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Integrating Woody Biochar, Women, and Youth in Maine's Bioenergy Industry: Benefits and Challenges

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Abstract: Over 30% of Maine's forestry industry is made up of women, with women in the minority comprising a small part of this. Improving representation in this industry can serve as a way for more women to enter the industry, to the benefit of their own professional paths and addressing climate change. Here, we share an effective approach to increase the number of women in the bioenergy sector, with an example of programming that centers mentoring and targets women in underrepresented groups. We found that approximately 29% of women hold executive or leadership positions in Maine companies related to bioenergy. We also discuss current strategies for improving gender-diverse teams in the bioenergy industry and increasing women's presence in this industry. Presented as a case study, our training program had two goals: (1) a focus on the benefits of biochar and its importance in boosting Maine's economy and mitigating climate change; and (2) using gender-diverse teams to encourage the next generation of girls and young women. Research universities are well-positioned to offer similar programs, and thus play a critical role in increasing and retaining the number of young women in forestry, agricultural, renewable energy, sustainable materials, and technologies programs. Our experience illustrates that gender-diverse teams can lead to better collaboration, innovation, and teamwork in the bioenergy and agricultural industry. This is the dynamic environment that can foster the relationship-building and mentoring necessary to retain underrepresented groups in the industry.

Keywords: agriculture bioenergy; biochar; environment; women

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1. Background

The state of Maine has 89% forest cover, with lumber a crucial part of the economy since the early 1800's [1,2]. Today, forestry in the state includes sustainable management for materials, wildlife, and recreation. Women make up 38% of the forestry industry nationwide [3], with eight percent as Maine women licensed foresters (52 of 680) [4]. The women in this labor workforce have unequal access to the same opportunities and resources as their counterparts [5,6]. In the wood products industry, including biochar and bioenergy production, they have to navigate a predominately male workforce [7] and culture that traditionally prizes endurance, physical labor, and physical strength [8,9]. Women also tend to be compensated unequally and inequitably, which can result in a salary gap [10], even if their workload is the same or more. It is seen that about 33% to 39% of women hold key decision-making roles [8,11]. Being promoted to a leadership role can be a challenge for women due to these expectations. Based on the nature of the industrial work culture, women decide not to pursue or work for companies in forestry. Enrollment and retention of female students in the forestry-related majors in higher-educational institutions in North America tends to be low, as with female workforce supply to the industries and academia [4,12,13]. To support better retention in these areas would allow for a better-equipped workforce that can tackle a variety of challenges that climate change presents.

Research shows that gender-diverse teams of women changed the dynamic of the traditional masculinity leadership structure. Encouraging diverse gender is integral to

workforce development for the new and emerging technologies in the bioenergy industry. It fosters a more dynamic workplace, encouraging better collaboration and innovative solutions to scientific questions. An exhaustive study of women in STEM careers found that to an extent, women felt connected to colleagues and were able to contribute in flexible formal and informal collaborations that drew on their unique strengths; they were able to achieve some measure of professional success and satisfaction [14] and make more informed decisions, sustainable solutions, and financial decisions. Another study also revealed that collaborative problem solving, social connections with peers, and flexibility were critical to women's positive perception of the scientific enterprise [15].

Therefore, developing interdisciplinary learning activities beyond the classroom will be a likely effective approach to increase women's engagement, inspiration, and commitment to the bioenergy and biochar industry.

Here, we aim to explore and address the effective approaches that encourage gender-diverse teams and environments. We developed a strategy for engaging women in the bioenergy industry of the State of Maine in the United States to enhance gender diversity, applied it in a university-sponsored interdisciplinary research project in summer 2021, and discuss the outcomes of this project. Our program specifically focused on biochar as a mechanistic example for the bioenergy industry, but we believe these practices could be applied to the wood products industry and forestry more broadly to address gender inequity.

