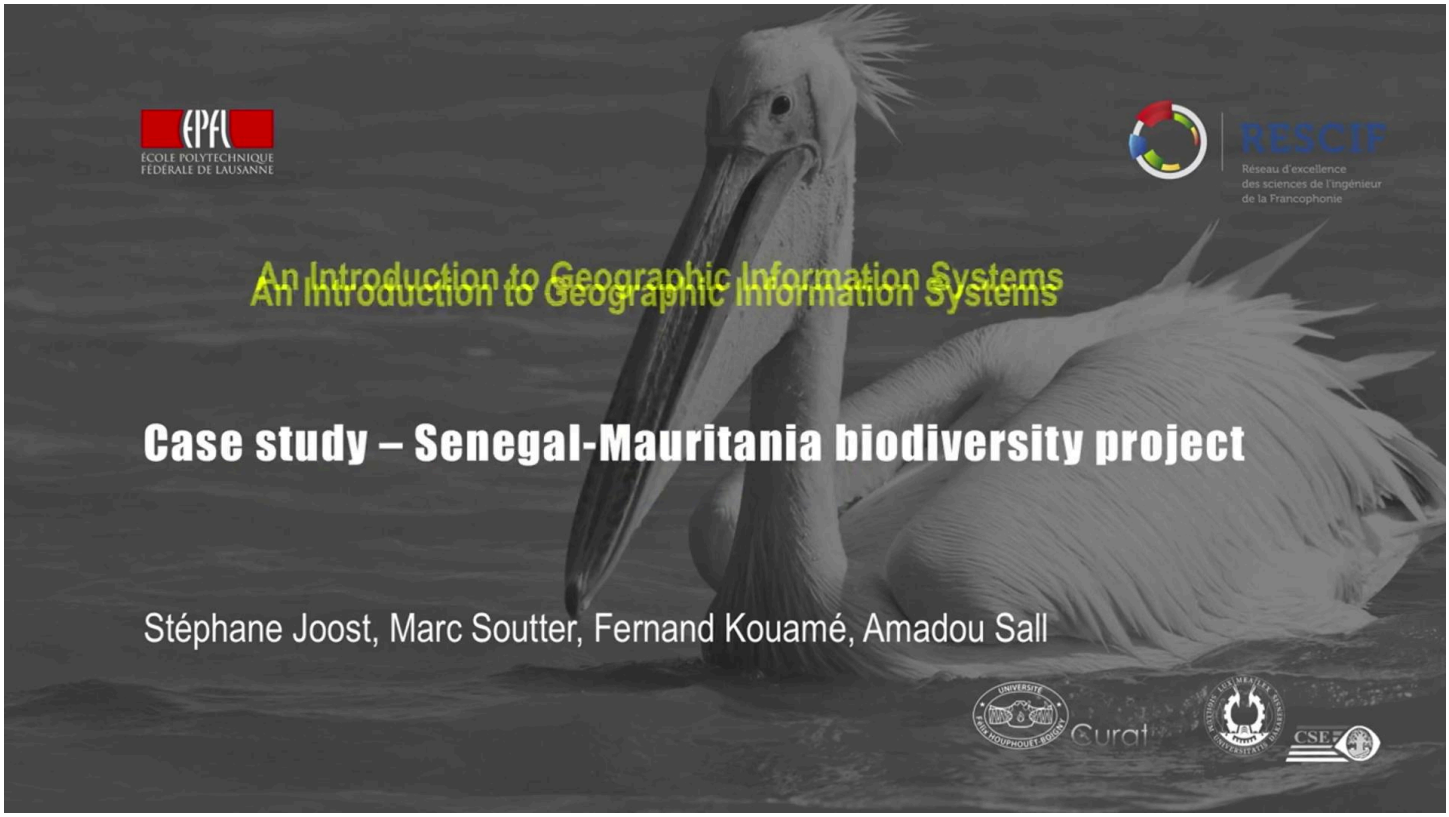

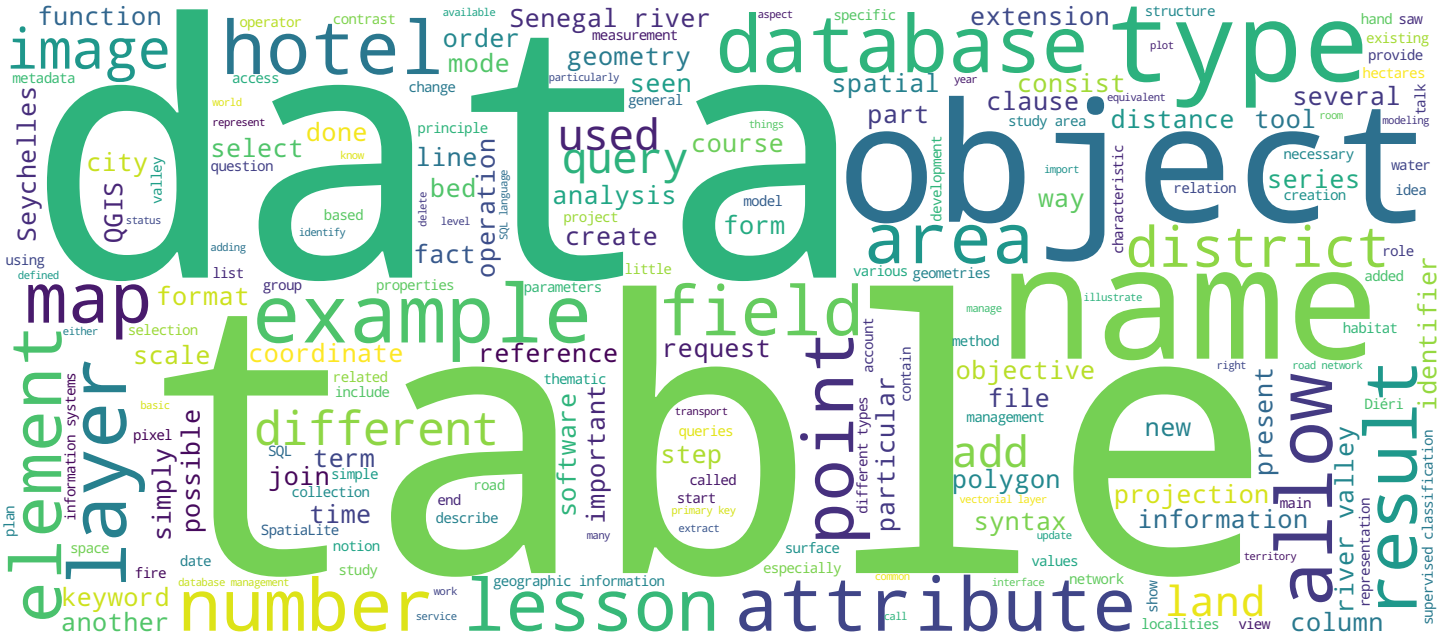

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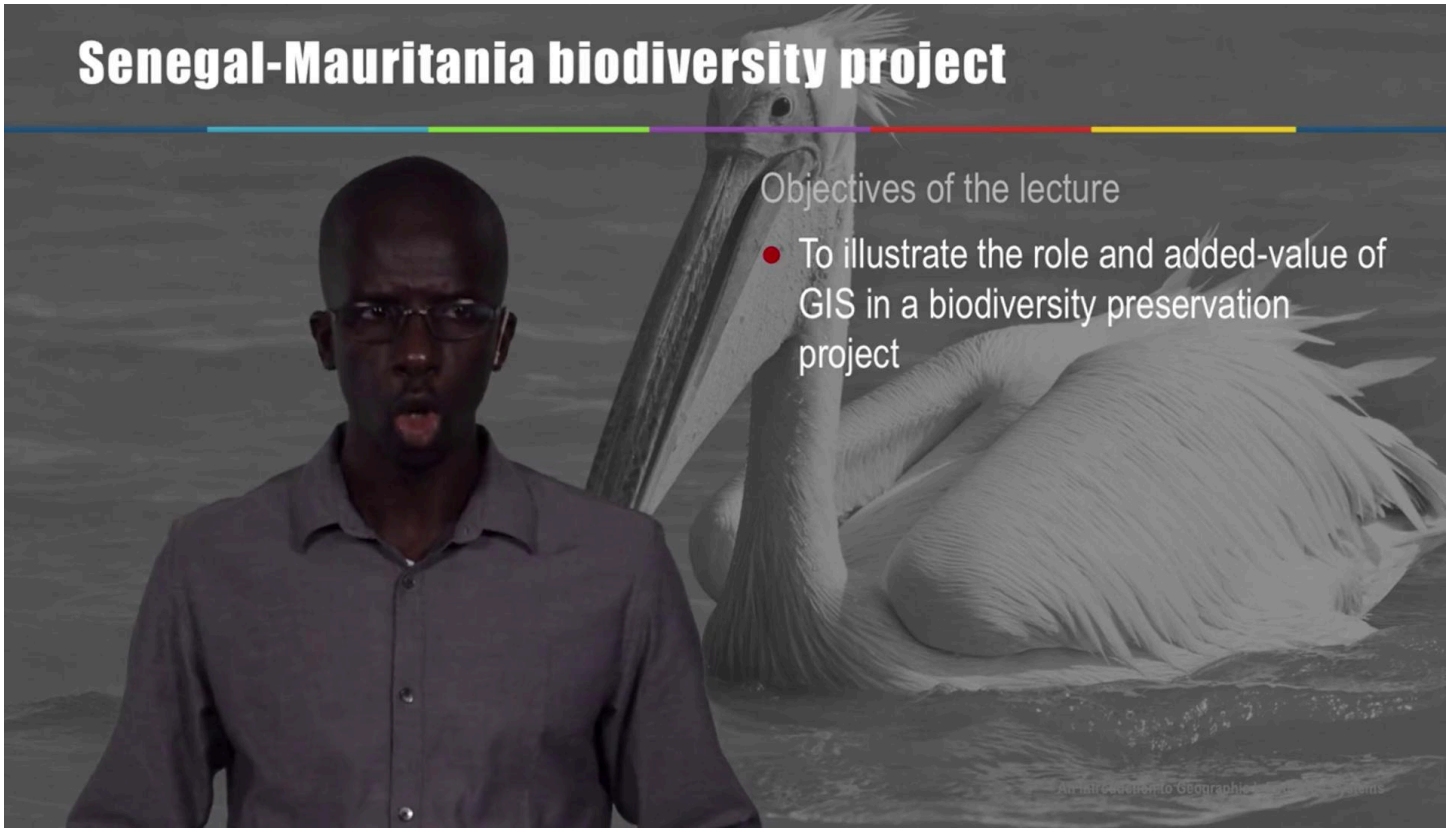
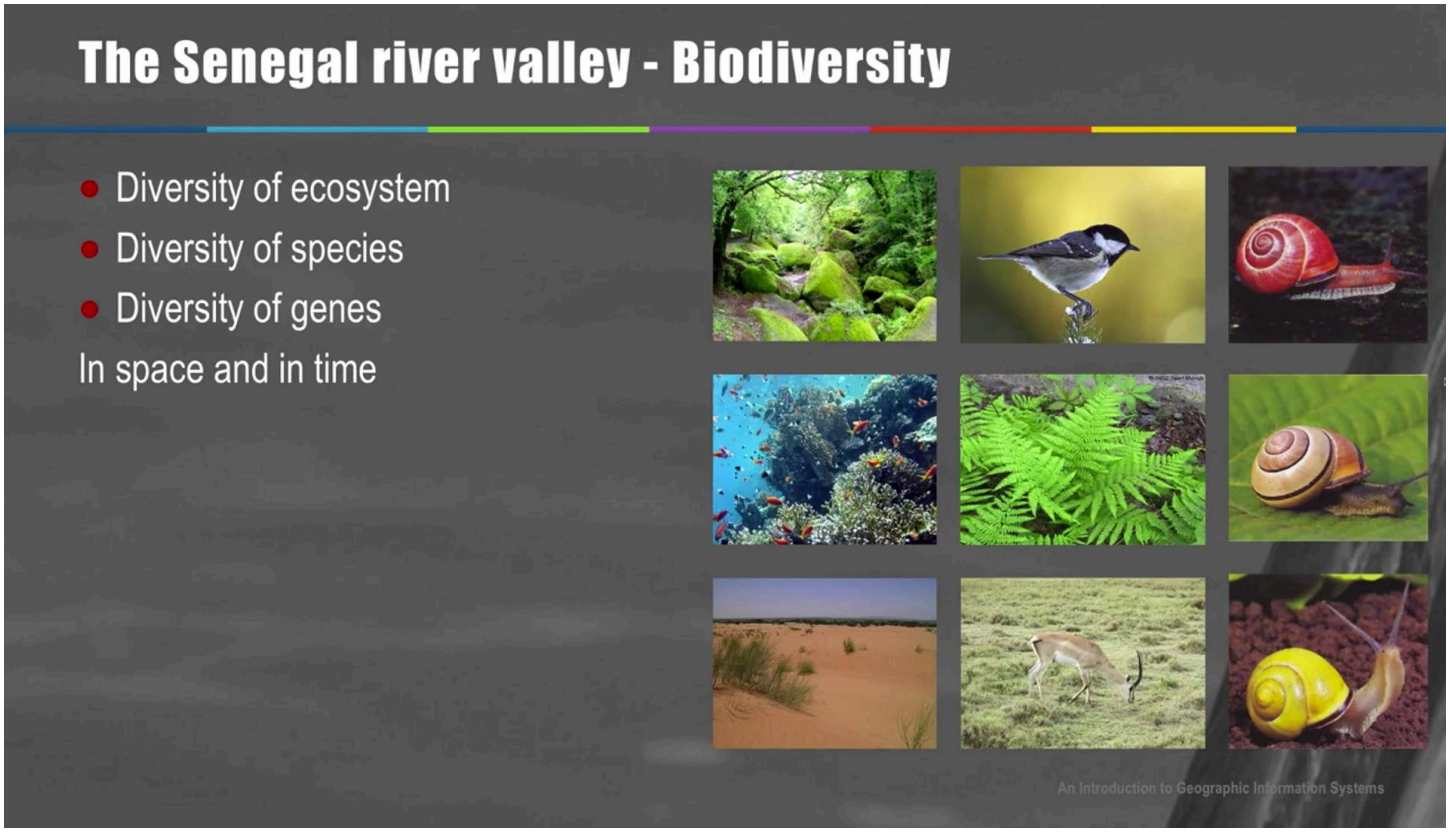


Good morning. I am pleased to present a case study covering the biodiversity of Senegal-Mauritania. The purpose of this lesson is to illustrate the role and contributions of geographic information systems in a biodiversity conservation project.

