NEW TECHS IN AMAZON RAINFOREST

FAUSTINO GUDIN
EUFJE

EU FORUM OF JUDGES FOR THE ENVIRONMENT
UE FORUM DES JUGES POUR L'ENVIRONNEMENT

IMPEL

EnviCrimeNet

ENPE

SAVE THE DATE

Cooperation in strengthening environmental enforcement - 4 Networks Conference 28-29 September 2023

Carabinieri School, Rome

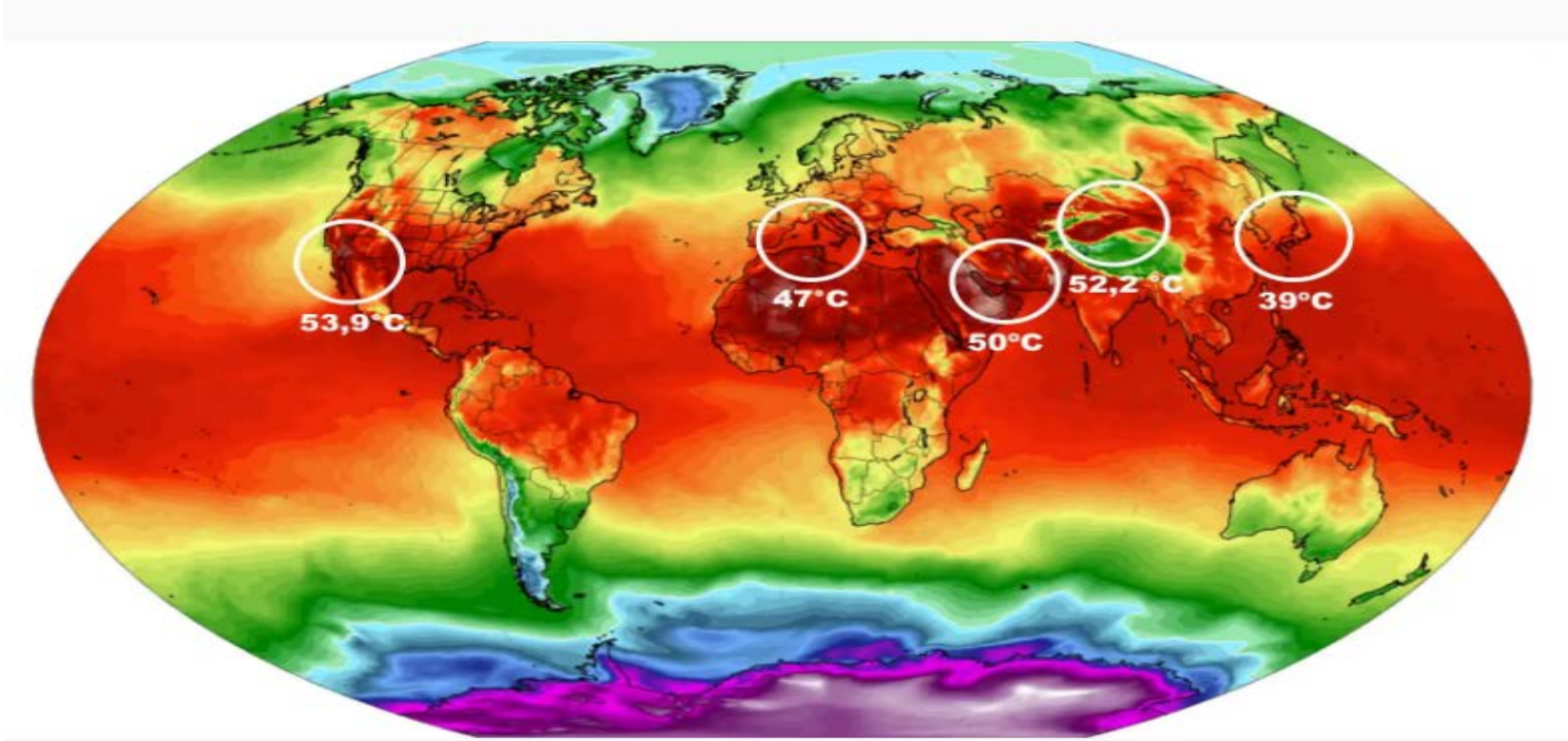
MAIN THEMES

1. How new techniques can be used to prevent and detect environmental offences?
2. How can administrative and criminal law enforcement complement each other?
3. How to make environmental crime unprofitable?
4. How to assess, remediate and compensate for the damage incurred?
5. How to measure enforcement results?

