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The men who feed the world? Putting masculinities on the agenda for crop breeding research for development

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Science, technology, engineering, and mathematics (STEM) fields that are dominated by men and masculine have historically been shown to lead to poor representation and discrimination of women and gender diverse scientists, managers, and leaders. This in turn negatively impacts inclusive innovation processes and outcomes. We claim that crop breeding is one such field that is undeniably dominated by men, and even masculine, and could therefore harbor the very same dynamics of exclusion. Yet there is a dearth of research systematically investigating how masculinities are performed in the institutions, organizations, cultures, discourses, and practices of crop breeding. In this Perspective piece, we present a theoretically informed hypothesis of crop breeding organizations as representing spaces where masculinities associated with rurality, management, and science and technology come together in ways that may marginalize women and gender diverse individuals, including in intersection with sexuality, race, ethnicity, and disability. In developing this hypothesis, we draw upon theoretical and empirical insights from masculinity studies in rural sociology, management and organization studies, and feminist technoscience studies. We demonstrate how critical men and masculinities studies can help expose masculinities in crop breeding to investigation, discussion, criticism, and change. As we seek to advance equality in and through crop breeding organizations, this framing helps to guide future research with potential to positively impact the culture of crop breeding research.

KEYWORDS

crop breeding, feminist technoscience studies, gender, masculinities, management and organization studies, rural sociology

Introduction

Men and masculinities studies of science, technology, engineering, and mathematics (STEM) have demonstrated the tangible impact of masculinities on women and gender diverse individuals, including in intersection with sexuality, race, ethnicity, and disability. For instance, several studies of physics and engineering show how femininities become denigrated within the masculine cultures and practices of these fields (e.g., McIlwee and Robinson, 1992; Kvande, 1999; Gonsalves, 2014; Francis et al., 2017). Many women experience a seeming incongruence between their gender identity and professional identity (Faulkner, 2007). They are forced to navigate a "dilemma of difference," meaning whether "to construct themselves as more or less different from men, or more or less visible as women" (Kvande, 1999, p. 309). Consequently, women struggle to feel a sense of belonging, which leads to poorer career progression and retention (Faulkner, 2009). Not only does this compromise women's equal status,

rights, and opportunities, but also lack of diversity and inclusivity have been shown to negatively impact innovation processes and outcomes (e.g., Østergaard et al., 2011; Beck and Schenker-Wicki, 2014; Hofstra et al., 2020; Jones et al., 2020; Daehn and Croxson, 2021).

In agricultural research and development, studies have shown that women are underrepresented as researchers and in top-level management and leadership (Beintema and Stads, 2017; CGIAR, 2021). For instance, numbers from the World Economic Forum demonstrate that agriculture has the fifth lowest representation of women in leadership positions (28%) among the 19 sectors investigated (World Economic Forum, 2022). In the Consultative Group on International Agricultural Research (CGIAR), women represent 33% of the research workforce and 29% of the senior workforce (which includes management), while 90% of the Director-Generals are men (CGIAR, 2021). Notably, men working in agricultural research organizations have reported a greater sense of fit and comfort, as well as feeling more valued compared to their women colleagues, with men being less likely to quit their jobs in the short and medium-term (CGIAR-IEA, 2017). A recent article further describes the misogyny faced by women leaders in crop breeding organizations (Bentley and Garrett, 2023). Moreover, if agricultural research is anything like other STEM fields, there is also reasons to believe that Black, Indigenous, and People of Color (BIPOC), as well as queer women and disabled women, are particularly exposed to discrimination and marginalization (e.g., Yoder and Mattheis, 2016; McGee and Bentley, 2017; Harrison et al., 2020; Wells and Kommers, 2022).

Various publications and initiatives at the forefront of agricultural research and development have helped draw attention to women's experiences in crop breeding organizations (e.g., Bentley and Verhulst, 2022; De Oliveira Silva et al., 2022; García et al., 2022; Bentley and Garrett, 2023), as well as the need to increase diversity and inclusion in staffing (Wilde, 2012; CGIAR-IEA, 2017; CGIAR System Organization, 2020). However, what has largely been missing from discussions on diversity and inclusion in crop breeding organizations, is the need for a critical analysis of men and masculinities (Sachs, 2023; but do see Resurrección and Elmhirst, 2020, for a discussion on masculinity and epistemic authority in agricultural research), meaning the "historically and socially constructed categories which define legitimate behaviors and identities for men" (Sinclair, 1998, p. 84; see Connell, 1987, 1995).

