**GVSU SAP Place-Based Project Grant Proposal**The Impact of Volunteer Tree Planting on Attitudes Toward Experiential Learning and Knowledge of Agriculture

**Section 1: Proposal Description and Abstract**

The purpose of this research project is to investigate student attitudes toward experiential learning. The subjects, recruited principally from sororities and fraternities on campus, will experience a tree planting event as treatment. Subjects will be briefed about the project twice, including on-site instruction. A mixed methods repeated measures design will include a questionnaire with both qualitative and quantitative components and will be administered before and after the treatment.

Serving as a subsequent model for commercial growers and home gardeners in the bioregion, subjects will plant trees on a 300 ft. x 200 ft. parcel of degraded land northwest of the current GVSU Wesley House. Once plant varieties and installation, management, and educational tools have been selected, tillage and cover crop seeding will prepare site soil. A quantitative instrument will be used to understand any change in attitudes toward experiential learning after the tree planting event. Qualitative methods will explore student attitudes toward and knowledge of plant varieties, water infiltration, system inputs, habitat creation, site productivity, and experiential learning in nature. As an additional resource, rudimentary research suggestions (Appendix) will be included to encourage future student- and faculty-led projects and other scholarly collaborations on the tree installation site.

**Section 2: Engagement of Undergraduate Students**

The project is oriented around students and their participation in planting the agricultural system. A late-Fall planting event, based on convenience sampling, will include sororities, fraternities, SAP volunteers and residents, and other on- and off- campus students. I, Cullin Flynn, will take the role of undergraduate researcher on the project, mentored by professor Amy McFarland and advised by farm manager Youssef Darwich regarding species selection and planting technicalities. The research has the potential for presentation at Student Scholars Day and subsequent publication.

Tasks include tree planting, tree guard installation and mulching. Future workshops, tours, and other educational events may address diverse forms of land stewardship, engaging diverse groups of students. Furthermore, the possibilities of undergraduate and postgraduate scholarship in subsequent years is endless. The project will include a publication of rudimentary research questions to encourage original research or curricular design. A straightforward management plan designed for SAP volunteers, residents and interns will also be included to encourage long-term stewardship of the agricultural system.

**Participant pool rationale**

The sample will be selected by convenience sampling. The GVSU sororities and fraternities will serve as our participant pool for two principal reasons that make their recruitment likely: the sheer size and locality of Greek Life organizations; and their role as active participants in the community, as expressed in their values and mission statement. Additional volunteer participants will also be sought and invited to participate, but with the large sampling of sorority and fraternity members, comparisons between the members of the Greek Life organizations and non-members will be necessary to ensure these are samples do not represent two distinct populations.

**Quantitative measurement**

This component of the study will utilize a questionnaire based on previously administrated and validated instruments. Instruments used to study student attitudes toward other pedagogical styles (such as service learning[[1]](#footnote-1)), including experiential learning in a classroom context[[2]](#footnote-2), will be adapted to study experiential learning. Cronbach’s reliability analysis will be conducted as well as factor analysis to ensure loading is consistent with expectation based on the previously published research.

**Qualitative measurement**

This component of methodology will be based upon a written responses to a free-response section of the questionnaire. As mentioned in the proposal, qualitative methods will explore student knowledge of sustainable agricultural concepts such as: plant varieties, water infiltration, system inputs, habitat creation, site productivity, and experiential learning in an informal, outdoor setting. Understanding these concepts is crucial to the optimality of an ecologically healthy agriculture. Furthermore, they may be taught and coded in metaphorical phrasing.[[3]](#footnote-3) A general inductive approach[[4]](#footnote-4) coupled with critical discourse analysis will help researchers to examine the effectiveness of salient metaphorical language at describing and teaching concepts in the free response section of the survey.[[5]](#footnote-5) This methodological approach will allow researchers to examine relationships between experiential learning and resulting conceptual shifts regarding student knowledge of various elements and systems in sustainable agriculture.

**Section 3: Budget: $3,500**

Given the seasonal demands of project implementation, coupled with delayed management pressures, the budget is divided into two phases.[[6]](#footnote-6)

PHASE 1, Planting (June-October): **$2,281**

* **Plants**

Selection of varieties will occur based on size and at least one of the following functional groups: productive capacity; ease of harvest and maintenance; companion, or guild, functionality; regional suitability; restorative potential; cultural uses; etc.

