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REVIEW ARTICLE

Developing Leaders and Leadership in Agrobiodiversity Management

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Abstract

Agrobiodiversity, the variety and variability of animals, plants, and microorganisms used in food and agriculture, is critical for ensuring food security and maintaining ecosystem health. Effective leadership in agrobiodiversity management is crucial for overcoming challenges such as climate change, habitat loss, and unsustainable agricultural practices. This paper examines the key qualities of leadership required for agrobiodiversity management, explores strategies for developing leaders in this field, and discusses the challenges and opportunities for fostering future leadership. The paper concludes by emphasizing the need for ongoing leadership development through education, mentorship, and inclusive practices to ensure the sustainable management of agrobiodiversity.

Keywords: Leadership, Values-based leadership, Improvisational practice, Sustainability, Collaboration, Mentorship, Governance, Innovation, Resilience, Visionary thinking.

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Introduction

Agrobiodiversity, or agricultural biodiversity, encompasses the range and variability of life forms, including plants, animals, and microorganisms, that are essential for food production and ecosystem services. It is central to addressing the challenges of food security, climate change, and sustainable agricultural intensification. However, managing agrobiodiversity effectively is fraught with challenges, such as habitat loss, climate change, and the prevalence of monoculture farming. Effective leadership is key to addressing these challenges, as it drives conservation efforts, promotes sustainable practices, and ensures the long-term viability of agrobiodiversity. This review paper explores the role of leadership in agrobiodiversity management, identifying the key leadership practices required, strategies for developing leaders, and the opportunities and challenges faced in cultivating future leaders.

The Evolving Landscape of Leadership?

Food and nutritional insecurity, ethnic, racial, and religious tensions, geopolitical unrest, trade wars, and wealth and power inequities mean that the context in which leadership is practiced today changes rapidly and unpredictably. The effective practice of leadership, however, remains unchanged and unchanging, albeit largely undiscovered and mostly misunderstood.

Leadership, as an improvisational practice, is not merely about managing resources or dictating outcomes. It is a dynamic, relational practice that thrives in uncertainty and complexity. For too many years, our understanding of leadership has been rooted in the idea of structure, authority, and control-values that

were strongly emphasized in traditional management frameworks. However, as thinking evolves, leadership is increasingly understood to be an improvisational practice that unfolds in real-time, shaped by the unique challenges and needs of the moment (Bateson, 2016; Haslam *et al.,* 2020; Ladkin, 2020).

True leadership involves guiding a group through a shared purpose, influencing individuals not by authority but through inspiration, empathy, and the ability to connect on a human level. It requires vision, the ability to navigate complexity, and the capacity to make decisions that balance short-term needs with long-term sustainability. Leadership is thus seen as a social achievement-emerging not just from one individual's actions, but from the interactions within the team or organization, where each member contributes to the collective direction and purpose.

An essential quality of effective leadership is courage-acting when others hesitate, speaking out when silence is easier, and taking risks despite uncertainty. Leadership in the realm of agrobiodiversity, for instance, requires the courage to champion long-term sustainability goals, even when they challenge short-term market demands. It also requires the ability to inspire trust and engagement, making leaders accountable not just to their teams but to the broader society whose food security and ecosystem services depend on their decisions.

Leadership is a practice of influencing people to change the way they think and act (Jessup, 2024). It is an improvisational, relational, and phenomenological practice, one that requires courage, authenticity, and a deep understanding of the human experience, dependent on making sense of the circumstances you are in at a particular point in time. And effective leadership is highly contextual, requiring leaders to understand what they are leading or managing. Leaders must have sufficient content knowledge that they can use first principles thinking, scepticism of received wisdom, and continuous learning to create understandable change for their teams and organizations.

Over time, our understanding of leadership has moved away from a static, hero-centric view to one that integrates management and leadership seamlessly. This evolution in thought aligns with the insights of thinkers such as Henry Mintzberg (2009, 2023), who emphasized that leadership is "management done well." It is about aligning actions with broader organizational goals and adapting to changing circumstances in a way that maintains momentum toward a collective vision. This review article attempts to capture some of these perspectives.