There are several possible explanations for this conspicuous absence. For one, many feminist researchers and gender specialists find themselves working within organizations dominated by men that discourage critical analysis of men and masculinities. There is often a strong pressure from men in positions of power and privilege to focus on women and "to sanitize sex and gender issues, packing them into more palatable discourses of 'diversity'" (Sinclair, 2000, p. 84). Drawing on her lived experience working as a gender expert, Ferguson (2015) notes that "it is 'okay' to talk about gender as long as nobody has to give anything up or be profoundly challenged about their assumptions, beliefs and behaviors" (p. 392). This relates to a second and closely interrelated argument, namely that men and masculinities remain unmarked and unexamined (Whitehead, 2001). Indeed, part of the power of hegemonic forms of masculinity is that they appear "natural" or "normal" and, thus, taken-for-granted, invisible, unexamined, and undiscussable (Sinclair, 2000). Thus, Hearn (2004) argues that "[m]ost analysis and policy development in research and academia, and often even that which is concerned with gender, continues not to gender men explicitly and not to make explicit men's part in the problem of gender inequalities" (p. 57).

We ask what we might learn from critically examining men and masculinities in crop breeding organizations in order to shed light on the marginalization of women and gender diverse individuals as researchers, managers, and leaders. In exploring this question, we argue that much can be gained by engaging with literature on masculinities in rural sociology, management and organization studies, and feminist technoscience studies. Indeed, we posit that crop breeding organizations represent spaces where masculinities associated with rurality, management, and science and technology merge in complex and, at times, mutually reinforcing ways. In what proceeds, we introduce the field of critical men and masculinities studies, followed by key insights from masculinities studies in each of the respective fields. Accordingly, in this Perspective piece, we demonstrate how critical men and masculinities studies can help expose masculinities to investigation, discussion, criticism, and change (Hearn, 2004). We end with a call for more research on men and masculinities to improve equality in and through crop breeding for development as a field.

Critical men and masculinities studies

Starting in the 1980s, there was a growing interest in men as gendered subjects and masculinities in our understanding of social hierarchies, eventually giving rise to what is today known as critical men and masculinities studies (Pilcher and Whelehan, 2017). The field has largely converged around the idea of "multiple masculinities," meaning an understanding that several masculine identities co-exist in fluid, fragile, and fragmented ways. However, some masculinities become more culturally dominant than others, which is captured in the concept of "hegemonic masculinity" (Connell, 1987; Brittan, 1989; Jeff and David, 1994; Connell, 1995, 2000, 2002; Connell and Messerschmidt, 2005).[1,2] Still, while all men position themselves in relation to hegemonic masculinities, few are able to (or want to) fully enact them, resulting in other forms of masculinities (Connell, 1995). For instance, hegemonic masculinities are more commonly performed by white, middle-class, middle-aged, able-bodied, cisgender, and heterosexual men, while masculinities performed by black, queer, disabled, and lower-class men tend to become subordinate and marginalized. Importantly, studies have demonstrated the harmful impact that both hegemonic and subordinate masculinities can have on men, including higher risks of violence, alcoholism, mental and physical health issues, and so forth

1 This should not be read as saying that hegemonic masculinities are stable across time and place. Rather, they are historically, culturally, and spatially contingent and dynamic.

2 The concept of hegemonic masculinity has been criticized on grounds of being too abstract and ill-defined to be analytically useful (Donaldson, 1993); for becoming a shorthand for a particular set of, often negatively charged, traits and behaviors (e.g., individualism, aggression, and competitiveness) (Collier, 1998; Kerfoot and Whitehead, 1998; Martin, 1998; Jefferson, 2002); and, relatedly, for being over-simplified and for establishing a false dichotomy between hegemonic and non-hegemonic forms of masculinity (Demetriou, 2001). Taking into account several of these critiques, Connell together with Messerschmidt revisited and reworked the concept (Connell and Messerschmidt, 2005).

(Möller-Leimkühler, 2003; Garfield et al., 2008; Cleary, 2012; Shai et al., 2012; Cleary, 2019; Thepsourinthone et al., 2020; Roose et al., 2022).

However, while the pluralization of masculinity emphasizes multiplicity and difference, it is important not to lose sight of men's unities and collective and structural power (Cockburn, 1991; Collinson and Hearn, 1994). Indeed, all men benefit from hegemonic masculinities due to "patriarchal dividend" (Carrigan et al., 1985; Connell, 1995), meaning the advantage that all men gain as a result of women's subordination. Men often position themselves as masculine by situating women as "other" (Pini, 2008; Ellis and Meyer, 2009; Keddie, 2022), and distancing oneself from femininity "becomes a way to claim power" (Ottemo et al., 2021, p. 1020). Acker (1990) contends that "[w]omen's bodies cannot be adapted to hegemonic masculinity; to function at the top of male hierarchies requires that women render irrelevant everything that makes them women" (p. 153). Even if women can perform (aspects of) hegemonic masculinity, they are likely not judged as positively as men, or, indeed judged unfavorably or even penalized (e.g., Cockburn, 1991; Pierce, 1995; Rutherford, 2001; Pini, 2008).[3] Additionally, though hegemonic masculinity builds itself in opposition to femininity, queerness similarly presents a threat to it by undermining the artificial gendered binary on which its assumptions and subjugations rest (Cheng, 1999; Heasley, 2005).