2. Methodology

We started by conducting a public data survey to investigate gender differences in bioenergy, wood products manufacturing plants, forestry, and agriculture sectors. Relevant information was collected from companies' webpages and by interview via email. Having statistically analyzed results, we developed strategies to reduce the differences and carried out a case study to foster women and youth in bioenergy. A Strength, Weaknesses, Opportunities, and Threats analysis (also known as S.W.O.T matrix) was conducted through a self-evaluation to help us identify those related to the strategical approaches developed and lessons learned from the case study. Lastly, we share a gender integration and youth workforce development roadmap for Maine's bioenergy industry and higher education institutes as a long-term goal.

3. Results and Discussion

3.1. Survey of Current Biochar Production and Agricultural and Environmental Applications in Maine and Gender Dimension

Biochar's use in the agricultural sector can help mitigate climate change due to its potential to increase the water-holding capacity and nutrient retention of various soil types [16–21]. Its agricultural application is now being scaled up in Maine with the emergence of sustainable, high-quality production this year. Some pioneer studies of biochar in crop agriculture and environments carried out by the University of Maine utilized waste biochar in the bioenergy sector [22–25]. One source is from local biomass combined heat and power (CHP) plants. CHP plants combust low-quality biomass such as bark, branches, and leaves to generate heat and electricity. During this process, an incomplete combustion leaves byproducts of biochar and ash. The other source is from the University of Maine's Forest Bioproducts Research Institute. Similar, biochar is a low-value byproduct of a patented thermochemical conversion of biomass for chemicals [22]. Rather than having the waste biochar go to the landfill, we recycled the biochar to develop value-added products as soil amendments and carbon sinks. Since this is an emerging field, there is a new, attractive research avenue that can retain novel solutions by interested students and apprentices.

To understand the connection of biochar and women, it is firstly important to understand the current dynamic in the industry. We compiled public data with keyword searches. The data were obtained by using the following keywords: CHP plant, wood pellet manufacturers, sawmills, and wood product plants. In summary, Maine has 19 industrial

CHP plants, some of which are integrated with wood pellets plants or sawmills. There are 10 wood pellet manufacturers, 2500 sawmill owners, and the 250,000 forest landowners, which provide sufficient biomass feedstocks for the CHP plants. Women working in these companies contribute to the biochar production, directly or indirectly, and are about 33–39% of leadership positions [3,5,6,8].

For the nine companies that had provided public data on their leadership team, we found that overall 29% of the women on the Boards of Directors were women. These can be further broken down into various categories that impact the forest industry such as, theMaine CHP plants in sawmills/wood product plants which have 31% representation of women and Maine sawmill/wood products plants which have 30%. This can be compared to the overall forest and agricultural sectors that have 38% and 43% among the United States (Figure 1).