Co-funded by the European Union

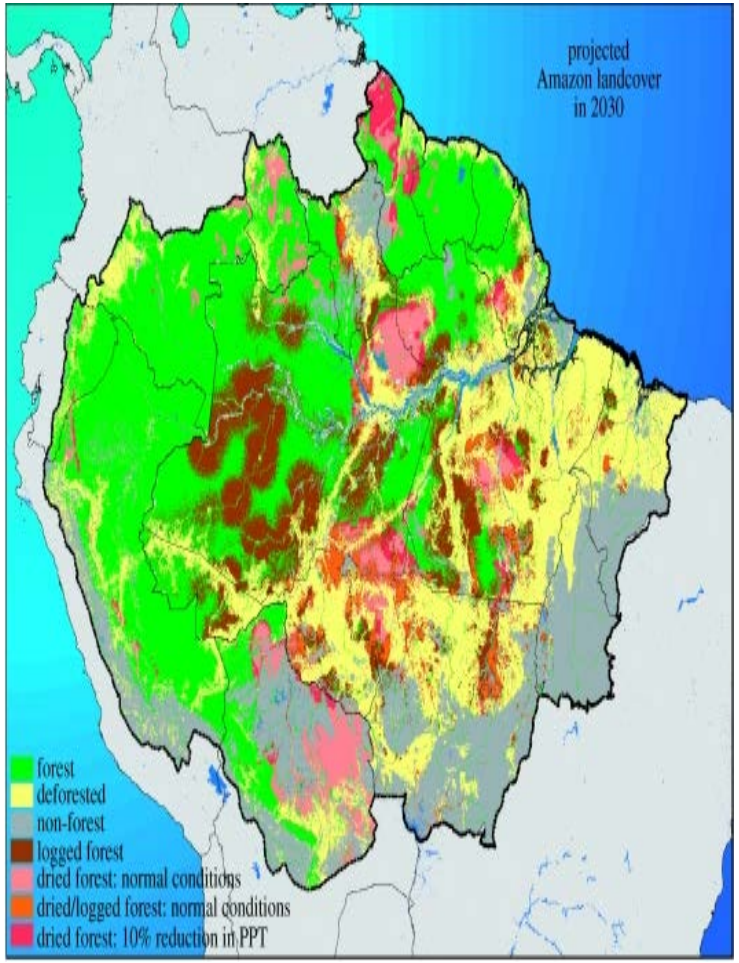
Life+ SATEC

GLOBAL WARMING JULY 2023

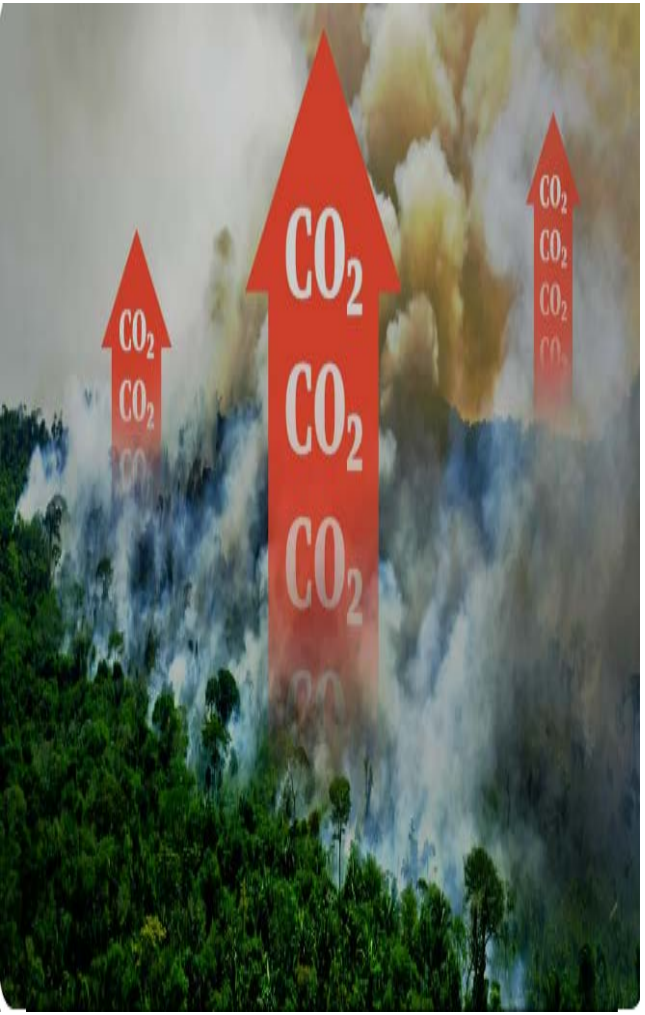


THE NEW ROLE OF AMAZON FOREST IN THIS NEW SCENARIO

- The Amazon rainforest is nicknamed the “lungs of the earth” because it is a vital source of oxygen for the entire planet.
- As an ecosystem, the Amazon is one of the most biodiverse places on earth. Over 3 million species live in the rainforest, and over 2,500 tree species (or one-third of all tropical trees that exist on earth) help to create and sustain this vibrant ecosystem..
- Like many wilderness areas, it is under threat from human activities. Just 2.8% of the world’s terrestrial surface is still “wild” or mostly intact.
- It makes a significant contribution to pulling carbon dioxide out of the atmosphere. It could be consider as a giant air conditioner that cools the planet.



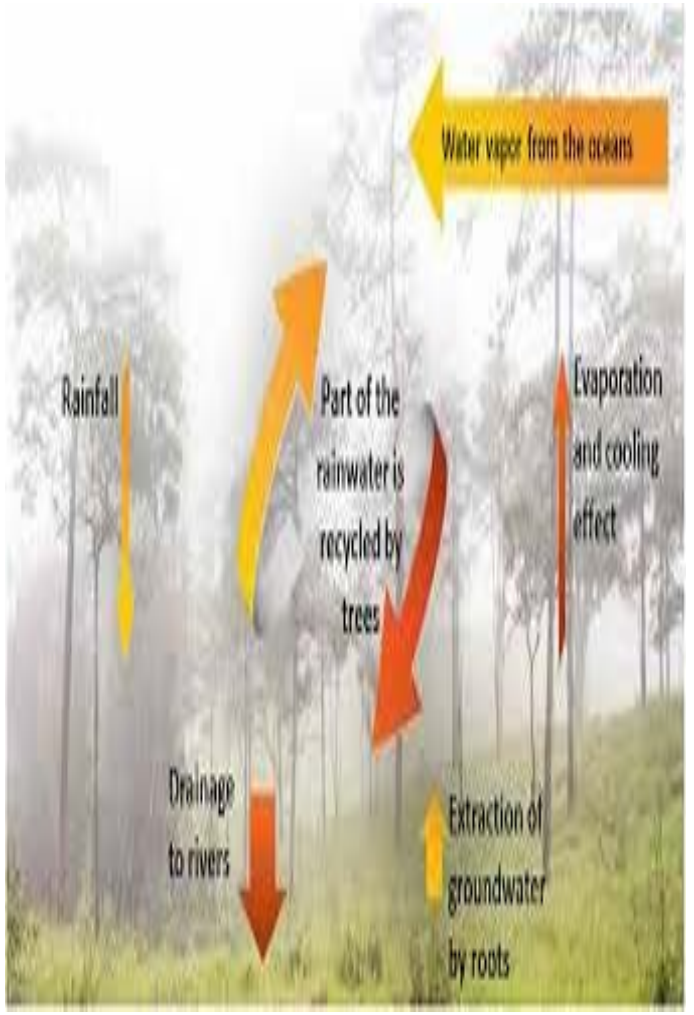
LOSS OF THE AMAZON RAINFOREST'S ABILITY TO ABSORB CARBON DIOXIDE



The rain forests, which contain an estimated 150-200 billion tons of carbon, help stabilize the local and global climate.