Thus, the concepts of hegemonic and plural masculinities can help shed light on the most culturally dominant forms of masculinity in crop breeding organizations and their effects on women, men, and gender diverse individuals, while simultaneously emphasizing the contradictions and ambivalences men face in creating and sustaining gendered selves. We hypothesize that hegemonic and plural forms of masculinity in crop breeding organization are shaped by rural, managerial, and technoscientific masculinities and their interrelations, as explored in the next sections.

Rural masculinities

Studies in rural sociology have highlighted the culturally defined characteristics of hegemonic masculinities in farming, such as independence, self-reliance, resilience, determination, heroism, physical strength, toughness, ruggedness, and control over nature through manual labor as a means to maximize production (e.g., Bryant, 1999; Liepins, 2000; Peter et al., 2000; Laoire, 2002; Little and Panelli, 2003; Harter, 2004; Ferrell, 2012). Additionally, in line with globalization, industrialization, and neo-liberalization, rural masculinities have become increasingly described in terms of entrepreneurship, managerial skills, business acumen, and technological competence (Brandth, 1995; Bryant, 1999; Laoire, 2002; Little, 2002; Saugeres, 2002; Barlett and Conger, 2004; Kenway et al., 2006; Bell et al., 2015; Anderson, 2020).

Women and their bodies, by contrast, are framed as lacking the physical and technical abilities required to be a "good" farmer, including the lack of an embodied relationship with the land (Saugeres, 2002). The latter point is interesting as it "counters the normative belief that it is femininity rather than masculinity that is most closely associated with nature" (Pini, 2008, p. 21). Queer studies have also produced important critiques of heteronormativity and heterosexism in/of rural spaces, along with theoretical and empirical contributions to our understanding of the intersection of agriculture and queer identities (Gray et al., 2016; Leslie, 2017, 2019; Leslie et al., 2019; Hoffelmeyer, 2020, 2021; Pfammatter and Jongerden, 2023).

While a majority of studies on rural masculinity derive from European and American contexts, several studies have also been conducted on rural masculinities in the "Global South" (Bolt, 2010; Chowdhry, 2014, 2019; Gonda, 2017; Rai, 2020; Kaur, 2022; Ragetlie and Luginaah, 2023). For instance, Twagira (2014) shows how irrigation technology and mechanization introduced by colonial powers in French Soudan (today's Mali) became closely tied to the performance of masculinity. In a more contemporary study, Cole et al. (2015) investigated rural masculinities in Zambia. The authors drew the connection between hegemonic forms of rural masculinity (described above) and the idea of the "big man" in southern African settings, the latter of which "might describe a person who is powerful, chief-like, demands respect, is married (perhaps to multiple women) and head of a household, accumulates wealth through people (e.g., children, spouse), and owns or controls assets such as land, cattle, and farming equipment" (p. 158).

As crop breeders interact with rural masculinities in the field, and may themselves have lived experience in rural settings, an important question worth investigating is how rural masculinities may permeate the research personas and practices of crop breeders? Furthermore, in what ways may heteronormativity and heterosexism in/of agriculture contribute to the marginalization of queer researchers? However, as crop breeders are embedded in organizational and managerial structures, we next explore the potential link between rurality and managerial masculinities.

Managerial masculinities

Since the 1990s, a rich body of work in management and organization studies has foregrounded the ways in which masculine values and assumptions are mutually shaped with the structures, cultures, and practices of organizations, and the ways in which men use managerial masculinities to exercise control over women (and many men) in the workplace (Acker, 1990; Burton, 1991; Cockburn, 1991; Kerfoot and Knights, 1993; Gherardi, 1995, 1996; Collinson and Hearn, 1996; Maier, 1997; Kerfoot and Whitehead, 1998; Gherardi and Poggio, 2001). Queer studies has also been applied to management and organization studies to uncover organizational and managerial heteronormativity and workplace experiences of those who identify as gay, lesbian, bisexual, transgender, and queer (Bendl et al., 2008; Pullen et al., 2017; Rumens, 2017a,b; Rumens et al., 2019).

Kerfoot and Knights (1996, 1998) found that dominant management practices tended to be associated with abstract, rational, calculating, instrumental, controlling, competitive, aggressive, future-oriented, strategic, and, most of all, masculine subjectivities. By contrast, studies have illustrated the tensions that exist between "manager" and "woman" (Marshall, 1984, 1995; Gherardi, 1996; Sinclair, 1998; Blackmore, 1999; Gherardi and Poggio, 2001). These studies demonstrate how women managers have to surveil and manage their gender to align with the orthodoxies of the workplace, such as by adapting (and typically minimizing) their femininities, sexuality, dress, speech, emotions, intelligence, and knowledge.