Notes

Summary

0m 23s



We will break down the presentation plan of this case study where we will first talk about the Senegal river valley, then break down the objectives to describe the methodology that was used and finally present the results. We are in a part of the world called the Sahel that has no major interest in terms of biodiversity. Fortunately today, there is attention given to these areas. And so we will look at the Senegal river valley that extends, for the part that we are interested in, from the Senegal river delta to Bakel on a strip of 50 kilometers on either side of the Senegal river over an area of 60,000 km2. So this is an area that provides a habitat for unique species. We have, in the Senegal river valley, an ecosystem diversity. We have 4 types of ecosystems. We have the sandy Ferlo, the lateritic Ferlo, we also have floodplains and wetlands.

Notes

Summary

0m 41s

The Senegal river valley

Diversity of the ecosystem and the ecosystems of the Senegal river valley

Due among others to

- Climate variations
- Geological and pedological variations
- Terrain
- Hydrographic structures

An Introduction to Geographic Information Systems

This diversity of ecosystems in the valley is linked particularly to climatic variations, to geological and pedological variations.

Notes

Summary

1m 52s

In this part of the Senegal river valley, we also have a diversity of ethnic groups and lifestyles. We have the Soninkés, Toucouleurs, Fulanis, Wolofs, Moors which are different ethnic groups. We also have sedentary farmers, breeders, diversity of agricultural activities, the cultivation of rice, millet, sugar cane.

Notes

Summary

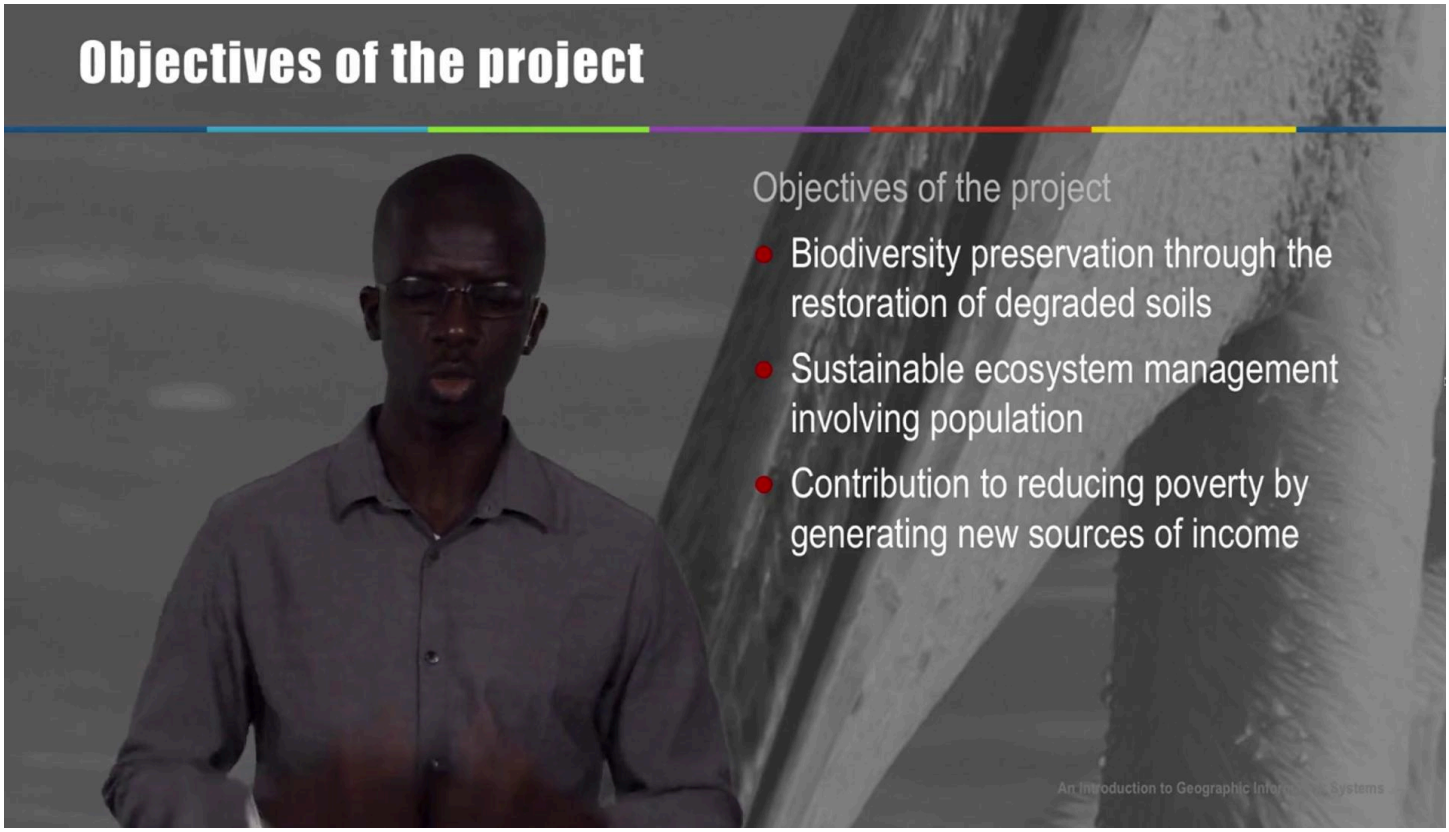
2m 05s

We also have extensive farming, fishing. We will stop a little on the objectives of the project. First to say that in this area of the Senegal river valley, there was a loss of biodiversity due to the expansion of agriculture, the increasing use of some tree essences in construction. Regarding the objectives of the project, we first have preservation of biodiversity through the restoration of degraded soils.