Forests play a crucial role in maintaining the global carbon budget. Worldwide, they suck up 2.4 billion metric tons of carbon each year, with the massive Amazon absorbing a quarter of that total.

In 2021 scientists confirmed for the first time that the Amazon rainforest was emitting more carbon dioxide than it was able to absorb.



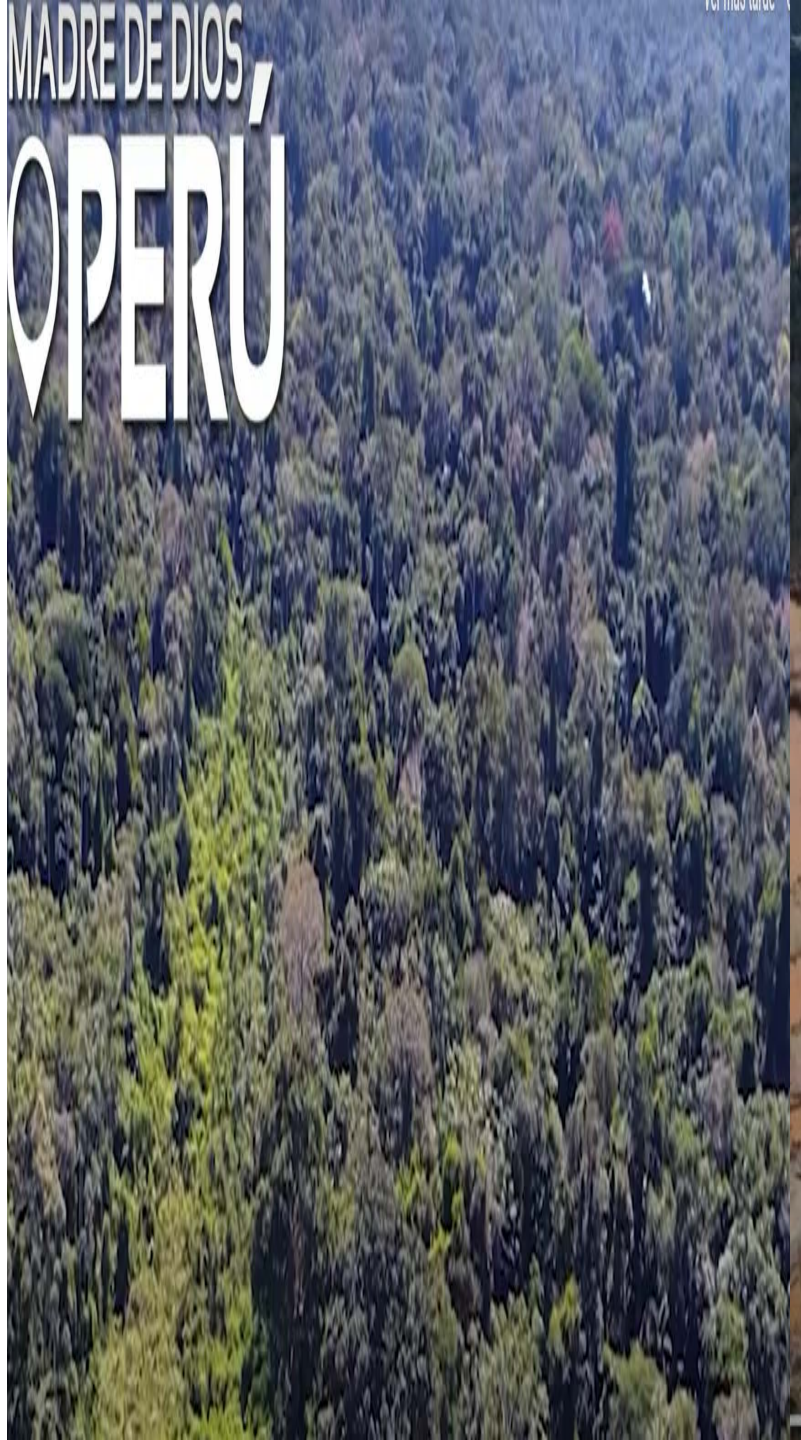
