Eberswalde University for Sustainable Development

Bridging Technology and Trust: Drones, Data, and Community-Driven Ecological Restoration in Wales

Research Project Plan for **Project Design & Management**

Supervisor:

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Project Introduction

Wales has only 15% woodland cover and low rates of afforestation. This research project addresses the need for transparent monitoring approaches to evaluate community-led restoration efforts. Working with Stump Up For Trees (SUFT) in Abergavenny, it explores how visual and data-driven storytelling can communicate ecological progress and community involvement to funders, volunteers, and policymakers.

WHY?

Two main reasons: First, community-led tree planting initiatives often lack accessible evidence of their ecological and social impacts. This limits accountability and transparency towards stakeholders. Second, there is insufficient integration of spatial monitoring technologies with story-telling that can foster stakeholder trust and long-term funding engagement.

WHAT?

The project will produce an interactive ArcGIS StoryMap showcasing the ecological survival and growth of newly planted trees complemented by stories captured during interviews. Key outputs include a georeferenced dataset of at least 1,000 planted trees validated through ground-truthing and qualitative interview transcripts documenting community experiences. This integrated approach aims to demonstrate the effectiveness of participatory GIS tools in monitoring ecological restoration while simultaneously strengthening community ownership and awareness.

HOW?

Drone surveys will capture imagery to map trees on different planting sites. Qualitative data collection through semi-structured interviews, participant observation, or photovoice will document volunteer motivations, experiences, and perceived impacts of their involvement in tree planting. These datasets will be elaborated through an ArcGIS StoryMap platform that layers spatial data with narrative content, creating a multimedia communication space.

WHEN?

The project spans 24 weeks. Weeks 1–6 focus on preparation activities including site selection, equipment procurement and testing, and literature review of comparable reforestation monitoring projects. Weeks 7–14 comprise intensive fieldwork, encompassing drone surveys, ecological assessments, spatial data processing, and qualitative data collection through interviews and photovoice sessions. Weeks 15–20 are dedicated to story map design, data integration, and deployment of the digital platform. Weeks 20–23 involve project write-up, evalua-

tion of stakeholder engagement, and internal review. Week 24 marks the submission of the final report and completion of deliverables.

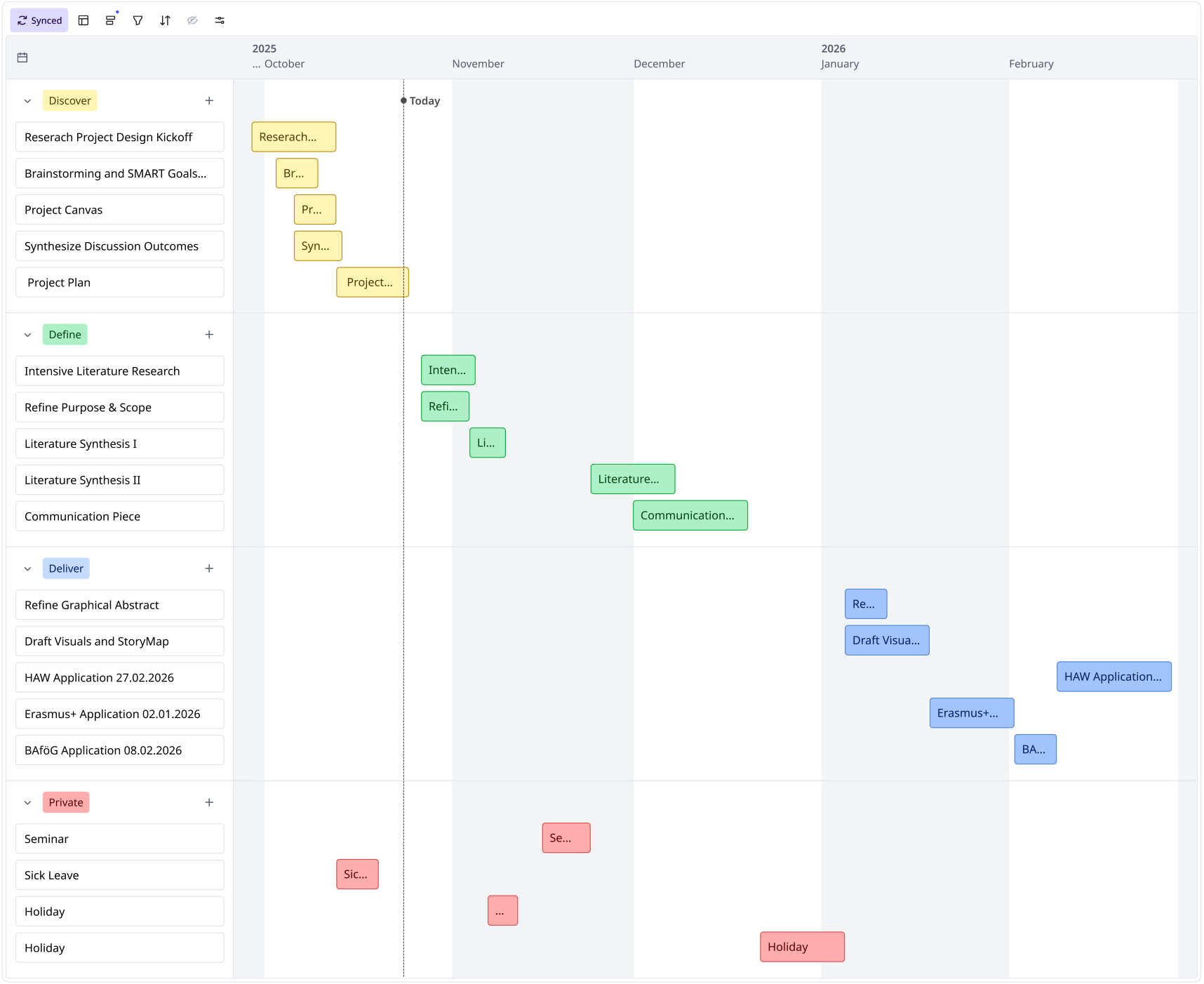
WHERE?

