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Adoption of Copernicus services

by those interested in the

spatial and landscape planning.

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1.General Information/Introduction

The survey has been implemented within the framework of the 2021-2-38 project, *User Uptake of Copernicus Services for Landscape and Spatial Planning Stakeholders*. Its main objective is to collect information from end-users and stakeholders in Earth observation products and services, specifically in the context of Copernicus services, both general and applied to spatial and landscape planning within the framework of the project and associated economic services.

The survey was carried out between April and July 2024, with the participation of 12 people belonging to **11 organizations, including SMEs, public administrations, universities and research centers.** Participants include potential end-users, researchers and experts from the private sector who use or wish to use remote sensing data. The entities involved include universities, research centres, SMEs and the public administration.

IH Cantabria has been in charge of carrying out this survey within the context of users of Copernicus services, aimed at stakeholders in landscape and space planning within the FPCUP project. A total of nine provinces participated in the questionnaire, which are:

Cantabria	Lion	Valladolid	Malaga	Madrid
Grenade	Valence	Seville	Almeria	

Board 1. Provinces participating in the survey

The survey consists of several questions with a **total of 8 questions**. These questions are grouped into blocks:

- Overview
- Information associated with European products
- Section on issues associated with gaps or gaps associated with remote sensing products.

2.Results

The survey consists of several questions with a **total of 8 questions**. These questions are grouped into blocks:

- Overview
- Information associated with European products
- Remote sensing problems in Forest Lands (FL).

1. Introductory Information Block

This block of the survey included two questions related to the information of both the institutions and the participants. The questions were focused on the type of organization and the sector in which they have experience.

1.1. Type of organization

Participants were asked about the **"Type of organization"** to which they belong, obtaining a total of 12 responses. The above organisations are mainly classified into the following

categories: **SMEs, universities or research centres, and public administrations.** In total, 12 responses were received corresponding to 11 entities.
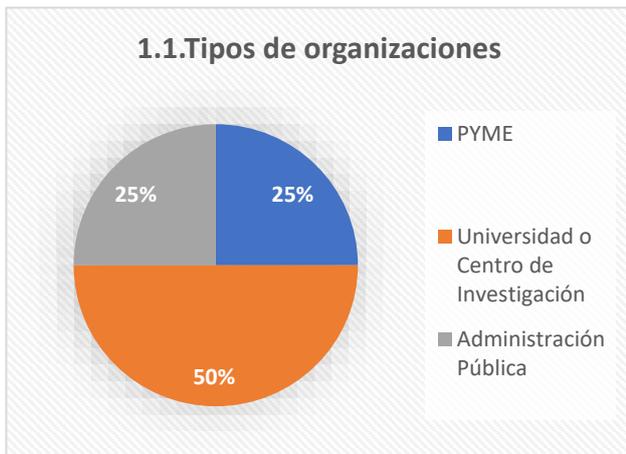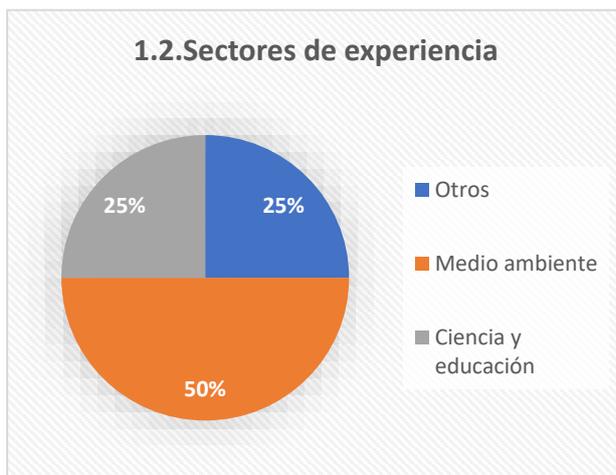

Sector	Number of participants
1.SME	3
2. University or Research Center	6
3. Public Administration	3
Total	12

Figure 1. Percentages of types of organizations and the number of participants.

It is observed that most of the participants come from **universities or research centers**, representing 50% of the total. In contrast, both the public administration and SMEs have a smaller participation, with 25% each.