Notes

Summary

2m 29s

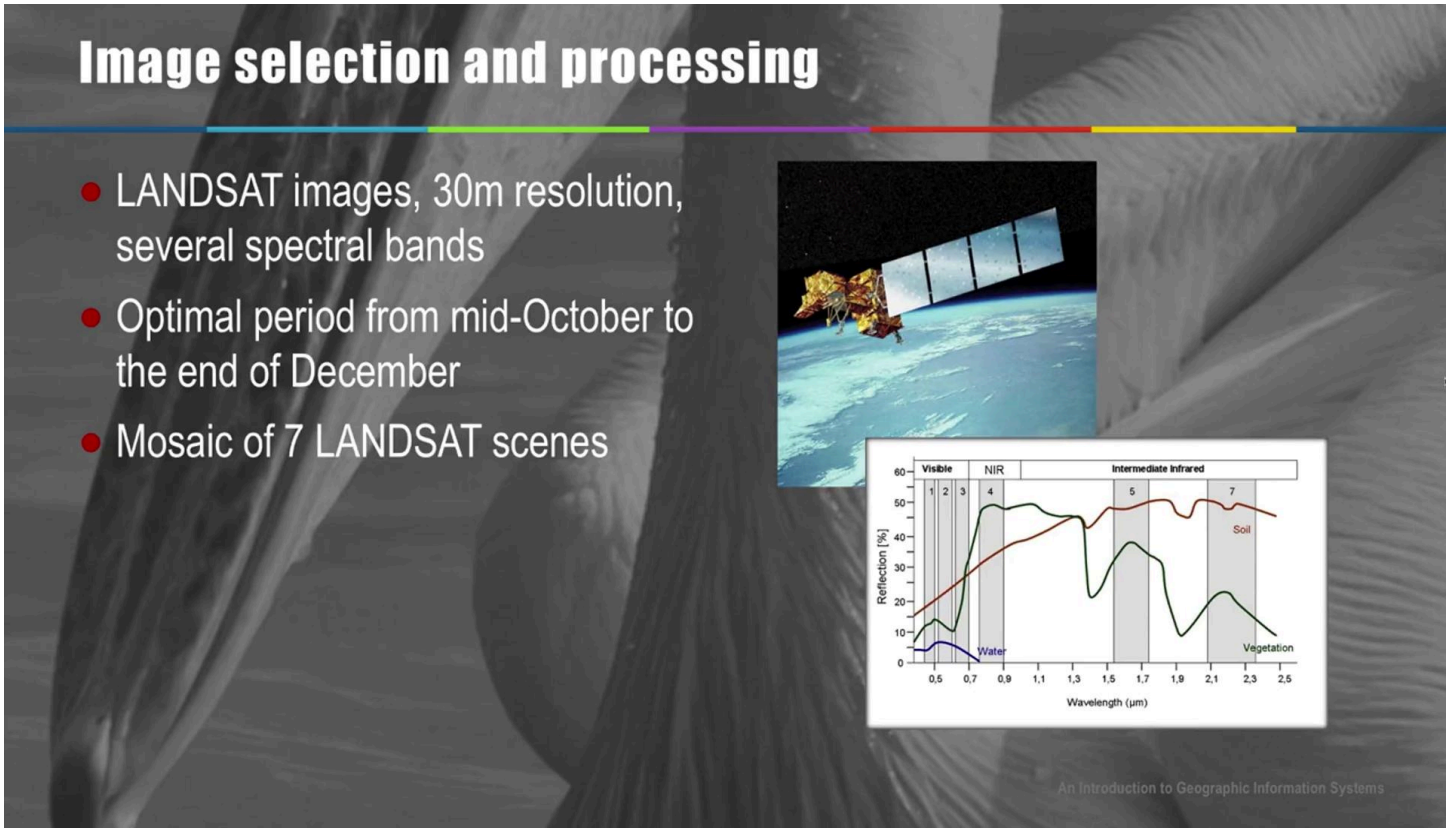


Our goal is also sustainable ecosystem management with the involvement of the population. Finally, a contribution to the fight against poverty by the generation, the creation of new sources of income. Information systems have an important role in achieving these objectives since GIS have the role of collecting and storing data, communication and information sharing, and also the analysis of land use and its dynamic.

Notes

Summary

2m 59s

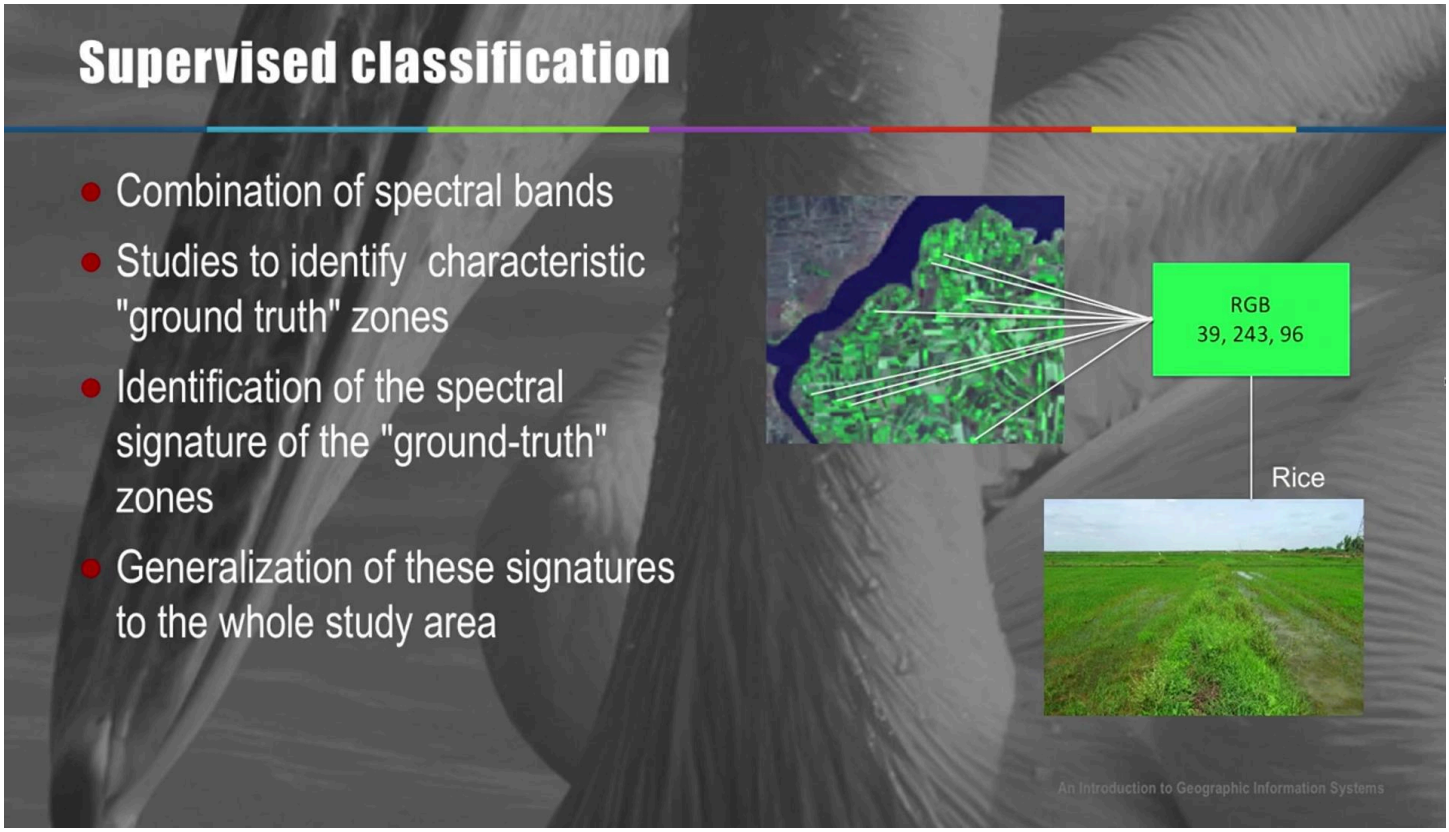


Regarding the approach followed in the case of the analysis of land use, 4 steps must be emphasized. The first step is the selection and processing of images the second step, the supervised classification, the third step, the diachronic analysis and the fourth step, the vectorization, digitalization and addition of vectorial layers. With regards to the selection step and the image processing, you should know that we used Landsat images, 30 m resolution with several spectral bands. The optimal acquisition period of these images is between mid-October and late December. Why? Because that is when the wood cover still keeps its leaves. It is also at this time that crop areas are easily recognizable. We have also done mosaic images since considering the extent of the study area, we had to have 7 Landsat scenes to cover the study area and so it was necessary to do a mosaic of these 7 Landsat scenes.