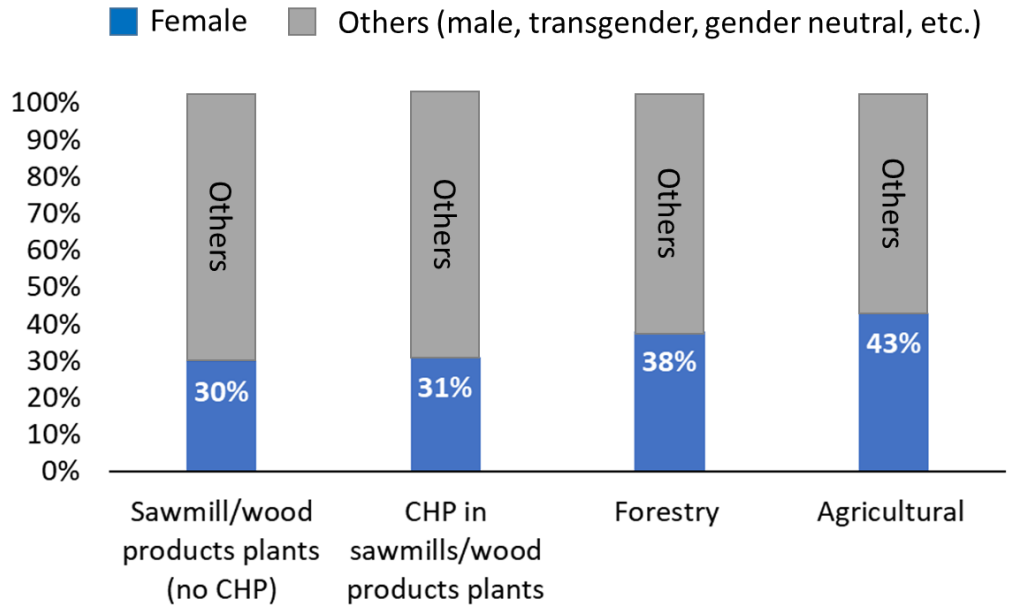

Figure 1. As of September 2022. Information came from businesses websites labeled "board of directors" or "leadership team".

It was also found that the 29% of women that hold leadership positions were largely Caucasian. Additionally, there are approximately nine companies that are either wood pellet manufacturing companies, CHP plants, or other related businesses where their information on the website did not provide a clear way to identify their Board of Directors or Leadership Teams. Further, the dominant race in Maine is Caucasian or white (94.31%) with 51% female and 49% male [26].

3.2. Strategies for Integrating Women and Youth in Bioenergy/Biochar Industry

By looking at current gender balance and women's impact in biochar application and expansion, we can consider how to expand diversity in the broader agricultural and bioenergy industry. Training goals center on developing confidence and leadership and opportunities for women, as well as a breadth of technical skills, so that they can apply knowledge and skills in technologically sophisticated occupations. The implementation of these strategies requires synergistic efforts from university educators, local employers, professional societies, and intermediary organizations. When high-impact strategies are created, it allows for robust, effective, and healthy bioenergy and biochar workforce environments for women and youth.

3.2.1. Science and Women: Bioenergy and Implementation and Benefits of Biochar

Interdisciplinary research is one of the most effective ways to integrate innovative solutions [27–30] for the wood products sector. Teams of different backgrounds are more likely to examine complex problems by looking at the facts differently, produce more innovative perspectives, and generate higher quality content working towards climate change solutions [31–34]. Therefore, we implemented a team of interdisciplinary research focusing on the bioenergy industry through the Summer 2021 program. We worked on developing better solutions to address issues such as Maine wild blueberries lacking efficiency in their soil amendments to retain water and nutrients. The bioenergy industry's efforts to maximize women in the workforce show that there is potential for an increase in profitability and success. Additionally, implementation of programs focusing on youth within a community connected to forestry can reveal the knowledge and prospects of youth and women pursuing careers. Many are considering careers that require higher education as well as moving away from their hometown with the intent to return [35,36].

3.2.2. Case Study of University of Maine Interdisciplinary Undergraduate Research Collaborative Team

To practice the strategy, in April 2021 we initiated a summer research program named "Foster Biochar-Oriented Multiple Applications and Workforce Development in Maine", which was funded by the University of Maine Research Reinvestment Fund for Rural Health and Wellbeing Grand Challenge Grant (Figure 2a). This program aimed to foster biochar-oriented bioenergy production, biochar for multiple applications, and workforce development, by collaborating with Maine-based biochar manufacturers. It delivered solutions to address the abundant biomass (~2.5 MT/year) harvested from Maine's forestlands, to maintain a healthy forest ecology system and to look at how to make a balanced economic rural community. When assembling an interdisciplinary research team, undergraduate students were recruited from the School of Forest Resources, School of Biology Ecology, College of Engineering, and Department of Biology of the University of Maine at Presque Isle. Priorities were given to women, minorities, persons with disabilities, and rural-living individuals in Maine.

(**a**) Interdisciplinary team

(**b**) Collaborative work of greenhouse construction

(**c**) Sustainability Lighting Talk

Figure 2. Assembly of the interdisciplinary team (**a**), Collaborative work of greenhouse construction (**b**), and Presentation of research findings (**c**).