Values-Based Leadership

As leadership practices shift from authority and control to influence and authenticity, values-based leadership emerges as a critical paradigm. Leadership is often misunderstood, equated with authority, titles, or formal positions of power. But leadership is not about rank-it is about influence, responsibility, and the ability to inspire action. Leadership is a dynamic, ever-evolving practice that requires adaptability, ethical decision-making, and purpose.

In its essence, then, leadership as an improvisational act requires making real-time decisions, responding to unforeseen challenges, and guiding people toward common goals in uncertain environments. The best leaders are not those who rigidly follow a predetermined script but those who adjust, adapt, and navigate complexity with agility. These leaders are guided by their values.

The Nature of Values-Based Leadership

Values-based leadership is predicated on the idea that effective leaders align actions with core ethical principles. Rather than lead by command or compliance, they lead by example, embodying the values they espouse. These values act as an internal compass, guiding decisions even when external conditions are ambiguous or difficult.

This concept contrasts with more transactional approaches, where incentives or penalties drive behaviour. Values-based leadership is relational and reflective, grounded in self-awareness, personal integrity, and mutual respect.

Theoretical Perspectives and Helpful Models

Several leadership models (Greenleaf, 1977; George, 2003; Sanders, 2007; Northouse, 2016) provide foundations for thinking about values-based leadership:

- Transformational leadership focuses on vision, inspiration, and moral purpose.
- Servant leadership promotes humility, empathy, and community.
- Authentic leadership stresses self-awareness and an internalized moral perspective.
- Adaptive leadership demands navigating complexity with values at the core.
- Transcendent leadership argues that self-mastery and spiritual maturity define great leadership.

Each model contributes facets of purpose, ethics, service, and adaptability to a composite image of the values-based leader. Leadership is not about choosing between the models but about using them effectively in context.

Practices of Values-Based Leaders

Self-knowledge and reflection

Values-based leaders engage in continual introspection, refining their awareness of what matters most. They journal, seek feedback, and ask critical questions about their motivations.

Integrity in action

Living one's values means acting consistently. It means standing for principles, even under pressure.

Empowering others

Values-based leaders are committed to developing those around them. They promote inclusivity, listening, and shared success.

Purpose orientation

These leaders often connect their work to a broader societal or ecological mission. Their decisions consider not only shareholders but also stakeholders and future generations.

System awareness

Especially in adaptive and transcendent leadership, values guide leaders in complex systems, where there are no clear-cut answers and multiple truths must coexist.

Sharing and agreeing on values

Getting a team aligned on values is fundamental. By having everyone agree to the values by which the team will operate, there is a solid basis on which success can be discussed, unhelpful behaviours identified and addressed, and professional development coordinated. The process on making values explicit and agreeing as a group to work in honour of them can be the step change often needed for success.

Key Leadership Qualities for Agrobiodiversity Management

Visionary thinking and strategic planning

Effective leaders in agrobiodiversity management must possess a clear vision of a sustainable future where agricultural practices and biodiversity conservation coexist harmoniously. Leaders must be able to anticipate future challenges, such as the impacts of climate change on crop yields and biodiversity, and devise strategies that balance the competing demands of food security and environmental sustainability (Altieri *et al.,* 2017). Visionary leaders inspire others to embrace sustainable practices, integrating ecological, social, and economic perspectives into their long-term goals (Pretty *et al.,* 2018).

Expertise and knowledge

Knowledge of ecological principles, sustainable farming techniques, and biodiversity conservation strategies is essential for leaders in agrobiodiversity management. These leaders must be well-versed in areas such as agroecology, plant and animal breeding, and conservation biology to make informed decisions. Furthermore, they must stay current with the latest research and technological advancements in agricultural sustainability (Brauman *et al.,* 2016; Thrupp, 2016). A well-developed knowledge base is crucial for advocating for appropriate policies and implementing effective conservation strategies (FAO, 2019).

Communication and collaboration

Successful leadership in agrobiodiversity requires strong communication skills and the ability to foster collaboration among various stakeholders, including farmers, policymakers, researchers, and the broader community (De Schutter, 2014). Leaders must be able to articulate the importance of agrobiodiversity, share knowledge effectively, and mobilize support for sustainable practices. Furthermore, collaboration is essential for integrating diverse perspectives and expertise, ensuring that conservation efforts are holistic and inclusive (Altieri and Nicholls, 2020).

