*Water, Earth, Greenery.*

# WÉGOUBRI, the Sahelian bocage

*Integrating environmental protection*
*in Sahelian agriculture in Burkina Faso.*

# CONCEPT NOTE

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The NGO TERRE VERTE is involved in Burkina Faso in the creation of bocage perimeters (*wégoubri in the Mooré language*), a new rural development concept developed by the Guiè pilot farm in the 1990s and now adopted by other pilot farms in Burkina Faso (*Filly, Goèma, Barga and Tougo*).

The degradation of the Sahelian rural environment has dramatically escalated during the last decades, endangering rural populations. In addition, damages caused by the on-going traditional practice of extensive agriculture have worsened the issue. Creating bocage perimeters in rural areas is a solution to the problems associated with this extensive agriculture.

By taking a holistic approach to the problem, a pilot farm integrates environmental protection into Sahelian agriculture, through three areas of work: applied research, training and direct support to farmers. A pilot farm is supported by five technical teams under the supervision of a manager. The pilot farm, owned by an inter-village association, is the linchpin in the implementation of the concept by farmers.

The concept is based on the creation of bocage perimeters in customary co-ownership, comprising individual plots and common areas which management is organized around a landholding group of beneficiaries. The result is a totally restored environment where agriculture is no longer synonymous with erosion, where livestock farming is no longer synonymous with overgrazing, and where trees and shrubs are harmoniously integrated into the environment.

The increase in agricultural yields obtained after just a few years of soil restoration means that the economic profitability of restoring millions of degraded hectares across the Sahel is now within reach.

The NGO TERRE VERTE was founded in France in 1989 to support the pilot farm of Guiè, created the same year in Burkina Faso. Since then, the pilot farm has developed a new concept of restoring degraded land in the Sahel area: the bocage management, which TERRE VERTE, established in Burkina Faso in 2001, is working to develop on other pilot farms in Burkina Faso, in Filly and Barga in the Yatenga province, Tougo in the Zondoma province and Goèma in the Sanmatenga province. The main goal of TERRE VERTE is to create islands of operational expertise at the heart of the Sahelian rural world.

These **pilot farms** are open-ended. Their first assignment is the development and restoration of rural areas, then they introduce sustainable agronomy techniques and finally they can become service providers for agriculture (*mechanized work, collection and marketing of products*).

The pilot farms belong to **inter-village associations** that TERRE VERTE supports technically, materially and financially so that they can integrate all the components of rural development, in line with the march of the contemporary world.

**The Sahelian bocage**

The **bocage** is defined as a rural landscape of meadows and/or fields surrounded by living hedges forming a continuous mesh, a linear forest. The bocage is a balanced environment created by man, combining trees, crops and livestock, where Humankind and Nature live in harmony.

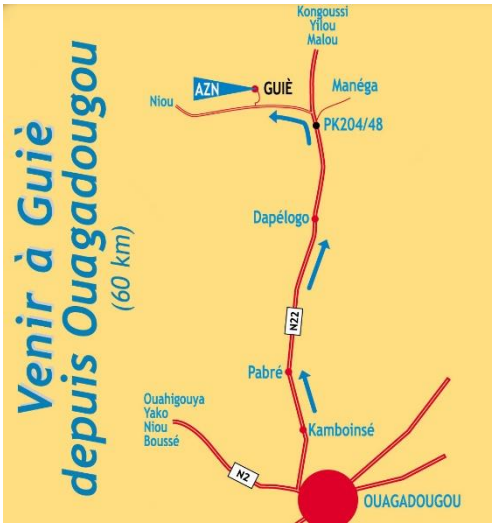
In the **Sahelian region**, the main purpose of the bocage is to keep rainwater where it falls, by building bunds, ponds and hedgerows to mitigate the erosive action of monsoon rains and maintain the biodiversity of an extremely fragile environment.

Following the example of irrigated perimeters protecting an area for growing vegetables or rice, we have created and developed a new concept in the Guiè region of Burkina Faso: the **bocage perimeter**, to solve the problems associated with extensive farming (*overgrazing, erosion, bushfires*). The *wégoubri* (bocage perimeter) is a form of land consolidation, from the request of the owners of a land who come together in a **customary landholding group** in order to fix the parcels of that land and thereby bring about environmental improvements.

