

COMBINING IN-SITU AND SATELLITE MONITORING OF WATER AND FOREST RESOURCES FOR ADAPTATION TO CLIMATE CHANGE”

***Space Agencies and Satellite Tools for Agricultural
Monitoring: Capabilities and Innovations***

12TH NOVEMBER 2025

ERIC BREL

**Espace pour la Guyane
Centre Spatial Guyanais**

01

INTRODUCTION

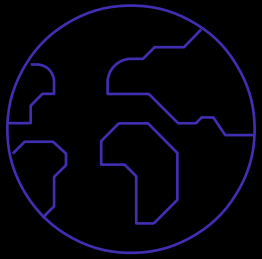
LE CNES ET LES APPLICATIONS

CNES – Agence française de l'Espace / Expertise technique française

L'ÉCOSYSTÈME SPATIAL FRANÇAIS EN CHIFFRES

3 milliards €

Le budget spatial institutionnel français en 2024, ce qui représente :



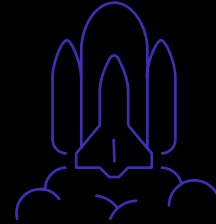
45 €

par an et par habitant
pays, après USA, Chine, Japon et la Russie

5^e

1^{er}

budget national en Europe

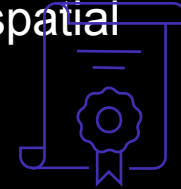


1

entreprises françaises dans la filière spatiale, qui représentent 1 500 établissements, 90 % de PME et ETI (entreprises de taille intermédiaire)

80

Plus de formations académiques spécialisées dans le spatial



Plus de

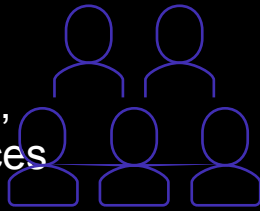
15

Centres Spatiaux Universitaires collaborant avec le CNES

70 000

personnes

travaillent dans la filière spatiale en France, dans l'industrie manufacturière et de services et le secteur académique.



1^e



pays européen en terme d'investissements privés dans le spatial

OUR 4 STRATEGIC PRIORITIES



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STRENGTHEN
our strategic autonomy



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SUPPORTING
the competitiveness of
the space ecosystem



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COMMIT
to a sustainable world



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SHOWCASE
our scientific excellence