Eight undergraduate students and three graduate students participated in this program and six out of the eleven participants were women, including one with disability. Among six faculty/industry mentors, one was a female faculty. We designed one internship and four research projects and paired graduate students with undergraduate students to work on different projects. During the execution of the research projects, young students were able to learn and gain critical thinking skills that could help them envision a career in forestry. Collaboration was a frequent practice as they would naturally work as a team (Figure 2b). The students were able to identify and execute their strengths when working on this interdisciplinary team through the process of creating their own scientific project, aided by mentors of different backgrounds and perspectives. Upon the completion of the summer projects, two undergraduates expressed their plan to pursue a graduate study in sustainability and nanoscience. One student enrolled in a forestry sustainability-related

graduate program at the University of Maine. Two undergraduates presented their research findings at several conferences, symposiums, and workshops (Figure 2c). A selection of the research reports was published in the *2021 Wild Blueberry Grower Report* published through the University of Maine Cooperative Extension Wild Blueberry Department.

We conducted a S.W.O.T analysis, which was used as a tool for evaluation of the interdisciplinary research program we developed in encouraging women and youth in bioenergy. The S.W.O.T matrix is plotted in Table 1.

Table 1. The S.W.O.T. matrix analysis results.

Strengths	**Weaknesses**
• Multidisciplinary research studies developed • Versatile research skills, leadership, teamwork experience • Excellent mentorship between faculty and undergraduate students, and graduate and undergraduate students	• Low enrollment in female faculty as research mentors • Low enrollment in undergraduate students from forestry and bioenergy programs • Lack of sustainable bioenergy research program for undergraduate students • Limited educational outreach on forestry and bioenergy for all individuals that may be interested • Limited statewide connectivity for workforce talent
Opportunities	**Threats**
• University-, regional-, and national level research and education programs for women, minorities, and under-representatives available • Curriculum development including bioenergy, forestry, and agriculture • Policy support and awareness of the environmental benefits of bioenergy	• Older regional demographic and rural communities leads to worker shortage of Maine in the future • Few bioenergy production plants and biochar manufacturing plants in Maine for job opportunities

3.2.3. Research Priorities for Expanding Women's Participation in Bioenergy Industry

Women from diverse backgrounds must have an elevated voice to help them participate at work and find leadership in research, the workplace, and equal opportunities for working in the agricultural and forest products industry. By giving underrepresented groups a voice, it provides a space to share their ideas, experiences, and stories. This will aid in the bioenergy workforce development implementing new ideas and strategies to their research. A recent research study highlights ways that Black, Indigenous and people of color can implement ways to elevate their voices. Simple strategies like creating communities to share experiences or ideas, speaking up against discrimination, taking a lead on small and large projects, and reframing academic privilege can help to create inclusivity and equitability in the workplace [37]. This can be included as a step to integrate for future practices that are highlighted in Table 2.

The current view of women in the bioenergy sector needs progress and movement from being a "male dominated kind of sexist, old fashioned industry" [9] to an inclusive gender-diverse environment. This can be achieved by dismantling the gender-based work culture and the gendered construction of skills, like physical labor. When this is achieved, the workplace becomes a more inclusive, collaborative environment that encourages individual strengths and mentorship. This would require academic leaders and teachers to consider replanning and structuring their teaching towards: (1) more collaborative pedagogy; and (2) curriculum that highlights colonial and patriarchal histories within their discipline. Projects addressing climate change in forestry and agriculture should highlight the effectiveness of using a community-based approach to integrate the knowledge of women and their counterparts [38]. This includes listening to current women who work in the forest sector, such as a study in Sweden where they interviewed women working at forest camps as cooks. A key finding highlights that female roles became more important after they

modernized the camp by creating better living conditions, such as providing more healthy, cost-effective meals and clean cabins. The female cooks' impact on the traditional work culture changed the dynamic and revealed their ability to gain respect from the loggers at the forest camps [7]. Further, young women should be included or encouraged to be a part of the forest sector, especially since the current generation of people working in wood science are beginning to retire [34]. Methods such as highlighting women working in the forest sector as mentors, or people to be reached out to, encourage other women to alter their view of careers that they are able to pursue [11,39].