Notes

Summary

3m 35s

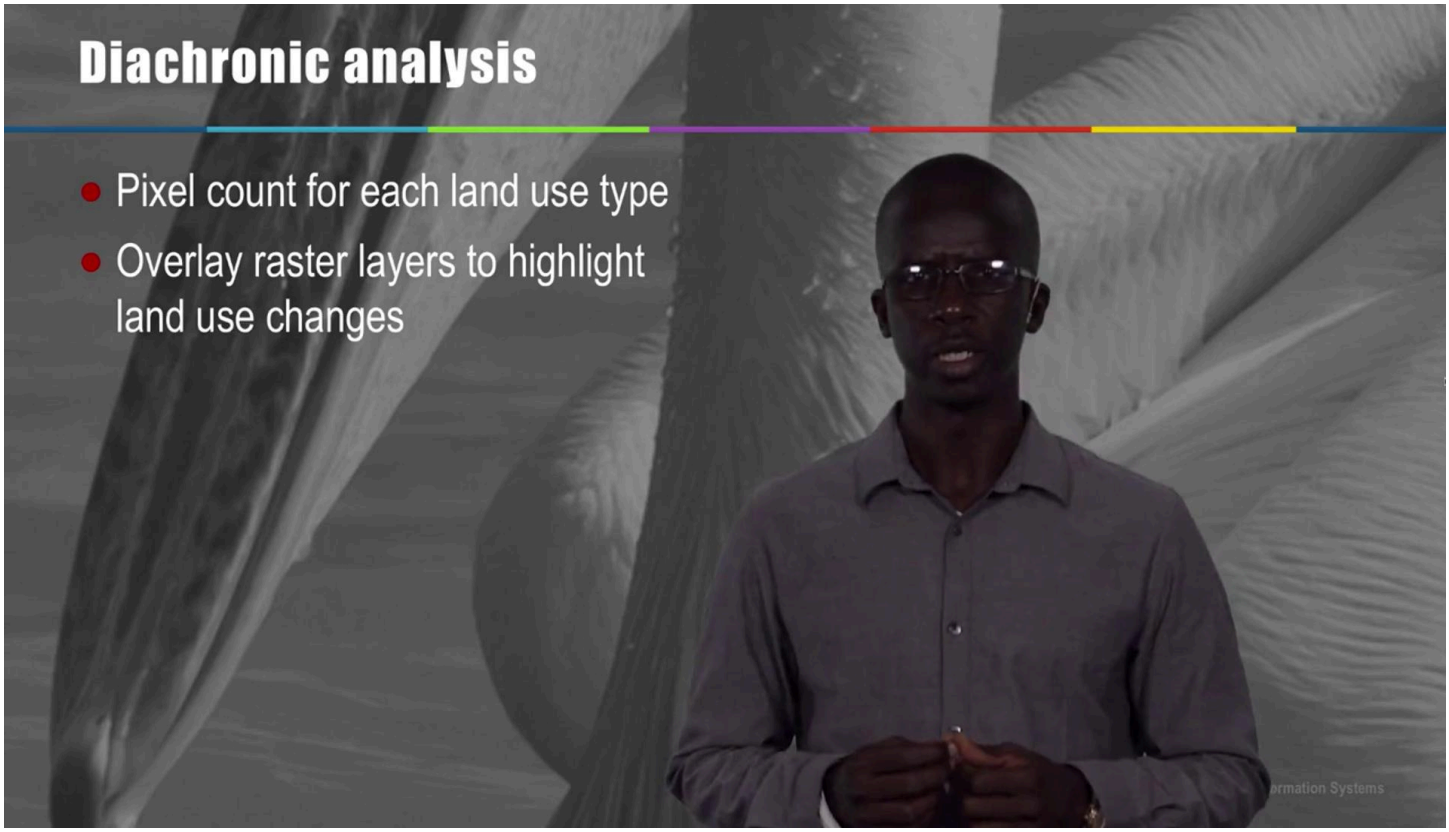


After the image processing step, there is the supervised classification step with a combination of spectral bands and field studies to identify the characteristic "sample" areas. There is also the identification of the spectral signature of the sample areas and finally, the generalization of these signatures for the entire study area.