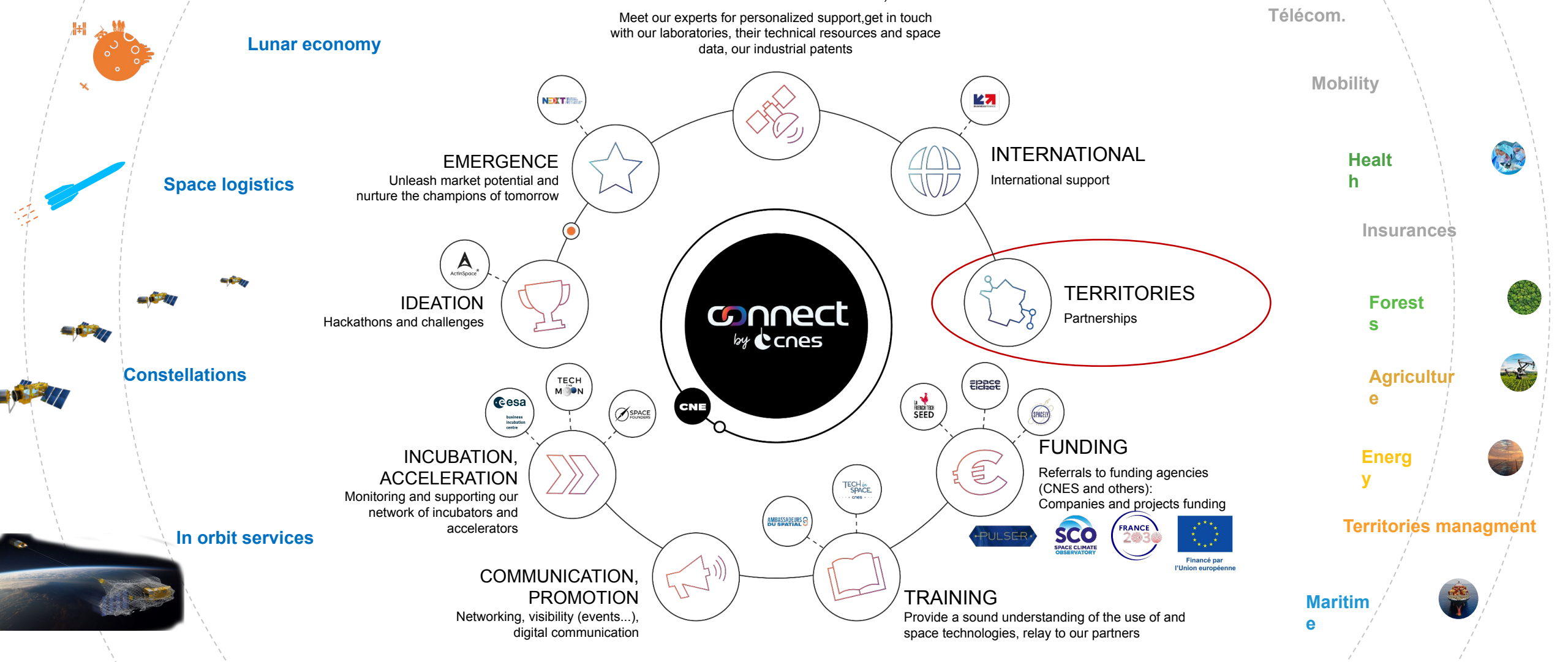


SERVICES FOR EVERYONE

FOR PRIORITY SECTORS

EXPERTISE,
TECHNICAL RESOURCES,

Meet our experts for personalized support, get in touch
with our laboratories, their technical resources and space
data, our industrial patents





02

APPLICATIONS IN ALL SOCIO-ECONOMIC FIELDS

rayon de 2500 km autour de sa position



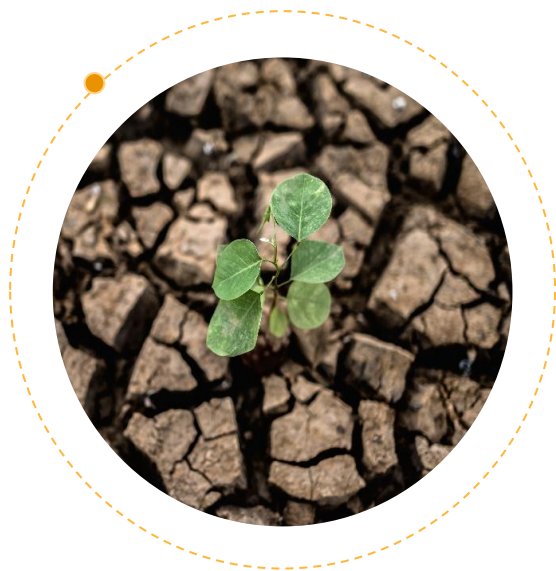


CRÉDITS PHOTOS

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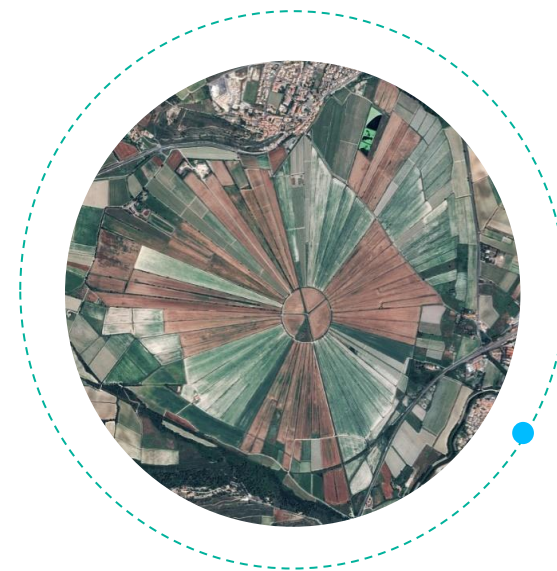
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FEEDING

