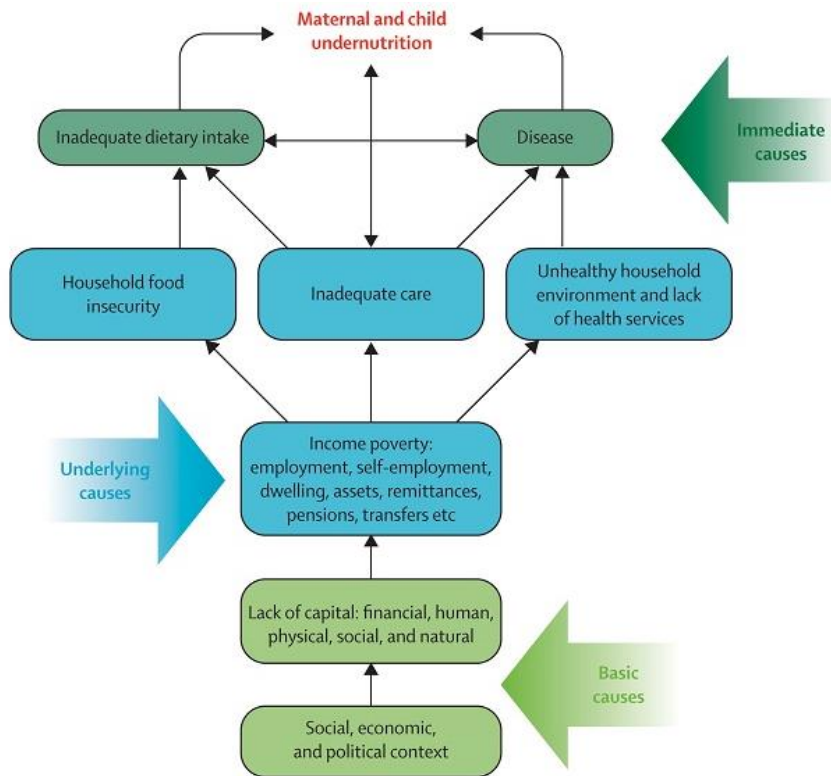Time consuming

Expensive

Lack of capacity

Our goal: leveraging AI to detect malnutrition rates

Objectives

- To monitor in real time the level of malnutrition in communities at risk

- To provide a timelier response

- To save lives !

Our model will focus on the key causes of malnutrition

Dependent variable:

- Initially: **GAM** (wasting) of children U5

- In future: different forms of micronutrient malnutrition, obesity/overweight, U5 mortality, IYCF practices

Approach:

- Build a **model** analyzing data on the causes of malnutrition and their correlation with malnutrition

- We will use **structured data** such as provided by the UN agencies, clusters and on-site surveys

- And **unstructured data** such as live feeds of social media and news outlets, satellite imagery

Source: UNICEF Conceptual Framework for Malnutrition, 1990 & Bhutta et al., Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet, 2013.

1st pillar: structured data to understand long-term trends (examples)

DISEASE	Measles outbreaks/cases	Cholera outbreaks/cases	Diarrhea outbreaks/cases	Other outbreaks/cases
INADEQUATE DIETARY INTAKE	% people who are food insecure	% of people eating adequate diet	% of people eating 2,000 kcal/day	Number of meals per day
FOOD INSECURITY	Agricultural output	Reliance on imports	Types of crops grown	Rainfall and drought level…
INADEQUATE CARE	Breastfeeding rate	Vaccination rate	Health literacy rate	% of children with both parents
ACCESS TO HEALTH SERVICES	Medical workers per 1000 residents	Hospital beds per 1000 residents	Distance to nearest health facility	% practicing safe hygiene practices
INCOME POVERTY	Poverty rate	Unemployment rate	Child labor rate	Income inequality
INFRASTRUCTURE	Access to safe water and sanitation	Electrification coverage	Internet coverage	Transportation network
SOCIO ECONOMIC FACTORS	GDP per capita	Food price increases	Fertility rate	Transparency index

