

# **CASA0023 - Personal Diary**

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# Table of contents

1	# About	3
	References	9

# 1 # About

Hello to all. I am Ana :)

First of all, I am a proud Colombian woman, very interested in understanding socio-cultural, economic and environmental behaviors around me, and committed to improving livelihoods and conditions for people and communities around the world.

I studied anthropology for my undergrad and later finished an MSc in Sustainable Development, currently I am studying an MSc in Social and Geographic Data Science. I have more than 8 years of experience working in rural development in Colombia, analyzing and developing different economic activities that contribute to both cultural and environmental conservation, as well as coordinating efforts with regional governments, NGO's and the environmental sector.

My expectation with this masters, and this specific course, is to acquire as many tools and skills in social and environmental data collection and analysis, that will permit me to continue designing, implementing and evaluating development projects and programs.

## 2

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title: "Week 1"

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### ## Introduction to Remote Sensing

NASA defines remote sensing as “acquiring information from a distance”. This information is acquired through sensors mounted on different platforms such as satellites, planes, drones, etc... Currently there are more than 150 satellites and more than 27,000 other devices orbiting the earth.

There are various types of sensors and data sources, as well as applications. Data can come from Sentinel, LANDSAT or SAR satellites, and can be used to monitor various phenomena such as land covered areas, urban or green space coverage, natural and climate phenomena, and other atmospheric characteristics.

### ## Types of sensors

There are two types of sensors:

Passive sensors use and detect energy that is available from the sun, but don't emit their own. Examples of this type are the human eye or a camera.

Active sensors have proper sources of illumination and actively emit electromagnetic waves. Some examples are X-rays and Lidar sensors. These are appropriate for difficult climatology and atmospheric conditions such as clouds and storms or air pollution, or to see during the night sky.

### ### Reflection and Resolutions

Natural or unnatural phenomenon, such as clouds or volcanic ash, can interrupt or affect the reflection and dispersion of electromagnetic waves. The earth absorbs some energy, the other is randomly dispersed in the atmosphere. Different sensors (as mentioned above) are used to identify and capture different electromagnetic wave lengths and types.

Independent of the sensor used, 4 resolutions are needed:

**\*\*Spectral:\*\*** The number of bands recorded (red, green, blue for visible light).

**\*\*Spatial:\*\*** The size of each pixel (from cm to km depending on the scope of analysis).

**\*\*Temporal:\*\*** The frequency with given geographical area is monitored.

**\*\*Radiometric:\*\*** The range of reflectance values that are registered.

### # Practical application and use

Remote sensing, as its name implies, is used to monitor and register spatial data from a remote sensor such as satellites; it is a great complement to more traditional and smaller-scale on-site monitors which only recover very localized information. I make an emphasis on “complement” because it also has limitations that are worth mentioning, such as its cost, resolution limitations in some cases, and the need for a more robust data processing and analysis.

Remote sensing can be used in various sectors such as agriculture, climate change mitigation and environmental conservation, monitoring of natural hazards, meteorology, as well as urban planning and development. Personally, I find it fascinating how it can be used to visualize and monitor natural resource management (conservation of hydric resources, of forest coverage, etc.).

In my view, the most exciting applications for remote sensing data are in situations where traditional forms of data collection -- such as a national census -- are unreliable or out of date. This is true of South Africa, where obtaining up-to-date demographic or economic information is very difficult. I'll discuss that a bit more in week 4, when I get into policy.

All though there are many applications, the ones that were covered in class are:

**Sentinel Data** - It comes from the European Earth observation satellite program, specifically from satellites that capture high-resolution optical and radar imagery. They use various sensors such as MSI for optical imagery and SAR for radar data; the data collected is mostly used for environmental monitoring, disaster management and agricultural monitoring.

**Landsat Data** - It comes from the NASA and the United States Geological Survey, specifically from satellites that have been orbiting for more than 50 years. These sensors capture different types of spectral data (visible, infrared and thermal, for example). This data is used for land cover monitoring, land use management and environmental monitoring. Due to its long-term archive, its data has been very useful for studying environmental and urban developments and evolution.

### ## Personal reflection

This is the first time that I work with this type of data. To be honest, it is quite an overwhelming process. It is very technical, I have had to review basic physics that I had not used in many years to remember the electromagnetic spectrum, the different types of wave lengths, colors, etc. It has also been a bit difficult to download data that works and then visualizing it on QGIS or Rstudio, for me it is a work in progress as I learn how to be more efficient and accurate.

It is quite amazing to see how these large satellites, that I have always seen as very scientific and foreign to me, can produce images and data that is super important and useful for my

“real world” applications such as conservation monitoring. Coming from Colombia, a country with unreliable and incomplete environmental and demographic data, I feel that these tools can be amazingly useful to have real-time ecological and social monitoring.

I am excited to see how the course progresses and all that I can learn and later apply.

# 3

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title: "Week 2"

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I attach a presentation on Landsat satellite data:

:::: xaringan source: C:/Users/USUARIO/Documents/UCL/Term 2/CASA0023/week  
2/xaringan\_\_presentation.Rmd

Enjoy!

# 4

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title: "Week 3"

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## References