Notes

Summary

4m 27s

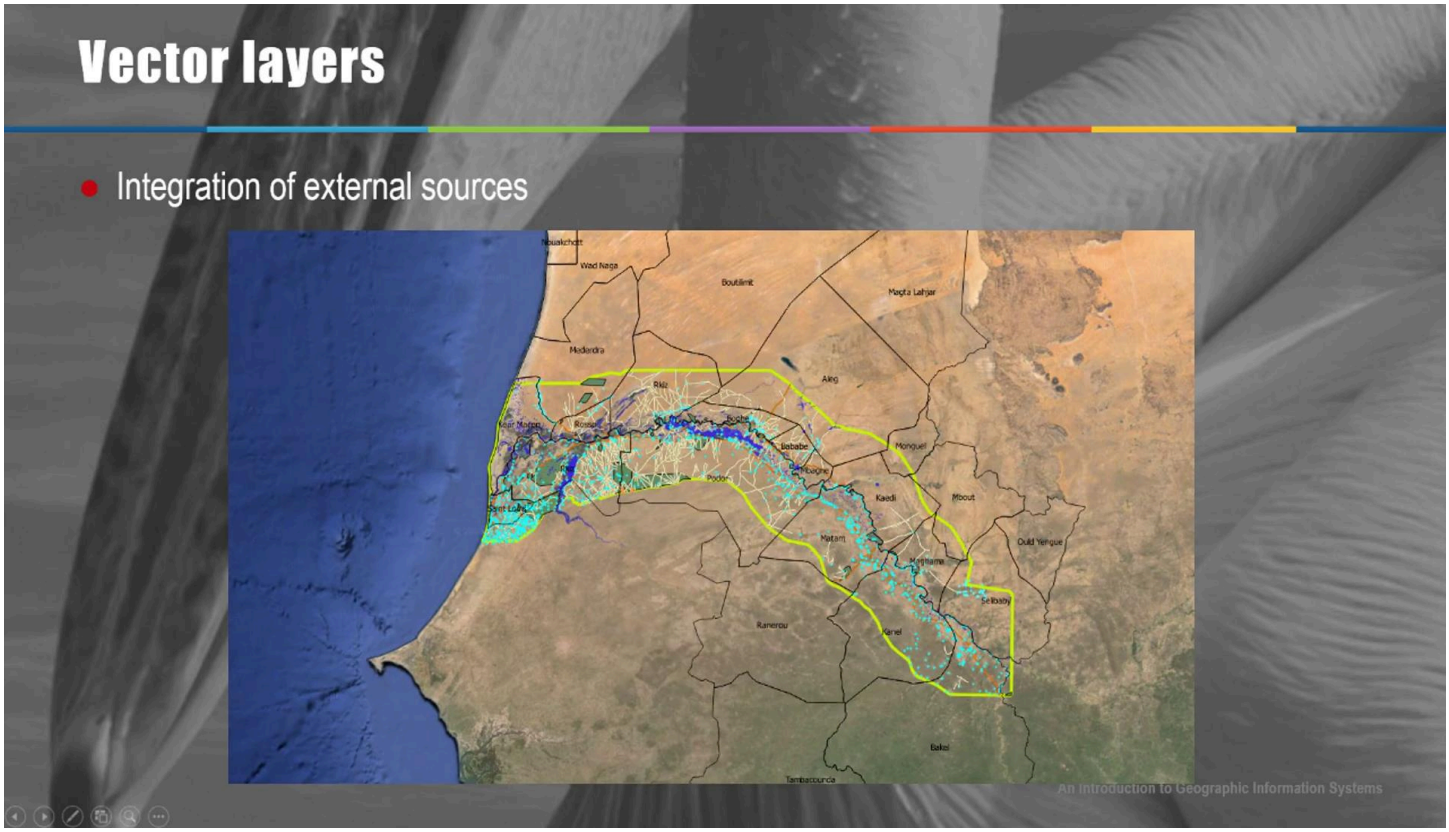


After the supervised classification step, we carry out a diachronic analysis. What is this analysis? It consists in counting surfaces / pixels in each land use category.

Notes

Summary

4m 44s



Next, there is an overlay of raster layers to highlight the pixels that have changed land use between the two dates, that is to say between 1984 and 2003. Still in this methodology part, we also have 3 other steps not less important in the elaboration of vectorial layers. It is first the vectorization of land use. Then digitalizing certain elements like road networks, some localities, etc. and also the integration of external sources since there are layers, data layers that exist in other institutions such as the administrative limits.

Notes

Summary

4m 57s

Results

- Land use statistics

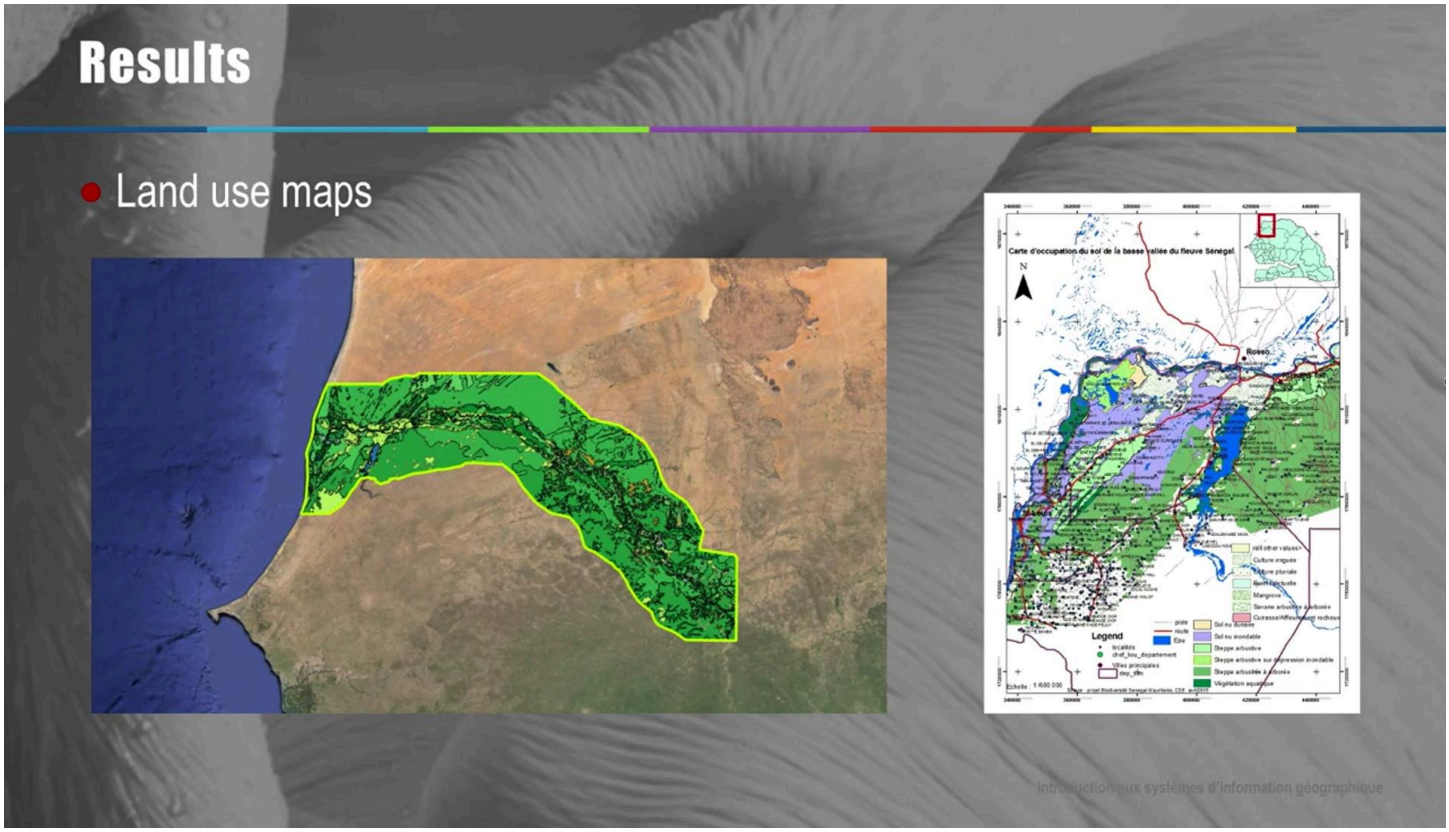
NB	THEMES	1984 (ha)	1984 (%)
1	Eau permanente	50779	0,886
2	Eau temporaire	581	0,010
3	Végétation aquatique	6652	0,116
4	Steppe arbustive	1414009	24,673
5	Savane arbustive à arborée	23681	0,413
6	Cultures irriguées	51619	0,901
7	Cultures pluviales	124863	2,179
8	Sols nus inondables	199153	3,475
9	Affleurement rocheux/cuirasse	48315	0,843
10	Mangrove	1445	0,025
11	Forêt relictuelle	86667	1,512
12	Steppe arbustive à arborée	2910169	50,780
13	Sol nu dunaire	187313	3,268
14	Steppe arbustive sur plaine alluviale et bas-fonds	625720	10,918

Thirdly, we also try to integrate these external sources. And for the results obtained: let's stop for a moment on the land use of 1984. What we should say is that the classification of satellite imagees brings out 7 vegetation types. The other terms favorable to the existence of habitats are related to surface waters. The ecosystems still reflect a certain diversity.

