ADAPTA-IF: An Information Factory for Adaptive Agriculture

Andy Shaw,
Director, Assimila Ltd

In partnership with:

The adaptation challenge

Agriculture highly exposed to climate change

Types of climate stress

- Acute and chronic climate change
- Abiotic and biotic hazards

Crop dimension - viability of crops and exposure to range of risks

Human dimension – ability to farm in a healthy and sustained manner

ECONOMIC CONSEQUENCES | EXPERTS CALL FOR MITIGATION

A warming world is affecting Indian agriculture, industries

Climate crisis costs farmers over £800m in lost crops this year

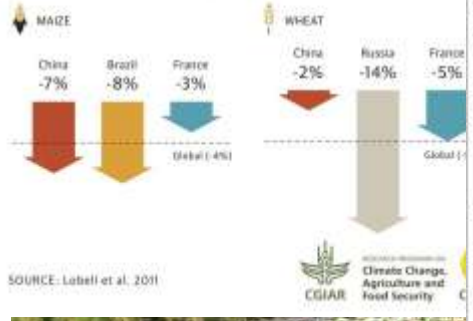
Damian Carrington
Environment editor

Climate change, food and farming: 2010s

According to the Fifth Assessment Report of the IPCC, climate change is affecting food and farming now

It is affecting crop yields

Maize and wheat yields show climate impacts



Climate Change Raises Risks to Corn

New research projects that rising global temperatures will reduce yields in the world's largest corn-producing regions and could lead to food shortages.

MAIZE PRODUCTION PROJECTIONS

Projections under different warming scenarios, top producers, mean figures

COUNTRY/RANK	2°C WARMING	4°C WARMING
1 U.S.A.	-17.8%	-46.5%
2 CHINA	-10.4%	-27.4%
3 BRAZIL	-7.9%	-19.4%
4 ARGENTINA	-11.6%	-28.5%