* + Large trees ($300)
		- **Pecans**, *Carya illinoinensis*

***R***: nut production ; native; companion (established: hickory, walnut). <http://hort.ufl.edu/database/documents/pdf/tree_fact_sheets/carilla.pdf>

Source: <https://newfarmsupply.com/collections/nut-trees/products/pecan-trees?variant=14386542660>

* + - **Hybrid Chestnuts**, *Castanea spp*.

***R***: nut production; companion (pecan). <http://naldc.nal.usda.gov/naldc/download.xhtml?id=IND79001346&content=PDF>

Source: <http://www.badgersett.com/plants/orderchestnuts.html>; or <https://newfarmsupply.com/collections/nut-trees/products/chinese-chestnut-trees?variant=1095685136>

* + Mid-size trees ($300)
		- **Persimmon**, *Diospyros virginiana L*.

***R***: adaptability; disease resistance; taproot erosion control; fruit production. <http://plants.usda.gov/plantguide/pdf/pg_divi5.pdf>

Source: <https://newfarmsupply.com/collections/frontpage/products/persimmon-trees>

* + - **Pawpaw**, *Asimina triloba*

***R***: productive capacity; site suitability (riverine). <https://www.uky.edu/Ag/CCD/introsheets/pawpaw.pdf>

Source: <https://newfarmsupply.com/collections/frontpage/products/pawpaw-trees>

* + Small trees/bushes/early succession species ($700)
		- **Hybrid Hazelnuts**, *Corylus avellana*

***R***: nut production; adaptability; erosion control. <http://www.badgersett.com/sites/default/files/info/publications/HH1.pdf>

Tree source: <http://www.badgersett.com/plants/orderhazels.html>

* + - **Seaberry**, *Hippophae rhamnoides*

***R***: fruit production; adaptability and resilience; erosion control. <http://uncommonfruit.cias.wisc.edu/seaberry-sea-buckthorn/>

(See discussion on invasiveness).

Tree source: N/A

* + - **Currants & Gooseberries**, *Ribes spp.*

***R***: fruit production; erosion control. <http://www.fruit.cornell.edu/mfruit/gooseberries.html>

Source: N/A

* + - **Raspberries & Blackberries**, *Rubus spp.*

***R***: fruit production; erosion control. <https://www.hort.purdue.edu/ext/HO-44.pdf>

Source: N/A

* + - **Hardy Kiwifruit**, *Actinidia arguta*

***R***: fruit production; erosion control; layer diversity. <http://www.fruit.cornell.edu/mfruit/kiwifruit.html>

Source: N/A

* + - **Annual rye**, *Lolium multiflorum*

***R***: ground cover; nitrogen scavenging. <http://covercrops.cals.cornell.edu/annual-ryegrass.php>

Source: N/A

* **Tree protectors** (100) = $170

***R***: increased rate of tree establishment

Source: <https://newfarmsupply.com/collections/tree-tubes/products/4-fiberglass-stakes?variant=1115268672PLANTS>

* **Paper mulch**: (4,000 ft. = 8 bundles of 48” x 500 ft.) = $751.60

***R***: increased rate of tree establishment

Source: <https://www.weedguardplus.com/products.php?cat=7>

* **Tree tags** (500) = $60.00

***R***: row management; documentation; harvest efficiency; education.

Source: <http://www.amleo.com/aluma-boss-double-faced-aluminum-tags/p/VP-OAT/>

* **Row stakes**: (20 rows: 40 stakes) = N/A

***R***: row management; documentation; harvest efficiency; education.

Source: N/A

PHASE 2, Maintenance (November-April): **$1,219**

* **BSC Sickle-bar attachment**: (1) = $1,219

***R***: row management; biomass and mulch production.[[7]](#footnote-7)

Source: <https://bcsamerica.com/product/sickle-bar-mower>

Species listed in the budget were initially listed with specific pricings. However, the SAP Farm Manager, who has ample experience with local tree nurseries and tree availability, advised a more general budget division based on plant size and function. This division pertains only to the Plants section, totaling $1,300. The specific plants selected were based on their adaptability to a permaculture type system, where harvesting can occur without soil depletion in a perennial system. The addition of rye, while it will not be harvested, will ensure the continuous building of a healthy soil profile through the addition of organic matter. The other items of phase one, totaling $981.60, have been selected to secure the healthy establishment of the plants. Once grasses and other vegetation appear in orchard alleyways, management becomes a concern, principally in the form of routine mowing and mulching. The BSC Sickle-bar attachment listed in phase two of the budget is the most economical way to do so. It provides trees with organic material by cutting vegetation between tree rows to be used as mulch.

