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INTRODUCTION

1- Geographic Information System (GIS)

A geographic information system (GIS) is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface. By relating seemingly unrelated data, GIS can help individuals and organizations better understand spatial patterns and relationships.

GIS technology is a crucial part of spatial data infrastructure, which the White House defines as "the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data."

GIS can use any information that includes location. The location can be expressed in many different ways, such as latitude and longitude, address, or ZIP code.

2- Definition of the application

SEDAC which stands for the NASA Socio Economic Data and Application Center is a distributed active achieve center in the earth observation system data and information system of US **NASA (national aeronautics and space administration)**; which is an independent agency of the united states federal government responsible for civilian space program as well as aeronautics and aerospace researches.

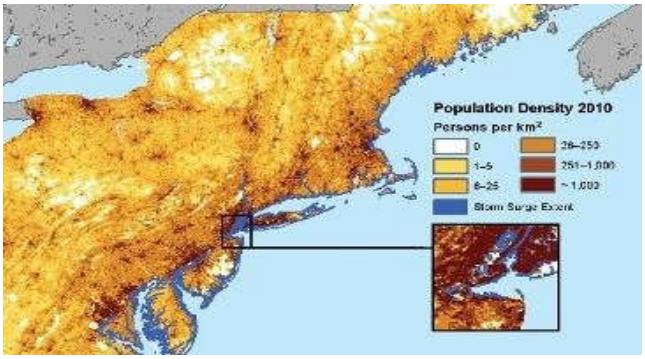
Focusing on the human interaction with the environment, SEDAC has as mission to develop and operate applications that support the integration of socioeconomic and earth science data; and this serves as an **"Information Gateway"** between earth science and social science.

To better enhance this Socio Economic Data, the platform "NASA (Socio Economic Data and Application Center)" came with a series of questions in order to provide ongoing advice and guidance regarding SEDAC activities and plans. SEDAC been a center for international earth science information network, a unit of the **Earth institute at Columbia university** based at the **Lamont-Doherty earth observatory** in Palestine, network.

a) Purpose of SEDAC

- ✓ Focus on human dimension of environmental change
- ✓ Integration of social and earth science data, especially with remote sensing
- ✓ Direct support to scientist users, decisions makers and policy communities
- ✓ Strong links to geospatial data community.

With what SEDAC answered our question: *how are to synthesize earth science and socioeconomic data and information in ways useful to a wide range of decision makers and other applied users, and to provide an "**information gateway**" between the socioeconomic and earth science data and information domains.*



Example: This map shows the storm surge from Hurricane Sandy in October 2012, as estimated by the Federal Emergency Management Agency, coupled with SEDAC population density data for 2010……

Figure 1: Population density data for 2010

3- Presentation of the software

a) Homepage

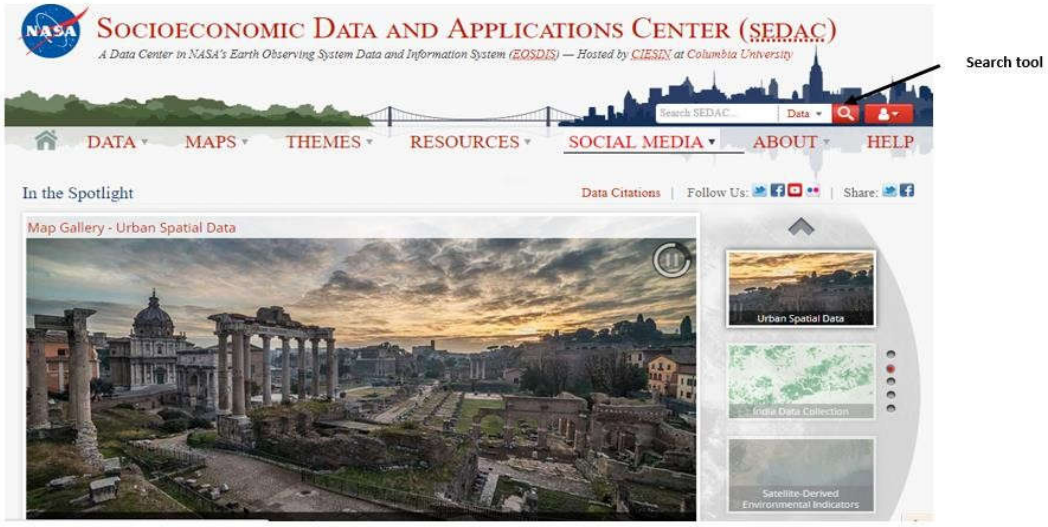


Figure 2: Home page of NASA SEDAC

The **NASA** Socioeconomic Data and Application Center (SEDAC) main interface presence to us exactly fives tabs as seen below alongside with their submenus, can observe a search bar with its precision tab and finally can observe the connation or the login button for users:

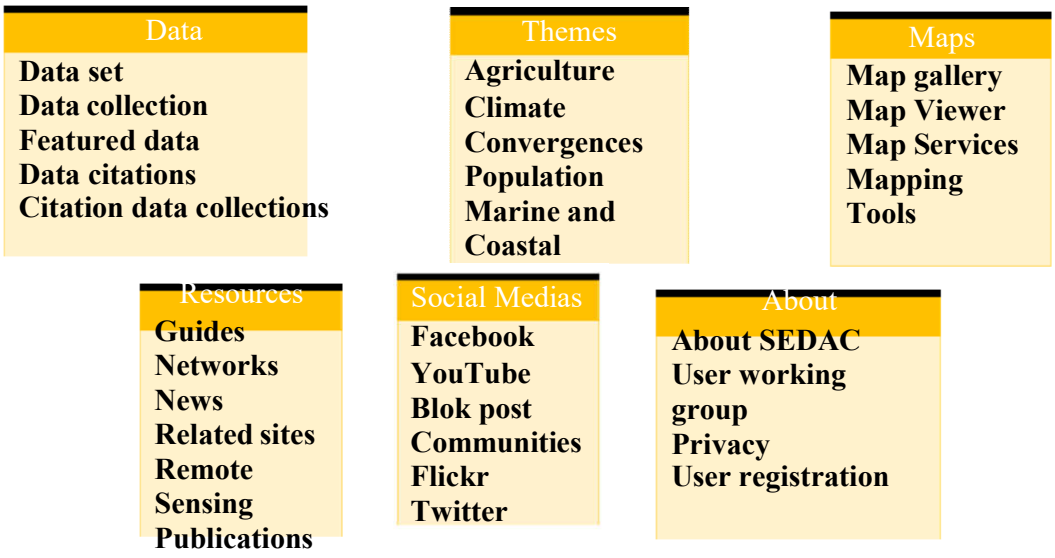
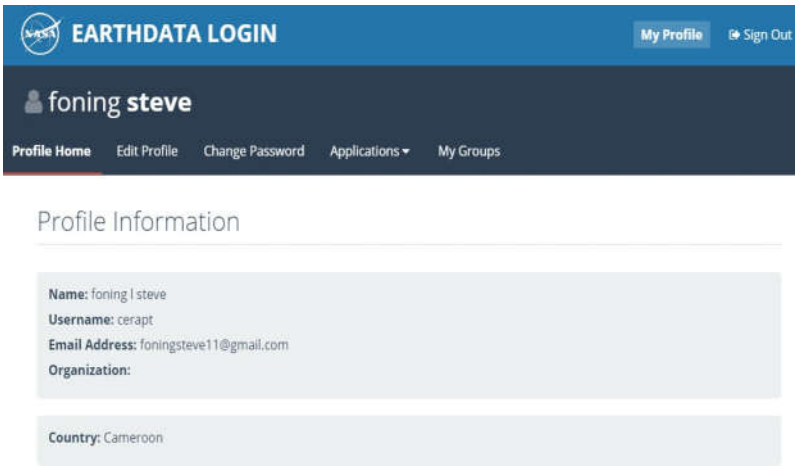


Figure 3: Menu bar of NASA SEDAC

b) Login page



This profile form is obtained after you've log in the app. And you should notice that a free account is compulsory for you to be able to download any information from the platform such as images etc.
On this form you have the possibility to edit your profile and overall sign out.

Figure 4: The login form of NASA SEDAC

FUNCTIONALITIES

I. DIFFERENT MENU'S AND THEIR FUNCTIONS

1- DATA

- Data Set Functionalities

A data set is a collection of data. Most commonly a data set corresponds to the contents of a single database table or a single statistical data matrix where every column of the table represents a particular variable, and each row corresponds to a given member of the data set in question. The data set lists values for each of the variables, such as height and weight of an object, for each member of the data set. Each value is known as a datum. The data set may comprise data for one or more members, corresponding to the number of rows.