*Aerial view of the Tankouri perimeter in Guiè.*

## Context

Humans, flora and fauna of the Sahel have long been accustomed to the occurrence of dry years (*in the form of pockets of drought during the rainy season*). This is part of the Sahelian climate. However, over the last sixty years or so, this episodic nature of the climate has become chronic. But human activity isn't stranger to the causes of desertification. They cause big damages to the environment through bushfires, irrational logging, mining agriculture (*soil exhaustion*) and overgrazing. Populations are affected, through water shortages, disappearance of flora and fauna, famine and the impoverishment of the rural world.




Since 1989, with the support of TERRE VERTE and its partners, the Pilot farm of Guiè has been working to restore the desertified soils of its region, using several techniques that converge on a renewal of the agricultural system through the creation of a bocage (*embocagement*). The Guiè Pilot Farm has developed a Sahelian bocage concept, known as wégoubri in the Mooré language, thanks to its freedom of initiative and long-term commitment.

## Methodology

From 1990 to 1995, the pilot farm was set up in the Guiè region, and to solve the problems associated with environmental degradation, we carried out action research on a new approach: integrated action on all aspects of the relationship between humankind and his environment. The research was conducted along three lines: **experimentation** with new rural development and bio-ecological farming techniques, **training** and **direct support** for farmers.

➢ So, to **experiment with new techniques**, we started with what was already being done in the region (*earthen bunds*) and amended it with bocage techniques (*ponds, living hedges*). These techniques were improved and perfected by our own research. For example, the degradation of vegetation by stray livestock was prevented by the use of wire fencing, and the sustainability of this fencing was made possible by the development of the **mixed-hedge** system, a fence combining wire fencing with a living hedge of *Senna sieberiana*, *Combretum micranthum* and *Diospyros mespiliformis*.

➢ **Local young people** are **trained in** these new techniques through the Bocage School (*see box on page 10*), and adults have been trained in their own fields. For our technicians and a few model farmers, we also encourage the discovery of other agro-environmental experiences, within Burkina Faso, in neighbouring countries and as far afield as Europe, where old bocage landscapes are full of lessons, veritable open books on respect for the environment.

➢ The third axis aims to develop sustainable agriculture by providing **direct support to farmers**, mainly for the development of hedgerows. To this end, we have developed a work organization that begins with a study of the site to be developed. Once the project has been drawn up, the beneficiaries clear the necessary layons for surveying by our technicians. The actual development site is managed on the principle of **high-intensity paid labor** (*HIMO*). This system makes it possible to involve rural populations in major works that are usually entrusted to mechanized companies (*earth embankments, ponds*). The contractors entrusted with the various structural tasks perform precision work, while at the same time acquiring the know-how and rigor required in connection with their remuneration. In addition, this choice stimulates the region's socio-economic development, with all components of the working population involved in the work (*young people, men, women*). Once completed, the bocage perimeter is managed by a **customary landholding group**, whose aim is to ensure the proper upkeep of the commons and respect for the three basic rules of Sahelian environmental preservation: control of livestock, fire and wood harvesting.

**These three lines of work** are found in the new farms created in the other provinces of Burkina Faso (*Filly, Goèma, Barga and Tougo*). We can thus define a typical organization for a pilot farm where the three axes of work are articulated around **five sections** or work teams supervised by a manager:

| SECTIONS | MISSIONS |
|---|---|
| Tree nursery  | • Experiment with new plants and horticultural techniques.<br>• Produce seedlings to meet the needs of the embocagement and local populations.<br>• Save local species that have become rare. |
| Land planning unit (*CAF)*  | • Creating perimeter hedgerows, rain gardens, bullis and tree-lined rural roads: site surveys, surveying, supervision of labor-intensive work, fencing, reforestation. |
| Farming technical supervision  | • Training[1] and technical support for farmers in the use of perimeter hedgerows.<br>• Develop rational grazing (*control of grassland and fallow land, haymaking and silage*) and better herd management.<br>• Monitor and evaluate farmers (*surveys, premiums, agricultural competitions, Ruralies*).<br>• Develop new skills in the rural world. |
| Agricultural equipment  | • Logistical support for work on the pilot farm.<br>• Develop targeted agricultural mechanization to facilitate the toughest farming tasks. |
| Maintenance of the bocage  | • Develop environmental management skills (*tree pruning & maintenance*).<br>• Maintain hedges and roadside trees. |

*Filly pilot farm.*

[1] Basic training for young people takes place at the Bocage school in Guiè, and internships at other farms (*see box*).