a growing global population

CONTROLLING

Its environmental impact

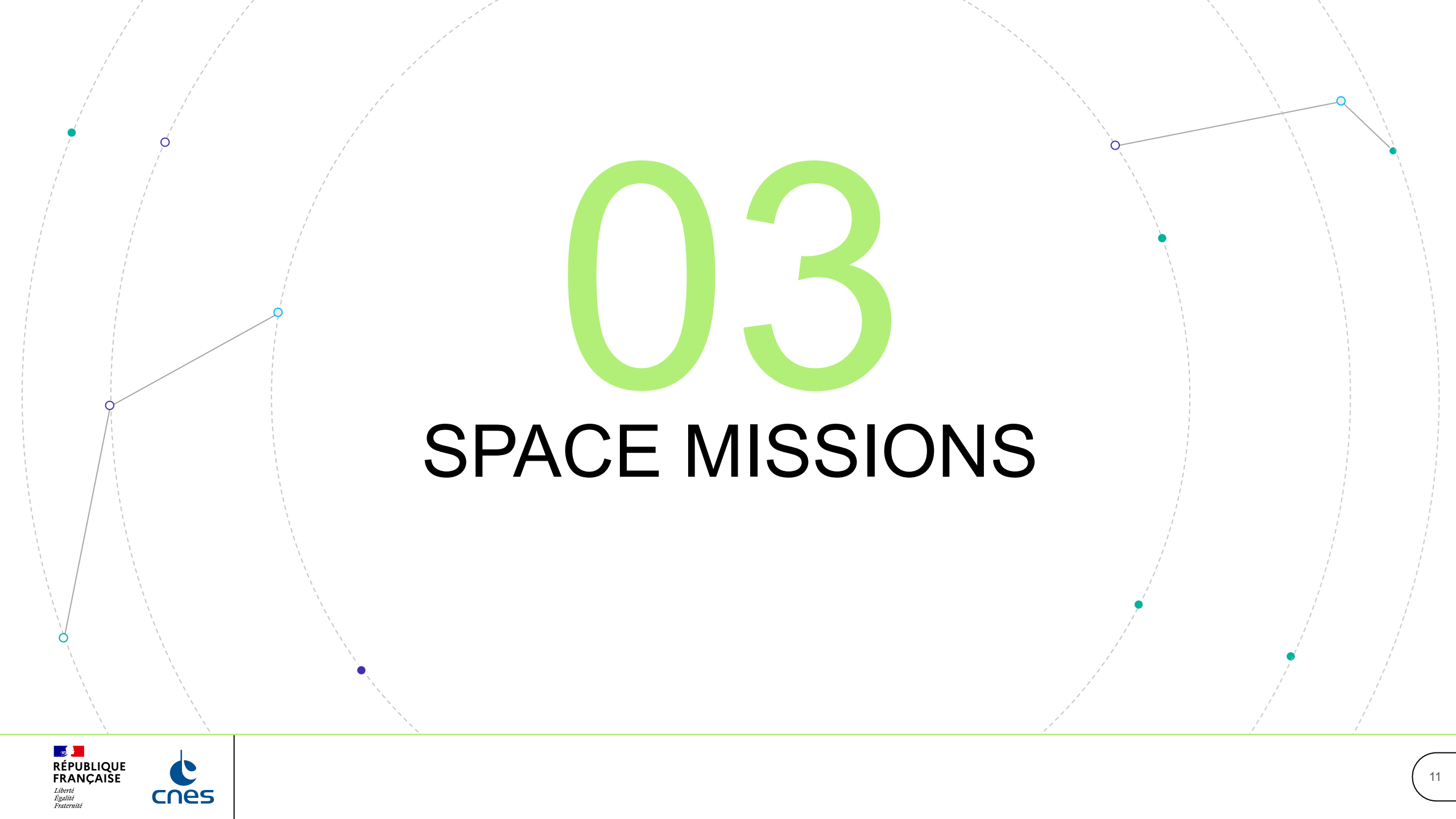
ADAPT

to climate change

SUPPORTING

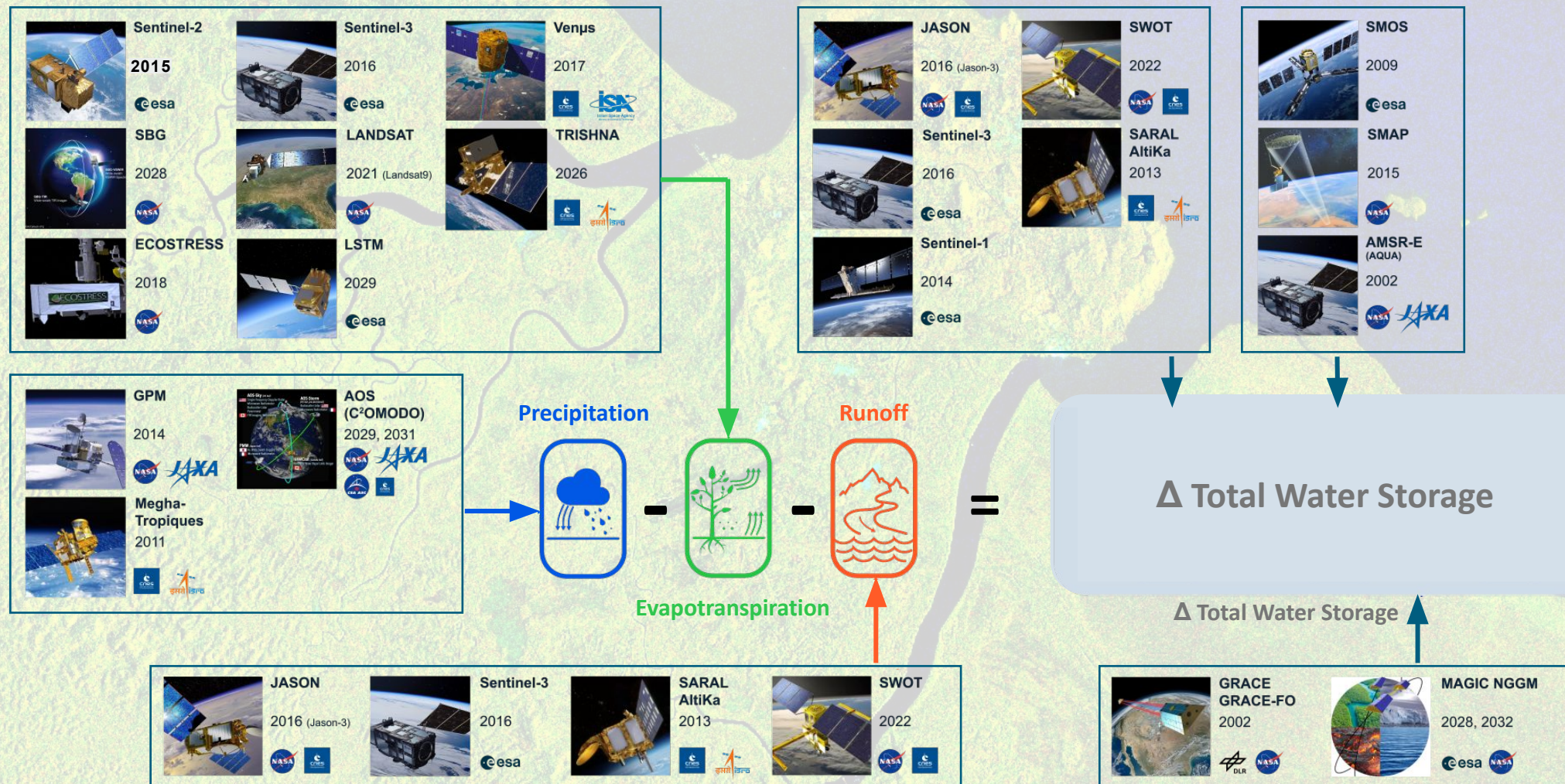
Agricultural stakeholders

Major challenges for the agricultural world involving Space



03

SPACE MISSIONS



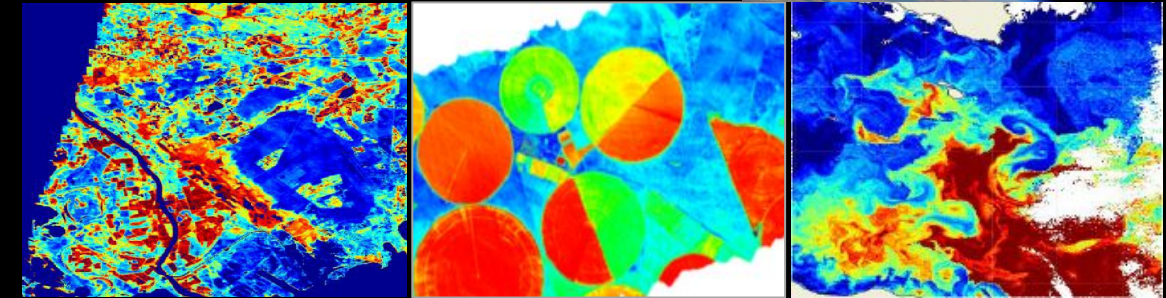
MEASURE THE SURFACE TEMPERATURE

The Franco-Indian TRISHNA mission and its frequent high-resolution measurements address major scientific, economic, and societal challenges