1.2. Experienced sector

Sector	Number of participants
1.Others	3
2. University or Research Center	6
3. Science and education	3
Total	12

Figure 2. Percentages of types of organizations and the number of participants in those sectors.

The sectors of expertise are more linked to the **environment with 50%.** Presented 25% in the aspect of science and **education and the rest of the percentage with 25%.**

2nd Block Specific Information

In this block, more detailed questions were asked, with the first two allowing a single answer option and the third being multiple choice:

- **2.1. What is the relationship of your company/institution with the LULUCF sector (Land Use, Land Use Change and Forestry)?**
- **2.2. Select what type of user you consider your company or institution to be.**
- **2.3. What is the origin of the data or information you use for your activity?**

2.1. What is your company/institution's relationship with the LULUCF sector (Land Use, Land Use Change and Forestry)

2.1.¿Cuál es la relación de su empresa/institución con el sector LULUCF?

- ■ Usuarios, realiza actividades relacionadas
- ■ Interesados, muestra interés por algún aspecto relacionado con el sector
- ■ Competentes, tiene alguna competencia sobre el sector LULUCF o alguna de sus tipologías
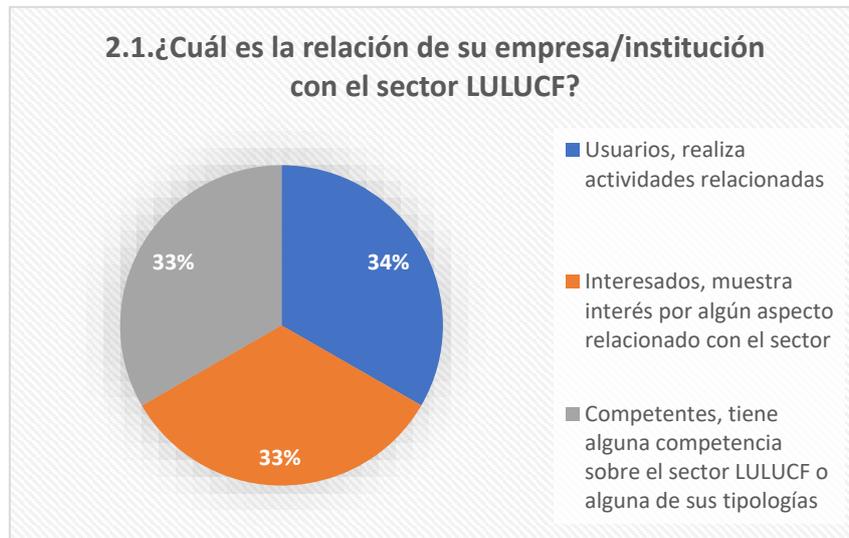
34%
33%
33%

Figure 3. Percentages of companies according to relationship/institution with the LULUCF sector

Regarding the linkage of companies or institutions with the LULUCF sector (Land Use, Land Use Change and Forestry), the 12 participants, coming from 11 organizations, did not show a clear preference for any option. The responses were balanced, with a similar distribution among the options raised.

