

## NETHERLANDS

# Bioeconomy

### Location

Zwolle

### Programming period

2014 – 2020

### Priority

P2 – Competitiveness

### Measure

M16 - Cooperation

### Funding (EUR)

Total budget 278 456

EAFRD 143 728

National/Regional 143 728

### Project duration

2018-2021

### Project promoter\*

Natural Soil Improvement

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Using biomass residues to produce a fertiliser, which is then used to grow trees, and will, over time, improve soil quality, has led to significant financial savings for nature conservation organisations and tree nurseries.

## Summary

Brickz is a fertiliser in block form, made from local and regional biomass materials (river sediment, turf and grass clippings), which are naturally rich in organic matter and spore elements. It is actively enriched with healthy soil fungi, mycorrhiza and nematodes which help to make Brickz a sustainable alternative to artificial fertilisers. Brickz also helps store carbon for decades, because residue material is used by trees.



The objective of this EIP-AGRI Operational Group is to create a new cooperation between nature conservation organisations and tree nurseries. Previously, nature conservation organisations only purchased trees from tree nurseries. Now they also deliver them material for natural soil improvement. By avoiding disposal costs (typically EUR 50 per tonne) the organisations save money which can be used for other conservation purposes. In turn, nature conservation organisations then buy trees from tree nurseries that have used Brickz, and in this way create a closed nutrient circle.

## Results

By avoiding biomass disposal costs, nature conservation organisations have saved approximately EUR 2 000 000 over the past two years.

Brickz are now being manufactured and sold for EUR 200 per tonne. Considerable growth across The Netherlands is anticipated.

The use of Brickz will lead to higher yields for tree nurseries, partly because fewer trees will die due to the May-beetle grub.

## Lessons and recommendations:

- ❑ The Operational Group project sought to create a product with a positive economic value for tree nurseries. It was necessary to prove that trees grown with Brickz would grow faster. During discussions with tree nurserymen it was clear that they wanted a fertiliser that would fight biological predators. Therefore, nematodes were added to Brickz to fight pests such as the Yew Beetle.
- ❑ The timing of the product's availability is essential because tree nurserymen can only apply fertiliser when they plant (early Spring and Autumn) and the residue materials are supplied between May and September.
- ❑ Logistics are also an important element. Tree nurseries and natural conservation areas are rarely close neighbours, so transport costs for biomass material and the end product need to be factored into the planning.

\* The Project promoter/beneficiary is an EIP-AGRI Operational Group (<https://ec.europa.eu/eip/agriculture/en>)

## Context

The fertility of many soils has declined rapidly in recent decades. This is partly due to a misconception that an artificial fertiliser would ensure the complete fertilisation of the soil. This has not been the case and in fact soil organic matters, minerals and nutrients - present in widely available material elsewhere in the Netherlands, specifically in river and stream deposits and clippings from roadside mowing- have decreased.

Every year, rivers and streams deposit many cubic metres of sediment which have a similar composition quality to the sediment that make up the Dutch soils. Hectares of wet nature areas and kilometres of roadside are mown.

In general, both these flows of biomass are treated as waste flows and nature conservation organisations have to pay to dispose of them (EUR 50 per tonne). Using this biomass to make Brickz could potentially save more than EUR 30 million per year in disposal costs.

Together with a decline in soil fertility, another driver for the project was the desire to restore ecosystems based in Natura 2000 areas. The cost of restoring ecosystems, such as heather and sand dunes, is significant. An ongoing discussion in the Netherlands on the necessity of re-creating treeless historical ecosystems can conflict with the need to plant trees to store carbon.

The new Brickz production chain means that the wood of trees felled to restore treeless historical ecosystems can be collected for free and used for making Brickz. This saves costs for nature conservation organisations and helps trees grow faster, which means that more carbon is stored in a shorter period. Nature conservation organisations can then buy the trees from the tree nurseries to use them in areas for reforestation, creating a closed nutrient cycle.