Conflict resolution and negotiation

Managing agrobiodiversity often involves navigating conflicting interests among stakeholders, such as balancing conservation goals with the need for increased agricultural productivity. Leaders must possess strong conflict resolution and negotiation skills to mediate between these interests and find solutions that support both biodiversity and food security (Fowler and Hodgkin, 2004). This requires the ability to engage in constructive dialogues, build consensus, and ensure that all voices are heard (Shiva, 2016).

Adaptability and innovation

The dynamic nature of ecosystems and agricultural systems demands that leaders be adaptable and open to innovative solutions. Agrobiodiversity leaders must be able to respond to emerging threats, such as new pest species or changing climatic conditions, and adapt their strategies accordingly. This may involve the development of new technologies, practices, or policies to enhance resilience and sustainability (Pretty *et al.,* 2018). Innovative leadership is crucial for ensuring that agrobiodiversity management strategies remain effective in the face of rapidly changing environmental conditions.

Entrepreneurship and resource mobilization

Effective leaders in agrobiodiversity management must also demonstrate entrepreneurship by identifying funding opportunities and securing the resources necessary to implement conservation initiatives. This requires not only the ability to mobilize financial resources but also the capacity to build partnerships with donors, governments, and the private sector (FAO, 2018). Resource mobilization is essential for sustaining long-term agrobiodiversity management programs and ensuring their scalability (Bennett *et al.,* 2016).

Developing Leaders in Agrobiodiversity Management

Developing effective leaders in agrobiodiversity management requires a multi-faceted approach that includes educational programs, mentorship, and specialized training initiatives. Universities and research institutions play a vital role in equipping future leaders with the scientific and technical expertise necessary for agrobiodiversity management. Programs in agroecology, sustainable agriculture, and environmental science provide students with the foundational knowledge required to address the complex challenges of agrobiodiversity (Altieri *et al.,* 2017).

Mentorship and apprenticeship programs are also essential for developing leadership skills in the field of agrobiodiversity. Experienced leaders can provide guidance and support to emerging leaders, helping them navigate the complexities of the field and develop the critical thinking and decision-making skills necessary for effective leadership (Fowler, 2013). Institutions such as the FAO and IUCN offer mentorship programs that connect young professionals with experienced mentors who can offer practical advice and career development opportunities.

Leadership development workshops and training programs that focus on specific skills such as strategic planning, communication, and conflict resolution are also crucial. These programs provide participants with the tools they need to lead effectively in the context of agrobiodiversity management. For example, the Global Biodiversity Leadership Development Initiative (GBLDI) offers training programs designed to build leadership capacity in the field of biodiversity conservation (FAO, 2018).

The Crawford Fund (2025) has been a leader in practice-based training of research managers. Its highly sought-after Master Classes provide an immersion process where emerging and experienced leaders can have an immediate impact on their management performance. These programs link leadership and management closely, and are developing the value-based approach to both management and, increasingly, to governance. Governance is increasingly important given the collaborative nature of research initiatives, and refers to the arrangements (processes, institutional arrangements, and underpinning compliance requirements) used to make decisions and take actions to ensure project meet their targets.

What Can You Do to Develop as a Leader?

Leadership development is a continuous process that involves both formal and informal learning. It is not merely about gaining technical knowledge but developing a deep understanding of oneself and one's relationship with others in the context of the broader systems in which we operate. Here are several strategies for developing as a leader in agrobiodiversity management:

Self-reflection and self-awareness

Regular self-reflection is essential for leadership growth. It allows individuals to assess their actions, understand their motivations, and identify areas for improvement. Leaders must continuously question their assumptions and be open to feedback from others. This self-awareness is critical for navigating complex challenges and making decisions that align with both personal values and the larger organizational goals.

Seek mentorship and guidance

Mentorship plays a pivotal role in leadership development. Learning from those with more experience helps to develop practical leadership skills and provides valuable insights into navigating the challenges of agrobiodiversity management. Seeking mentors from a variety of disciplines, such as agriculture, environmental science, and policy, helps broaden leadership perspectives.

Pursue formal leadership training

Attending leadership development programs that focus on areas such as strategic thinking, communication, and conflict resolution is essential for building the skills necessary for effective leadership. Engaging in such programs provides opportunities for networking, learning best practices, and gaining new tools that can be applied in real-world settings.