Case of Environmental Performance Index

Purpose:

To provide quantitative metrics for evaluating a country's environmental performance in different policy categories relative to clearly defined targets.

Abstract:

The 2018 Environmental Performance Index (EPI) ranks 180 countries on 24 performance indicators in the following 10 issue categories: air quality, water and sanitation, heavy metals, biodiversity and habitat, forests, fisheries, climate and energy, air pollution, water resources and agriculture.

Figure 5:Environmental performance Index

- Data Collection

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. The data collection component of research is common to all fields of study including physical and social sciences, humanities, business, etc. While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same.

Case of climatic Effect on Food Supply

In the coming decades the agricultural sector faces many challenges stemming from growing global populations, land degradation, and loss of cropland to urbanization. Although food production has been able to keep pace with population growth on the global scale, periodically there are serious regional deficits, and poverty related nutritional deficiencies affect close to a billion people globally. In this century climate change is one factor that could affect food production and availability in many parts of the world, particularly those most prone to drought and famine.

These data sets are based on two studies that use similar methods to identify likely impacts of climate change on crop yields. The first, Potential Impacts of Climate Change on World Food Supply: Data Sets from a Major Crop Modeling Study, was released in 2001, and the second, Effects of Climate Change on Global Food Production from SRES Emissions and Socioeconomic Scenarios, was released in 2009.