**The bocage perimeter concept**
A bocage perimeter (wegoubri in mooré) consists of a grouping of agricultural plots within the same site protected from erosion and wandering livestock. Each farmer receives a plots lot of which he becomes the owner, all of the common areas being managed by a co-ownership system, within a land group formed by the bringing together of the different owners.

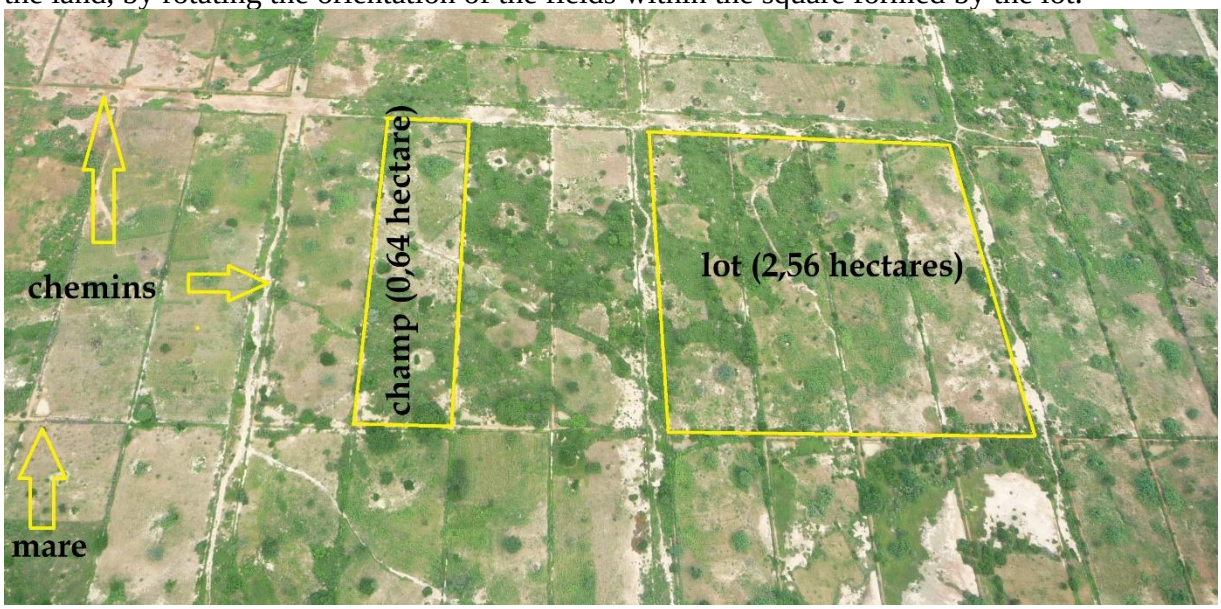
The principle behind the management of bocage perimeters is **informal co-ownership** organized around the beneficiaries' **customary landholding group**, and comprising individual plots and common areas. This status is informal because rural land co-ownership has yet to be conceived.

**The commons** are the structural foundation of the **bocage perimeter**. They are, from the outside in :

1. The **firewall** that surrounds the entire area protects it from the ever-present risk of fire during the long dry season (*October to May*).
2. The **mixed fence** blocks the path of stray livestock. It consists of sheep netting enclosed between two lines of shrubs.
3. **Openings** provide access to the site. Covered gates allow bicycles and pedestrians (*but not animals*) to pass through; barrier gates provide access for cattle, cart and tractors.
4. The main and secondary **roads** serve each lot (*the reference co-ownership unit is a 4-field lot*).
5. Eventually, a **bulli** (*large pond*) collects water from the paths to water the livestock.
6. Some **lots** are shared (*woods, pastures, collective fields*).
7. In some cases, certain **ancillary facilities** (*diversion channels, bullis*) are required to protect the site from unauthorized runoff from undeveloped areas.

