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## Transformation of the Sahelian Landscape Through Bocage Reforestation

The term 'Sahel', which means 'shore' in Arabic, refers to the region bordering the Sahara to the north and south. This region stretches for nearly 6,000 kilometres, from the Atlantic Ocean to the Red Sea. Sahara is the largest hot desert on the planet, covering an area of approximately 9 million km<sup>2</sup>. Throughout the Pleistocene and Holocene epochs, its natural environment underwent significant changes in response to climatic variations. We will focus here solely on the most recent cycle of aridity and wetness.

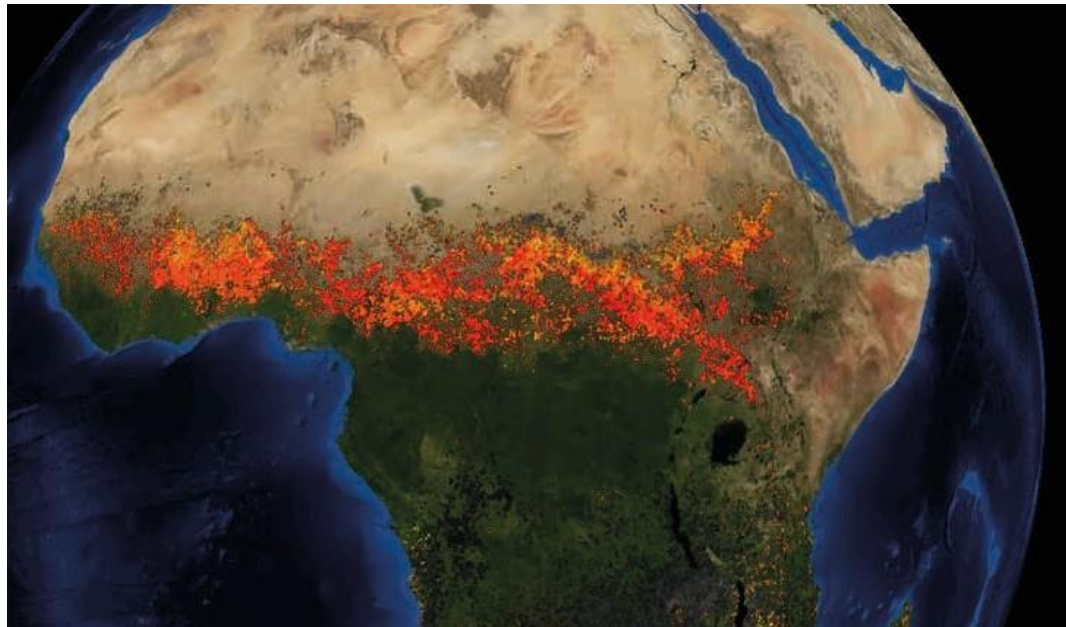
### **The causes of desertification in the Sahara during the Holocene**

Following a period of extreme aridity between 20,000 and 12,000 years BC, the return of rainfall encouraged the development of a savannah dotted with lakes and criss-crossed by watercourses. As drier conditions set in, this savannah transformed into a steppe, which still persists today in a few areas favoured by their geography and hydrography: high mountain ranges and sheltered valleys. However, desertification continues to spread. The gradual transition of hunter-gatherer and fishing societies to agropastoralism from the 6th millennium BC onwards also shaped the transformation of the natural environment. Overgrazing, slash-and-burn farming (clearing scrub by fire) and deforestation have led to soil

degradation and, consequently, the deterioration of habitats. Faced with this deterioration, local communities have been forced to migrate ever further south or north to continue their farming, livestock rearing, hunting and fishing activities.

### **The accelerating deterioration of the Sahelian environment**

During the 20th century, the pressure exerted by human activities on natural environments reached unprecedented levels, mainly due to population growth. In West Africa, the boundary between the Sahara and the Sahel has shifted southwards by around 250 kilometres over the course of a century. This retreat is due to deforestation and the loss of vegetation, which prevent rainwater from seeping into the ground: the water now runs off the surface, washing away the soil.



This phenomenon has intensified considerably since the 1960s. The increase in production and consumption has led to excessive logging, bushfires that deplete the soil of humus, 'mining'-style agriculture – whether subsistence or commercial –

overgrazing caused by roaming livestock, preventing the regeneration of vegetation. All of this has serious environmental and social consequences: water scarcity due to runoff, depletion of groundwater reserves, the gradual disappearance of flora and fauna, recurring famines



and the impoverishment of rural communities.