## Objectives

By launching an innovative fertiliser on the market and setting up a new regional chain of producers and customers, the project aims to:

- Help reverse the decline in soil quality across agricultural soils and forests in the Province of Overijssel.
- Improve the water retention capacity of soils and thereby reduce the impact of drought on their production capacity.

- Reduce the leaching of nitrates and lower pesticide use through healthier soil life.
- Create value out of river sediment, turf and grass clippings and therefore create savings for nature conservation organisations.
- Prove that trees that grow on Brickz grow faster than trees that are grown in other ways.
- Reduce the transport costs of fertilisers and residue biomass materials by forming new local partnerships between suppliers and purchasers.

## Activities

The Operational Group partners during the whole project were:

- Nature conservation organisations (suppliers of biomass and purchasers of trees);
- Triple E, a research organisation, which developed the Brickz concept (natural soil improvement);
- Tree nurseries (customers of Brickz, producers of trees);
- Consultants (developers of business cases, coordinators of field experiments); and
- Research institutions (coordinators of field experiments, independent reviewers of growth measurements).

The project has four phases with associated activities.

### Phase 1: Exploration (October 2018 – May 2019)

Carrying out research in two areas of Overijssel province to find out the needs of the agricultural and forestry sectors in terms of fertilisers, including the preferred shape, transport requirements and shelf life of a product. This phase also included research to find out the quantities of river sediment, turf and grass clippings available (both current and future volumes). Making an inventory of all the residual materials concerned with nature conservation in the province of Overijssel was not straightforward and nature conservation organisations did not know how residual biomass materials were re-used.

### Phase 2: Determining the Brickz range (May 2019- September 2019)

This phase involved establishing the composition of a number of Brickz variants, tailored to agricultural needs. Important characteristics are mineral composition, organic matter content, chemistry and soil life. It also involved exploring the viability of a Brickz mobile production unit.

### Phase 3: Testing phase (May 2019 – December 2020)

This phase involved producing at least three Brickz variants, and monitoring the effects on crop production, soil and soil life over an area of at least 50 hectares. These results are now published and customers given the opportunity to 'build' their tailor-made Brickz.

### Phase 4: Developing a Business Plan (December 2020 – April 2021)

This phase, which is still ongoing, involves developing a business plan and establishing local and regional agreements for Brickz production, sale and use. It includes the delivery of a concluding symposium where agreements of intent between suppliers and purchasers will be signed. The Operational Group will match supply and demand, and production will be scaled up and new production facilities developed and/or acquired.

## Main results

A new, innovative product has been developed, and a European patent has been requested and granted for Brickz.

Through the avoidance of biomass disposal costs, nature conservation organisations have saved approximately EUR 2 000 000 over the past two years.

Brickz are being sold for EUR 200 per tonne. The use of Brickz, which can be easily stored with no reduction in product quality, leads to higher yields for tree nurseries, partly because fewer trees die due to the May-beetle grub.

Over the coming years, and as part of the fourth and ongoing phase of the Operational Group work, a small network of Brickz processors ('Fytorefineries') in the Netherlands will be developed.



## Key lessons

The project will lead to a new production chain with new stakeholders. This should lead to other spin-offs and cooperation in the future. The project has been discussed twice on national radio which has led to contacts from parties in other parts of the country, as well as the development of new projects with the same focus, e.g. in the province of Brabant.

The project highlights the importance of a circular economy, with mutual benefits for the main partners, namely tree nurseries and nature conservation organisations. The project also assists other EU objectives and policies related to the achievement of climatic and conservation goals. Brickz can be used more widely than in tree production. Other forms of agriculture could benefit from new forms of Brickz in their transition to a more sustainable footing. For example, the Operational Group is currently working on a Brickz product for hops. Producing Brickz can be part of sustainable agriculture, social revitalisation and reforestation initiatives elsewhere in the EU.

### Additional sources of information

[www.tripleee.nl/product/brickz/](http://www.tripleee.nl/product/brickz/)

\*This project has been categorised under 'Bioeconomy' by the nominating National Rural Network