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# The “Catch-22” of Representation of Women in the Forest Sector: The Perspective of Student Leaders in Top Global Forestry Universities

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**Abstract:** Although there are continuous efforts aimed at increasing gender diversity, the forest sector is still largely perceived as a male dominated field, indicated by a persistent masculine image. As a result, women are still underrepresented. Utilizing interviews, we found that greater representation of women in the forest sector is considered as one of the best solutions to attract young women to the industry. However, it presents a ‘Catch-22’ in which the solution is denied by a circumstance inherent in the problem. We propose to change the forest sector image by tackling gender issues such as sexual harassment, and by simultaneously focusing on the good features of the industry such as its important role in a sustainable future and solutions for the modern world. For example, the sector can show its role in mitigating climate change and in supporting a more sustainable future economy (e.g., bioeconomy and green jobs) and urban built environment. In addition, changing the forest sector image should be supported with better marketing and promotion in various platforms, both online and offline. The sector also needs to utilize social media to attract younger generations.

**Keywords:** gender diversity; diversity in higher education; women leaders; college women student leaders; college student leadership; perceived fit; image theory

## 1. Introduction

The forest sector (an umbrella term covering companies producing and using wood and wood fiber as a raw material) is important to the economies of North America and Nordic countries such as Finland and Sweden. In the U.S., the industry employs approximately 950,000 workers with a payroll of approximately \$55 billion and manufacturing output of over \$300 billion [1]. Nevertheless, the forest sector has not attracted sufficient young talent interested in a career in the industry, resulting in a graying workforce [2]. Enhancing gender diversity or the proportion of women versus men is a reliable solution for filling the workforce gap, since women make up nearly half of the labor force in North America [3], Finland [4], and Sweden [5].

The timing for this study is fortuitous due to a generational transition from a graying workforce to a new generation of leaders and workers. The transition presents a novel and significant opportunity to diversify the workforce in order to prepare the forest sector to face an unpredictable future. This paper specifically focuses on gender as one aspect of workforce diversity due to a fact that although there are continuous efforts aimed at increasing gender diversity including in the forest sector, women are still underrepresented in its workforce [6]. There is also underrepresentation of women in top leadership in forest sector companies, even in Nordic countries that are considered at the forefront of gender equality [2].

The perception of the forest sector as a male dominated field is not only related to workplaces, but also forestry education. A web content analysis found that images on US forestry universities’ websites

rarely portrayed women, possibly perpetuating the suggestion of a less perceived fit for women in the forest sector [7]. Perceived fit is a direct measure of fit, the degree to which individuals can see themselves fitting into an organization [8]. This theory, together with image theory, may explain that due to a persistent masculine image [7], women students were reported less likely to choose a career in the forest sector [9].

This paper attempts to address the issues related to forest sector image and the influence of that image on attracting women into the industry from the perspectives of student leaders as future leaders in the forest sector. Here we define the sector image according to the perceptions of respondents regarding the industry. Interviews are utilized to answer three research questions: (1) What are the perceptions of women college student leaders on the current situation with respect to gender diversity in the forest sector? (2) What motivates women college student leaders to enter the forest sector? (3) In what ways do women college student leaders think the forest sector could be made more attractive to young women?

In the remainder of the paper, we first provide a description of the methods employed in the study, followed by results and a discussion. We then provide study limitations and insights regarding potential paths forward.

## 2. Research Context

Due to the complexity of the issues and difficulties to conduct a global study, we utilize The Center for World University Rankings by subject [10] to determine our potential respondents. This approach has two benefits. First, we assume that students from top global forestry universities will generally be able to communicate and express their opinion and perspectives in English. Therefore, we do not need translators (additional persons to the researchers) for data collection and data analysis. Direct communication is important to build trust between researcher and respondents when dealing with sensitive issues such as gender. Second, choosing these universities allows us to understand how they—as top forestry universities in the world—treat gender diversity, represented by their student perspectives.

Based on The Center for World University Rankings, the top four forestry universities are located in the Global North: the Swedish University of Agricultural Sciences in Sweden, Oregon State University in the US, the University of British Columbia in Canada, and the University of Helsinki in Finland. Two of the locations are considered at the forefront of gender equality in the world, ranking number 3 (Finland) and 4 (Sweden) on the Global Gender Gap, an index that measures gender-based gaps [11]. From the same index, Western Europe has reportedly made the most progress on gender parity, followed by North America.

## 3. Theoretical Background

### 3.1. Perceived Fit

Perceived fit is conceptualized as a direct assessment of compatibility, whether an individual fits well in an organization [8]. The rationale behind this construct is that people's perceptions of reality will drive their cognitive appraisals and their reactions to specific circumstances [8].

In the perceived fit concept, all assessment is done in an individual's head, allowing them to apply their own weighting scheme to various dimensions of the environment [12]. Due to this holistic assessment of fit and its tendency to be more consistent, perceived fit allows for a great level of cognitive manipulation. Therefore, the perception of organizational characteristics has stronger effects than actual characteristics, especially for characteristics that are difficult to verify, such as values or goals [8].