**Environmental conservation and restoration initiatives**

This degradation is not inevitable. Humans can counteract it through soil stabilisation practices, which have long been used by the Kabyè people of Togo and the communities of the Bamiléké Plateau in Cameroon. Today, the proliferation of technical and organisational initiatives led by institutions, local associations and NGOs is encouraging rural Sahelian communities to innovate in this field.

The creation of hedgerows around farmland, also known as 'Sahelian bocage', is emerging as a holistic and efficient practice. It involves surrounding fields with living hedges, reinforced by small earthen embankments. This system

retains all rainwater within the plots, thereby promoting its infiltration into the water table or its evapotranspiration on site. This 'zero runoff' principle optimises the greening of rural areas. Furthermore, it limits the erosion caused by monsoon rains and helps to preserve biodiversity in a particularly vulnerable environment.

In Burkina Faso, the NGO TERRE VERTE implements this approach through inter-village associations that run pilot farms. These farms play a central role in the management of the bocage landscape, carried out for the benefit of farmers organised into traditional rural land-sharing co-ownerships. Farmers thus benefit from an optimal working environment, ensuring high-yield cereal harvests whilst remaining sustainably productive. Trees are planted

*Rational grazing.*

*Opposite page: the Sahel ablaze.*



in the middle of the fields and the shrubs are integrated into the hedgerows, so as not to hinder mechanised or horse-drawn work. The Zaï method first regenerates the soil and then preserves it through a crop rotation system that includes grazed fallow land, secured by an electric fence. This is complemented by other innovative techniques, such as localised weeding and the use of the FACA roller to control weeds.

### Beneficial contributions for West Africa

According to the work of Anastassia M. Makarieva and Victor G. Gorshkov (2007: 1013; 2010), 'vegetation plays a decisive role in the transport of atmospheric moisture, acting as a veritable biotic pump.' Thus, through their farming practices, each farmer



*Above: The crossroads of the fields (Guiè).*

*Opposite: A field within a hedgerow-enclosed area.*

can influence its immediate environment and help to draw rainfall back towards the interior of the West African sub-continent, thereby playing a part in this 'pump' linking the ocean to the desert. By retaining rainwater, the bocage promotes evapotranspiration and feeds the small water cycle: a local, self-sustaining precipitation cycle that allows rainfall to penetrate further inland. This leads us to reflect on the concept of climate responsibility. Just as water is shared between countries bordering the same river (the Nile, Tigris and Euphrates), there could be a genuine responsibility regarding access to rainfall, the flow of which can be affected by the environmental management of rural areas through which rainfall patterns pass.



Just as deforestation in the coastal regions of the Gulf of Guinea prevents moist air masses from reaching the West African Sahel, does the desertification of the Sahel not also limit the advance of rainfall into the interior of the Sahara? Should we consider, in future, treaties on the sharing of rainwater, similar to those that exist for river water?

### Conclusion

Any action for environment must be planned with the long term in mind, applied to a clearly defined area whilst forming part of a global approach. This enables a better understanding of the issues and the implementation of effective solutions, as demonstrated by the bocage pilot farms in the Burkinabe Sahel, which are working to establish a genuine green pact for rural areas – or, to use the established term, 'a rural Green New Deal'.

*Henri Girard, a Frenchman from a farming family in the Avesnois region (59), has been based in Burkina Faso since 1989, where, together with his team at the Guiè Pilot Farm, he pioneered the concept of the Sahelian bocage. He is president of TERRE VERTE: [info@eauterreverdure.org](mailto:info@eauterreverdure.org)*

*NGO TERRE VERTE was founded in 1989 to support the Guiè bocage pilot farm initiative in Burkina Faso. Since 2001, it has been based in Ouagadougou, where it coordinates a network of inter-village associations involved in the design, refinement and implementation of a bocage system adapted to the Sahelian regions.*



*Localised weeding, Guiè (Burkina Faso).*

### Further reading

Makarieva, A. M. and Gorshkov, V. G., 2007, 'Biotic pump of atmospheric moisture as driver of the hydrological cycle on land', *Hydrology and Earth System Sciences*, 11 (2), pp. 1013–1033.

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