2.2. Select what type of user your company or institution considers

Regarding the type of user they consider themselves to be, 75% of the 12 participants identified themselves as "Intermediate Users", that is, those who generate information or add value from raw data.
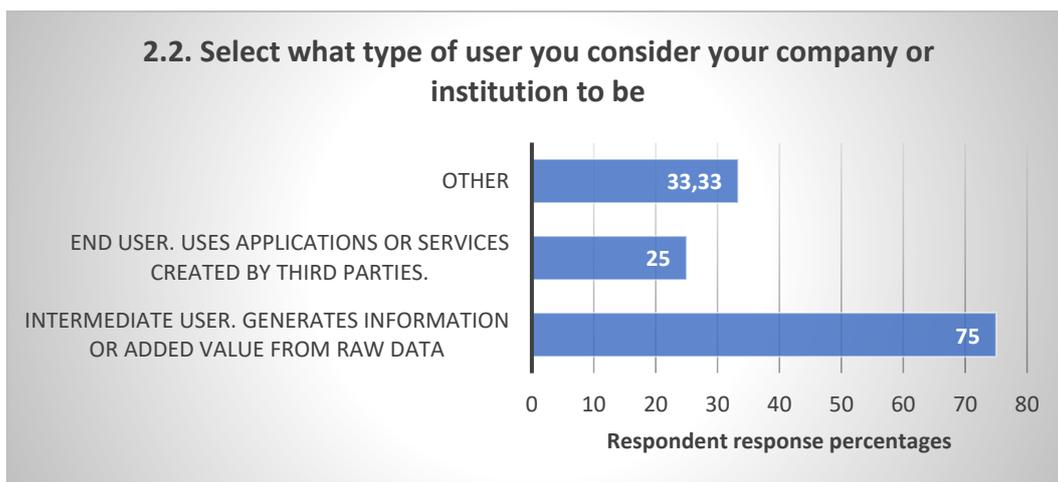

2.2. Select what type of user you consider your company or institution to be

OTHER — 33,33
END USER. USES APPLICATIONS OR SERVICES CREATED BY THIRD PARTIES. — 25
INTERMEDIATE USER. GENERATES INFORMATION OR ADDED VALUE FROM RAW DATA — 75

0 10 20 30 40 50 60 70 80

Respondent response percentages

Figure 3. Percentage of responses surveyed based on the type of user who considers their company or institution.

On the other hand, 25% defined themselves as "End Users", those who use applications or services developed by third parties. In addition, 33.33% selected the "Other" option, indicating various types of users who do not fit into the previous categories.

2.3. What is the source of data or information you use for your activity?

This multiple-choice question **reflects** that participants have a good understanding of the origin of the data they use in their activities. In total, the responses of 11 participants were analyzed.
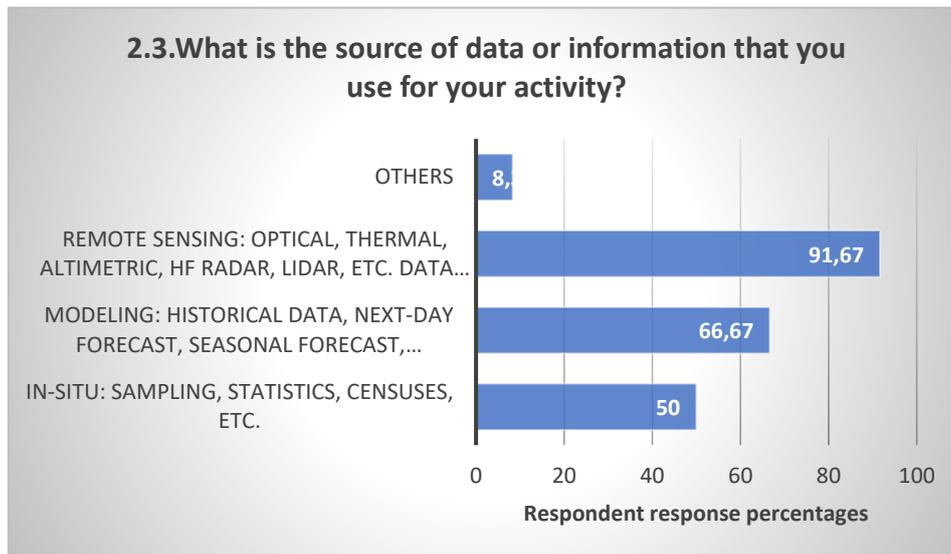
2.3.What is the source of data or information that you use for your activity?

Category	Value
OTHERS	8,
REMOTE SENSING: OPTICAL, THERMAL, ALTIMETRIC, HF RADAR, LIDAR, ETC. DATA…	91,67
MODELING: HISTORICAL DATA, NEXT-DAY FORECAST, SEASONAL FORECAST,…	66,67
IN-SITU: SAMPLING, STATISTICS, CENSUSES, ETC.	50

Respondent response percentages

Figure 4. Percentage of respondents from the data or information source they use for their activity.