**Section 4: Project Description and Timeline:**

1. **Alignment with SAP Mission**

The research about student attitudes toward sustainable agriculture will help promote the SAP as an integral educational opportunity that supports the core mission of the university, even in informal settings. The site design and patterns are based on ecological principles that encourage biodiversity, likewise animating a diverse human landscape and **healthy community**. The production of fruits, nuts, timber, and other ecosystem services are likely **sustainable practices**. Students may find **leadership opportunities** in the form of SAP events, volunteering, internships, and original research projects. As species adapt to the site, and as personal experiences and positive interactions among students, staff and faculty take root, an increased **sense of place** is anticipated.[[8]](#footnote-8)

1. **SAP community involvement in project design: consultation + collaboration**

The Wesley House will serve as a center for stakeholders where they can voice concerns for the proposed site layout. The undergraduate research has had extensive conversations with current interns about a perennial planting, including on-going consultation with Farm Manager Youssef Darwich and Academic Coordinator Dr. Amy McFarland, to permit any system elaboration throughout the life of the project. Other active SAP students and faculty, including those who frequented the site in the past, will also have the opportunity to voice their concerns via email.

A concise outline of consultations will increase the success of stakeholder activities, allowing students and faculty to add to the project. Additions must be in accordance with the SAP Mission Statement, and may occur immediately following tree planting and at anytime throughout the life of the agricultural system. Published opportunities for involvement—e.g. tree planting, mulching, soil inoculation events—will target students in residence halls, off-campus living centers, and the GVSU Community Service Learning Center. The tree planting will occur late in Fall semester and is expected to involve the most students.

1. **Positive impacts on SAP mechanics**
2. The project plans to restore and bring into production a 200 ft. x 300 ft. (1.3 acre) parcel northwest of the currently cultivated SAP property.
3. Full production is expected within seven years. Though the productive life-span of the initial project installation is estimated at **25-150 years**, increased soil form and tree replacements from on-site stock may permit a permanent agriculture.
4. **Required resources** include:
	1. Labor (planting; produce harvest, sanitization, transportation and resale; tree health and pest surveillance; row maintenance; etc.).
5. **Optional resources** include:
	1. Specialized internships (harvest, pruning, marketing, mulching, etc.).
	2. Pruning instruments.
	3. Infrastructure for amendments and additions to initial project.
6. All orchard profits from market will contribute to the SAP reinvestment fund. Harvest plans will develop as the trees come into fruition, likely based on an increased labor force in the form of SAP interns. Other **financial impacts** include new markets (Grand Rapids cider and dessert; Campus Dining; holiday sales; diversified CSAs; etc.) and increased donor visibility.
7. **Pest control** and prevention will be proactive and entirely organic. First responses include identifying pest(s) and life cycle(s), manual removal of infected tissues, and evaluation. The Farm Manager will determine acceptable injury levels. Other controls include hanging traps in recyclable containers; applying organic sprays to leaves to occupy disease entry points; and establishing habitat for beneficial predators.
8. Diverse pasture grown between tree rows, later mowed with the sickle-bar and piled for compost or mulch, will serve as **fertilization**. Mycorrhizal inoculations for increased nutrient cycling may also be a viable option.
9. The enhancement of **Student Experience** includes passive and active forms.
	1. **Social:**
		1. *Active*: research on volunteer opportunities via tree planting.
		2. *Passive*: increased community resources (events; food pantry contributions); social networking.
	2. **Educational**:
		1. *Active*: tours and workshops; research opportunities; diverse curricula.
		2. *Passive*: new learning networks; open access to site maps and plans.
	3. **Aesthetic**: designed infrastructure to encourage appreciation of ecological functionality; new spaces to create and showcase student art.
10. The project design is structured to permit both passive and active **site education**. Amaster document containing replicable data of the project and site design will be accessible to students and others in the Great Lakes region. Site postings, boundary labels, and tree identification tags may also contribute to educational experiences. Community programming—such as workshops on grafting, agriculture design, and tree planting techniques—will involve campus organizations, including Farm Club, Beekeeping Club, and Housing & Residence Life. Faculty and staff may tailor curricula to the project, stimulating outdoors and hands-on learning experiences.
11. **Timeline**
* **June**

*Research*: select scaled response instrument for survey; submit IRB proposal.