To start lifting voices that are suppressed, networks like Women in Wood could be utilized more in teaching and training. Women in Wood encourages conversations and initiatives for increasing equitability of women as a pivotal way to produce more efficient ideas in wood science. Additionally, in recent years, podcasts have been an alternative way to communicate messages of science in a non-traditional way. *Talking forests* podcast's motto is "Let your voice be heard", to increase social media presence or be an avenue for voices less heard. Podcasts allow for a storytelling dialogue that provides the listeners the ability to witness tone, emotion, and passion that can be left out of conventional scientific articles or other written material [40]. This new scientific method could allow women in agricultural and bioenergy to participate and be open to collaboration and new research. This is another method to implement in the future, highlighted in Table 2.

Table 2. A roadmap to gender integration and youth workforce.

Prioritize Youth Outreach for Diverse Workplace Environments and Institutional Academic Programs in Bioenergy	To create a more diverse environment in workplace settings and at universities, there needs to be a set plan to implement outreach. In communities like Maine made up of many rural towns and cities, this would open the door for people who are discovering what they want to do or seeking opportunities within their region or state. There are several ways that the forestry industry and universities could apply outreach listed below: 1. Research, analyze, and highlight local middle school or high schools that meet your goals and guidelines to increase diversity; 2. For universities, dedicate a day of programmed activities and information for people of interest and contact potential candidates through several communication methods based on the demographic and regional constraints; 3. Create a Forester Ambassador program, apprenticeship, internships, or a related organization focused on middle and high school students [41,42].
Create Safe Spaces to Elevate Underrepresented Individuals in Industry and Institutions	As discussed earlier, creating opportunities for people that are underrepresented is one of the most important ways to making gender-diverse teams. By doing this, people of all backgrounds have the opportunity to voice or write down their challenges, concerns, or positive interactions about being a part of the forestry industry or universities. Often, underrepresented groups feel targeted, as if their position will be in jeopardy because they were not able to freely communicate their hardships in the workplace in fear of being let go. Additionally, this needs to be modified based on the workplace and institution, as communication styles, strategies, and policies may differ across the groups.

Table 2. *Cont.*

Be Transparent with Efforts to Address the Challenges of Retention for Women	Transparency is important for increasing diversity, as it shows that the company or university is held accountable for their actions and wants to improve the information shared with consumers, stakeholders, and potential employers [43]. This ensures that transparency and accountability can form in several different outcomes. Many companies disclose information about their supply chain or about actions they are taking to improve company dynamics. With steps to move toward honesty in actions, there is a sense of clarity and trust that the company or university can present to their workforce [44].
Set Goals or Reachable Actions to Increase Leadership in the Forestry Industry and Academic Institutions	The forestry industry in Maine has below 38% of women in executive or leadership positions, so there should be goals or reachable actions in a business plan or institutional committee. There are several ways to do this: 1. Make a 5-year plan to put your goals into perspective and understand how the goals might fit in or improve the workflow of your team; 2. Participate or organize philanthropic activities within the community or regional fundraiser, a workshop event, or be a participant in a conference or research event to educate your audience or learn more about the people in your industry or institution; 3. Endorse and/or promote women into the workforce by investing in a well-researched and well-experienced team [45]; 4. Create designated personnel to implement increasing the retention of women in leadership positions. This person could oversee outreach, job hiring, or organize ways to integrate local people in their community; 5. Deconstruct biases in the organization or university about gender and perceptions of the industry [46].
Highlight Past or Present Work of Women in Maine's Forestry Industry	If there are women that have worked, or are currently working, at your business or university and are willing to share their experiences, take advantage of this. It has been shown that seeing people that look like you in the workplace they desire, or have not even considered, is a way to implement a gender-diverse team. This can be communicated in many formats such as a workshop, lecture, newsletter to the community, word of mouth, or social media post.

4. Gender Integration and Youth Workforce Development Roadmap

We have developed the following roadmap, based on the approach and effective outcomes from our own background research and program development. Similar workforce development that aims to integrate diversity identities, early career individuals, and emergent materials and problems in the forest industry should focus on the following priorities.