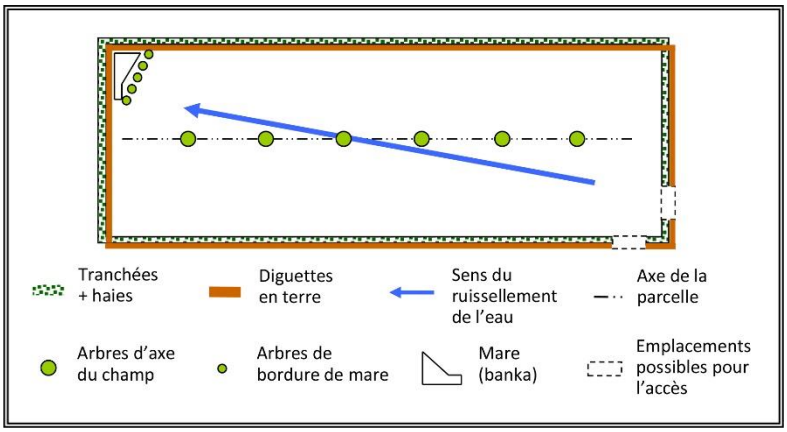
**Individual plots of arable land** enjoy all the advantages of common land in improving agriculture and stockbreeding, while preserving the individual property that farmers value so highly.

Each **owner** receives **1 lot** of **2.56 hectares** (*160 X 160 meters*) divided into **4 fields** of **0.64 hectare** each (*160 X 40 meters*). This allows the technicians to adapt to changes in the slope of the land, by rotating the orientation of the fields within the square formed by the lot.



Each field is accessed by a path and surrounded by a double protection system: an earthen **bund** lined with a shrub **hedge**. At the lowest point of the field is a small *banka* (infiltration **pond**) for excess runoff water. In the center of each field, tall trees leave a two-meter-wide strip of grass to slow down runoff.

The result is the recovery of all rainwater without erosion. We even recover water from the paths. This "**zero runoff**" system enables efficient revegetation of the Sahelian countryside. Farmers benefit from an excellent **working environment**, ensuring **good yields** and **lasting productivity**.




**Trees** are planted along the axis of the field, and **shrubs** in straight hedgerows, so as not to interfere with ploughing or motorized cultivation.

**Zaï cultivation** (*see box on page 11*) regenerates the soil before preserving it through a **crop rotation** that includes **fallow grazing** in the rainy season with a solar electric fence, as well as grazing animals in the fields after harvest thanks to the electric fence adapted to the dry season (*two wires stretched 20/30 centimeters apart, one of which acts as a ground and the other is under tension*).

*Rainy season grazing with electric fence.*

At the same time, the pilot farms are helping to structure **rural roads** by planting trees alongside them, and to create **rain gardens** and **bullis** (*micro dams*) where runoff is no longer under control - all with the same aim of keeping rainwater in the soil, to give a future to our rural landscapes and the people who live there !

**Dissemination of the concept.**

Through this work, we have succeeded in redesigning the countryside, creating a new, more pleasant landscape and ensuring greater, more diversified production while respecting biodiversity. In our experimental plots in the heart of the Guiè/Tankouri bocage perimeter, we have achieved average **sorghum yields** of around 22 quintals per hectare (*2,200 kg/ha*) over an 18-year period (*2006-2023*) with an average rainfall of 736 millimeters! This demonstrates the performance of the concept in a region where average yields are in the order of 10 to 12 quintals per hectare. This substantial increase in yields makes it possible to envisage profitable development on a large scale, and is naturally in line with the prospect of global regreening. We are therefore persevering with the construction of new perimeters and the training of beneficiaries in the management of these areas, in order to demonstrate their effectiveness and profitability. To date, **2,155 hectares** have been developed, benefiting **721 families** (*around 7,000 people*):