Embrace lifelong learning

Leadership development does not stop after formal education or training programs. The best leaders are those who remain curious and engaged with new developments in their field. Participating in conferences, reading widely, and engaging in continuous learning allow leaders to stay informed and adapt to evolving challenges in agrobiodiversity management.

Foster collaborative relationships

Building strong, collaborative relationships is essential for effective leadership. Leaders must create environments where trust, respect, and open communication can flourish. This involves being receptive to new ideas, supporting others' growth, and facilitating shared decision-making processes.

Case Studies: Successful Leaders in Agrobiodiversity Management

Genetic resources conservation-led global effort

Australia's engagement with plant genetic resources from 1926 to 1980 (Byerlee, 2025) was key in the global movement for conservation and utilization of agricultural genetic diversity. Australian-led plant collection expeditions after World War II, and by the 1950s, Australia had become a global leader in genetic resource conservation, largely due to Sir Otto Frankel's advocacy. Australia's plant exploration efforts were shaped by the country's agricultural dependence on introduced species, with institutions like the Waite Agricultural Research Institute playing a central role. During the 1960s and 1970s, Australia influenced CGIAR centres and global pasture systems but faced challenges in transferring its farming systems to other regions. By the 1980s, the focus shifted from conservation to ownership and access, which has diminished Australia's role as a global leader in genetic resource conservation. The vision, however, has now become embedded more widely throughout the whole genetic resources system.

Dr. Vandana Shiva

Dr. Shiva, a prominent environmental activist and founder of the Research Foundation for Science, Technology, and

Ecology, has been a leader in promoting agrobiodiversity through her Navdanya initiative. Her leadership has focused on preserving seed diversity and promoting organic farming practices. By combining traditional knowledge with modern ecological principles, Dr. Shiva has mobilized communities and influenced policy at both national and international levels (Shiva, 2016).

Dr. Cary Fowler

Dr. Fowler, former executive director of the Global Crop Diversity Trust (Crop Trust), has been instrumental in safeguarding global crop diversity. Under his leadership, the Svalbard Global Seed Vault was established as a secure storage facility for the world's seed collections. His work exemplifies strategic vision, knowledge, and resource mobilization in the field of agrobiodiversity conservation (Fowler and Hodgkin, 2004).

International Rice Research Institute (IRRI)

The International Rice Research Institute (IRRI) is a leader in agrobiodiversity management, particularly in the development of rice varieties that are resilient to climate change and pests. IRRI's collaborative approach, which integrates research, innovation, and partnership-building, has been instrumental in enhancing agrobiodiversity and improving food security in rice-growing regions (IRRI, 2019).

Challenges and Opportunities in Developing Agrobiodiversity Leaders

Challenges

Several challenges hinder the development of leadership in agrobiodiversity management, including limited financial resources, lack of awareness about the importance of agrobiodiversity, and political instability. Additionally, the complexity of agrobiodiversity management requires interdisciplinary approaches, which can be difficult to implement due to institutional silos (Bennett *et al*., 2016). Moreover, the socio-political context in which agrobiodiversity management operates often hinders effective leadership development, as entrenched agricultural practices and policies may prioritize short-term productivity gains over long-term sustainability (De Schutter, 2014).

Opportunities

Despite these challenges, there are significant opportunities for promoting leadership development in agrobiodiversity management. The growing recognition of the importance of sustainable agriculture and biodiversity conservation in global agendas, such as the United Nations Sustainable Development Goals (SDGs), has led to increased funding and policy support for agrobiodiversity initiatives (Global Alliance for the Future of Food, 2019). Furthermore, promoting gender equity and inclusivity in leadership development programs will ensure a diverse pool of leaders with varied perspectives, which is critical for the sustainable management of agrobiodiversity (AWARD, 2020).

Conclusion

Leadership is essential for the sustained management of agrobiodiversity. Leaders who possess a clear vision, strategic thinking, and the ability to collaborate across sectors are crucial for overcoming the challenges facing agrobiodiversity management. By investing in educational programs, mentorship, and leadership development initiatives, we can cultivate the next generation of leaders who will drive the conservation and sustainable use of agrobiodiversity. As global pressures on food systems intensify, the need for strong, visionary and improvisational leadership in agrobiodiversity management will only grow, highlighting the importance of continuous leadership development to ensure the resilience and sustainability of agricultural systems.

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