### 3.2. Image Theory

Image theory, or naturalistic theory of decision-making [13] is developed to describe decision making processes wherein the anticipated benefits are relatively abstract and not easily quantified [14].

Images or schemata are representations of information and knowledge that organize people's values and guide people's behavior [14]. A situation that people face sets a frame and determines which images will be used in the decision process. The framing, which includes assessment of contextual characteristics, sets scenes for decision making by defining the context inherent in the situation and derived from the decision maker's knowledge.

Following this theory, decisions are made if people feel they fit with their personal values, trajectory/goals, and strategies [14]. Collectively, these three cognitive structures are called "images" [15]. Among the three image types, value is considered as the primary motivator of the entire decision-making process, determining what should and should not [14]. The second structure, trajectory, consists of the goals which decision makers want to achieve. Varying from abstract to specific, goals form a useful agenda for the future. As the third type of image, strategies consist of plans, tactics, and forecasts.

#### 4. Methods

Since our study was qualitative by nature, we utilized interviews to answer our research questions. Before conducting the data collection, study approval was sought from The Institutional Review Board (IRB) at Oregon State University.

We identified potential respondents from the top four forestry universities in the world based on The Center for World University Rankings: the Swedish University of Agricultural Sciences in Sweden, Oregon State University in the US, the University of British Columbia in Canada, and the University of Helsinki in Finland. Targeted participants were currently enrolled students (both undergraduate and graduate students) that identify as women, have experience in forestry-related student organization leadership (e.g., president, vice president, secretary, treasurer), and able to do an interview in English.

Potential participants were identified in two steps. First, identification was done through the available public information on university/college websites and social media. Based on our visual interpretation of the names and/or pictures, we sent an email to the leaders. The introduction email outlined the study, confirmed whether the contacted leaders were eligible (e.g., do they identify as women?), and invited them to participate. Interested students were given a detailed project description that contains all the elements of informed consent and asked whether they know somebody that fits the study. In other words, the second potential respondent identification process was through a snowball sampling method.

We conducted individual interviews, in-person, on the phone, or online (via Skype or FaceTime). Individual interviews can provide a more supportive environment for women, especially when the study is about sensitive topics (e.g., gender-based experience) [16]. We employed a semi-structured interview technique to allow for flexibility in following up on interesting responses.

The initial interview protocol was designed based on the extant literature [17]. We pre-tested the protocol twice: first, to a group of experienced qualitative researchers in the forest sector at Oregon State University, and second, to a convenience sample of four women who are ex-student leaders in forestry-related student organizations in the targeted universities.

We recruited respondents on a voluntary basis. Respondents were assured that they have the right to withdraw at any time. In total, 41 women student leaders in four universities agreed to be interviewed. To assure anonymity and confidentiality, a number (between 1 and 41) has been randomly assigned to each student participant. Interviews were conducted in English, based on assumptions that students in top global universities are fluent in English regardless of their nationality. In addition, English ability to do an interview was one of our screening questions to potential respondents. Interviewers were aware of different accent and dialects of English, and therefore, asked for immediate clarification every time encountering a doubt. Interviews ranged from 30 min to 2 h in length. This wide range may be caused by different interactions that were built between an interviewer and an interviewee due to respondents' characteristics (e.g., extrovert vs. introvert) and respondents' mood on the interview day (e.g., good day vs. bad day). All interviews were then verbatim transcribed and thematized.

We conducted inductive thematic analysis based on our research questions addressing perception, motivation, and attractiveness. The first theme, perception, aimed to describe the students' perception of the forest sector with respect to gender diversity and identify the changes that have occurred. The objective of the second theme, motivation, was to identify reasons why women student leaders enter forestry education. The third theme, attractiveness, aimed to investigate what ways the forest sector can be made more attractive for young women.

Inductive thematic analysis was conducted by two authors, utilizing NVivo software. By considering inter-rater reliability agreement, the authors compared and discussed their emergent themes and subthemes (Table 1).

**Table 1.** Themes and sub-themes.

<b>Theme 1 Perception</b>	<b>Theme 2 Motivation</b>	<b>Theme 3 Attractiveness</b>
Forest sector image	Circumstances	Women representation
Perception	Family	Publication/marketing
Legacy	Role model	Inclusion
Changes	Outdoor/nature	Mentor
	Funding	Role model
	Career	Curriculum

## 5. Results

Findings are organized according to the primary themes: perception, motivation, and attractiveness. All quotations in the results section come directly from the interviews, with respondents' random numbers provided after the quote.