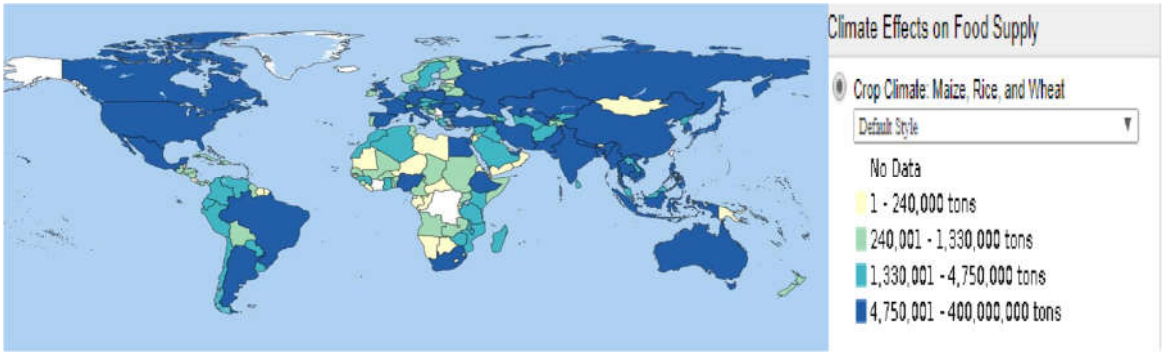


Figure 6: Climatic effect on food supply

2- MAP

- Map Gallery

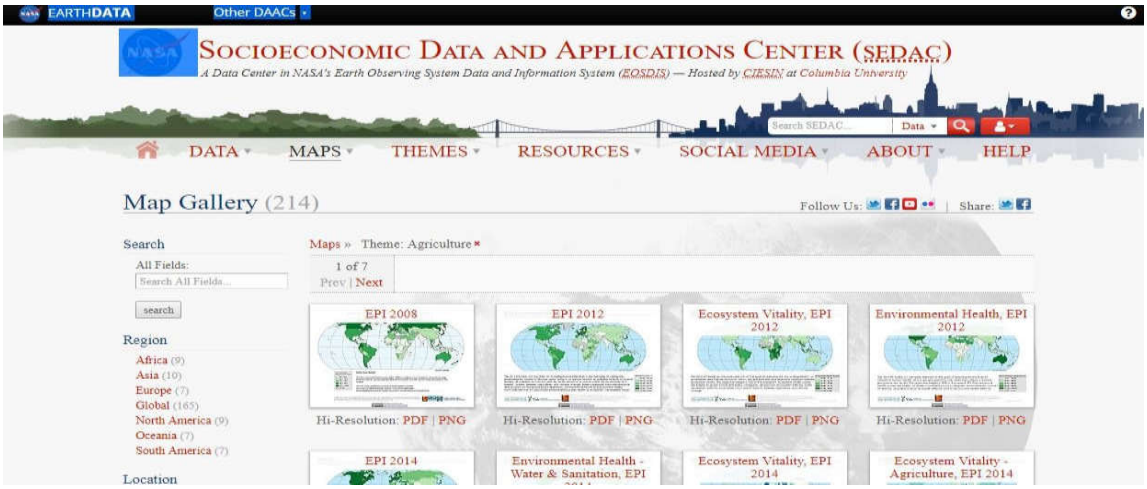


Figure 7: Capture of the Map Gallery menu

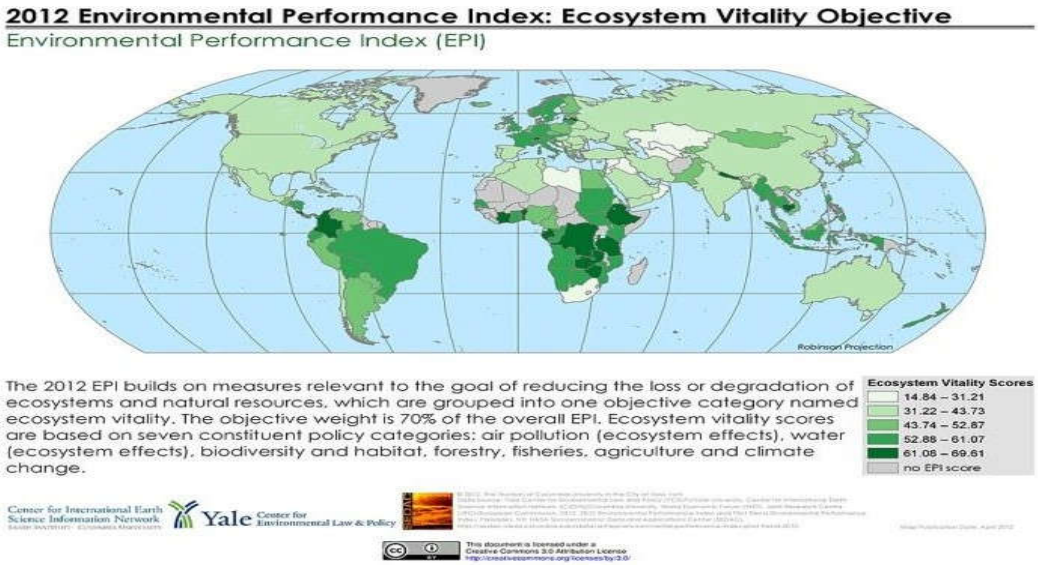


Figure 8: capture of the ecosystem vitality objective from map gallery

- Map Viewer

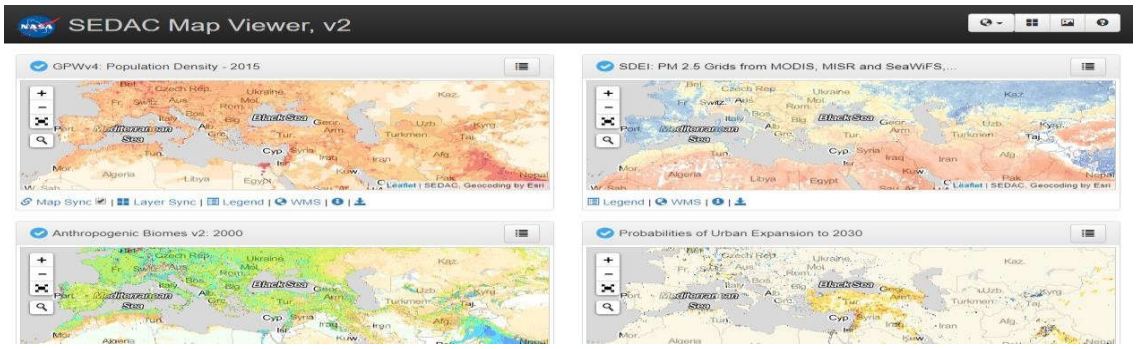


Figure 9: Capture of the map viewer menu

3- RESOURCES

The resources of SEDAC are the tools that enable to develop and operate applications that support the integration of socioeconomic and earth science data amongst this we have:

PERN e-library

The PERN e-library is an important and unique reference tool for classic population-environment literature; journal articles, relevant datasets

Environmental Treaties and Resource Indicators (ENTRI)

The Environmental Treaties and Resource Indicators (ENTRI) query service is a comprehensive web-based application for accessing environmental treaty texts and treaty status data such as signatories, parties, year of agreement and enforcement and other related information.