5. Conclusions

By using biochar as a case study, we can see that about 29% of women hold leadership positions in Maine, and expanding women's participation is likely to lead to connected companies producing more profit, better decision-making practices, and a better understanding of what sorts of methods will be more efficient for their companies in the future. We demonstrated that developing gender-diverse teams into the bioenergy industry aids in workforce development strategies that are flexible, effective, and can be easily integrated into academic and other related programs. Additionally, it is crucial to have a

well-developed planning committee that has support and resources available. These can be practiced for any field, and they will be beneficial.

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References

1. Kanoti, A.; Bergdahl, A.; Parisio, M.; Schmeelk, T.; Teerling, C. *2021 Maine Forest Health Highlights*; Department of Agriculture Conservation & Forestry Forest Service: Augusta, ME, USA, 2021; pp. 1–23.
2. Harper, T. *Tracks through Time a History of the Maine Forest & Logging Museum's Steam Lombard Log Hauler*; Maine Forest & Logging Museum: Bradley, ME, USA, 2015.
3. Lee, R.U.S. Forest Service Women: Opportunities Are Endless. Available online: https://www.usda.gov/media/blog/2012/03/16/us-forest-service-women-opportunities-are-endless (accessed on 14 March 2021).
4. Staples, B. SWIFT Action Positively Impacts Women in Forestry. Available online: https://umaine.edu/news/blog/2020/03/03/swift-action-positively-impacts-women-in-forestry/ (accessed on 14 March 2021).
5. Facts & Figures. Available online: https://www.unwomen.org/en/news/in-focus/commission-on-the-status-of-women-2012/facts-and-figures (accessed on 14 March 2021).
6. *FAO The State of Food and Agriculture*; Food and Agriculture Organization of the United Nations: Rome, Italy, 2011; pp. 1–4. ISBN 978-92-5-106768-0.
7. Ostlund, L.; Obom, A.; Lofdahl, A.; Rautio, A.-M. Women in forestry in the early twentieth century—New opportunities for young women to work and gain their freedom in a traditional agrarian society. *Scand. J. For. Res.* **2020**, *35*, 403–416. [CrossRef]
8. Larasatie, P.; Baublyte, G.; Conroy, K.; Hansen, E.; Toppinen, A. "From nude calendars to tractor calendars": The perspectives of female executives on gender aspects in the North American and Nordic forest industries. *Can. J. For. Res.* **2019**, *48*, 915–924. [CrossRef]
9. Larasatie, P.; Barnett, T.; Hansen, E. The "Catch-22" of Representation of Women in the Forest Sector: The Perspective of Student Leaders in Top Global Forestry Universities. *Forests* **2020**, *11*, 419. [CrossRef]
10. Binns, C. What's Behind the Pay Gap in STEM Jobs? Available online: https://www.gsb.stanford.edu/insights/whats-behind-pay-gap-stem-jobs (accessed on 18 January 2022).
11. Women in Forestry: Natalie. Available online: https://www.youtube.com/watch?v=YXQ4q0u5fdM (accessed on 15 March 2021).
12. Sharik, T.L.; Lilieholm, R.J.; Lindquist, W.; Richardson, W.W. Undergraduate Enrollment in Natural Resource Programs in the United States: Trends, Drivers, and Implications for the Future of Natural Resource Professions. *J. For.* **2015**, *113*, 538–551. [CrossRef]
13. Christensen, R.R. Forestry School Enrollment and Degrees Granted, 1971−1981. *J. For.* **1983**, *81*, 660–662. [CrossRef]
14. Yentsch, C.M.; Sindermann, C.J. *The Woman Scientist: Meeting the Challenges for a Successful Career*, 1st ed.; Springer: New York, NY, USA, 1992; ISBN 978-1-4899-5976-8.

