

Assignment internship Agroforestry or Soil Sciences

Living Lab Biobased Brazil

The Living Lab Biobased Brazil is a transnational Living Lab in the field of Biobased Economy, created in 2014 by a consortium of Dutch Universities of Applied Sciences in collaboration with several Brazilian universities. The Living Lab helps students with internships and graduation projects in the Netherlands with the focus on Biobased Economy. We also help students finding accommodation, and offer buddy support and some events.

For more information please see www.biobasedbrazil.org and www.biobasedbrazil.org/student/the-netherlands/ or ask the International Office of your university.

University of Applied Sciences information:

The universities of applied sciences (in Dutch: 'hogescholen') offer programs that focus on the practical application of arts and sciences.

Getting practical work experience through internships is an important part of the professional study programs offered at these institutions. The largest universities of applied sciences enroll 20,000 to 40,000 students. Altogether some 446,000 students are enrolled on professional programs. University of Applied Sciences have also research groups. This groups do applied research and they are so called professorships. This internship assignment is within one of the associate professorships.

Van Hall Larenstein University of Applied Sciences information:

Welcome to Van Hall Larenstein, the most sustainable University of Applied Sciences in the Netherlands. We train high-quality, ambitious and innovative professionals who contribute to a more sustainable world. The curricula of Van Hall Larenstein focus on the domains Delta Areas and Resources - Food and Dairy - Animal and Business. Alongside Bachelor programmes, we also provide Master's programmes, Certificate programmes and short courses for regional, national and international students. As a university of applied sciences, we conduct high-quality practice-based research which enhances both our teaching and our position as a research institute.

Our educational programme is competence based. This means that, right from the start, you will be in close contact with professional life and practice. Supported by our teaching staff, you will work on your competences in a range of projects relating to applied research and practical internships. That is why choosing Van Hall Larenstein means choosing a professional education, which you apply in real life!

At Van Hall Larenstein you will study in an inspiring international environment. You will work together with students from different countries and you will develop a network of friends and colleagues from all over the world. Thanks to our internationally oriented curriculum, you will be trained to develop a sharp focus on international practice. Van Hall Larenstein has over 4000 students and is home to over forty different nationalities. You will have various opportunities to operate in an international context - not just in programme-specific projects, but also in your work placement and thesis. At Van Hall Larenstein we provide students with opportunities for international educational exchange and professional development.

Van Hall Larenstein is based on two locations in the Netherlands: Leeuwarden and Velp.

Main research topic:

Towards circular economy in the Dutch agriculture: the role of Agroforestry.

General background:

In the line of circular food systems, an integrated nature-inclusive circular farming approach is needed in order to develop a feasible resource-efficient and sustainable business models that bring shared value into the food chain while invigorating the rural areas. This integrated farming must ensure that:

- a. The natural resources from which the raw materials are obtained remain in good condition (e.g., soil, water, biodiversity), increase the use of renewable natural resources, such as biomass not only for food production but also for other uses such as biobased energy, efficiently use mineral resources such as nitrogen, phosphate and trace elements.
- b. Optimises the use of food by preventing and utilising waste and residue streams.

Agroforestry is an example of an integrated nature-inclusive circular farming. It is a multifunctional system that diversifies and adapts the production while reducing the carbon footprint and minimizing the management efforts and input costs; where trees, crops and/or livestock open business opportunities in the food value chains as well as in the waste stream chains (see figure 3 for examples in Europe). Agroforestry systems take into consideration the role of diversity as a characteristic of a resilient and productive system. Therefore, agroforestry can play a key role in: (a) closing loops (circularity), (b) creating short value chains, (c) generating nature-based entrepreneurship, (d) strengthening local markets, (e) generating socially acceptable landscapes.