THE EMERGING THREATS

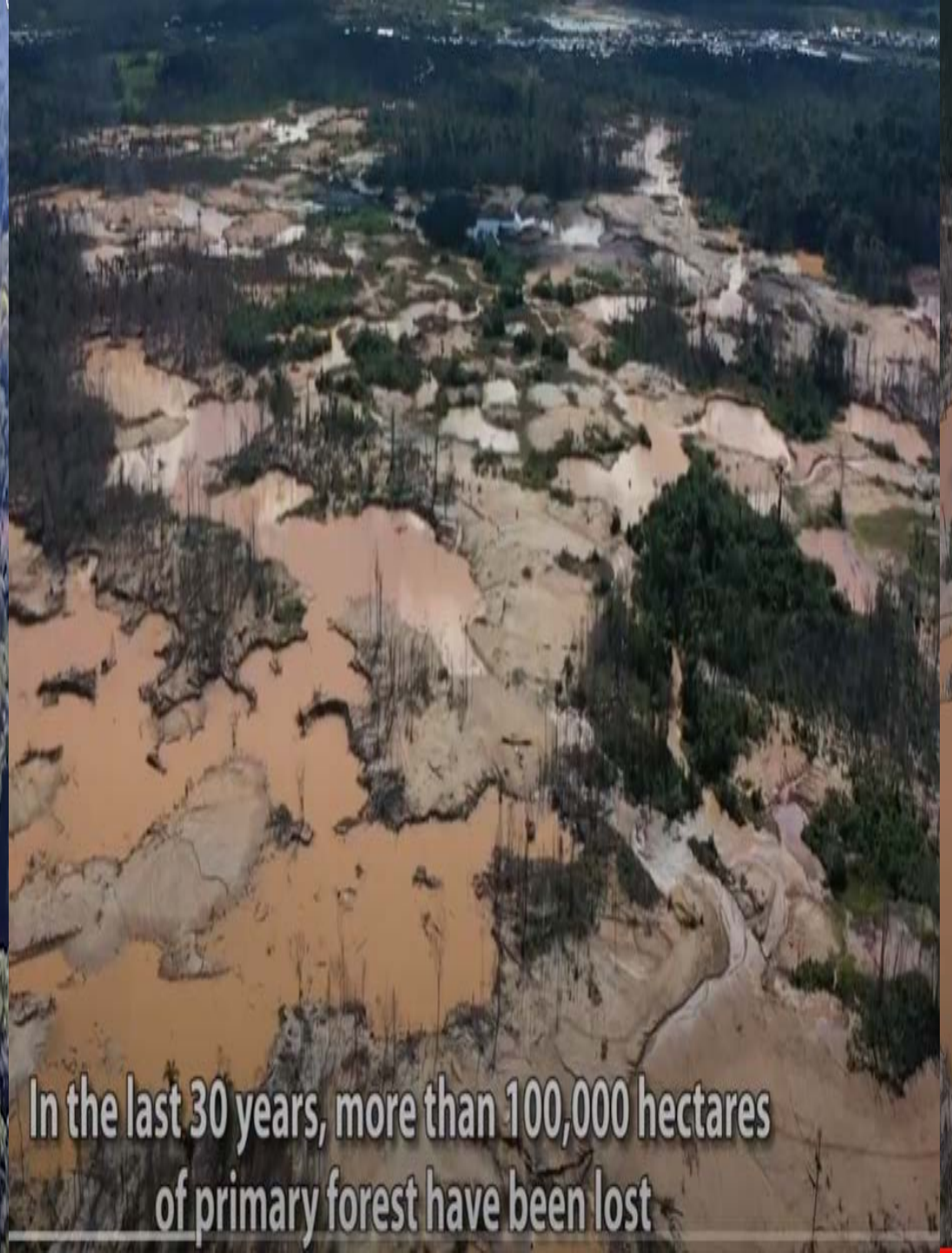
ILLEGAL LOGGING

OIL EXPLORATION

GOLD MINING

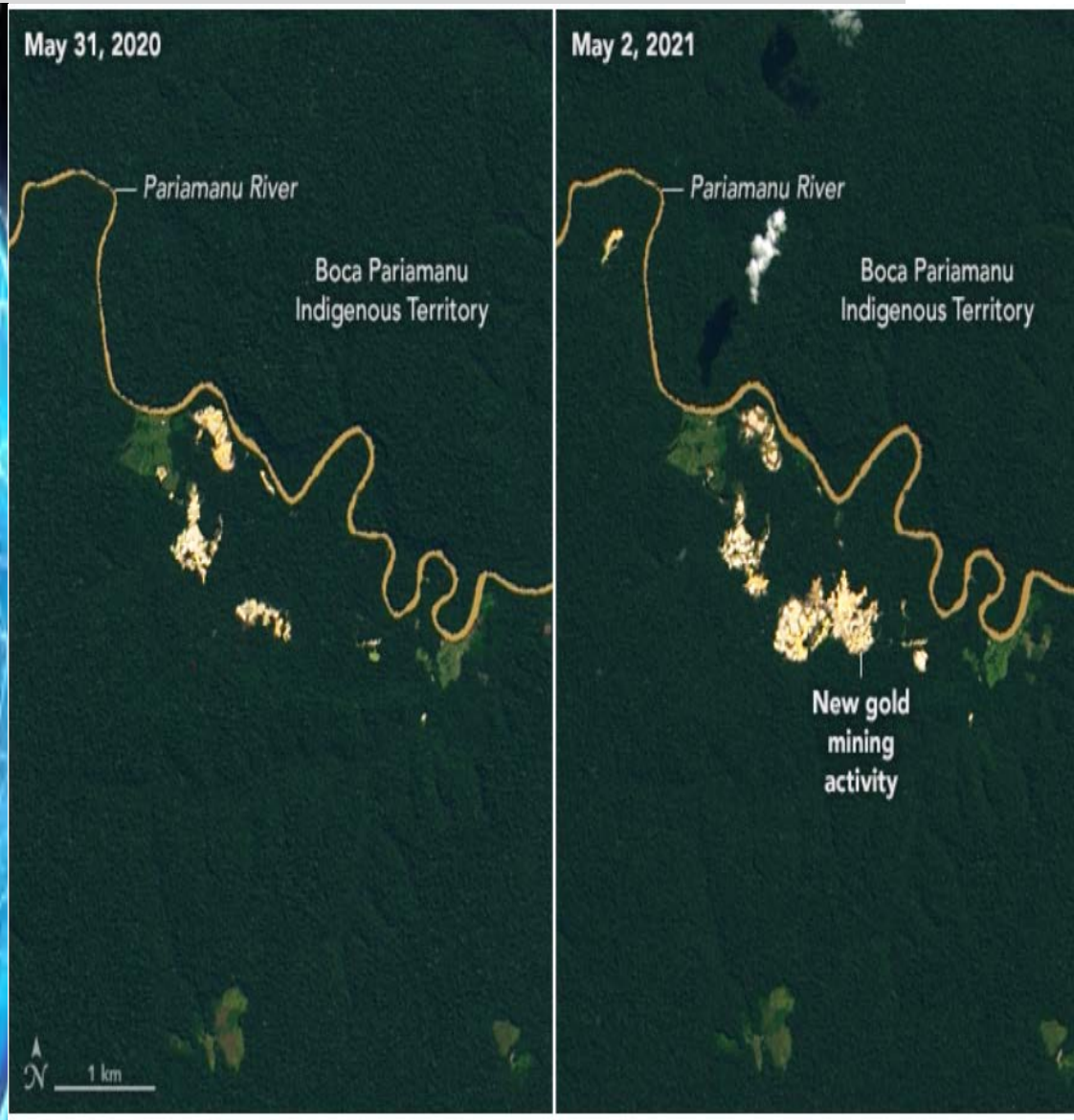
LAND SPECULATION AND AGRICULTURAL EXPANSION


MADRE DE DIOS
PERÚ


In the last 30 years, more than 100,000 hectares
of primary forest have been lost


due to the devastation of natural ecosystems
and the contamination of water sources