### 5.1. Student Perceptions of the Forest Sector

Although most respondents agreed that there is better gender diversity in forestry higher education and government, the forest sector is still perceived to be a male dominated profession into which it is hard to attract women. A leader in North American university mentioned that forestry in government might look more diverse due to diversity quotas that they need to obey. Respondents argued that women do not want to be in the forest sector because they do not see women represented. The forest sector is usually associated with "people out in the woods and chopping down trees" (#3) or "lumberjack stereotype with big bushy beard" (#24), holding a "chainsaw" (#24), "or fighting fires or working for warehouse or cruising plots" (#11). Therefore, to enter the forest sector, there is an expectation for women to be tough and act more like men such as wearing specific apparel.

"This is an industry that we weren't in the first place and we've found our place in it over time." (#14).

"... a lot of women end up [in the forest sector] coming from other fields. It's not really a career path [that] a lot of young women out of high school or something make up for themselves." (#24).

Working in the forest sector often means working remotely which brings disadvantages to women such as high risk of "harassment and violence" (#29). Field job postings typically mention physical fitness requirements which are perceived as indicating masculinity. This situation makes some respondents question their belonging in the forest sector as there is also a feeling that "women are not seen as competent or not having any knowledge" (#38).

A respondent warned that there are still many men in forestry who think women should not be doing forestry things. These men are not interested in diversity because they have the privilege of never being in a discrimination or micro-aggression situation. As a result, they do not give credit to women or other underrepresented groups that might need to overcome many hurdles to get where they are.

“Diversity was not a thing. You hired whoever you could hire and if the only person available was a woman you would hire the woman, but you wouldn’t actually make any special allowances for them being different. . . . I have worked with a bunch of guys who were complete assholes.” (#27).

## 5.2. Motivation to Enter the Forest Sector

The student leaders mentioned that their pathways started because they enjoy being in the forest, therefore they want to “work outdoors” (#7) and to have a career with an impact on “forests and sustainability” (#39). One leader has grown her interest in forestry since high school when she learned to be “a tree hugger” (#29). Another respondent realized that forestry could contribute to answering sustainability questions related to “climate change and carbon uptake” (#10).

“I chose it because I wanted to live and work anywhere in our country. I didn’t want to have to live in a city. I wanted to live in the countryside. So that is one reason and I also think that forest is one of the solution[s] in the new era of environment . . . it includes so much, like the social, the economic, the environmental in the world aspect of biological, air pollutants, that it’s so complex.” (#38).

Surprisingly, many of our graduate student respondents did not intend to get into forestry education programs. Before enrolling in forestry, they were studying different fields such as, “wildlife conservation” (#23), “disaster management” (#13), “microbiology” (#30), or even “international business” (#34). These students encountered forestry programs and when they got to know more, they became actively involved. A major factor of this encounter is a financial opportunity. A leader in North American university mentioned that the college/faculty of forestry has more funding support, compared to others.

“I kind of came to it by accident, which is something I actually heard quite a bit . . . We’d had a really, big bushfire throughout my state with really significant impacts, including losses of life. . . . actually forestry, which I previously thought of is like, destructive native timber harvesting, you know, very political issue like, ‘oh, wow, actually, it includes all of these different components of forest ecology, management, social science and community-based management.’” (#13).

“When grad school comes around, it’s really based on funding . . . I wasn’t really interested in . . . taking on more debt to go to grad school.” (#11).

“ . . . and I ended up getting a scholarship into [her major], and so I thought “hey, if I’m on a scholarship, I might as well try it out for a term, and I can always get a term of school at least partially covered,”. Because it was appealing to get into the major, and then I really enjoyed it, so, I stuck with it. And then, I decided to continue my master’s program here.” (#40).

One respondent became interested in forestry after joining a forest summer camp activity, held by one of the Nordic universities. The four-day summer camp was intended for young women participants only. She was impressed with outdoor lectures from people working in the industry and hand-on activities such as planting trees and forest thinning practices.

Five leaders thanked their family for inspiring them to go to forestry. They either grew up nearby forests or have parents/older family members that were working with nature. By seeing on a firsthand basis, they value the benefits of nature to the world.

“ . . . once I actually came to that realization, and I discovered how much forests really do impact [to] everyone’s lives, whether it’s directly or indirectly, [then I realized] that this was the perfect fit for me.” (#22).

“I was very skeptical in the beginning, if my uncle didn’t convince me that [as a forester] wasn’t just working in the toilet paper industry, then I wouldn’t have applied.” (#41).

## 5.3. Making the Forest Sector More Attractive

### 5.3.1. More Representation of Women

Due to a perception of the forest sector as a “male dominated kind of sexist, old fashioned industry” (#6), there is an urgent need to have more gender diversity and create a more gender balanced place. It

is important to have more women represented, especially in leadership. In addition, one respondent thinks that there is a need to show women who are successful in the forest sector as their chosen career path. Another leader thought that encouraging and empowering women to stay will have a snowball effect, attracting other women to enter the sector. However, having more women is considered as “a circular problem” (#39): to attract women, there should be more women in the field.