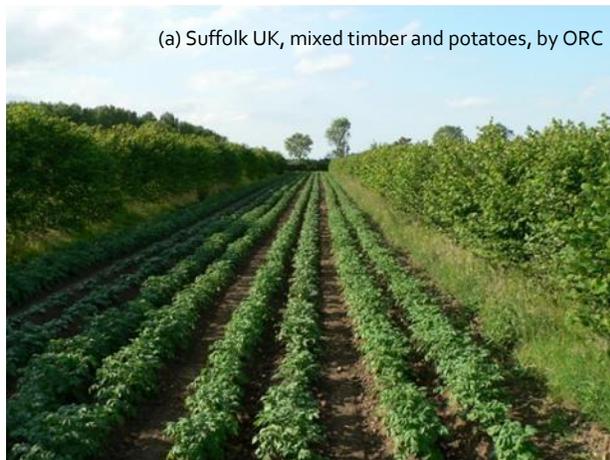


Figure 3. Examples of agroforestry systems in Europe.

Agroforestry also plays an important role in creating a circular economy (see figure 4). For example, it makes a sustainable management of resources by using nitrogen fixing trees that can build up soil health and increase crop production. The roots of the trees can slow down soil erosion, and thanks to the trees, birds return to feed off insects thereby reducing the use of chemical pesticides. It also reduces waste by recycling wastes into productive agricultural use. For example, the proportion of chemical fertilisers in agriculture could be minimised or simply not utilised by increasing the volume of nutrients created by biological processes that can be stimulated by good farming practices. Additionally, agroforestry optimises residual streams by providing biobased organic waste flow materials such as solid biomass (e.g., lignocellulosic waste) and other agroforestry primary residues (e.g. manure, straw, crop residues).

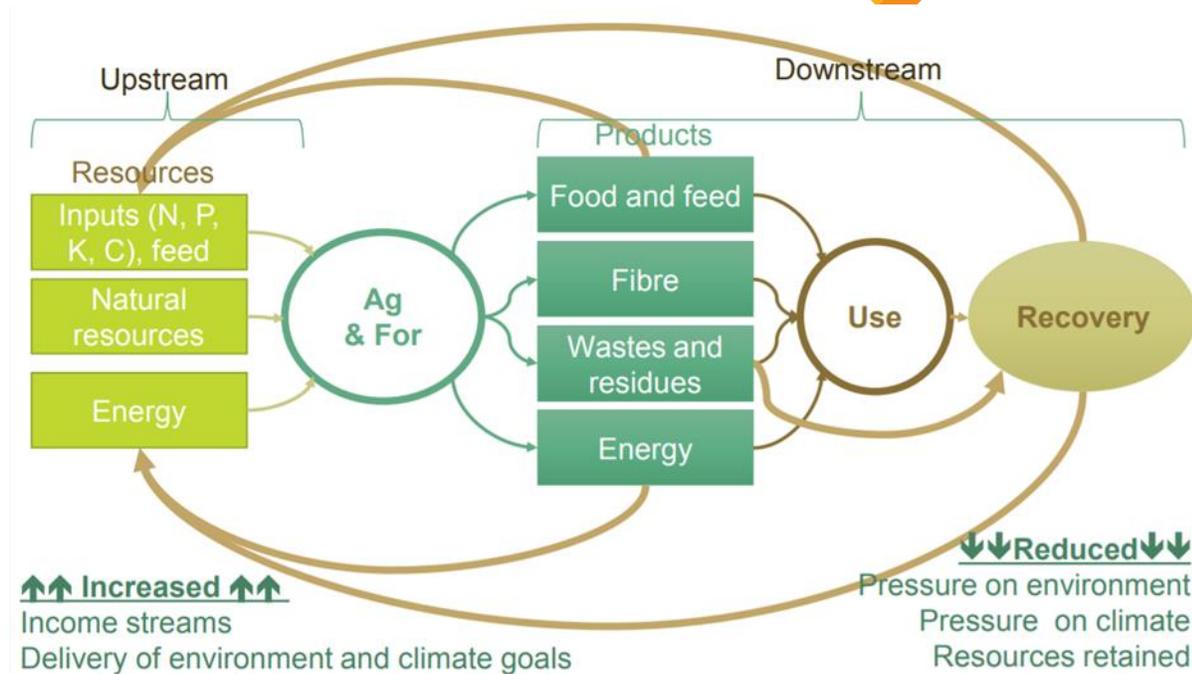


Figure 4. Agroforestry potential in the circular economy (Modified from: Allen 2015). Abbreviations: Ag = Agroforestry, For = Forestry