15. Watt, H.M.; Eccles, J.S. (Eds.) *Gender and Occupational Outcomes: Longitudinal Assessments of Individual, Social, and Cultural Influences*; American Psychological Association: Washington, DC, USA, 2008; p. xxii, 384. ISBN 978-1-4338-0310-9.
16. Basso, A.S.; Miguez, F.E.; Laird, D.A.; Horton, R.; Westgate, M. Assessing potential of biochar for increasing water-holding capacity of sandy soils. *GCB Bioenergy* **2012**, *5*, 132–143. [CrossRef]
17. Wang, B.; Gao, B.; Zimmerman, A.R.; Zheng, Y.; Lyu, H. Novel biochar-impregnated calcium alginate beads with improved water holding and nutrient retention properties. *J. Environ. Manag.* **2018**, *209*, 105–111. [CrossRef]
18. DeLuca, T.H.; Gundale, M.J.; MacKenzie, M.D.; Jones, D.L. Biochar Effects on Soil Nutrient Transformations. In *Biochar for Environmental Management*; Routledge: Abingdon, UK, 2009; pp. 251–270. ISBN 978-1-84977-055-2.
19. Karhu, K.; Mattila, T.; Bergström, I.; Regina, K. Biochar addition to agricultural soil increased CH4 uptake and water holding capacity—Results from a short-term pilot field study. *Agric. Ecosyst. Environ.* **2011**, *140*, 309–313. [CrossRef]
20. Lehmann, J.; Pereira da Silva, J.; Steiner, C.; Nehls, T.; Zech, W.; Glaser, B. Nutrient availability and leaching in an archaeological Anthrosol and a Ferralsol of the Central Amazon basin: Fertilizer, manure and charcoal amendments. *Plant Soil* **2003**, *249*, 343–357. [CrossRef]
21. Yu, O.-Y.; Raichle, B.; Sink, S. Impact of biochar on the water holding capacity of loamy sand soil. *Int. J. Energy Environ. Eng.* **2013**, *4*, 44. [CrossRef]
22. Bai, X. Soil Organic Carbon in Maine, Its Responses to Biochar Addition, and Climate Change. Ph.D. Thesis, The University of Maine, Orono, ME, USA, 2021.
23. Novak, A.; Li, L.; Zhang, Y.-J. *Effects of Biochar on Improving Sandy Soil Water Retention and Wild Blueberry Plants' Resilience to Drought*; 2021 Wild Blueberry Research and Extension Report; The University of Maine Cooperative Extension: Orono, ME, USA, 2022; pp. 121–133.
24. Tasnim, R.; Zhang, Y.-J. *Investigation of Soil Amendments (Biochar-Compost and Mulch) on Soil Water Availability and Resilience of Wild Blueberries to Warming*; 2021 Wild Blueberry Research and Extension Report; The University of Maine Cooperative Extension: Orono, ME, USA, 2022; pp. 92–104.
25. Zhang, Y.-J.; Calderwood, L.; Tasnim, R. *Using Foliar Fertilizers and Soil Amendments to Improve Wild Blueberry Production and Resilience to Warming*; 2021 Wild Blueberry Research and Extension Report; The University of Maine Cooperative Extension: Orono, ME, USA, 2022; pp. 160–179.
26. Maine Population 2022 (Demographics, Maps, Graphs). Available online: https://worldpopulationreview.com/states/maine-population (accessed on 21 April 2022).
27. Clemmens, A.J.; Levine, D.B.; Dedrick, A.R.; Clyma, W. Interdisciplinary Teams for Assessing the Performance of Irrigated Agriculture Systems. Ph.D. Thesis, Colorado State University, Fort Collins, CO, USA, 1992.
28. Harris, F.; Lyon, F.; Clarke, S. Doing Interdisciplinarity: Motivation and Collaboration in Research for Sustainable Agriculture in the UK. *Area R. Geogr. Soc.* **2009**, *41*, 374–384. [CrossRef]
29. Mccarl, B.A. Analysis of climate change implications for agriculture and forestry: An interdisciplinary effort. *Clim. Change* **2010**, *100*, 119–124. [CrossRef]
30. Morse, W.C.; Nielsen-Pincus, M.; Force, J.E.; Wulfhorst, J.D. Bridges and Barriers to Developing and Conducting Interdisciplinary Graduate-Student Team Research. *Ecol. Soc.* **2007**, *12*, 1–14. [CrossRef]
31. Campbell, L.G.; Mehtani, S.; Dozier, M.E.; Rinehart, J. Gender-Heterogeneous Working Groups Produce Higher Quality Science. *PLoS ONE* **2013**, *8*, e79147. [CrossRef] [PubMed]
32. Nishii, L.H. The Benefits of Climate for Inclusion for Gender-Diverse Groups. *Acad. Manag. J.* **2013**, *56*, 1754–1774. [CrossRef]
33. Rock, D.; Grant, H. Why Diverse Teams Are Smarter. *Acad. Manag.* **2016**, *4*, 2–5.
34. Burns, C. Women in Wood Science Who Rock—Pipiet Larasatie. Available online: https://talkingforests.com/women-in-wood-science-who-rock-pipiet-larasatie-episode-45/ (accessed on 14 March 2021).
35. Robson, J.P.; Wilson, S.J.; Sanchez, C.M.; Bhatt, A. Youth and the Future of Community Forestry. *Land* **2020**, *9*, 406. [CrossRef]
36. Poudel, A. Migration, youth workshops and forestry: Case studies from Nepal. *Trees For. People* **2021**, *3*, 100057. [CrossRef]
37. Halsey, S.J.; Strickland, L.R.; Scott-Richardson, M.; Perrin-Stowe, T.; Massenburg, L. Elevate, don't assimilate, to revolutionize the experience of scientists who are Black, Indigenous and people of colour. *Nat. Ecol. Evol.* **2020**, *4*, 1291–1293. [CrossRef]
38. Boyer-Rechlin, B. Women in forestry: A study of Kenya's Green Belt Movement and Nepal's Community Forestry Program. *Scand. J. For. Res.* **2010**, *25*, 69–72. [CrossRef]
39. Women in Science: Dana Mitchell. Available online: https://srs.fs.usda.gov/women-in-science/dana-mitchell/ (accessed on 13 March 2021).
40. Kinkaid, E.; Emard, K.; Senanayake, N. The Podcast-as-Method?: Critical Reflections on Using Podcasts to Produce Geographic Knowledge. *Geogr. Rev.* **2019**, *110*, 78–91. [CrossRef]
41. Sundström, K.; Branco, J.; Ruiz-Tagle, F.; Sutton, M.; Oswald, P. WBCSD Forest Sector SDG Roadmap. Available online: https://docs.wbcsd.org/2019/07/WBCSD_Forest_Sector_SDG_Roadmap.pdf (accessed on 13 March 2021).
42. Wallace, D.R.; Strumsky, D.D.; Yeitz, L.; Bailey, M. The Forest Opportunity Roadmap for Maine Workforce Development Strategy Prepared for Forest Opportunity Roadmap for Maine (FOR/Maine). Available online: https://formaine.org/wp-content/uploads/2021/07/FORMaine-Workforce-Report-Final_Revised_06.2021.pdf (accessed on 28 October 2022).