The primary study area is the Bryn Arw tree planting site in South Wales, selected in collaboration with Stomp Up For Trees. The site provides access to recently planted native broadleaf species and opportunities for volunteer engagement.

WHO?

Stomp Up For Trees as the primary community organization leading tree planting activities. Other possible institutions are Coed Cadw (Woodland Trust Wales), UK Forest Research, Bangor University, Resources Wales and the Centre for Alternative Technology. Volunteers participating in tree planting campaigns for data collection and a co-design processes for the digital story map. Academic support is provided with Eberswalde University for Sustainable Development.

Design Timeline



Project Canvas

GIS-based digital story map

communicating ecological and social impact of tree planting campaing

UAV survey for geo-referenced mapping and qualitative storytelling

Goals

Short-term Goal (1 months)
By Week 4, prepare for field and UAV data collection at Bryn Arw by finalizing site selection, securing UAV and GPS equipment, and conducting a literature review of similar reforestation monitoring projects, ensuring readiness for baseline surveys.

Mid-term Goal (1–2 months)
By Week 10, complete field and UAV data collection to assess tree survival and early growth at Bryn Arw, producing a georeferenced dataset of at least 1,000 planted trees and validating 10% through ground-truthing, and simultaneously collect volunteer narratives through at least 15 interviews and 30 photovoice images.

Long-term Goal (End of Project)
By Week 14, deliver an integrated GIS-based story map combining ecological monitoring data and volunteer narratives, and evaluate its impact on stakeholder engagement by collecting pre/post feedback from at least 20 participants, including results in the final project report.

Research questions

How can GIS-based digital story mapping effectively communicate the ecological and social impact of community-led tree planting initiatives in South Wales, UK?

~~What are the key factors influencing successful restoration outcomes?~~

How effective is drone-based monitoring in capturing the survival and growth of newly planted trees in South Wales?

How can GIS-based story maps combine ecological monitoring and community narratives to visualize the social-ecological impact of tree planting in South Wales?

Stakeholders/actors and partners

Stomp Up For Trees

Coed Cadw (Woodland Trust Wales)

UK Forest Research (technical expertise)

Bangor University's forestry/land-use research

NRW (Natural Resources Wales)

CAT (Centre for Alternative Technology)

Activities

Data Collection & Ecological Monitoring
drone surveys, tree survival/growth, mapping

Social Research
interviews, volunteer engagement surveys

Integration & Communicatio
GIS story map design, combining data + stories

Impacts

SUFT:
communication with funders & communities

Volunteers:
increased ownership and awareness of reforestation.

Academia:
A pilot model for linking ecological + social monitoring in reforestation.

Policy:
Demonstrates role of participatory GIS in Wales' climate/forest policy.

Network:
linking HNEE, CAT/Bangor University

Context

Product Manager

Head of B2B online

Head of Marketing

Head of Product

Needs

Field Equipment: Drone, measuring tools

~~Computer and Software~~
done

~~Car~~
done

Office

Supervisor and project partner
urgent

Resources

Scholarships (PROMOS, HAW.International, ERASMUS, Leonardo)

BAföG

Outputs

Digital story map

Report

Dataset of mapped trees

Interview feedback dataset

Master's Thesis

Risks

Ecological:
Seedlings too small for UAV detection → mitigate by mapping planting rows + ground-truthing

Social:
Volunteer fatigue / low engagement → mitigate by co-designing story map with them.

Time:
Bad weather for drone flights → build time buffer.