The most selected option was "Remote Sensing", which encompasses optical, thermal, altimetric, HF radar and LiDAR data, obtained from satellites, airborne sensors (drones, aircraft) and ground devices. **The second most chosen option was "Modeling**", which includes the use of historical data, short-term forecasts, seasonal forecasts and climate change projections. It is followed by "Datosin-situ", which includes sampling, statistics and censuses, selected by **50% of the participants**. **Finally, "Others",** which includes "Management data and administrative control of activities in the natural environment", was the least selected option, with **8.3%.**

These results indicate that Copernicus products, especially those based on remote sensing, are quite well known among those interested in spatial planning.

3rd Block associated with the problem of remote sensing Forest lands (FL)

To identify the problems associated with remote sensing on forest lands, three multiple-choice questions were asked. The questions were as follows:

- **3.1. Afforestation/reforestation**
- **3.2. Identification of other natural disturbances**
- **3.3. Identification of forest harvesting of wood and firewood**

3.1. Afforestation/reforestation

One of the key aspects in forest areas focuses on three fundamental questions to identify problems in these areas: **afforestation/reforestation, identification of other natural disturbances and forest use of wood and firewood.**
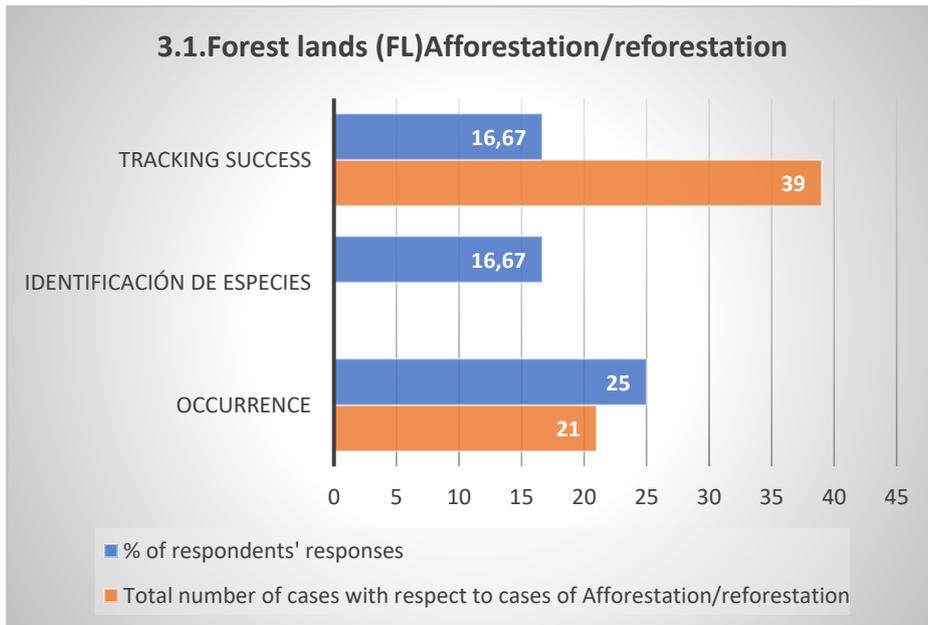
3.1.Forest lands (FL)Afforestation/reforestation

TRACKING SUCCESS	16,67 / 39
IDENTIFICACIÓN DE ESPECIES	16,67
OCCURRENCE	25 / 21

■ % of respondents' responses
■ Total number of cases with respect to cases of Afforestation/reforestation

Figure 5. Percentage of responses surveyed and the number of total cases identified. Forest lands, afforestation/reforestation

This questionnaire allowed multiple answers and the results reflect percentages on the different problems. Regarding the use of remote sensing in the forest field for afforestation/reforestation, the most selected option was the **monitoring of the success of the actions carried out, with 39 responses**. The option of occurrence of afforestation / reforestation was selected in 21 cases. Finally, **species identification** was mentioned in **16.67%** of the responses.

