

COURSE REPORT

Agroforestry Planning

November 7–8, 2023
Eunápolis, Bahia, Brazil

A field course organized by:

- The Environmental Leadership & Training Initiative (ELTI), Yale School of the Environment
- Instituto de Pesquisas Ecológicas (Institute for Ecological Research [IPÊ])
- Projeto de Desenvolvimento Socioambiental para Agricultura Familiar do Núcleo de Estudos em Agroecologia e Produção Orgânica Pau-Brasil, Universidade Federal do Sul da Bahia (Socio-Environmental Development for Family Farming Project [DSAF] at the Pau-Brasil Center for Studies in Agroecology and Organic Production [NEA-PB], Federal University of Southern Bahia [UFSB])
- Instituto Fotossíntese (Photosynthesis Institute)



Course participants conduct a planting activity.

Background: The landscape of southern Bahia encompasses vast areas of eucalyptus plantations, livestock pasture, fruit and vegetable farms, coffee and cocoa plantations, and a variety of agroforestry systems interspersed with remnant patches of native forest. In this area, numerous rural communities have been established through the subdivision of large estates, including through agrarian reform, land purchases with rural land credit, and purchase agreements with forestry companies.

Encouraged by conservation organizations and universities as a strategy for both environmental and financial sustainability, the adoption of management practices integrating biodiversity is gaining traction.

ELTI is an initiative of:

Yale SCHOOL OF THE ENVIRONMENT
The Forest School



Erica Munaro

Course participants receive instructions for a practical course activity.

Crop intensification, the incorporation of high-profit crops, community processing, and integration into local production chains are also strategies for contributing to increased income and production of diversified food for family consumption. The anticipated positive environmental outcomes resulting from the proliferation of these practices include enhanced structural connectivity, improved soil quality, restoration of Legal Reserves, reduced pesticide use, and the preservation of regenerating forest fragments capable of providing numerous other environmental services. The development of more biodiverse systems is most prevalent among small rural properties where the landowners are aiming for optimal land utilization. Other communities, however, need to be encouraged to adopt these practices.

This course took place at the Nova Vitória Association Farm, situated along the BA 683 highway in the João de Tiba River basin, in the municipality of Eunápolis, Bahia. The local community in Eunápolis has been supported since 2019 by the Socio-Environmental Development for Family Farming Project (DSAF), a research and extension project of the Pau-Brasil Center for Studies in Agroecology and Organic Production (NEA-PB) at the Federal University of Southern Bahia (UFSB). Recently, the Photosynthesis Institute joined the DSAF project as an executive body to facilitate the implementation of the project, which focuses on research in agroecology, seedling production, and a pilot project on the essential oils production chain. The Institute for Ecological Research (IPÊ)-ELTI initiative is collaborating with these partners to enhance the results achieved so far, while benefiting from the project's onsite experiences to develop a training landscape in southern Bahia.

Course objectives: The overall goal for the field course was to offer productive planning tools to small farmers, particularly those settled in land reform areas of Eunápolis, so they could consider implementing biodiverse and agroecological production systems, which would increase landscape connectivity.



Hands-on green manure planting activity.



Course participants discuss the importance of planting and seedling production planning.



Production of bio-inputs (effective microorganisms) to enhance agroforestry productivity.

Course content: The course consisted of the following three modules:

Module 1: Agroforestry Systems (AFS) Concept: Theoretical approach to fundamental concepts

Module 2: Benefits of AFS: Economic, environmental, and productive aspects

Module 3: AFS Planning: The importance of soil analysis, initial system objectives, typologies, species selection (native, fruit-bearing, timber, oil-producing, agricultural, fertilization, etc.), definition of economically significant species, area measurement, collective practice of new productive system designs, system sketching, implementation planning (planting time, planting schedule, labor, maintenance, soil and plant management, fertilization, pest and disease control), and financial planning (costs and revenues)

Throughout the course, participatory methodologies were used, encouraging participants to reflect on the importance of planning before implementing agroforestry systems and to create plans for their own plots based on practical experience at the Nova Vitória Association Farm.

Course format: The course took place over two days. The first day of the course was held at the plot of Patrícia Amorim do Santos and Jardson de Oliveira Manguiera, a family of farmer promoters who have been developing a diverse agroforestry system for the past three years focused on vegetable production and are aiming to expand their productive area. The second day of the course took place at the plot of Maria Nogueira de Souza and Valdeny dos Santos Prado, where the DSAF project has a research unit/nursery for melaleuca (*Melaleuca alternifolia*) propagation (a flagship element for essential oil production) mixed with legumes that are used for groundcover, fertilization, and seed production.