Goal of internship:

The goal of the internship is the production of quantitatively data over the contribution of agroforestry for climate adaptation and circularity in the Dutch. Students will conduct the baseline measurements that will lead to a two-year monitoring of new agroforestry systems in three Dutch farms. Depending on academic background students can choose one of the following themes:

1. Soil quality
2. Water quality
3. Soil fauna
4. Mycorrhizae
5. Aboveground biodiversity
6. Biomass

Biodiversity Inventory. Soil life biodiversity is already included under C1-2. This sub-action is about inventory of flora, mammals, birds, insects, fungi and amphibians/reptiles. Students and teacher-researchers walk so called 'hour blocks' to identify species and numbers.

Activities:

The Project involves:

- Soil quality. This theme involves the sampling and assessing abiotic variables (e.g., Soil Condition Score, Organic Matter, Bulk density, Porosity, Aggregate stability, Saturated hydraulic conductivity at soil surface (0-5 cm layer), Hot water extractable organic carbon, Particulate organic matter, Total Organic carbon, Total Nitrogen, Soil pH (H₂O/KCl), Cation Exchange



Capacity, exchange bases, Percentage base saturation (%), Extractable Phosphorus and Potassium, Extractable micro-nutrient cation).

- Water quality. Sampling and assessing chemical quality (e.g. cadmium)
- Soil fauna. Sampling, identifying and assessing Meso-biology (worms, insects, etc), Micro-biology (fungi, bacteria, mycorrhizae). For this theme students may choose to sample and assess one or more taxonomic groups.
- Mycorrhizae. Sampling and assessing indicator species of mycorrhizae
- Biodiversity. Depending on skills, background and interest students can choose one of the following taxonomic group: birds, carabid beetles, dwelling spiders, reptiles, amphibians, flora, fungi.

Final product

The student will contribute to the European Union project Farming the Future – Building Rural Networks for Climate-Adaptive Agriculture with code LIFE17 CCA/NL/000093 (acronym FARM LIFE), all results and assessments from each internship will be written as one partial report. Students will be given instruction on how to report. Possibilities for study publication are open depending on ambitions and skills.

Starting date

January 2019. The length of the assignment is approximately 5 months (20 weeks). The student who will execute the assignment get unfortunately no internship fee.

The intern will be part of a research team lead by the Professor Eurídice Leyequién, depending on topic other supervisor(s) will provide advice and supervision. All students will be working in teams together with Dutch students.

Desirable skills/qualities of the student

The student should be able to carry out independent field and laboratory research. The preferred background depends on the chosen topic (e.g., soil sciences), but good skills for field research are needed, and if a taxonomic group is chosen, proved experience is compulsory. We also would love to receive passionate students that are disciplined and systematic.

Good knowledge of the English language is required. We have set minimum language requirements for foreign students. The minimum English language prerequisite is: an academic IELTS test (or equivalent*) with an overall band score of at least 6.0. As a foreign student you must provide evidence of your language competences in the form of an official certificate: IELTS, TOEFL, TOEIC or Cambridge ESOL. It is your responsibility to ensure that you meet these requirements. **Please see the requirements on the webpage.**

Information of the company:

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Interested?

Please see the procedure at <https://www.biobasedbrazil.org/student/the-netherlands/>. Please be aware that the process stated at the above mentioned link applies.

PLEASE CONTACT FOR ADDITIONAL INFORMATION THE INTERNATIONAL OFFICE OF UFMG, UFV, UFSJ, UFOP OR PUC MINAS