Notes

Summary

5m 34s

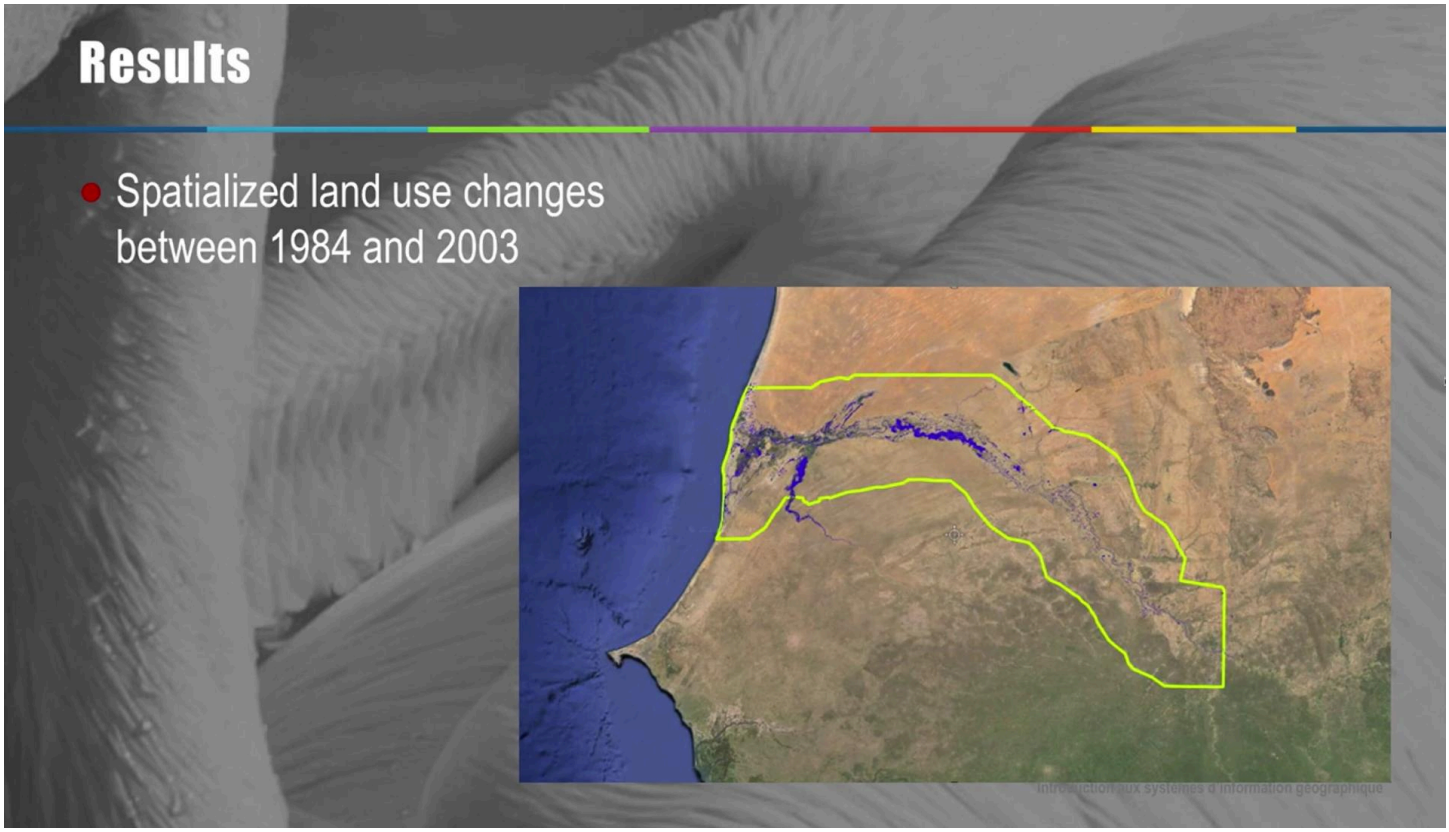


On the map of 2003, the same number of classes as in 1984 was listed. This shows that the evolution of the environment has not resulted in theme appearances or disappearances, the natural information among which the shrub steppe composing by far the first class. That is also important to note. Between 1984 and 2003, major changes in the occupancy and use of the space took place in the Senegal river basin in general and the delta and valley in particular. So between 1984 and 2003, major modifications in the occupation and use of space took place in the Senegal river valley and delta. These changes can be detected through the variations, increases or decreases of the surfaces the different types of occupancy, land use that have been highlighted by the cartography of the area between these two dates, that is to say between 1984 and 2003.