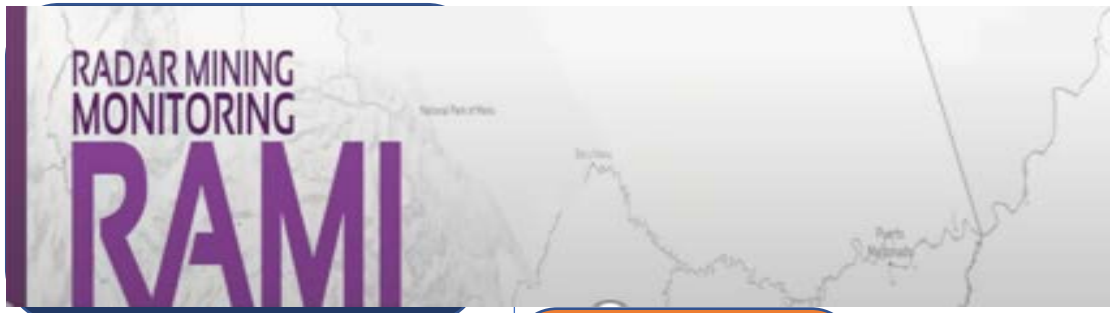
GPS IN AMAZON RAINFOREST
(PERU: MADRE DE DIOS)

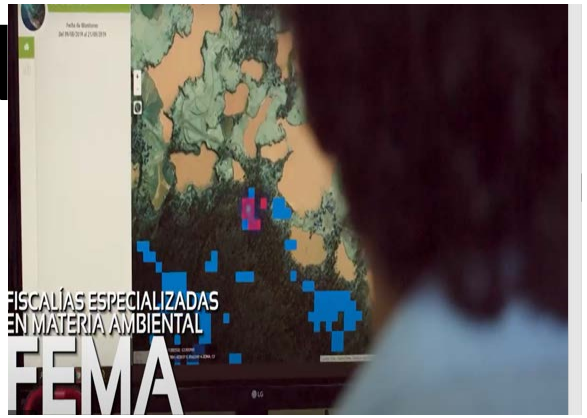


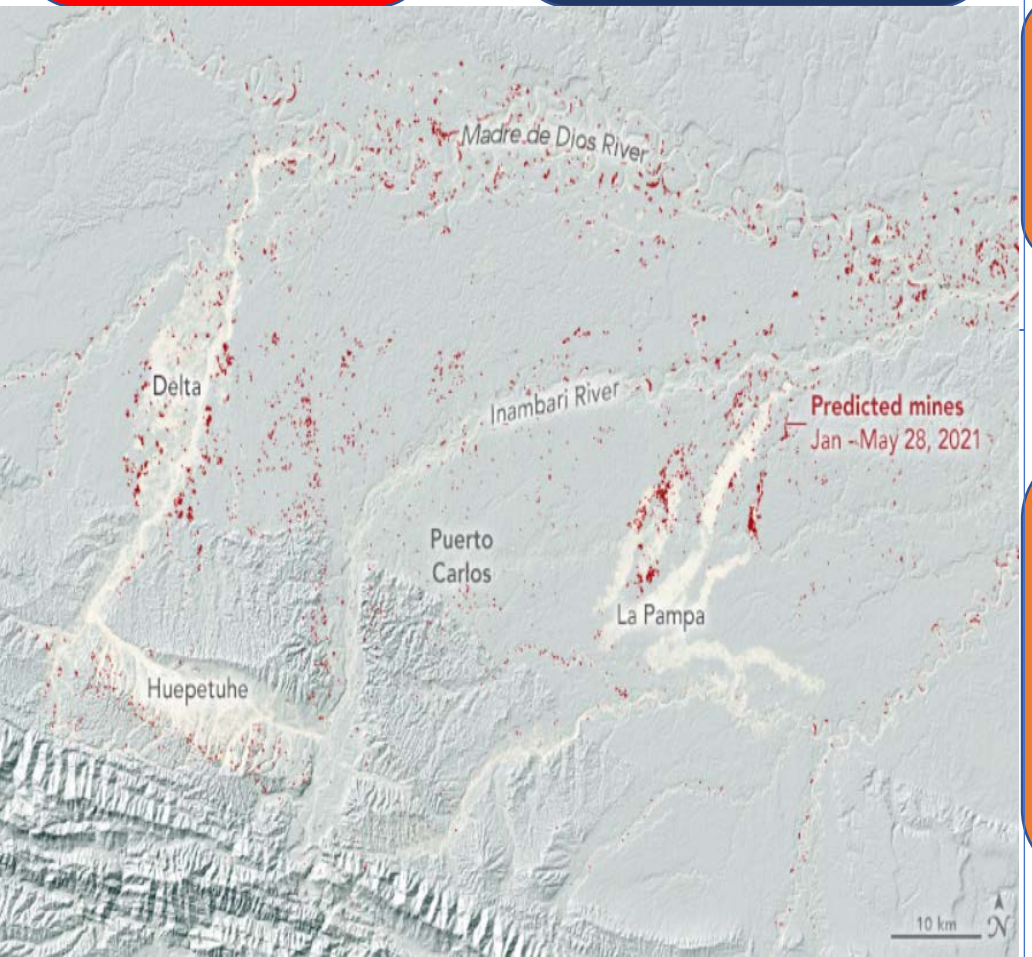
May 31, 2020 - May 2, 2021

MADRE DE DIOS: PERUVIAN AMAZON

96.000 HECTARES OF PERUVIAN AMAZON







LANDSAT 8
NASA
(optical imagery)

COPERENICUS
SENTINEL-1
EUROPEAN
SATELITE
AGENCY
(mapping for forest, wáter and soil manggment)

REAL TIME

ANALYSIS
&
ALERTS

SPECIAL PROSECUTOR
(FEMA)