through the five main themes which the mission addresses from research perspective and application development. These five main themes are:

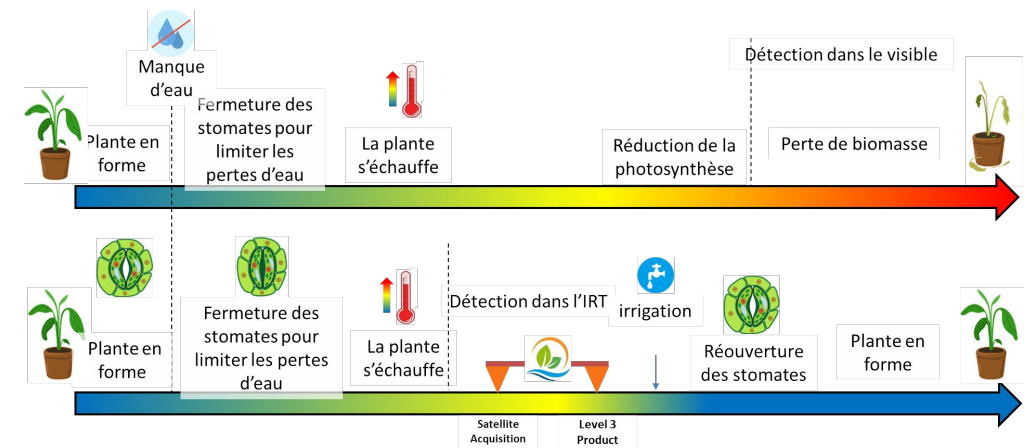
- ECOSYSTEM MANAGEMENT AND WATER STRESS DETECTION (ADJUSTING IRRIGATION NEEDS AS BEST AND AS EARLY AS POSSIBLE)
- MONITORING OF COASTAL AND INLANDS WATERS
- URBANIZATION AND URBAN HEAT ISLANDS
- ATMOSPHERE (AEROSOLS, WATER VAPOR, CLOUDS)
- CRYOSPHERE (SNOWMELT RUNOFF)

Mission characteristics:

- Lifetime 5 years
- Global land and coastal coverage
- 3-day revisit, 60 m resolution
- Equator crossing: 12:30 PM & AM
- Variable viewing angles up to 38 degrees
- VNIR-SWIR (7 bands) – TIR (4 bands)
- NeDT 0.2K instrument output, 0.5°K at 1C level
- Linked with ESA mission: **LSTM** to be launch in 2029 – A and 2030 – B
- Free and open data:
 - Level 2: surface reflectance, **surface temperature**, émissivity, plant-related variables, evapotranspiration flux
 - Level 3: **'Daily evapotranspiration product by interpolation**