Erica Munaro

Course participant planting a Pitanga seedling (*Eugenia uniflora*).



Erica Munaro

Explanation before the practical planting activity of arrowroot (*Maranta arundinacea*).

Day 1

The first day began with breakfast and an opening session in which coexistence agreements were established and participants introduced themselves. João Pedro Fernandes Lenz (DSAF), Lucas Peranovich e Lima (DSAF and Photosynthesis Institute), and Isabela Guedes (DSAF and Photosynthesis Institute) were the instructors.

In the morning, the instructors led a discussion of agroforestry system (AFS) concepts and benefits, followed by a guided walk through the plot. This was an opportunity for participants to observe and reflect on the landscape and its potential. The group then focused on AFS planning, which included analyzing the landscape and environmental suitability of the property as well as measuring the planting area.

After lunch, the focus shifted to practical planning. The instructors guided participants through soil analysis and the establishment of AFS goals. Together, they selected species and prepared a planting sketch that outlined the structure of the proposed system. The day concluded with coffee and a group discussion to consolidate the day's learning.

Day 2

The second day began with a walk through the plot, led by the instructors, to discuss the implementation of the melaleuca-based AFS. The discussion included considerations for spacing, plant distribution, and optimizing sunlight and soil use. To put the concepts into practice, the participants engaged in a planting activity, establishing four rows intermixing pitanga (*Eugenia uniflora*), pimenta-de-macaco (*Xylopia aromatica*),



Mr. Valdeny Prado and Ms. Maria Souza's property with melaleuca and pigeon peas.



Hands-on seedling planting activity.

and tea tree (*Melaleuca alternifolia*) as essential oil producers. Arrowroot and corn were also planted for food security and nutrition alongside green manure species such as pigeon pea (*Cajanus cajan*) and jack bean (*Canavalia ensiformis*). These mixed planting rows integrating melaleuca and other native species were designed to enhance biodiversity and productivity while benefiting from pollinators present in the adjacent Permanent Preservation Area.

In the late morning, the instructors facilitated discussions on AFS implementation planning, covering topics such as planting schedules, labor, maintenance, soil and plant management, fertilization, and pest and disease control. A workshop on effective microorganisms followed, providing participants with practical knowledge and tools for soil enhancement.

After lunch, participants engaged in a roundtable discussion to reflect on the potential formation of production and marketing networks. This session allowed them to consider the broader economic and social implications of their work. The day concluded with coffee and a final reflection summarizing key takeaways and next steps.

On September 6, Ristiyana led a field practice on carbon inventory in mangrove forests in Kendari. Stakeholders from Southeast Sulawesi engaged in hands-on activities, including building sample plots, identifying mangrove species, measuring tree volume, collecting soil samples, and recording data in tally sheets. This field practice provided practical experience and skills essential for conducting accurate carbon inventories in mangrove ecosystems, contributing to improved management and conservation efforts.



Course participants and organizing team.

Participants : The course was attended by farmers affiliated with the Nova Vitória Association, Maravilha Association, Produzir Association, and Irmã Dorothy Stang Association, all of which are beneficiaries of the DSAF project. An agricultural analyst from the Associação Baiana das Empresas de Base Florestal (Bahian Association of Forest-Based Companies) along with four students from UFSB also attended.

Maria Otávia Crepaldi (Brazil program coordinator, ELTI), Mabel Ludka (Brazil program assistant, ELTI), Erica Munaro (associate researcher, IPÊ), Gabriela Narezi (DSAF), Lima, and Ryu Okada (Photosynthesis Institute) organized the course. Sabrina Weber (Brazil program administrator, ELTI) provided administrative and logistical support. Munaro also contributed to course facilitation and moderation.

Outcomes and follow-up: In the end-of-course survey, 13 participants rated the overall course experience and educational content 4.85 out of 5. As a result of the course, the two families who made their areas available for the event will receive technical and financial support to develop their projects. This support is made possible through the IPÊ-ELTI Leadership Program with the collaboration of the Photosynthesis Institute and the NEA-PB at UFSB. All participants received arrowroot (a nutrient-rich tuber) propagules and seeds for green manure.

This event was possible thanks to Arcadia Fund, whose Environmental Conservation grants support programmes that protect and enhance biodiversity, and provide field training and academic research.