“I think just more representation and like seeing many women in these higher positions and these jobs that you want to be in not seeing it as this like impenetrable, like, ‘that’s a lot of men working there’, not seeing it as like a male dominated fields, it’d be more inspiring.” (#25).

“This sort of catch-22, where women don’t want to go into a field because there aren’t women in the field. Well, how do you get women into the field? And so I think from a very young age, cultivating in women . . . And I think women often dominate a lot of the social sciences. Not necessarily in like upper level leadership positions.” (#35).

There is an expectation that the women leaders can be role models and mentors for younger women. By having these women in those positions, the respondents feel that there is “a welcoming space” (#11) for them by having people whom they can talk with. However, a respondent warned about the possibility of having women leaders in forestry as tokens who are maybe hired because of their gender.

“Some strong and competent female role models who really kind of show that it’s okay to be a woman in science or the greater number of women in leading positions, not based off the old guys in the offices. (#32).

“I really like it when they have women that are really knowledgeable and really passionate about what they do. And when they’re in a leadership position. It’s great. Because it’s one of my biggest pet peeves when they’re like, ‘Oh, we have this woman in leadership.’ But it’s like, she doesn’t know anything . . . it’s really important for women to see that we’re not just tokens and we’re not just a diversity hire and that we actually do have something to bring to the company or community.” (#33).

Since there are not many women in the forest industry, one leader suggested an intentional mentorship program for young women, especially on a one-on-one basis. She continued that the mentor can also be a man who has professional experience with women in their company.

“[Male mentor] who has a personal connection to a female in their company . . . to really lift up [the young women] experience and help them be successful on an individual basis, because interacting with one male . . . is a lot less intimidating than somehow trying to be in a room with 15 men.” (#16).

Academically, the respondents hope to see more women as lecturers or professors, distributed equally in all forestry majors. One leader noticed that there are significantly fewer women in technical aspects of forestry and even fewer in “hard science forestry faculty positions” (#16) which are historically perceived more male dominated than social sciences. Another respondent noticed that because women researchers are few in the college/faculty of forestry, they have to take more administration work for gender representative and therefore end up supervising more PhDs and postdocs than their male colleagues.

“ . . . females within academia might not be viewed as skillful as an equally success like as an equal male. Like, for instance if a professor is female, they might have been viewed as getting in that role because [of] their gender, rather than because of their skill. You don’t view a male like that. And I think as a female in industry, if they’re in a higher leadership role, people might feel that they are worth more.” (#40).

### 5.3.2. More Publication and Better Marketing

The forest sector should do better on publicizing all positivity aspects of forestry. The sector should be marketed as more than traditional forestry (e.g., extractive and logging industry), focusing on human dimensions, conservation, and ecology. To attract more women, a leader in a North American university suggested that the college/faculty can shift the current curriculum to be broader

and connected to global issues. Furthermore, forestry universities should utilize social media such as Instagram or Facebook for advertising their programs, especially for targeting younger generations.

“It always cracks me up when I go to these forestry conferences. And people are just like talking about the latest chainsaw technology and stuff. And I’m just like, can we talk about people? Can we talk about human connections with nature? Can we talk about the ways we interact with space and time and all of these things? So, to me, I feel like that the known discrimination in traditional forestry field is really a turnoff to women pursuing forestry. I think [it’s important to] market forestry more inclusively, to include these other perspectives.” (#11).

It is important to raise the diversity issue that women should be treated equally as men. Diversity should be represented visually in publication platforms such as brochures. The visualization can have a huge impact. For example, a leader in a Nordic university raised a concern of a forest machine advertisement with “three women dancing in short skirts [with] barely any clothes” (#38). For her, this advertisement indicates the positions that women are expected to occupy in the forest sector.

“I’m proud of this sector but seeing the kind of thing [advertisement on forest machines], that would be like, oh my place in this forestry sector is dancing in a short skirt.” (#38).

### 5.3.3. More Accepting Environment

For making the sector more attractive, respondents suggested creating a “more accepting environment for women” (#12). While they are still in the university, male students need to have education for accepting more gender equity such as women in leadership. Therefore, if the male students, who then become foresters, see “inequality, [they know] how to speak up” (#23).

“I wish forestry had a quota like ‘we cannot hire more men than women’, ‘we cannot pay more to a male professor than a female professor’ . . . to acknowledge [women have] been discriminated, that’s the only reason why we have less female[s]. We’re not less smart. We’re not in any physiological disadvantage. Yet, we’re not as present as a male.” (#15).

“Going into forestry as a student is no big deal. Going into forestry in the workforce and staying there may be a bigger deal . . . working in a logging camp, washroom facilities, field gear that fits, guys that’ll wait for you to catch up in the woods if you’re not fast enough . . . The studies have shown that if you’ve got a group of 10 men, and then you put in one woman, it’s not going to behave like a mixed gender group, the woman basically has to start acting like a man and fit in with the rest . . . they’re not going to put in another washroom just for you. You have to suck it up and share with the guys. And if the guys don’t like it, well, they have to suck it up too. But of course, . . . they’re not always going to be happy. They’re not always going to treat you well, because they’re mad. . . . It’s sort of upsets the apple cart.” (#27).