Production at 100%

UK heatwave: Lettuce growers warn of imminent shortage

News • Science

Deadly disease killing olive trees 'could cost over £20bn' across Europe

Disease, spread by spittlebugs, capable of infecting over 300 plant species

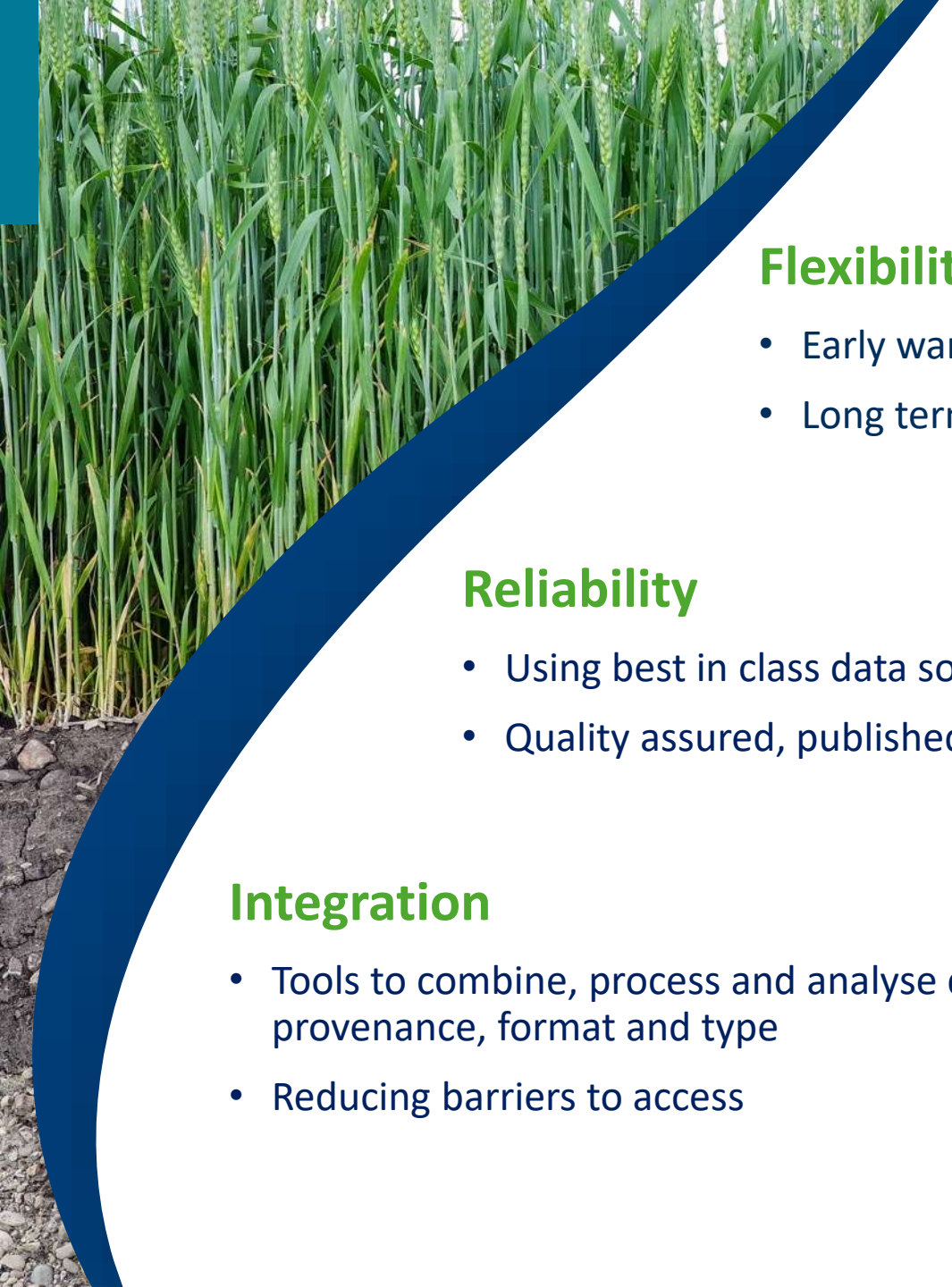
Peter Stubley

EO technology is applicable to many adaptation options

UNDP: Climate change adaptation in agriculture involves adjusting farming practices, technologies, and management strategies to cope with extreme weather, reduced yields, and changing growing conditions.

Incremental adaptation	Transformational adaptation	Enabling conditions
Improve water use Inform agronomic decisions e.g planting / harvesting dates Biosecurity and pest control	Early warning systems Planning for and prediction of seasonal to intra-seasonal climate risks Crop and livestock insurance Erosion control Climate services for new agricultural programmes	Establishment of climate services Integrated water management policies Climate information in local development policies National food security programmes

Following: Synthesis of food security related adaptation options to address climate risks (IPCC 2014b; Vermeulen et al. 2013, 2018; Burnham and Ma 2016; Bhatta and Aggarwal 2016)



ADAPTA: Accelerating delivery of data-driven solutions

Flexibility

- Early warning systems need timely, real-time data
- Long term investment planning requires long time series, and projections

Reliability

- Using best in class data sources
- Quality assured, published meta-data

Partnership

- Open to a variety of input data suppliers
- Develop service intermediary partnerships to address specific market verticals