Focus on the contributions of TRISHNA in agriculture



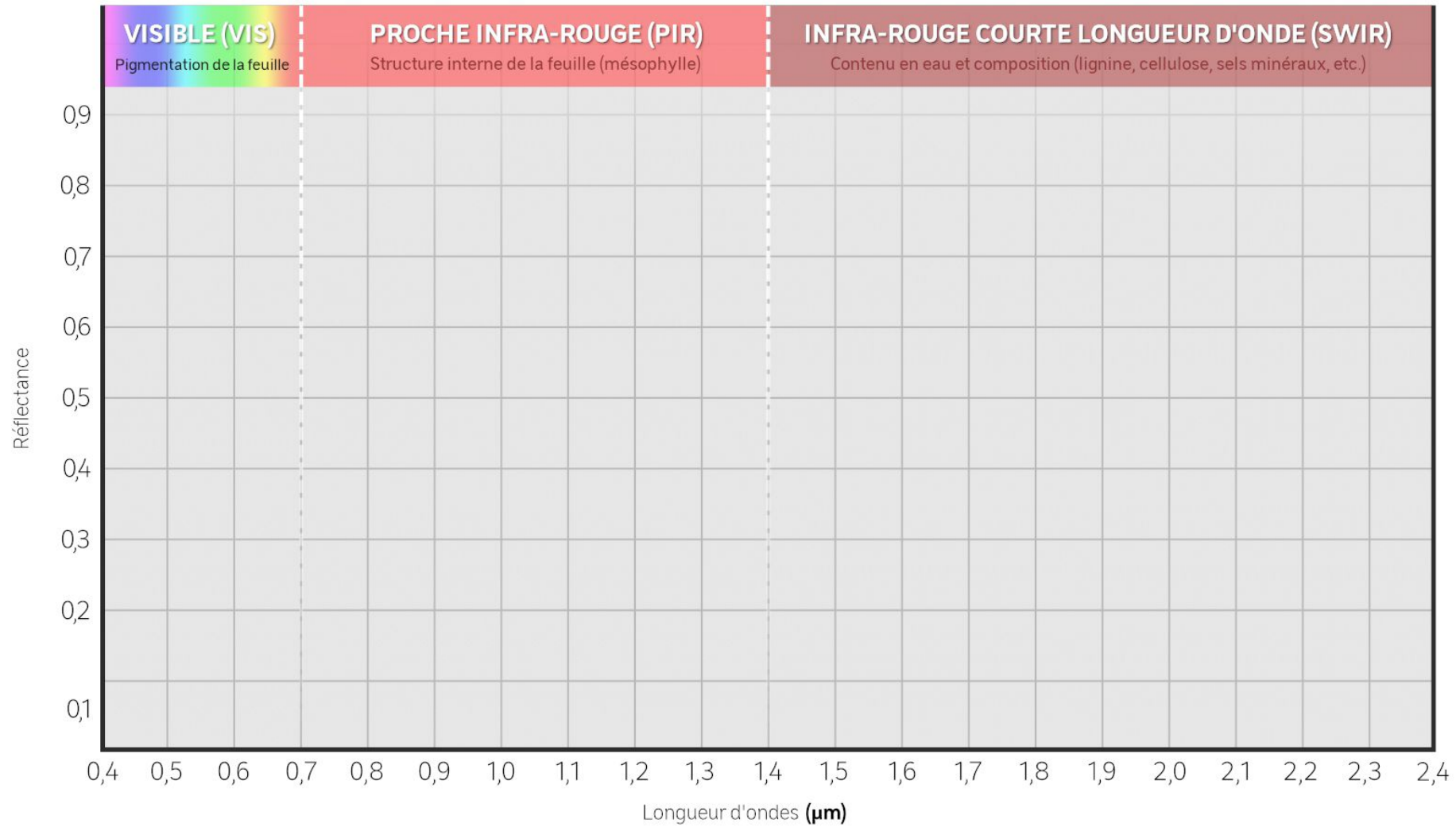
(Philippe Gamet, CESBIO/CNES)

04

SOME APPLICATIONS



FREQUENCY CHOISE

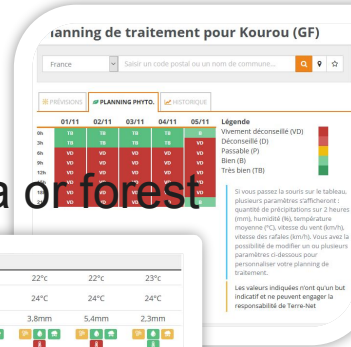


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OTHER APPLICATIONS

Meteorology: Temperature and rainfall forecasts...