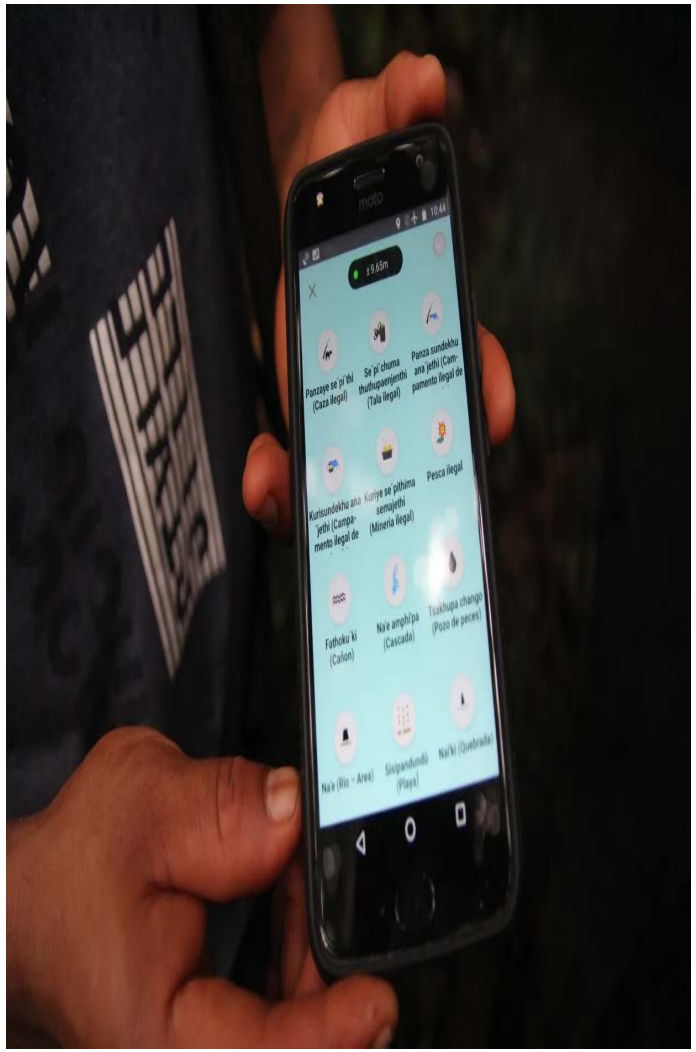
STAKEHOLEDERS

THE USE OF DRONES

- The use of drones and smartphones that can process satellite data allows **indigenous communities** to successfully monitor their territories thus considerably limiting **deforestation**, according to a STUDYrecently published in the journal Proceedings of the National Academy of Sciences (PNAS).
- The survey took into account the data collected in three years which showed the excellent results achieved by the initiative. Launched in 2018, the monitoring program involved three non-governmental organizations: the **Rainforest Foundation US**, the World Resources Institute (WRI) and ORPIO an association working in 15 river basins in the Peruvian Amazon.

THE BENEFITS OF USING DRONES AND AERIAL MAPPING

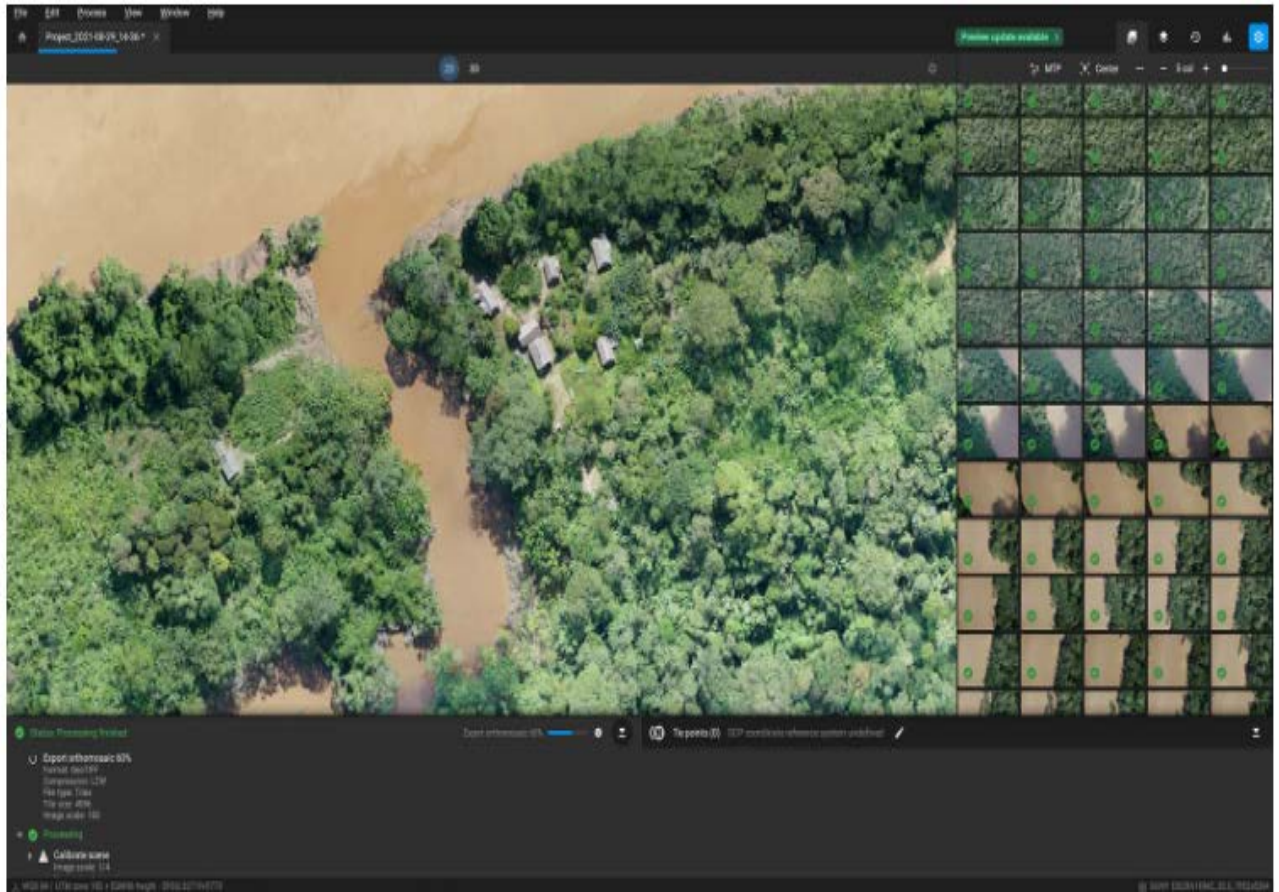
- Monitor vegetation health and assist conservation efforts
- Provide transparency and be accountable to Wilderness International donors
- Check for illegal logging on the Wilderness International land.
- The situation in remote and hard-to-reach areas can be made more visible.
- Greater transparency and increased possibilities for information transfer with stakeholders.