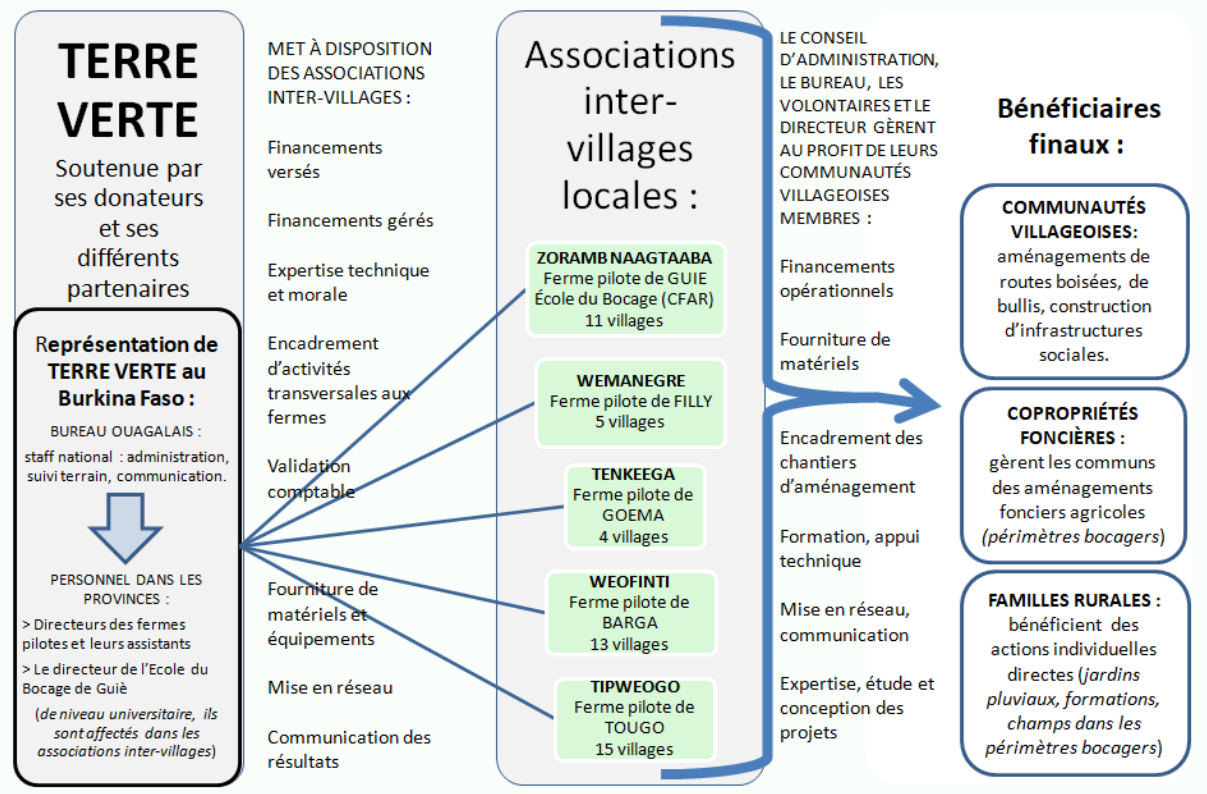
| Provinces | Villages | Developed sites | Year(s) of construction | Total surface area (in hectares) | No. of beneficiary families (A family = 10 people on average) |
|---|---|---|---|---|---|
| Oubritenga | Guiè | Kankamsin | 1995 | 2 | 4 |
| | | Zemstaaba | 1996/1997 | 8 | 4 |
| | | Tankouri | 1998/2000 | 100 | 23 |
| | | Konkoos-Raogo | 2014/2017 | 155 | 56 |
| | | Tounda | 2023 | 132 | 46 |
| | Cissé-Yargo | Taag-Banka | 2008/2009 | 146 | 55 |
| | Babou | Relwendé | 2022/ | 111 | 32 |
| Kourwéogo | Douré | Boangb-Wéogo | 2004/2005 | 133 | 48 |
| | Doanghin | Rimpintanga | 2005/2006 | 113 | 42 |
| | Bendogo | Pasgo | 2021 | 65 | 22 |
| Yatenga | Filly | Manegrewayan | 2008 | 23 | 9 |
| | | ZAMTAOKO | 2009 | 86 | 36 |
| | Gourbaré | Maneguedtindbeogo | 2014 | 66 | 29 |
| | Barga | Landao | 2018 | 109 | 39 |
| | Ramdolla | Dabéré | 2021 | 49 | 19 |
| | Ziga | Wanmanegdo | 2021 | 116 | 35 |
| Sanmatenga | Goèma | Neerwaya | 2010 | 130 | 27 |
| | Toéghin | Managzanga | 2015/2017 | 102 | 33 |
| | Kamsé | Bangue Goudin | 2017/2018 | 80 | 28 |
| | Lebda | Targouda | 2019/2020 | 98 | 32 |
| | Nabdogo | Katre Tanga | 2022/2023 | 331 | 102 |
| | | | **TOTALS** | **2 155** | **721** |