Adaptations to Climate Change in Multiple Regions and Sectors (AIACC)

The web site synthesizes information on the sectors, systems and groups studied, methods utilized, and key results of the 24 AIACC (Assessment of Impacts and Adaptations to climate Change in Multiple Regions and Sectors) projects.

The Application for Extracting and Exploring Analysis Ready Samples (AEEARS)

The Application for Extracting and Exploring Analysis Ready Samples(AEEARS), developed and operated by the LP DAAC, offers a simple and efficient way to access and

transform geospatial data from a variety of federal data archives. It enables users to subset geospatial datasets using spatial, temporal and layer parameters.

4- SOCIAL MEDIA

Access to SEDAC and its products can be accessed on the following social medias;

- Twitter https://twitter.com/hashtag/NASAsedac;
- Facebook https://www.facebook.com/socioeconomicdataandappsctr?ref=ts&fref=ts;
- YouTube https://www.youtube.com/channel/UCjUjAvV7M04SxxpM5wq4fMw?view_as=public;
  FLICKR https://www.flickr.com/photos/54545503@N04;

5- THEMES

The themes of NASA SEDAC website provides information about climates, population, water...etc.

Purpose:

To provide an assement of potential climate change impacts on world crop production.

Abstract:

This theme concerns the effects of climate change on global food production from SRES emissions and Socioeconomic scenarios is an update to a major crop modeling study by the NASA Goddard Institute for Space Studies (GISS).

Figure 10:crop-climate-effects on global-Food-production on cartographic-national-boundaries

CASE STUDY

1. Case study: Cameroon

- The web site provides a variety of information about DATA, Themes, Resources, social media. However, once you want to get an information about a particular country you perform a search and at this level, we have only three information (data set, maps and website).
- For the case of Cameroon at the level of data set they present a set of information such as environmental performance index release in 2018(1950-2018), commercial crop production, economic systems index (200,2010), Demographic and health survey data sets, Deforestation.

Figure 11: Informations about data set in cameroon

Once you click deforestation they will present to you information about the deforestation in Cameroon, that is areas of forest cover loss in coastal zones in a year interval of 2000-2012.

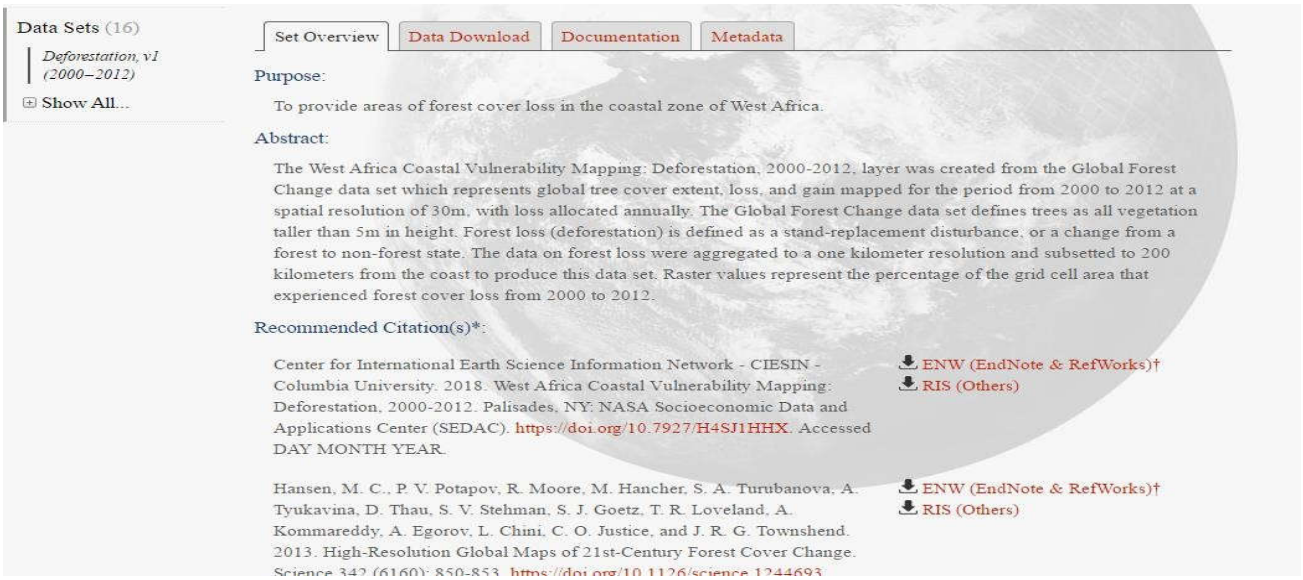


Figure 12: Information about deforestation in Cameroon

Secondly, we have maps that give information about administrative boundaries, population density, settlement points and urban extends.