Respondents raised some major concerns about sexual harassment, gender pay gap, and clothing size problems. Two leaders in a North American university pointed out the front-page news of sexual harassment that took place in the Forest Service. Therefore, there is a need to have some specialized trainings in forest sector institutions for issues such as sexual harassment, unconscious bias, and micro aggression. It is also important to take “sexual harassment claims seriously” (#11).

“The Forest Service needs to get its act together on sexual harassment, because it’s really appalling . . . I know that they’re trying to address it, but they’re probably not doing enough. So I think that there’s this issue where forestry work is really often really remote out in the field, the dangers are high for harassment, for violence . . . shifting the forestry profession more in the direction of ecological restoration based forestry, I think will be more attractive to women. I think having more women as supervisors as like high up in the ranks of companies and agencies, it’s really important.” (#29).

## 6. Discussion and Conclusions

Although gender diversity in forestry universities is perceived to be better today than in the past, there is significant room for improvement in the industry. The discontinued paths from women in forestry higher education to workplaces happens due to the perception of an unwelcoming environment,

lack of sense of belonging, and lack of career opportunities [18,19]. In other words, the women students do not experience perceived fit in the forest sector.

Forestry is still perceived as a profession for men, even in an interdisciplinary field such as urban forestry that is considered more attractive for women among other forestry professions [20]. Women in this sector often felt being socially forced to adapt to male norms [21] in order to be accepted and earn respect from their male colleagues. In some cases, these women will adapt a masculine communication style [22] and even distance themselves from femininity traits, including limiting their interaction with other women colleagues [23]. Because of a strong masculine culture, some women leaders who have been successfully climbing the ladder may give preferential treatment to men [24] over junior women [25]; a practice that is called a “queen bee” phenomenon [26].

Although our respondents considered more women in the forest sector as one of the best solutions to attract young women, it is a dilemma. As mentioned by one of our leader respondents, it presents a ‘Catch-22’ in which the solution is denied by a circumstance inherent in the problem. An example of the Catch-22 of representation of women is women will be attracted to enter the forest sector if there is visibility of women in the sector, especially in leadership, but the question remains, how to get these women in? How to get women into leadership positions in the forest sector? Increasing the number of women should not be tokenism, an unfair practice where these women will be treated only as a symbol of gender representatives, not as individuals [27]. If hired only as tokens, women will typically feel excluded and lack the support and respect from the rest of the group.

### 6.1. Changing the Image

The existing masculine image of the forest sector forms a strong barrier to attracting women into the industry and perpetuates the perception that the industry has less perceived fit for women. The sector is strongly connected with traditional forestry such as logging with big heavy machines in difficult, sometimes dangerous, landscapes. The harsh workplace environment has been associated with physical strength and has been perceived “too heavy for women” (and only suitable) “for real men” [28]. These workplace characteristics are frequently seen as causes of gender issues such as sexual harassment [21]. Therefore, tackling the issue should be the first priority.

Simultaneously, the forest sector should focus on the good features of the industry such as its important role in a sustainable future and solutions for the modern world. For example, the sector can show its role in mitigating climate change (idea 1) and supporting a more sustainable future economy (idea 2) and urban built environment (idea 3).

#### 6.1.1. Idea 1

A comprehensive analysis of conservation and restoration efforts show that forests and other ecosystems could provide a chance of holding warming to below 2 °C through the next decade [29]. Emphasizing the environmental role of forests as a large carbon sink which can help slow global warming may motivate young women to enter the forest sector. Women and younger people are found to have more ecological and environmental values than men and older people [30]. In forest management, women find it more important to preserve forests and emphasize environmental and human-centered management [31].

#### 6.1.2. Idea 2

The forest sector has a central role in the bioeconomy that is currently a dominant concept in the political discussion on global sustainability transformations [32]. In a bioeconomy, the sector has a role as both a provider of biomass and as a manufacturer of higher-value products [33]. Focusing on the global role of forest-based bioeconomy in creating a more sustainable future will interest and attract young talent [6,34].

Forests are also considered to have important roles for achieving Sustainable Development Goals (SDGs). Anchored in a green economy, global experts have introduced the concept of green jobs,

that are defined as decent jobs that contribute to preserving or restoring the environment [35]. In the forest sector, green forest jobs refer to forest based economic activities and therefore being a part of a forest-based bioeconomy [35]. Green forest jobs have expanded traditional forestry jobs as a core to seven thematic areas and 19 fields of activity (Table 2).