Clear needs related to **improving the identification and monitoring of forest species were identified.** This includes discriminating between woody vegetation (shrub or wooded) and creating **more detailed forest mapping.**
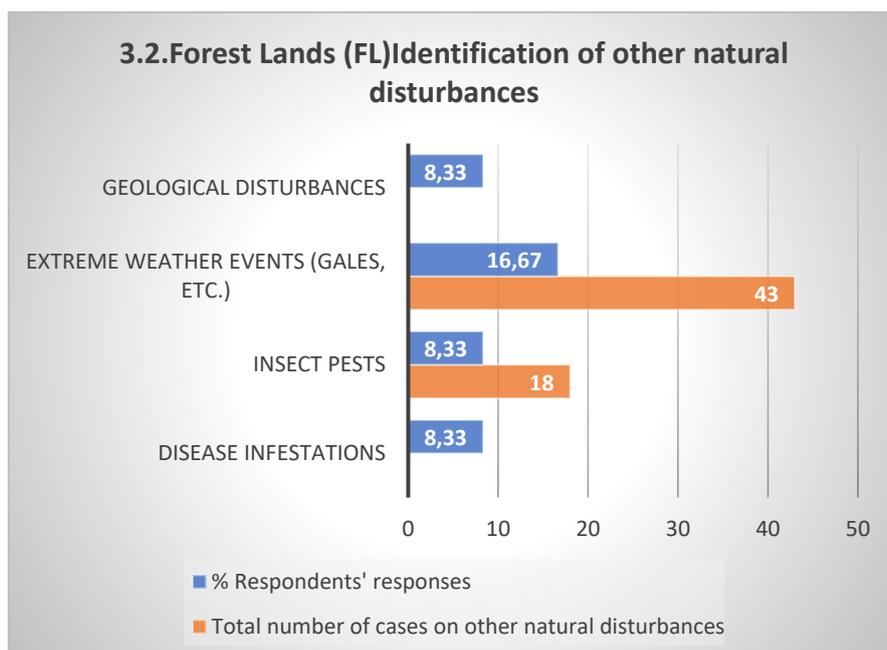
3.2. Identifications of other natural disturbances

3.2.Forest Lands (FL)Identification of other natural disturbances

GEOLOGICAL DISTURBANCES	8,33
EXTREME WEATHER EVENTS (GALES, ETC.)	16,67 / 43
INSECT PESTS	8,33 / 18
DISEASE INFESTATIONS	8,33

■ % Respondents' responses
■ Total number of cases on other natural disturbances

In this section, the main needs detected are related to the identification of **extreme weather events** such as gales, which received 43 mentions, which represents 16.67% of the responses of the respondents

Other events such as **insect pests** were mentioned in 18 cases, although **geological disturbances** and **diseases** were not identified in any case.

This block highlights the need to improve the **identification of natural disturbances, such as diseases and pests, extreme weather events and geological disturbances, as this would help to better understand the natural environment and its management**.

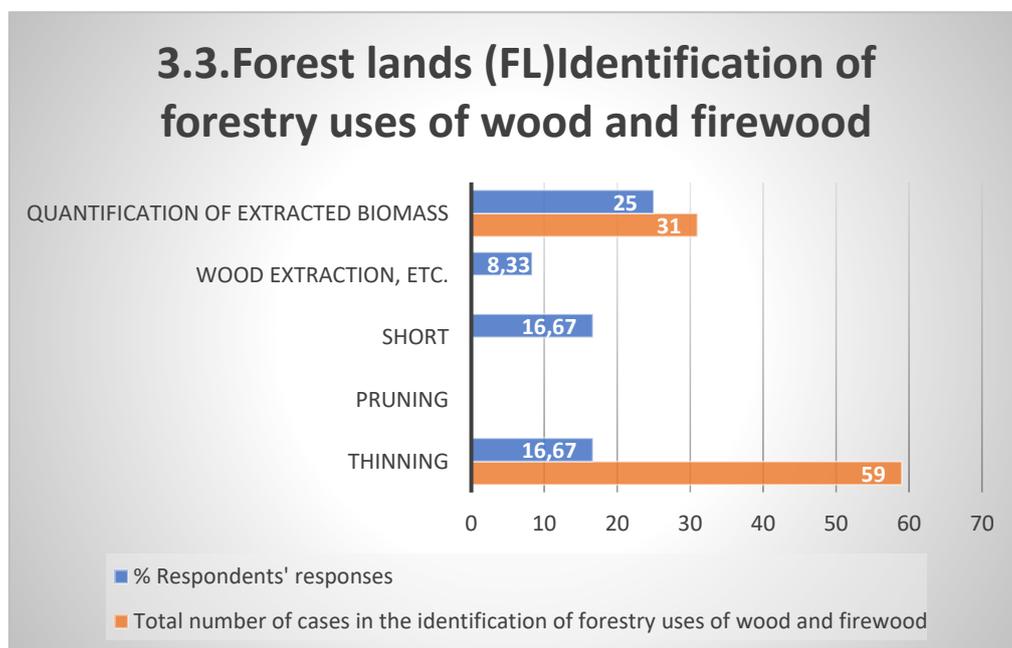### 3.3. Identification of forest harvesting of wood and firewood.