Milestones

Week 2–4:
Site selection finalized, UAV and GPS equipment tested, literature review completed.

Constraints

Scope

Create a GIS-based StoryMap that visualises SUFT's tree-planting progress in South Wales using drone imagery. Combine spatial analysis + volunteer narratives to promote transparency and community engagement.

3-month limited timeframe

Flights depend on weather

Equipment availability

Young seedlings maybe not detectable

Personal Reflection

Almost a month has passed since the start of the module. I enjoy looking back on the past weeks. I feel that my project has taken shape in a grounded and more realistic way. Through the course and peer sessions, I have been able to refine my idea into a concrete plan for a research project focused on community-led forest restoration supported by drone-technology in Wales.

Over the past four weeks, I have successfully completed brainstorming sessions, developed SMART goals, constructed a detailed project checklist canvas, and synthesized discussion outcomes with peers and potential partners. I am completing the **Discover Phase** of my project timeline, having finalized the project plan today on October 24, 2025. The next steps will focus on deepening the literature review, refining research questions, and securing funding to move the idea forward.

I have reached out to mentors and research partners including Stomp Up For Trees, UK Forest Research, Coed Cadw, and the Centre for Alternative Technology. While some initial conversations have been fruitful, several partners have not yet responded. This will **require a follow-up** in the coming days. Looking ahead, the immediate tasks involve deepening the literature review between October 27 and November 9, synthesizing findings into two phases (November 4–9 and November 24–December 7), and preparing communication outputs including a graphical abstract by mid-December.

Three funding sources are avalable for me: the Erasmus+ scholarship (deadline February 1, 2026), BAföG (deadline February 8, 2026), and HAW.International (deadline February 27, 2026). These applications can help me to finance a potential specialization module at the Centre for Alternative Technology in Wales and, subsequently, the actual master's thesis research project beginning in summer 2026.

What Worked and What Was Challenging

A key take-away was the hands-on structure of the course. The step-by-step build-up gave me a real feeling of progression. Each exercise linked to the next and helped me to form the initial idea into this project plan. Most surprisingly the **use of pen and paper** was the most effective way of sketching, mapping, and visualizing ideas physically or just actually taking notes. It slowed down my thinking in a good way and gave space for creativity while feeling more intuitive than the Miro board.

Getting constant and instant reactions from others kept me from falling into a narrow inside view. It helped me see challenges more realistically and maintain perspective. Something that I easily tend to lose when immersed in a specific topic. In contrast, the internet sessions were more challenging: connection issues and shifting group attendance made it harder to stay focused and productive. Still, I think that these sessions offered valuable insights through peer feedback and discussions, even if not as dynamic as the in-person work.

Learning and Self-Development

The course delivered several critical insights that extend far beyond traditional academic training. First, working on this project plan helped me improve my time management, something that I have been emphasizing in therapy work balancing self-employed project contracting, academia and personal life. Hopefully I will be able to apply these lessons to what sometimes feels like a work-work-life-balance.

Second, the course helped me see challenges more realistically. Early brainstorming sessions revealed potential risks, such as young seedlings being undetectable by UAV, weather impacts for drone flights, and volunteer engagement fatigue, that I might have underestimated without structured risk assessment exercises. By articulating mitigation strategies (e.g., mapping planting rows, building time buffers, co-designing the story map with volunteers), with the help of my peers I was able to develop plans that help to keep the research project on track.

Third, I learned the importance of feedback loops. The constant exchange with peers prevented tunnel vision. It encouraged me to adapt earlier ideas multiple times and demonstrated that **project design is not linear**.

The Importance of Funding

Securing scholarships or other funding is of high importance to the success and viability of this research project and my academic career. These funding sources collectively cover living expenses, travel, equipment, and tuition for the planned specialization module. Without this financial support, the project would not be feasible. The scholarships enable me to dedicate focused time to research rather than diverting attention to freelance work during critical data collection periods. The alignment of application deadlines (January–February 2026) with the project timeline ensures that funding decisions will be confirmed before the planned thesis start in summer 2026.

Conclusion

As I move forward into the **Define Phase**, I carry with me a sense of clarity. This course has provided me with new ideas on how I approach uncertainty, manage competing demands, and engage with peers and partners. This reflection process has reinforced that **good research emerges through dialogue**. I like that. Thank you.

giants

rays of sun dance through the leaves
a play of light nature weaves
the wind blows soft
the wind blows strong
makes trees to sway along
the wind blows low
presenting a gentle show

once giants were standing loud
majestic, unique and proud
now old giants stand a few
but bannau and valley keep
memories of the welsh deep

what now lays bare
the future shall bear
seeds of hope
for you, him and her
plenty, vivid and young
stretching towards rays of the sun
and so a new story begun

Fabian Bona, 2022