*Planting*: delineate site, seed cover crop.

* **July**

*Research*: document with photos, soil samples, etc.

*Planting*: research tree vendors and local genetic pools;

* **August**

*Research*: develop volunteer recruitment materials.

* **September**

*Research*: make contacts regarding volunteering.

*Planting*: stake out tree rows; install paper mulch, trees, tree guards; mow and mulch.

* **October**

*Research*: implement tree planting event

* **November**

*Planting*: compile management plan (pruning schedules, harvest windows, etc.)

**Appendix**

**Potential Research Question(s)[[9]](#footnote-9)**:

* What minimal energy inputs are required to convert monoculture land to perennial polyculture? \*There will be no “straightforward answer” here, as the range of intentions for agroforestry developments is nearly endless.
* What replicable patterns exist in perennial polycultures that can lend themselves to educational endeavors? In other words, can one get a better understanding of sustainable agroforestry design with a better understanding of the simple design metaphors involved? (i.e., the positive effects diversity in the human “landscape” is akin to the diversity promoted by perennial polycultures) I would expect draw much from *Metaphors We Live By* (Lakoff & Johnson, 1980) in answering this research question.
* How will student visibility of the SAP change with the installation of a perennial polyculture? Perhaps we could establish a baseline of data from Laker alumni and current students, especially the freshmen of 2016, in a longitudinal undertaking.
* In what ways will the currently depleted soils change after the installation of a fruit and nut polyculture? Variance in root systems could lead to controls and such: commercial clonal rootstock from Oregon vs. NRCS locally-sourced vs. self-sprouted.

**Bibliography**

Aguilar, O.M., T.M. Waliczek, & J.M. Zajicek. 2008. “Growing environmental stewards: The

overall effect of a school gardening program on environmental attitudes and environmental locus of control of different demographic groups of elementary school children.” *HortTechnology 18(2)*, 243-249.

Lackoff, G., & Johnson, M. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.

1. See: Waliczek, T.M. and Zajicek, J.M. 2010. “The benefits of integrating service teaching and learning techniques into an Undergraduate Horticulture Curriculum.” *HortTechnology (20),* 934-942. [↑](#footnote-ref-1)
2. See: Chavan, M. 2011. “Higher education students’ attitudes toward experiential learning in international business.” *Journal of Teaching in International Business (22),*126-143. [↑](#footnote-ref-2)
3. Using soils as an example, soil aggregates may be described as houses with rooms, small cities or, more generally, buildable structures. See: Lakoff, G. and Mark Johnson. 1980. “The metaphorical structure of the human conceptual system.” *Cognitive Science (4)*, 195-208. [↑](#footnote-ref-3)
4. See: Thomas, D.R. (2006). “A general inductive approach for analyzing qualitative evaluation data.” *American Journal of Evaluation (27)*, 237-246. [↑](#footnote-ref-4)
5. See: Musolff, A. 2012. “The study of metaphor as part of critical discourse analysis.” *Critical Discourse Studies (9)3*, 301 –310. [↑](#footnote-ref-5)
6. Though Phase 1 funding is necessary for the research project, Phase 2 may be delayed or funded elsewhere. [↑](#footnote-ref-6)
7. The sickle-bar attachment will be a crucial component to minimizing system inputs; easily creating mulch by chopping and piling crops between tree rows, it will essentially eliminate the need for irrigation. [↑](#footnote-ref-7)
8. Methodologies described in Section 1 Abstract will examine environmental locus of control. Aguilar et al. 2008 may serve as a model for research methodology. [↑](#footnote-ref-8)
9. A diverse array of research methodologies could be used to explore the following questions. [↑](#footnote-ref-9)