Figure 7. Percentage of responses surveyed and the total number of cases identified on forest lands of timber and fuelwood harvesting.

In the section on forest harvesting of wood and firewood, the most selected option was the **quantification of the extracted biomass**, with 31 cases registered. Regarding **thinning**, this option was identified on 59 occasions, representing 16.67% of the responses.

On the other hand, no mentions of pruning were observed, because the current spatial resolution is not detailed enough to allow their identification, which makes it almost impossible to reflect these cases in the data.

In summary, a clear need was identified to improve the **quantification of extractable biomass** in forestry activities such as **thinning**, **pruning**, **felling** and **timber harvesting**, in order to obtain more accurate data on the management and use of forest resources.

4.Conclusions

In Spain, IH Cantabria has carried out a survey aimed at potential users of the Copernicus Service, in which most of the responses were multiple choice. The respondents, a total of 12 people, belong to various institutions such as universities, research centers, public administrations and SMEs. The majority group, with 50%, is made up of universities or research centres.

In terms of experienced sectors, the **environment** stands out as the most represented sector, with 50% of respondents. Other sectors involved include **science**, while 25% belong to unspecified sectors. Regarding respondents' relationship to land use, land-use change and forestry (LULUCF), responses are evenly distributed among **users**, **stakeholders** and **competents**, with 33% for each option, with none clearly prevailing.

Regarding the **type of user** that respondents consider themselves to be within their organization, the majority (75%) identify themselves as **downstream users**, who generate or add value to information from raw data. In contrast, 25% consider themselves **end users**, who use applications or services created by third parties. As for the origin of the data they use, **remote sensing** is the most mentioned source, with 91.67% of respondents, which include the use of optical, thermal, altimetric, radar, LIDAR data, among others, obtained from satellites, airborne sensors (aircraft, drones) and ground devices. It is followed by **modelling**, with 66.67%, and **in-situ data** (sampling, statistics, censuses), with 50%. These results reflect that remote sensing is a widely known source of information among those interested in spatial planning.

In the area of **remote sensing applied to forest lands**, several needs have been identified. A key aspect is **afforestation and reforestation**, where the importance of **monitoring the success** of planted species is highlighted. This option was selected on 39 occasions, representing 16.67%. It also stresses the need to improve **vegetation identification** to discriminate between woody, wooded or shrubby vegetation, in order to have a more detailed mapping.

In addition, challenges were identified in detecting **natural disturbances** such as disease infestations and insect pests, extreme weather events, and geological disturbances. Extreme **weather events**, such as gales, were the most indicated option, with 16.67% of the responses. Other disturbances, such as insect pests and diseases, received 8.33% of the responses.

Another key need is the **quantification of extractable biomass** in forestry, which includes activities such as thinning, pruning, felling and timber extraction. The **quantification of the extracted biomass** was the most selected response, with 31 mentions. As for **thinning**, they were identified on 59 occasions, representing 16.67%. This set of needs is linked to the process of **active reforestation** (rewilding) in areas that have experienced **agricultural abandonment** and **rural depopulation**, which has favoured forest expansion in territories with a rich agricultural tradition.