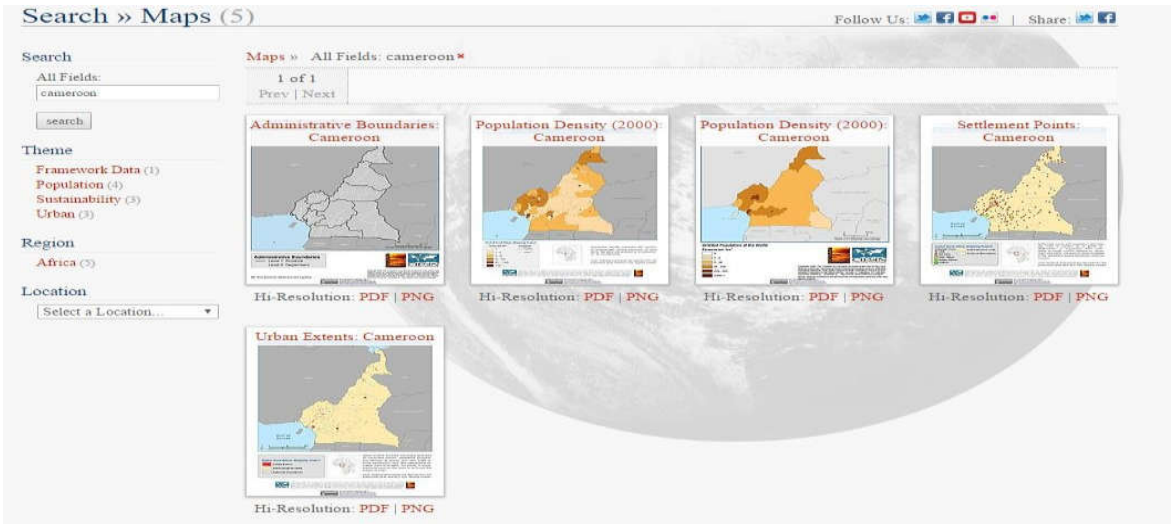


Figure 13: Differents maps about cameroon

In the map showing settlement, points you will notice that there are some areas where there is little or no settlement. This is certainly, because those areas are covered with dense forest or grace land hence little or no settlement.