USING PHOTOGRAMMETRY AND DRONES IN THE PERUVIAN RAINFOREST

SPECIAL ATTENTION TO THE RIVERS

The Amazon is full of dense vegetation, so traveling via the rivers makes it easier to access the forest

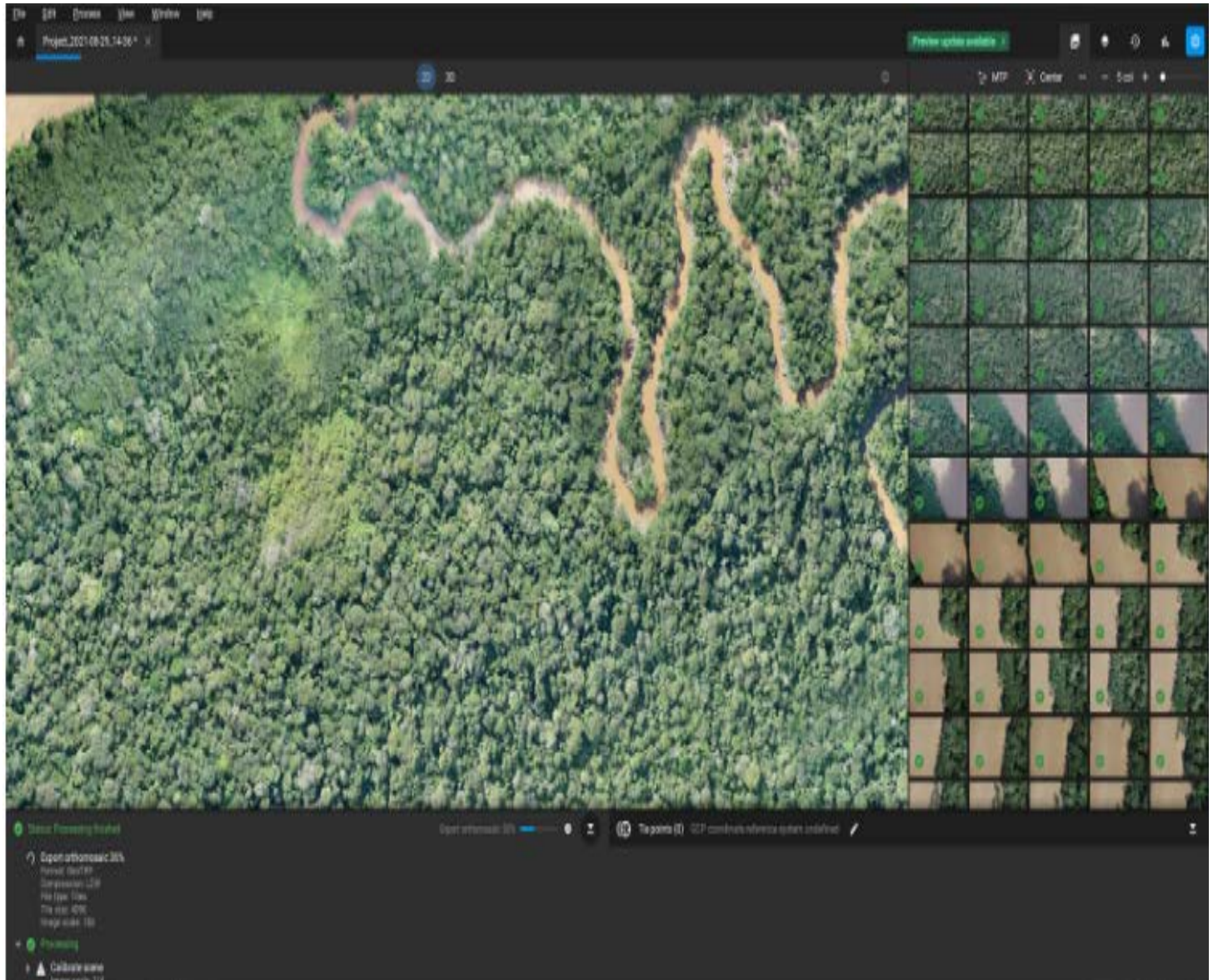


- Norway funds satellite map of world's tropical forests Through its International Climate and Forests Initiative (NICFI).
- Drone image processing involves an analysis of the information that can be processed under AI systems.
- The multi-spectral images were imported to PIX4Dfields, which can analyze how plants reflect green light. Measuring these light reflections will tell researchers about the health of plants, their age, etc.

PROCESSING DRONE IMAGERY OF THE AMAZON

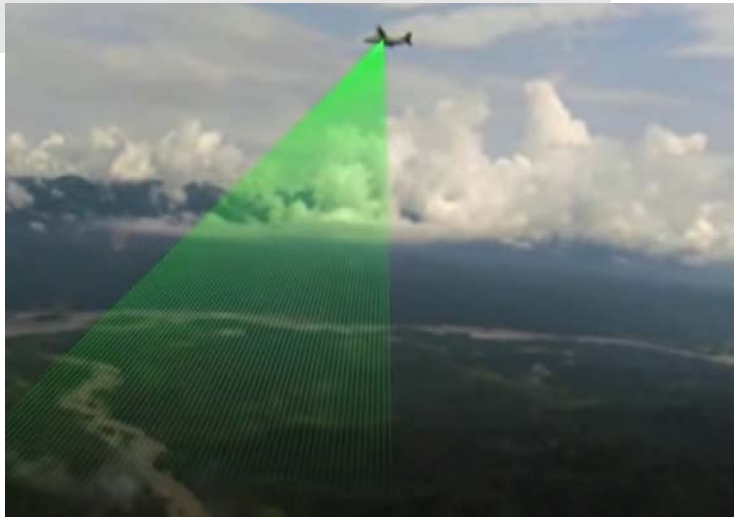
It´s important to collect a huge dataset of very high quality, and connected the drone to a base station at our camp to make sure the images were geotagged, which ensures the accuracy of the final map.