Structured data are backward-looking. We need real-time data

EMBA | EXECUTIVE MASTER OF BUSINESS ADMINISTRATION

2nd pillar: unstructured data to get new insights in real time (examples)

Continuous media screening

RADIO

PRESS

SOCIAL MEDIA

GOOGLE TRENDS

+

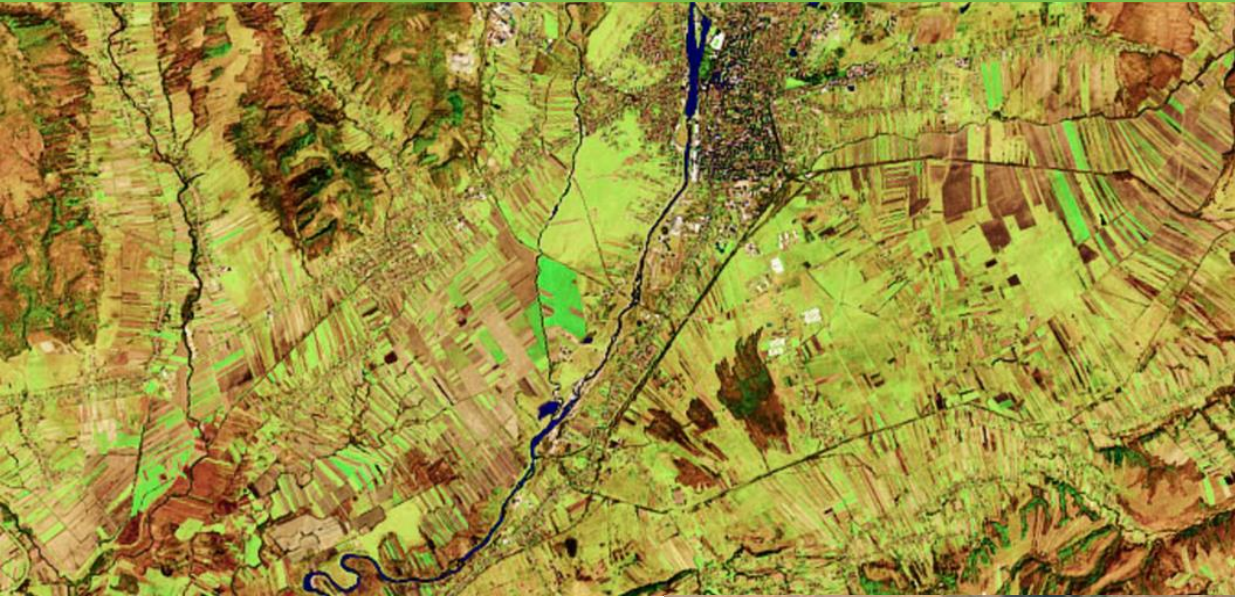## Real-time satellite data

Drought & floods

Farming landscape

Forecasting Crop Production

Monitoring the Crop Impacts of Natural Disasters

Habitats for disease-carrying animals and insects