43. TNRC Practice Note Building Transparency and Accountability in Natural Resource Management (NRM): The Role of Social Accountability and Civic Participation in Addressing Corruption in the NRM Sector | Pages | WWF. Available online: https://www.worldwildlife.org/pages/tnrc-practice-note-building-transparency-and-accountability-in-natural-resource-management-nrm-the-role-of-social-accountability-and-civic-participation-in-addressing-corruption-in-the-nrm-sector (accessed on 27 October 2022).
44. 2021 ESG Report. Available online: https://www.thehersheycompany.com/content/dam/hershey-corporate/documents/pdf/hershey_2021_esg_report.pdf (accessed on 28 October 2022).
45. Roadmap to Gender Equality Plans in Research and Higher Education Institutions. Available online: https://eige.europa.eu/sites/default/files/gear_roadmap_02_successfactors_obstacles_0.pdf (accessed on 28 October 2022).
46. Insights-4-A-Roadmap-to-Gender-Equality-in-Organizations-and-Gender-Balanced-Leadership-Teams.pdf. Available online: https://amcham.com.sg/wp-content/uploads/2020/04/Insights-4-A-Roadmap-to-Gender-Equality-in-Organizations-and-Gender-Balanced-Leadership-Teams.pdf (accessed on 28 October 2022).