These 21 sites can be viewed on Google Maps using the hyperlinks in the perimeter names, as long as the satellite image is up to date for recent perimeters.)

**Operationality of the concept.**

To achieve these results, it's not just the agri-environmental techniques themselves that are important, but also the organizational mechanisms behind them. A symbiotic relationship between local stakeholders and TERRE VERTE makes it possible to :

- technical and organizational skills (*managers/assistants*)
- strong autonomy of action for local stakeholders (*financial management, planning*)
- certification of operations (*audit, procedure manual, technical reports*)
- access to quality equipment and supplies (*wire fencing, topographical material, farm motorization equipment*)
- networking and openness to the outside world (*publication of results, national and international exchanges*)




**Perspectives.**

**Any action in the field of the environment must take place over time and be confined to a well-defined area**, in order to go in-depth into understanding the problems and implementing the solutions. That's what we're aiming to do with our bocage pilot farms, in order to implement this Sahelian "**green new deal**"!

The **Centre de Formation des Aménageurs Ruraux de Guiè (*CFAR*)**, l'**Ecole du Bocage,** was created in 2008 in the Pilot farm of Guiè, to meet the growing need for technicians specialized in the innovative work we are developing.

In addition to participating in the pilot farm's activities, CFAR offers young people theoretical training to prepare them to be operational in the field of soil degradation control.

Each year in February, the training is open to young men and women (*14-17 years old*) motivated by the fight against desertification and keen to train and work in this field. The aim of the training is to provide **the** necessary **knowledge** and **know-how**, mainly in the development and maintenance of hedgerows in rural Sahelian areas, to enable these young people to play an active role in agro-sylvo-pastoral development initiatives.

**Training content :**

- survey and development of degraded areas,
- survey and construction of rural roads,
- survey and construction of bullis
- agroecology,
- ecological farming,
- forest nursery and reforestation,
- rural craftsmanship,
- general culture.

Life in the center is organized as a three-year boarding program, including 8 months of internships on other pilot farms.

At the end of the course, students receive a certificate of training in rural development.

For further information, please contact us at: cfar@azn-guie-burkina.org

**Zaï** is a traditional technique originating from the north-western region of Burkina Faso (*Yatenga*). It's a cereal-growing technique that concentrates water and nutrients around the plant. In practical terms, this is achieved by digging **holes** 30 cm in diameter and 15 to 20 cm deep **during the dry season**. **Ripe compost** is deposited and covered with a small quantity of soil, on the edge of which the cereal (*millet, sorghum or maize*) is sown as soon as the rains of May-June, which are often insufficient.

By **locating** water and compost, this technique guarantees early planting of crops, which will take full advantage of the monsoon and resist pockets of drought. The only obstacle to the development of Zaï is the lack of compost, which can be overcome by the rational use of livestock.

This technique makes it possible to reclaim degraded soil and harvest a good harvest from the very first year. It's also a guarantee of having enough to live on, whatever the weather. In Guiè, we had good results in 2001, with rainfall of just 428 millimeters!

TERRE VERTE promotes this technique in the pilot farms. In Guiè, since 2002, an agricultural competition for the most beautiful Zaï field is organized every year in November, between farmers from the 11 AZN village members, on the occasion of the Ruralies. This competition is now also organized by the 4 other farms.