Assessing Water Pollution

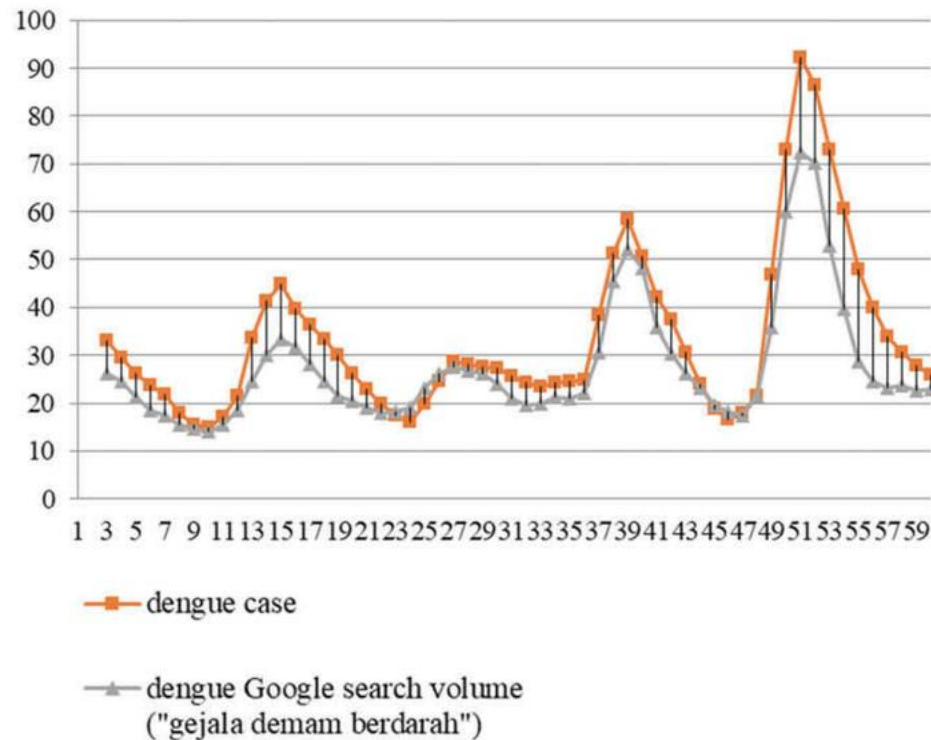# Satellites will be the eyes of our machine...

Farming landscape in Romania

up to 30 cm of resolution

Flooding in South Sudan

Dengue fever tracking with Google Trends shows correlation

- ■ dengue case
- ▲ dengue Google search volume ("gejala demam berdarah")
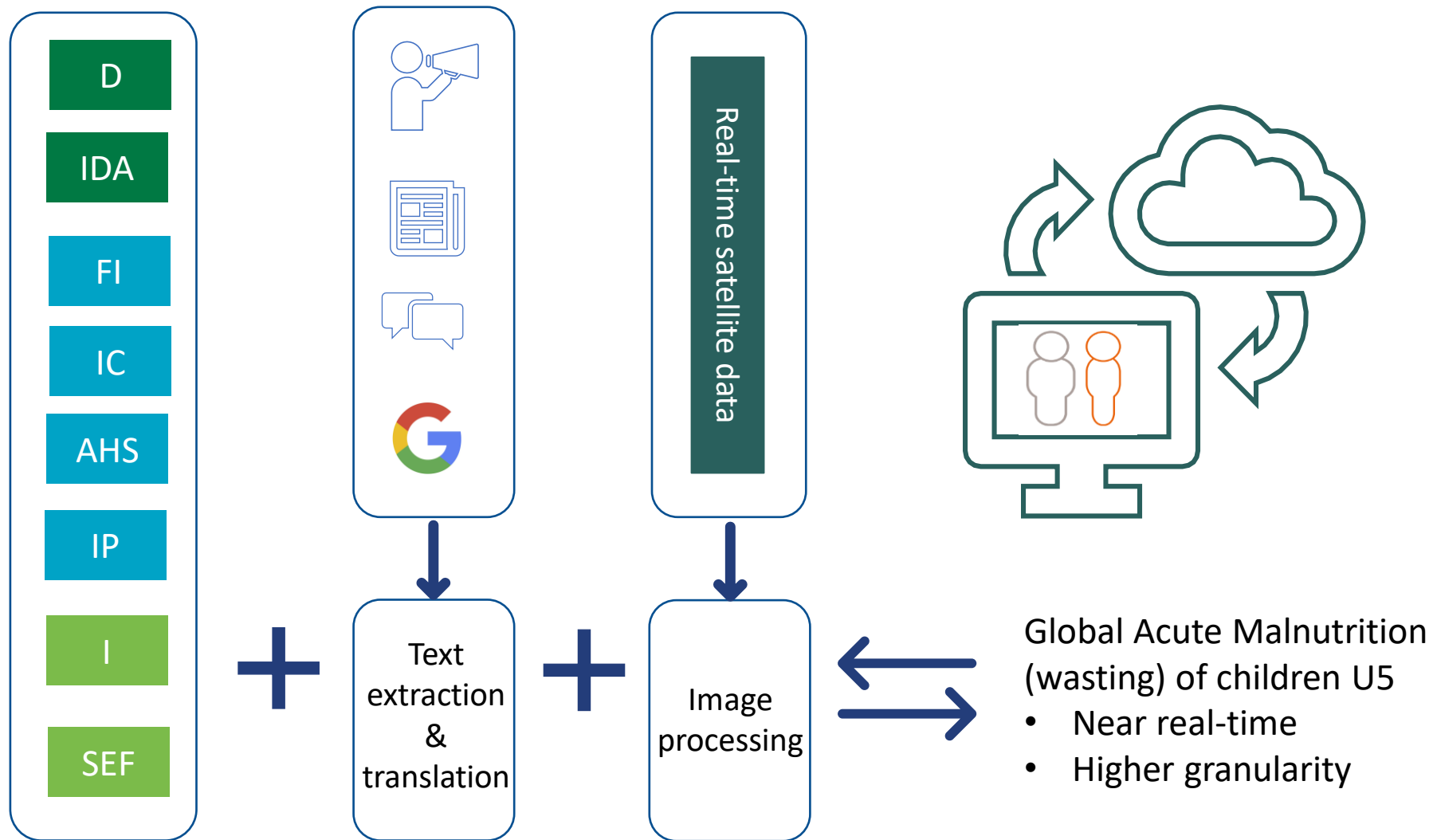
Husnayain (2019) Correlation between Google Trends on dengue fever and national surveillance report in Indonesia, Global Health Action, 12:1,