Scholars of management and organization studies have further sought to define typologies to classify managerial masculinities. In their seminal

3 That does not mean, however, that women cannot or do not perform masculinities (see, e. g., Halberstam, 1998).

work, Collinson and Hearn (1994) created a typology consisting of five (often overlapping) hegemonic forms of managerial masculinity: authoritarianism, careerism, informalism, entrepreneurialism, and paternalism. Scholars such as Bird (2006) and Pini (2008) assert that rural discourses and material conditions are particularly conducive of paternalistic managerial masculinity, which describes a combination of (overt and covert) violence, care, and protection grounded in a familial narrative and the paternal figure who is wise, self-disciplined, authoritative, and benevolent. Indeed, dominant employment relations, decision-making processes, and ownership arrangements in agriculture have historically been paternalistic (Wallace et al., 1994; Bennett, 2004; Price and Evans, 2006; Gibbon et al., 2014). Pini (2008), in her examination of managerial masculinities in farmers' unions and networks, hypothesizes that "the hegemony of paternalism on-farm has spilled over into organizational life" (p. 119), with both managers and farmers being "engaged in battle and require the same traits of aggression, toughness, tenacity and strength" (p. 120). Women, by contrast, "are presented as overly emotional, easily distracted and irrational" (Pini, 2008, p. 120). Thus, Pini (2008) draws the conclusion that "[b] eing a 'real farmer', a 'real agricultural leader' and a 'real man' are often constructed as synonymous" (p. 34).

Still, despite the importance of organizations and management for the (re) production of (certain) men's power and masculinities, we know little of how masculinities are performed in the organizations and managerial structures and practices of agricultural research and development, including crop breeding. Thus, the extent to which and the ways in which paternalistic managerial masculinity, and/or other types of managerial masculinities, pervades in crop breeding research organizations remain unknown, including how these may potentially reinforce heteronormativity. Given that these are technoscientific organizations, however, we can further benefit from insights from feminist technoscience studies.

Technoscientific masculinities

Feminist technoscience studies has helped produce important critiques of the deeply Eurocentric, imperialist, and masculine ideology and philosophy of science (e.g., Harding, 1991; Noble, 1992). Such an ethos promotes a mechanistic worldview, control and mastery over nature, and distance between the observer and the observed (Merchant, 1980; Keller, 1985), and acknowledges white, cisgender, heterosexual, well-educated, and economically privileged men as the most legitimate knowing subject (Haraway, 1997; Harding, 1998). Studies have further shown how male scientists and academics have been depicted, popularized, and celebrated as confident, arrogant, individualistic, self-reliant, heroic, tough, aggressive, and rugged (as well as passionate and sympathetic; Haraway, 1989; Hevly, 1996; Oreskes, 1996; Ong, 2005; Endersby, 2009; Myers, 2010; Ensmenger, 2015; Milam, 2015).

As noted in the introduction to this Perspective, women, femininities, and gender diverse individuals are constructed as being in opposition to science, leading to marginalization and exclusion. Indeed, women have been considered less capable of abstract, rational, and objective thought, which is particularly true for BIPOC (see, e.g., Schiebinger, 2004). This prompts us to ask: what characterizes a "legitimate" or "good" crop breeder and how are these characteristics associated with masculine subjectivities? To what extent and in what ways is the technoscientific culture of crop breeding masculine and heteronormative? How does this culture impact the sense of belonging and, ultimately, retention and progression of women and gender diverse individuals, including in intersection with sexuality, race, ethnicity, and disability?

Toward masculinities studies in/of crop breeding research for development

Crop breeding research organizations can be theorized as spaces where rural, managerial, and technoscientific masculinities interconnect in complex and, at times, mutually reinforcing ways. For instance, we have seen how rural, managerial, and technoscientific hegemonic forms of masculinity share some common themes, including individualism, heroism, toughness, rationality, and control (whether over employees or nature). These masculine performances and interconnections may, in turn, affect the positions and experiences of women and gender diverse individuals in crop breeding research organizations. It is our opinion that to create more equitable, supportive, and enabling environments in crop breeding research organizations, there is a need to transform the masculine organizational and institutional structures, cultures, discourses, and practices. Such a transformation can be assisted by critical men and masculinities studies, which exposes masculinities to investigation, discussion, criticism, and change. We thus call for more scholarly attention and research in this space to improve equality in and through crop breeding for development as a field.

Author contributions

IAT and HAT contributed to the conception of the paper and manuscript revision. IAT wrote the first draft of the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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