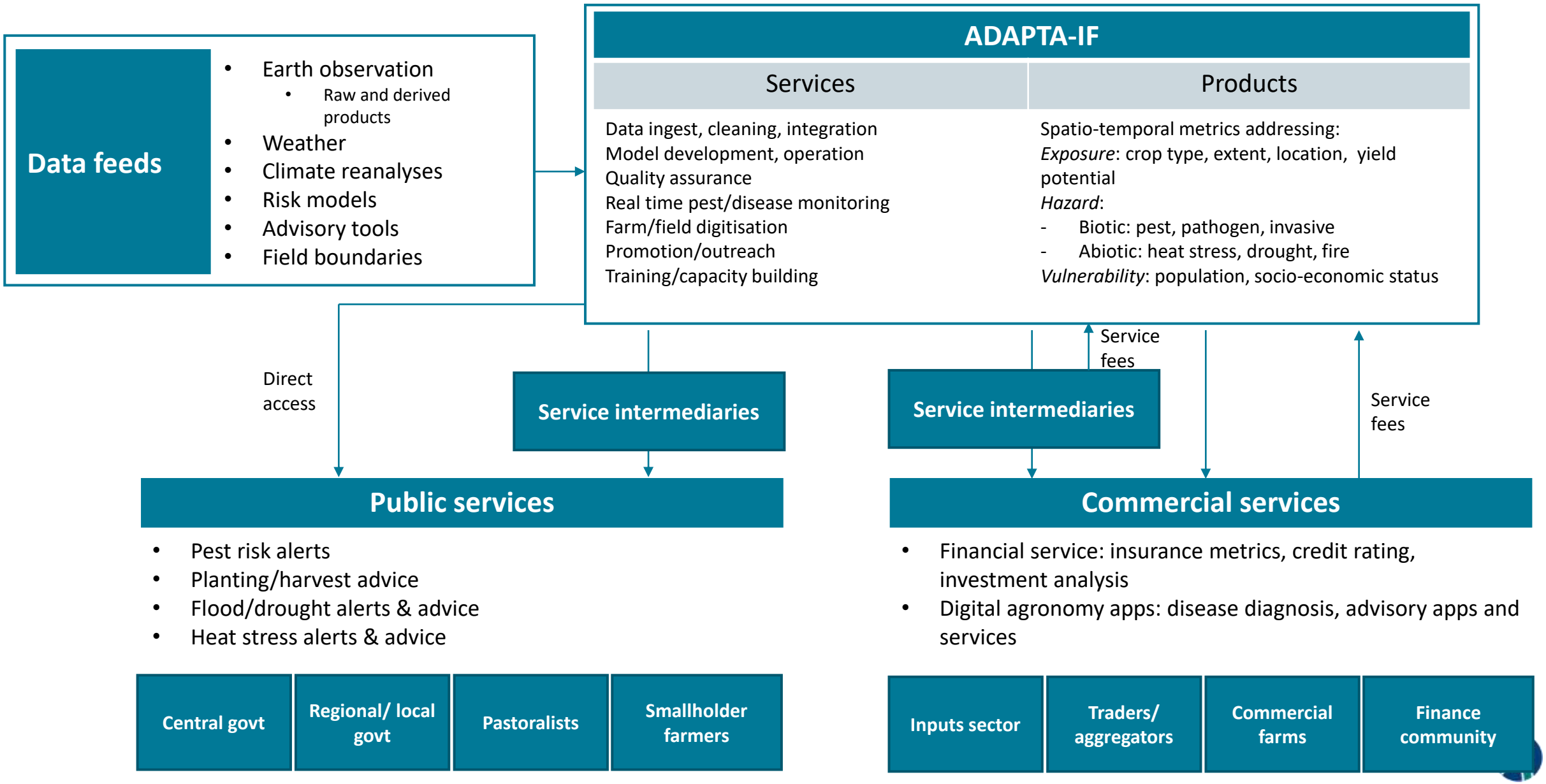
Integration

- Tools to combine, process and analyse data of different provenance, format and type
- Reducing barriers to access

Market oriented

- Developing tools for multiple agri supply chains
- Flexible business models

ADAPTA Information Factory Concept



ADAPTA-IF

An Information Factory for Adaptive Agriculture

Reusable datasets, components, methods and algorithms from:

EOEPCA+ | APEx / NoR | CDSE

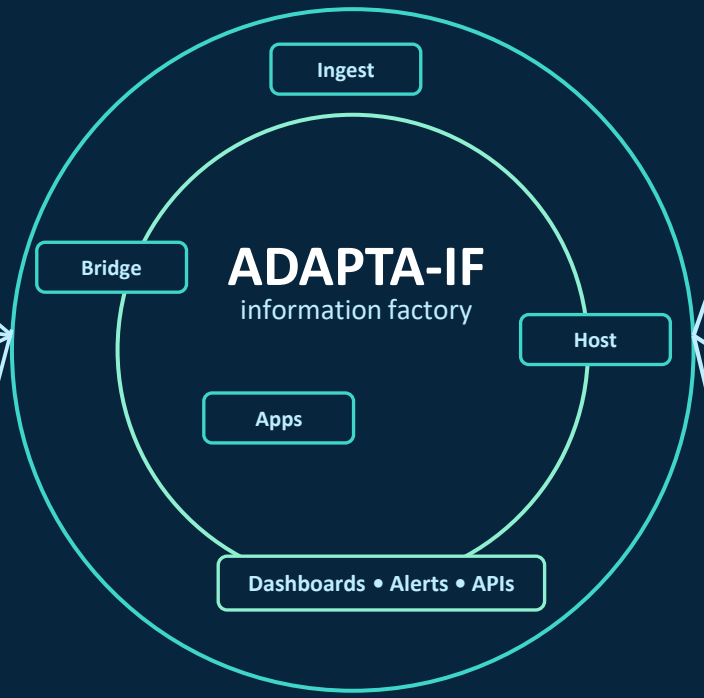
EO + climate + non-EO

Sentinel-1/2, CLMS products

ERA5-Land • CHIRPS
Weather forecast

Flood • Drought
Fire • Crop stress

Yield • Pest • Farm data



Use cases

Cotton supply chain risk

India / Bangladesh

S1/S2 | ERA5 | CHIRPS | Flood | Heat | Pest

Maize yield optimisation

Kenya

S1/S2 | ERA5 | GloFAS | Soil moisture | Pests

Olive farm decisions

Cyprus & Greece

S2 | ERA5 | CHIRPS | Fire | LULC | DEM | LAI/FAPAR

Initial ADAPTA Use Cases

Services

Tactical: Short term decision-support tools and early warning systems

Strategic: Long term analysis informing investment and management strategies

Maize, Kenya
Project lead: CABI

- **Tactical:** Crops stress alerts; pest risk advisory
- **Strategic:** Production estimates; yield loss attribution; economic burden estimates

Cotton, India/Bangladesh/Pakistan
Project lead: CottonConnect

- **Tactical:** Production shock alerts; health advisories
- **Strategic:** Lost productivity indices; Regenerative practices report; Long term viability reports

Olives, Cyprus/Greece
Project lead: Geosystems Hellas

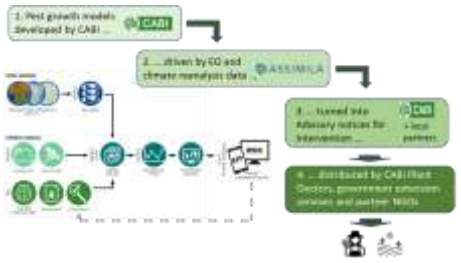
- **Tactical:** Health status; Early pest/disease detection; Extreme weather alert
- **Strategic:** High risk area analysis; spatio-temporal disease prediction

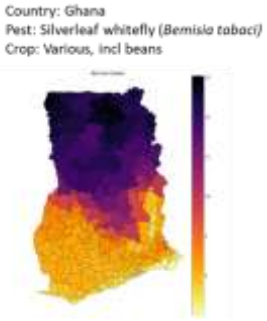
Biosecurity and agricultural sustainability