© picture-alliance/blickwinkel/Blinkcatcher

Radio is the number one media in Africa

East Africa – media use

Media	%
Radio	86.36%
TV	56.52%
SMS	47.62%
WhatsApp	45.45%
Web Portal	31.58%
Mobile Apps	30.43%
Twitter	30.00%
Facebook	27.78%
Instagram	25.00%
Telegram	22.22%
Print / Média imprimé	20.00%
Snapchat	9.52%
E-mail	7.14%
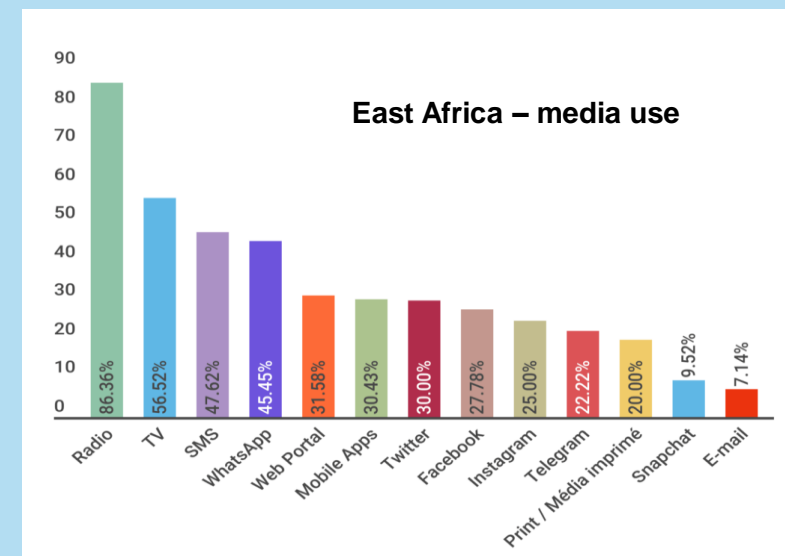
Our solution innovates by combining a broad range of inputs for a valuable output

D

IDA

FI

IC

AHS

IP

I

SEF

+

Text extraction & translation

+

Real-time satellite data

Image processing

Global Acute Malnutrition (wasting) of children U5
- Near real-time
- Higher granularity

Proposed discussion questions
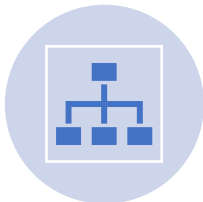
Does the presented approach make sense?

Is it feasible to select as an initial outcome acute malnutrition?

Would it be possible to define the outcome as the regression problem (continuous data)?

What accuracy and lead time we can realistically achieve?

At what admin level can we predict the outcome?

Next steps and is tehre an interest to work jointly (i.e. TF?)