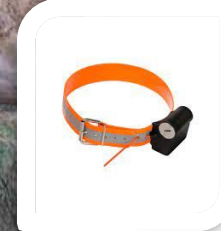
Reliable and accurate weather forecasting for sensitive plots even in the middle of savanna or forest



Precise location: Guiding machinery for sowing, harvesting, and weeding

But, also geolocate livestock

- Locate any precise animal on the planet, in a field
- In time precisely identify the elements of a herd
- Accompany the herd leader to the best watering hole or to the field with the best grass

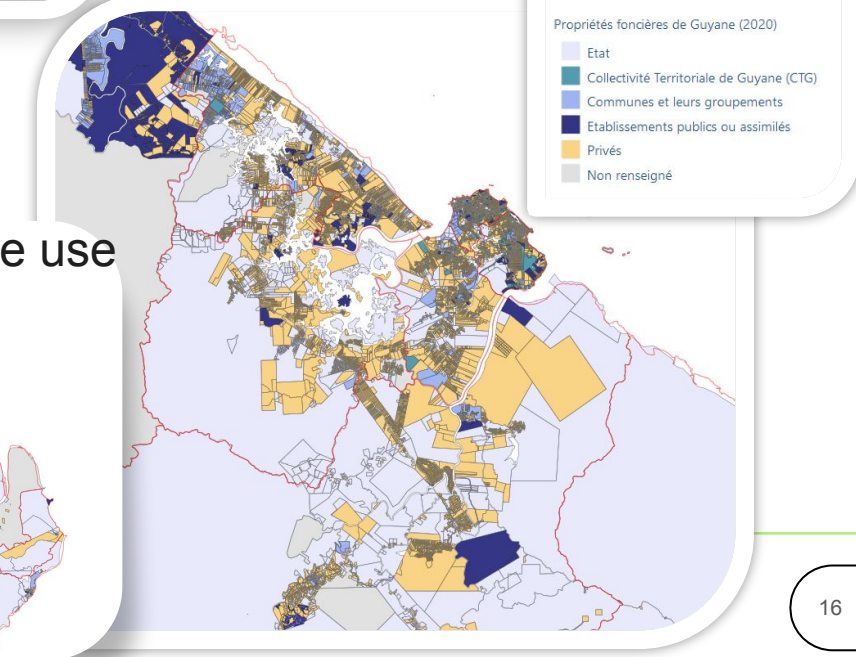
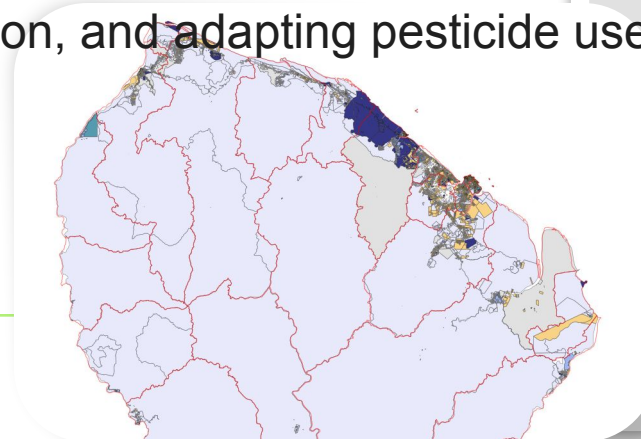


AGRONOMIE

	1°C au sol	22°C	22°C	22°C	22°C	23°C
Pluie	0.0mm	0.0mm	0.0mm	0.0mm	0.0mm	0.0mm
Humidité	5.3mm	5.3mm	5.3mm	5.3mm	5.3mm	5.3mm
Température	24°C	24°C	24°C	24°C	24°C	24°C
Traitement	1	1	1	1	1	1
Traitement glob.	1	1	1	1	1	1
Date prévision	01/11	01/11	01/11	01/11	01/11	01/11
Météo agricole	01/11	01/11	01/11	01/11	01/11	01/11

high-resolution mapping and soil characteristics;

- accurately surveying and monitoring plot development
- adjusting fertilization, optimizing irrigation, and adapting pesticide use





THANKS!