Delivering……

Pest Risk Information Service

Helping farmers reduce losses to pest and disease



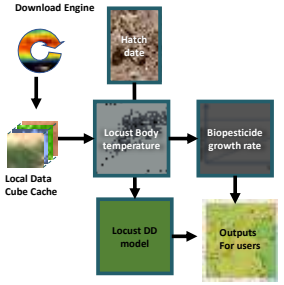


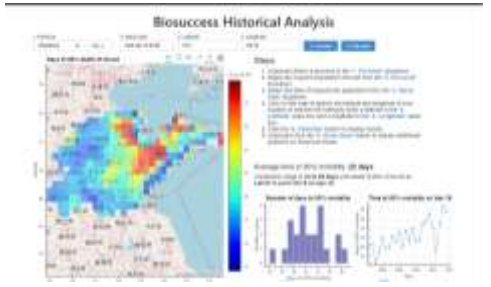
UK SPACE

prise.org

BioSuccess

Enhancing biopesticide efficacy

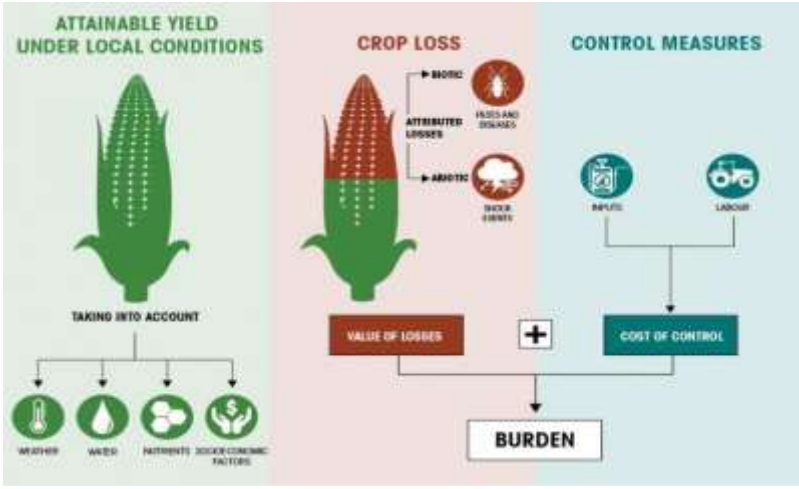




climate.copernicus.eu/biosuccess

Global Burden of Crop Loss

Developing a data driven system to describe the scale and causes of crop loss



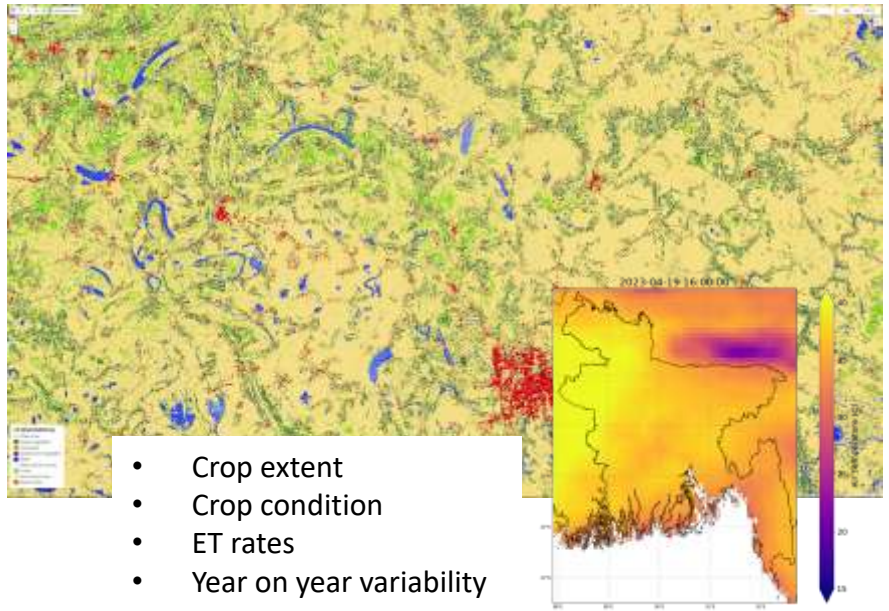
Supported by:

croploss.org

Cotton farming: Heat stress, farmer health and reducing lost productivity

Delivering……

Crop Context Products



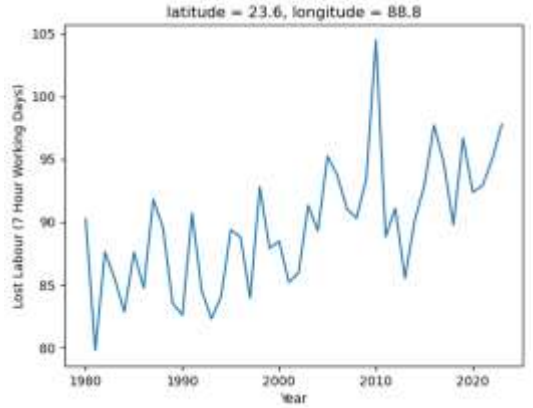
- Crop extent
- Crop condition
- ET rates
- Year on year variability

> " We are stuck in a 5am to 9pm work hour cycle, with a lot of home, farm and livestock responsibilities. It leaves us hardly any time to rest. Our work at home and field has increased, so we have the same or more expenses but the income is not much."
>
> ***Female cotton farmer in Pakistan***

Heat Risk Advisories for Rural Agricultural Workers

Quantifying labour lost to heat

Hour	Wet Bulb Globe Temperature (°C)	Approximated work/rest cycles (minutes)	Lost Labour (minutes)
06:00	22.07	No recommendations	0
07:00	24.01	45/15	15
08:00	26.05	30/15	20
09:00	27.94	30/15	20
10:00	29.39	30/30	30
11:00	29.97	30/30	30
12:00	30.62	15/45	45
13:00	30.81	15/45	45



Assimila

Thank you!

For further information please visit:

www.assimila.earth/adapta-if

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