The multi-spectral images were imported to PIX4Dfields, which can analyze how plants reflect green light. Measuring these light reflections will tell researchers about the health of plants, their age, and can be used to create vegetation indices to learn information about the forest that is invisible to the human eye.
Conservationists can use this data to analyze planting projects or restoration efforts.

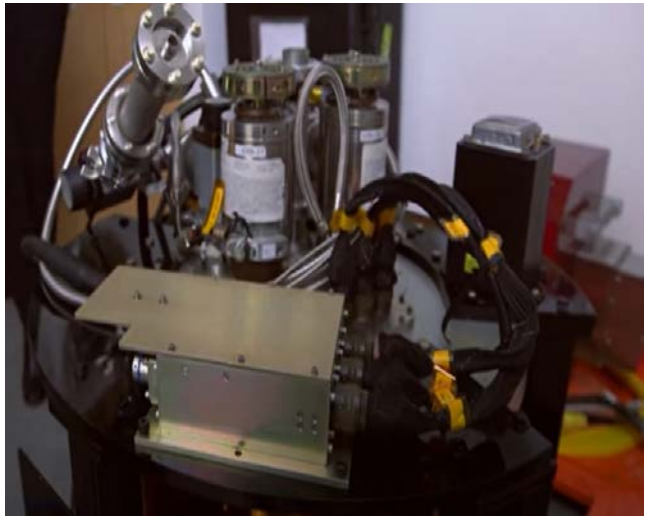


GLOBAL AIRBORNE OBSERVATORY
(formerly the Carnegie Airborne Observatory, Stanford)

FIRE LASER BEAN: LASER IMAGING SYSTEM



INFRARED IMAGING SPECTOMETER: 420 CHANNEL OF LIGHT
WHICH CAN DETECT CHEMICALS IN THE FOREST BELOW INCLUDING MERCURY



The new devices use visual and thermal cameras and infrared sensors to capture photos of intruders into protected areas, and immediately transmit these photos to authorities.

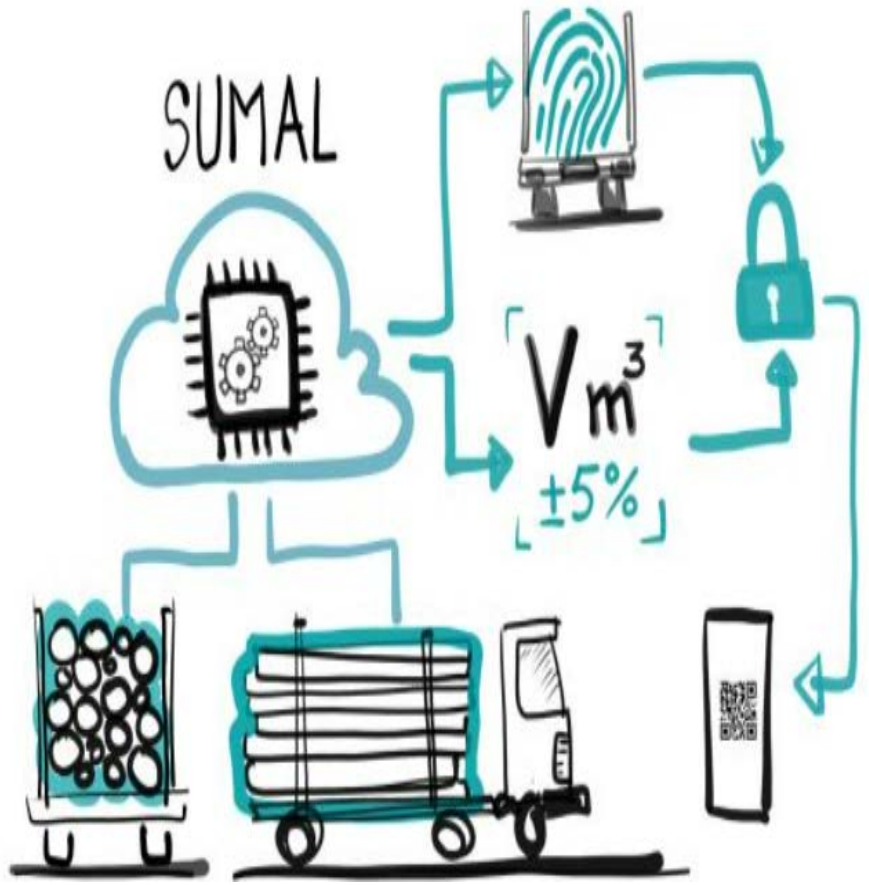
It has developed an audio detection device from repurposed cellphones and solar panels that can be hidden in tree canopies to pick up errant noises, such as chainsaws, trucks and motorcycles. The device is paired with an alert system that instantaneously notifies users when a suspect noise is detected.

COLLABORATION WITH INDIGENOUS COMMUNITIES

- **Phone app and drones have enabled 80 native communities in the Peruvian Amazon.**
- **Crowdsourcing Applications seems to be useful to report new cases**
- the use of drones and smartphones that can process satellite data allows **indigenous communities** to successfully monitor their territories thus considerably limiting **deforestation**, according to a study of the National Academy of Sciences (PNAS). The survey took into account the data collected in three years which showed the excellent results achieved by the initiative.
- Launched in 2018, the monitoring program involved three non-governmental organizations: the **Rainforest Foundation US**, the World Resources Institute (WRI) and ORPIO an association working in 15 river basins in the Peruvian Amazon.

ELECTRONIC TAGGING TO COMBAT ILLEGAL LOGGING

An Invisible Track, smaller than a deck of cards, passes location information from the module to a central server, via the local cellular networks.
From the server, alerts are then sent to rangers and officials of the Brazilian Environment and Natural Resources Institute (IBAMA), the country's environment protection agency.



CONCLUSIONS

- The Amazon rainforest plays a crucial role in climate change that is impossible to forget. Defending a place as vast and rugged as the Amazon rainforest is an extremely complex task.
- Technology is not a panacea, but it can serve to counterbalance the real systematic plundering that is taking place in this area.
- To this end, there are multiple technologies (GPS, drones, monitoring tagging, on-the-Ground Sensors, smartphone, Apps, etc.) that should be coordinated by an international body.
- The EU should set up technological assistance programmes to support and coordinate the different countries involved.