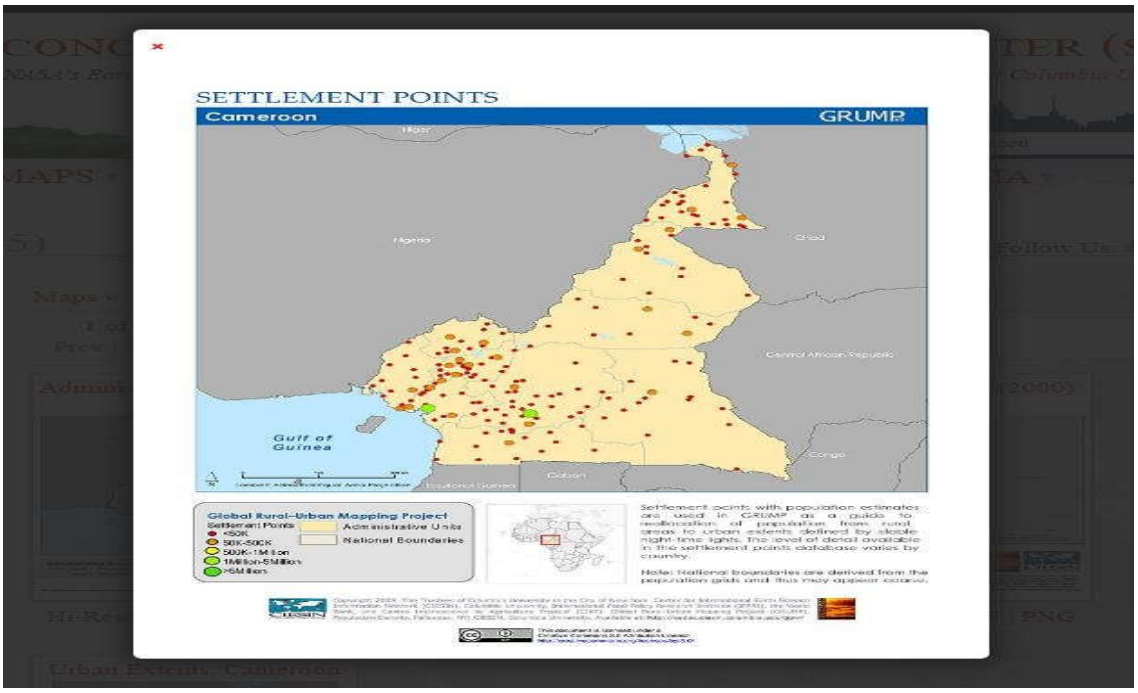


Figure 14:Settlement points in Cameroon

At the level of websites, it provides some links where you could open some websites depending on the information you want to get.

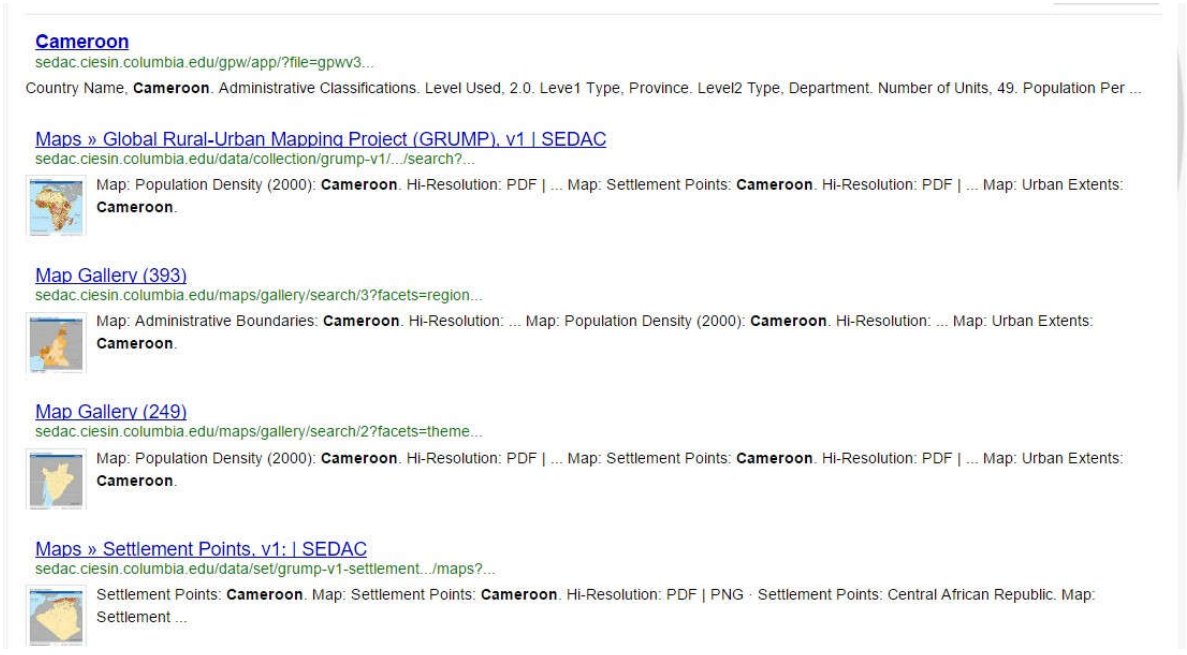


Figure 15:Website gallery about Cameroon

CONCLUSION

To better answer the requirements of this work which was to study the NASA Socioeconomic data and application center in relation to the geographical information system.

In order to solve our problem of how to synthesize earth sciences and socioeconomic data and information in ways useful to a wide range of decision makers and other applied users, and to provide an "**information gateway"** between the socioeconomic and earth science data and information domains. We've got to implement the above solutions that sounds quite reliable for better decision making can also serve as a platform education and more than expected.