**Table 2.** Green forest jobs thematic area and fields of activity [35].

Seven Thematic Area	19 Fields of Activity
Wood and energy production	Wood production
	Energy production
Agroforestry and mountain forestry	Agroforestry
	Mountain forestry and soil bioengineering
Social and urban development	Urban forestry and arboriculture
	Culture and forests
Forest management, inventory and planning	Forest inventory and forest monitoring
	Planning, governance, sustainable forest management
	Pests, disease and forest fires
	Risk management and contingency planning
Biodiversity and ecosystem functioning	Biodiversity conservation and nature protection
	Climate change
	Forests and water
	Mycoforestry
Health and recreation	Forest ecotherapy
	Recreation, leisure and sports
Education and research	Education, further training and knowledge transfer
	Forest research

### 6.1.3. Idea 3

The forest sector can help make the urban built environment a more sustainable space by providing wood as an alternative to steel and concrete construction [36]. With innovations in engineered wood products (e.g., cross-laminated timber), it is now possible to construct buildings over 40 stories tall made primarily from wood [37]. The public believes that tall wood buildings are more aesthetically pleasing and create a positive living environment [38]. Growing interest in using wood in advanced manufacturing will attract more diverse talent to the forest sector workforce.

### 6.2. Promoting the Sector

Changing the forest sector image should be supported with better marketing and promotion on various platforms, both online and offline. One way to promote gender diversity is to highlight diversity in forest sector organization websites, pamphlets, and other media [7]. In higher education, emphasizing diversity on university websites is a central strategy for attracting new student populations. Diversity represented on the university websites will increase perceived person-organization fit [39], and in turn, increase enrollment commitments [40].

Similar with applying for universities, people will be more attracted to apply for jobs in an environment where they can see themselves fitting in (perceived fit) [41] and where they feel welcomed. When it comes to applying for jobs, women are more interested than men to find positions that will minimize conflicts with their other social roles (e.g., spouse and/or parent) [41]. Therefore, to attract

more women, forest sector companies can provide information about their organizational attributes (e.g., flexible hours, family-friendly benefits, onsite daycare) in their job advertisements.

The forest sector should also utilize social media to attract younger generations. Generally, people who attend university and are entering the workforce nowadays were born after 1990 [42]. Since this generation is born in a digital era, they are frequently referred to as digital natives [43] and a major part of ‘Generation C’. The capital letter of ‘C’ refers to an English word of ‘connected’ symbolizing the generation connection with the internet [44]. In addition to attracting younger people, promotion through social media may also attract more women as they are reported to use social media more than men [45].

## 7. Study Limitations and Future Pathways

A potential limitation of this study is related to respondents’ experiences and knowledge. We have respondents with varied interactions with the forest sector, from having work experience and being forestry students for multiple years, to those just only enrolled for a few months. These differences create different perspectives. Limited experience in their leadership positions by some of our respondents may impact their responses. In addition, the respondents’ willingness to share their personal experiences with our interviewers is likely varied. Those variables may result in different time length of interviews. Moreover, since this study’s site selection is large universities in predominantly white and developed countries (the Global North), we did not aim to generalize the findings to the global forest sector.

Attracting more women should be balanced with retaining women who have been in the sector. Based on a recent study about the importance of women’s networks on supporting women’s retention in the forestry profession [46], future research can be directed at developing a comprehensive understanding of what is needed to retain women in the forest sector. There is also a need to do research addressing complex gender issues in the forest sector such as sexual harassment and the gender pay gap. With regard to a consideration that the studied universities may have great resources including funding availability, further research can be done at different types of organizations (e.g., profit-oriented companies), different scale of organizations (e.g., small to medium), and different locations (e.g., less-developed countries).

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## References

1. American Forest & Paper Association. Available online: <https://www.afandpa.org/advocacy/economic-impact> (accessed on 3 April 2020).
2. Hansen, E.; Conroy, K.; Toppinen, A.; Bull, L.; Kutnar, A.; Panwar, R. Does Gender Diversity in Forest Sector Companies Matter? *Can. J. For. Res.* **2016**, *46*, 1255–1263. [CrossRef]
3. World Bank. Labor Force, Female (% of Total Labor Force)—North America | Data. Available online: <https://data.worldbank.org/indicator/SL.TLF.TOTL.FE.ZS?locations=XU> (accessed on 3 April 2020).
4. World Bank. Labor Force, Female (% of Total Labor Force)—Finland | Data. Available online: <https://data.worldbank.org/indicator/SL.TLF.TOTL.FE.ZS?locations=FI> (accessed on 3 April 2020).
5. World Bank. Labor Force, Female (% of Total Labor Force)—Sweden | Data. Available online: <https://data.worldbank.org/indicator/SL.TLF.TOTL.FE.ZS?locations=SE> (accessed on 3 April 2020).

