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Multi-functional hedgerows in the bocage systems of France

Rejuvenating a traditional system through farmer-led innovation

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Why bocage agroforestry today?

In Brittany, the main period for creating the bocage landscape stretched from late 18th Century to early 20th Century. The hedgerows drew on the discontinuities of the physical environment; they signified the limits of ownership or use, while delivering fuel and timber wood for local and regional use. During the last 50 years, agricultural and broader rural changes have led to the deconstruction of the bocage and to the loss of ecological functions it provides. To date, initiatives of bocage restoration have primarily emphasised the value of hedgerows as providers of environmental services rather than productive resources, and creates a problem in terms of sustainability.

The principle of bocage agroforestry is to develop a holistic approach, whereby hedgerows are considered as multi-functional components of landscapes and agricultural systems. This requires a change in both mindset and practices.



Strengthening the bocage network is achieved by enhancing the social linkages between farmers, and other stakeholders. Here we see a participatory planting day.



The bocage can be managed as a form of agroforestry that operates at the field boundaries. Here several hedgerows have been planted on a bank (centre and top of the photo), in order to reconnect, on the basis of the current field borders, the remnants of the old hedgerows.

Farmer innovation – the experience of the “Terres et Bocages” Association

Renewing the perspective on hedgerows and bocage landscapes

The T&B Association considers hedgerows as part of the agricultural productive space which should be fully incorporated into the management at the field, farm, and collective levels. Emphasis is placed on the multi-functionality of hedgerows at the farm and local levels. Paying attention to the integration of hedgerows in the landscape in order to re-establish a diversity of ecological functions is an important aspect of this approach.

An adaptative process of renovating the existing bocage is envisaged. The aim is to build upon the existing “foundations” when they are of interest and value, and to develop flexible systems which meet current demands but can also be adapted to meet future needs and interests.

Renewing the practices of plantation and management

The T&B Association integrates silvicultural thinking in their farming practices. The aim is to shift from practices that focus on limiting encroachment of hedgerow growth into the field, to those which promote tree development. To achieve this, the Association has been working to increase the density of trees in new hedgerows and also on the enlargement of the structure of existing hedgerows (e.g. from single to double rows of trees). They also practice selective thinning, which they consider to be more effective, cheaper and less strenuous than traditional management practices such as tree pollarding.

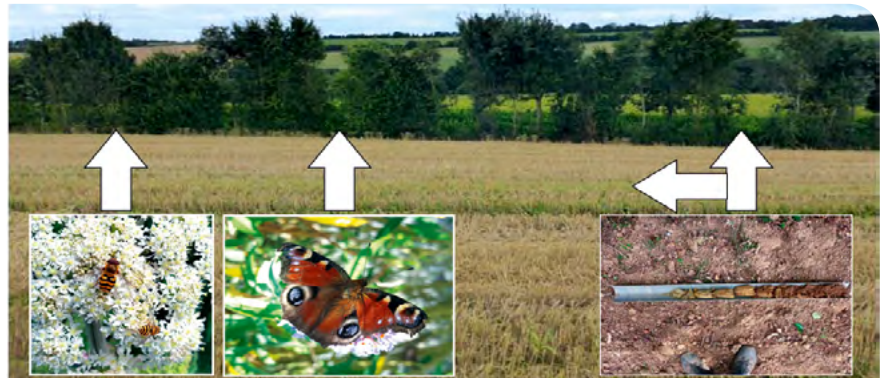
The tree species and modes of establishing the hedgerows (e.g. banks, mulching) are chosen according to farmers’ objectives, the use of their fields, the nature of the terrain, the observed vegetation structures, and species already present in the surrounding area.

This process of renewal mobilizes many different sources of knowledge including agriculture, silviculture and ecology. Through participatory fieldwork and action-learning sessions, the Association ensures relevant information and experience is shared among key stakeholders.



Advantages

- Reconnecting sections of old hedgerows through new hedgerows reinforces the structure and ecological functions of the whole bocage landscape.
- 10-20 years after planting, the expected agroecological benefits can already be perceived.
- Crop and livestock production have been maintained, even enhanced, as crops and livestock in pasture are now sheltered against inclement harsh weather.
- The farm use and the sale of wood chips and logs have made it possible to cover on-going hedgerow maintenance costs.
- The involvement of the Farmers' Association, and the support they provide, have made it possible to adapt and extend bocage management to the wider farming community.



Example of a new single row hedgerow planted on flat ground, and now 13 years old where ecological observations (on the photo: syrphid flies and butterflies) and soil measurements were made. Soil profiles sampled to a depth of 1-m showed an increase in soil organic carbon.

New hedgerows, biodiversity and soil quality

Fifteen years after planting, new hedgerows harbour a similar species diversity to that of old hedgerows, and are providing needed habitat and refuge for fauna and flora. Predatory arthropods tend to be more numerous in crops adjacent to new hedgerows, suggesting that they might contribute to pest control in crops over the longer term. Spatial connectivity of new and old hedgerows is also crucial for enhancing biodiversity in hedgerows and adjacent fields.

Soil organic carbon content is beginning to increase under the hedgerows, even though this is not always significantly different from that measured in the middle of the fields and away from the area of influence of the trees. Building up soil organic carbon is a slow process: planting regularly and managing hedgerows will, in the long run, enhance soil organic carbon storage at the field and the landscape scales.

New hedgerows on farms

According to the farmers, the new hedgerows have met their desired objectives such as: protecting and enclosing cattle in pastures, regulation of runoff and erosion, enhancing the beauty of the landscape, and the designation of field boundaries. Firewood production and the protection of wild fauna were mentioned as supplementary benefits. Farmers have also observed that crop yield is different on each side of hedgerows (within the first few metres), and varies according to the orientation of the hedgerows. According to the farmers, these differences are compensated at the field scale, and the yield differences at farm level are mostly explained by the variations in soil quality.

The labour required for hedgerow maintenance remains a challenge for the farmers, with some reporting 10-20 days per annum being spent on tasks such as shrub clearing and tree pruning. Further work is required to identify how to reduce these labour demands and thus ensure the sustainability of the bocage system.

Further information

- Antoine A, Marguerie D (Eds.) (2008). *Bocage et Sociétés*. Presses Universitaires de Rennes, Rennes (France). 512 p.
- Baudry J, Jouin A (Eds.) (2003). *De la haie au bocage*. Organisation, dynamique et gestion. INRA Editions, Paris (France). 435 p.
- Baudry J, Bunce RGH, Burel F (2000). Hedgerows: an international perspective on their origin, function and management. *Journal of Environmental Management* 60: 7-22.
- Web Site of Terres & Bocages Association: <http://terresetbocages.org/>

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