Notes

Summary

6m 05s

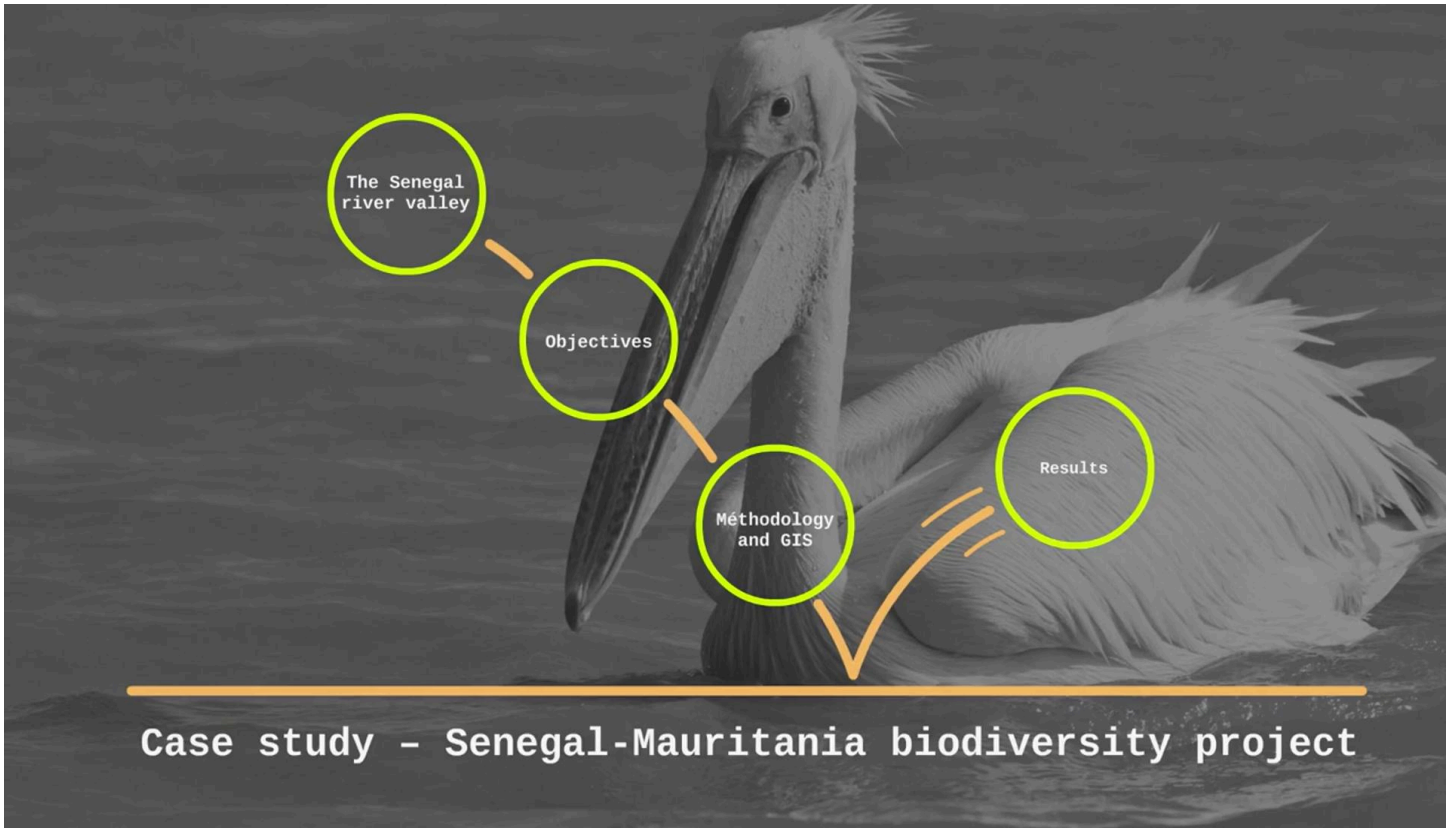


Let's take the example of the mangrove. It is a sparse mangrove formation that has gradually deteriorated over time. And the mangrove has decreased by 468 hectares between 1984 and 2003, going from 1445 hectares to 970 hectares at the rate of at least about 25 hectares per year. The irrigated crops have also, considerably developed, the greater availability of water induced by the Diama and Manantali dams. And its extension was mainly done at the expense of natural vegetal formations in the floodplain, that is to say the shrub steppe and what we can call the relic forests. Globally, we can say that the water and the types of land use related to its presence, aquatic vegetation, irrigated crops, bare easily flooded soil, have increased whilst the terms such as the natural vegetal formations that are more exposed to entropic actions have substantially decreased. In terms of the spatial dynamic of land use between those two dates, we must take into account the contrast between the Diéri and Walo land. The Diéri is a toucouleur geographical term which means non flooded areas of the valley and the Walo means the land cultivated in the area flooded by the annual rains of the river. So it is very important to take this opposition into account when, the spatial dynamic is done.

Notes

Summary

6m 54s

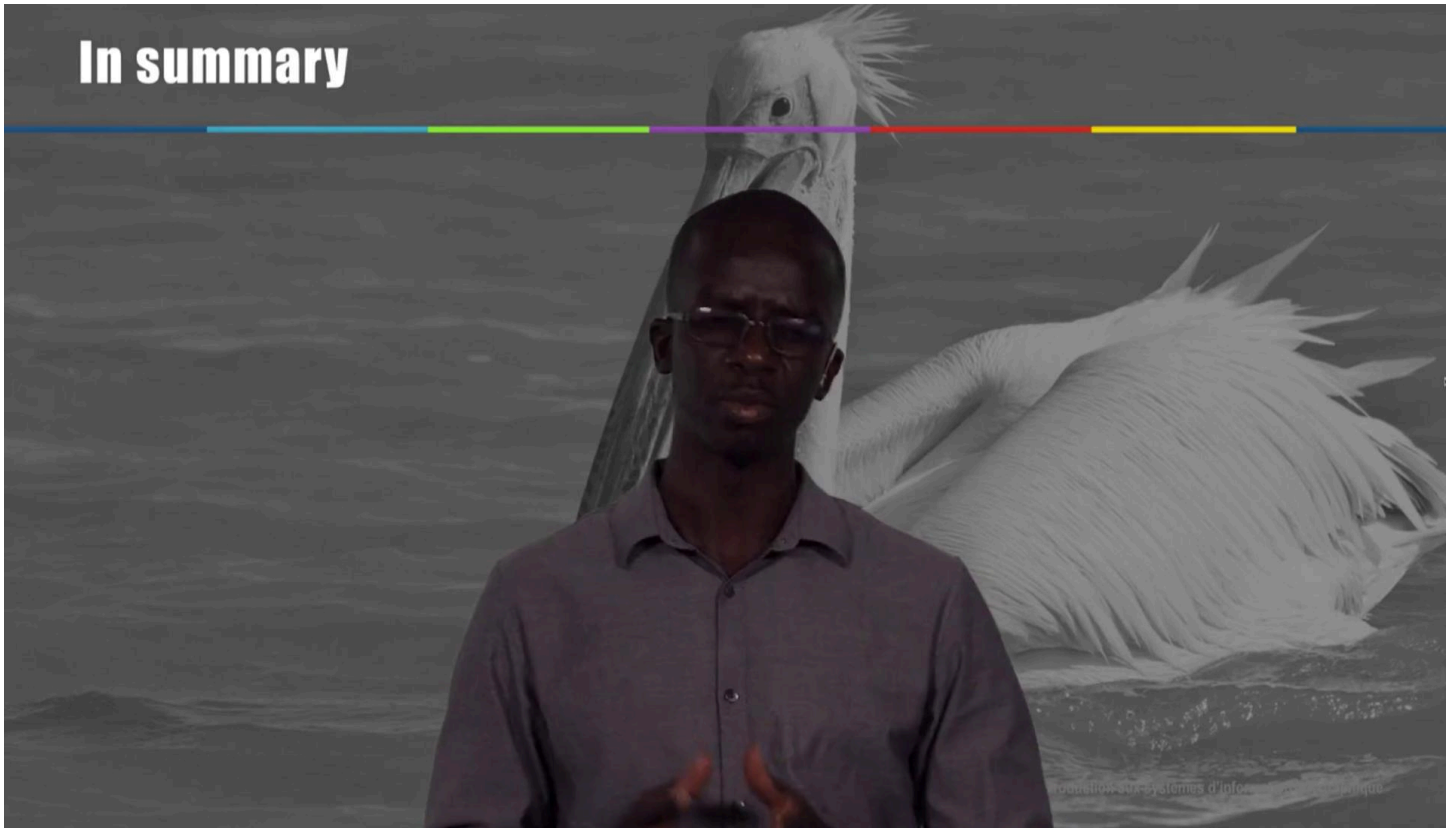


It is important to take this contrast into account since the dry crop areas are generally most threatened because they totally depend on rainfall.

Notes

Summary

8m 21s



We have just presented the objectives of the case study, the methodology and the results. What we can remember is that in total, the study area consists of different ecosystems providing a habitat for hundreds of animal and vegetal species, so a very valuable biological diversity for a zone which is located next to the desert. But natural resources have evolved under the combined effects of several processes where entropic actions and physical factors are questioned. And the analysis of production systems revealed a contrast between the Diéri and the Walo but especially a complementarity between the scenes of agricultural production, I will quote the agricultural surplus, the irrigated agriculture and livestock. The multidate cartography in the 200 thousandth highlighted the major changes resulting on one hand from the vegetal potential that has been hit hard between 1984 and 2003 and on the other hand from the relaxation of the water resources mobilization constraint.

Notes

Summary

8m 33s