6. Lawrence, A.; Spinelli, R.; Toppinen, A.M.K.; Salo, E. What Are the Implications of the Bioeconomy for Forest-Related Jobs? In *Towards a Sustainable Bioeconomy: Assessment and the Way Forward*; Winkel, G., Ed.; European Forest Institute: Joensuu, Finland, 2017; pp. 108–117.
7. Bal, T.L.; Sharik, T.L. Web Content Analysis of University Forestry and Related Natural Resources Landing Webpages in the United States in Relation to Student and Faculty Diversity. *J. For.* **2019**, *117*, 379–397. [[CrossRef](#)]
8. Kristof, A.L. Person-Organization Fit: An Integrative Review of Its Conceptualizations, Measurement, and Implications. *Pers. Psychol.* **1996**, *49*, 1–49. [[CrossRef](#)]
9. Gharis, L.W.; Laird, S.G.; Osborne, D.C. How Do University Students Perceive Forestry and Wildlife Management Degrees? *J. For.* **2017**, *115*, 540–547. [[CrossRef](#)]
10. CWUR. Rankings by Subject—2017 | CWUR | Center for World University Rankings. Available online: <https://cwur.org/2017/subjects.php#Forestry> (accessed on 3 April 2020).
11. World Economic Forum. Available online: <https://www.weforum.org/reports/gender-gap-2020-report-100-years-pay-equality/> (accessed on 3 April 2020).
12. Kristof-Brown, A.L.; Zimmerman, R.D.; Johnson, E.C. Consequences of Individuals' Fit at Work: A Meta-Analysis of Person-Job, Person-Organization, Person-Group, and Person-Supervisor Fit. *Pers. Psychol.* **2005**, *58*, 281–342. [[CrossRef](#)]
13. Morrell, K. Decision Making and Business Ethics: The Implications of Using Image Theory in Preference to Rational Choice. *J. Bus. Ethics* **2004**, *50*, 239–252. [[CrossRef](#)]
14. Nelson, K.A. Consumer Decision Making and Image Theory: Understanding Value-Laden Decisions. *J. Consum. Psychol.* **2004**, *14*, 28–40.
15. Beach, L.R. *Image Theory: Decision Making in Personal and Organizational Contexts*; Wiley: Hoboken, NJ, USA, 1990.
16. Kruger, L.J.; Rodgers, R.F.; Long, S.J.; Lowy, A.S. Individual Interviews or Focus Groups? Interview Format and Women's Self-Disclosure. *Int. J. Soc. Res. Methodol.* **2019**, *22*, 245–255. [[CrossRef](#)]
17. 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**, *49*, 915–924. [[CrossRef](#)]
18. McGown, K.I. Student Perspectives on North American Forestry Education. *J. For.* **2015**, *113*, 585–586. [[CrossRef](#)]
19. Hubbard, J.A. Are Women Barking up the Wrong Tree? A Case Study of the Experiences of Women Majoring in Forest Resources. Ph.D. Thesis, University of Missouri, Columbia, MO, USA, 2014.
20. Kuhns, M.R.; Bragg, H.A.; Blahna, D.J. Involvement of Women and Minorities in the Urban Forestry Profession. *J. Arboric.* **2002**, *28*, 27–34.
21. Johansson, M.; Johansson, K.; Andersson, E. #Metoo in the Swedish Forest Sector: Testimonies from Harassed Women on Sexualised Forms of Male Control. *Scand. J. For. Res.* **2018**, *33*, 1–7. [[CrossRef](#)]
22. Von Hippel, C.; Wiryakusuma, C.; Bowden, J.; Shochet, M. Stereotype Threat and Female Communication Styles. *Pers. Soc. Psychol. Bull.* **2011**, *37*, 1312–1324. [[CrossRef](#)] [[PubMed](#)]
23. Wright, T. Women's Experience of Workplace Interactions in Male-Dominated Work: The Intersections of Gender, Sexuality and Occupational Group. *Gen. Work Organ.* **2016**, *23*, 348–362. [[CrossRef](#)]
24. Kaiser, C.R.; Spalding, K.E. Do Women Who Succeed in Male-Dominated Domains Help Other Women? The Moderating Role of Gender Identification. *Eur. J. Soc. Psychol.* **2015**, *45*, 599–608. [[CrossRef](#)]
25. Faniko, K.; Ellemers, N.; Derks, B. Queen Bees and Alpha Males: Are Successful Women More Competitive than Successful Men? *Eur. J. Soc. Psychol.* **2016**, *46*, 903–913. [[CrossRef](#)]
26. Derks, B.; Van Laar, C.; Ellemers, N. The Queen Bee Phenomenon: Why Women Leaders Distance Themselves from Junior Women. *Leadersh. Q.* **2016**, *27*, 456–469. [[CrossRef](#)]
27. Kanter, R.M. Some Effects of Proportions on Group Life: Skewed Sex Ratios and Responses to Token Women. *Am. J. Sociol.* **1977**, *82*, 965–990. [[CrossRef](#)]
28. Follo, G. A Hero's Journey: Young Women among Males in Forestry Education. *J. Rural Stud.* **2002**, *18*, 293–306. [[CrossRef](#)]
29. Griscom, B.W.; Adams, J.; Ellis, P.W.; Houghton, R.A.; Lomax, G.; Miteva, D.A.; Schlesinger, W.H.; Shoch, D.; Siikamäki, J.V.; Smith, P.; et al. Natural Climate Solutions. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, 11645–11650. [[CrossRef](#)]

30. Tarrant, M.A.; Cordell, H.K.; Green, G.T. PVF: A Scale to Measure Public Values of Forests. *J. For.* **2003**, *101*, 24–30. [[CrossRef](#)]
31. Nordlund, A.; Westin, K. Forest Values and Forest Management Attitudes among Private Forest Owners in Sweden. *Forests* **2011**, *2*, 30–50. [[CrossRef](#)]
32. D’Amato, D.; Droste, N.; Allen, B.; Kettunen, M.; Lahntinen, K.; Korhonen, J.; Leskinen, P.; Matthies, B.; Toppinen, A. Green, circular, bio economy: A comparative analysis of sustainability avenues. *J. Clean. Prod.* **2017**, *168*, 716–734. [[CrossRef](#)]
33. Kleinschmit, D.; Lindstad, B.H.; Thorsen, B.J.; Toppinen, A.; Roos, A.; Baardsen, S. Shades of Green: A Social Scientific View on Bioeconomy in the Forest Sector. *Scand. J. For. Res.* **2014**, *29*, 402–410. [[CrossRef](#)]
34. Hodge, D.; Brukas, V.; Giurca, A. Forests in a Bioeconomy: Bridge, Boundary or Divide? *Scand. J. For. Res.* **2017**, *32*, 582–587. [[CrossRef](#)]
35. Kacprzak, A. Green Jobs in the Forest Sector. In Proceedings of the XXV World Congress International Union of Forest Research Organizations, Curitiba, Brazil, 29 September–5 October 2019.
36. Milaj, K.; Sinha, A.; Miller, T.H.; Tokarczyk, J.A. Environmental Utility of Wood Substitution in Commercial Buildings Using Life-Cycle Analysis. *Wood Fiber Sci.* **2017**, *49*, 338–358.
37. Bowyer, J.; Bratkovich, S.; Howe, J.; Fernholz, K.; Frank, M.; Hanessian, S.; Groot, H.; Pepke, E.D. *Modern Tall Wood Buildings: Opportunities for Innovation*; Dovetail Partners Inc.: Minneapolis, MN, USA, 2016.
38. Larasatie, P.; Guerrero, J.E.; Conroy, K.; Hall, T.E.; Hansen, E.; Needham, M.D. What Does the Public Believe about Tall Wood Buildings? An Exploratory Study in the US Pacific Northwest. *J. For.* **2018**, *116*, 429–436. [[CrossRef](#)]
39. Greguras, G.J.; Diefendorff, J.M. Different Fits Satisfy Different Needs: Linking Person-Environment Fit to Employee Commitment and Performance Using Self-Determination Theory. *J. Appl. Psychol.* **2009**, *94*, 465–477. [[CrossRef](#)] [[PubMed](#)]
40. Ihme, T.A.; Sonnenberg, K.; Barbarino, M.-L.; Fisseler, B.; Sturmer, S. How University Websites’ Emphasis on Age Diversity Influences Prospective Students’ Perception of Person-Organization Fit and Student Recruitment. *Res. High. Educ.* **2016**, *57*, 1010–1030. [[CrossRef](#)]
41. Chapman, D.S.; Uggerslev, K.L.; Carroll, S.A.; Piasentin, K.A.; Jones, D.A. Applicant Attraction to Organizations and Job Choice: A Meta-Analytic Review of the Correlates of Recruiting Outcomes. *J. Appl. Psychol.* **2005**, *90*, 928–944. [[CrossRef](#)]
42. Booz&Co. Available online: <https://www.strategyand.pwc.com/gx/en/insights/2002-2010/rise-generation-implications-world-2020.html> (accessed on 3 April 2020).
43. Prensky, M. Digital Natives, Digital Immigrants. *Horizon* **2001**, *9*, 1–6.
44. Solis, B. Available online: <https://www.briansolis.com/2012/04/meet-generation-c-the-connected-customer/> (accessed on 3 April 2020).
45. Solis, B. Available online: <https://www.briansolis.com/2009/10/in-world-of-social-media-women-rule/> (accessed on 3 April 2020).
46. Crandall, M.S.; Costanza, K.K.L.; Zukswert, J.M.; Kenefic, L.S.; Leahy, J.E. An Adaptive and Evidence-Based Approach to Building and Retaining Gender Diversity within a University Forestry Education Program: A Case Study of SWIFT. *J. For.* **2020**, *118*, 193–204. [[CrossRef](#)]

