

Review

‘Land Maxing’: Regenerative, Remunerative, Productive and Transformative Agriculture to Harness the Six Capitals of Sustainable Development

Roger R. B. Leakey ^{1,*}  and Paul E. Harding ²¹ International Tree Foundation, Oxford OX4 1JE, UK² Tropical Agriculture Association International, Newton Stewart DG8 6EQ, UK; chair@taa-international.org

* Correspondence: rogerleakey@btinternet.com

Abstract

After decades of calls for more sustainable land use systems, there is still a lack of consensus on an appropriate way forward, especially for tropical and subtropical agroecosystems. Land Maxing utilises appropriate, community-based interventions to fortify and maximise the multiple, long-term benefits and interest flows from investments that rebuild all six essential capitals of sustainable development (natural, social, human, physical, financial and political/corporate will) for resource-poor smallholder communities in tropical and subtropical countries. Land Maxing adds domestication of overlooked indigenous food tree species, and the commercialization of their marketable products, to existing land restoration efforts while empowering local communities, enhancing food sovereignty, and boosting the local economy and overall production. These agroecological and socio-economic interventions sustainably restore and intensify subsistence agriculture replacing conventional negative trade-offs with fortifying ‘trade-ons’. Land Maxing is therefore productive, regenerative, remunerative and transformative for farming communities in the tropics and sub-tropics. Through the development of resilience at all levels, Land Maxing uniquely addresses the big global issues of environmental degradation, hunger, malnutrition, poverty and social injustice, while mitigating climate change and restoring wildlife habitats. This buffers subsistence farming from population growth and poor international governance. The Tropical Agricultural Association International is currently planning a programme to up-scale and out-scale Land Maxing in Africa.

Keywords: agroforestry; agroecology; biodiversity; community engagement; climate change; marketing and trade; non-timber forest products; policy; tree domestication



Academic Editors: Alejandro Rescia and David Lopez-Carr

Received: 27 April 2025

Revised: 13 June 2025

Accepted: 19 June 2025

Published: 26 June 2025

Citation: Leakey, R.R.B.; Harding, P.E. ‘Land Maxing’: *Regenerative, Remunerative, Productive and Transformative Agriculture* to Harness the Six Capitals of Sustainable Development. *Sustainability* **2025**, *17*, 5876. <https://doi.org/10.3390/su17135876>

Correction Statement: This article has been republished with a minor change. The change does not affect the scientific content of the article and further details are available within the backmatter of the website version of this article.

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

There have been numerous international reports (Rio Earth Summit, 1992; Millennium Ecosystems Assessment, 2005; International Assessment of Agricultural Science and Technology for Development, 2009), international development goals (UN-SDG/One Health/African Union Agenda 2063 goals), declarations from policy conventions (the Malabo Declaration, UNCDD and UNFCCC, Global Biodiversity Framework and UN Paris Climate Agreement) and international stakeholder conferences (e.g., COP29 for climate change, COP 19 for biodiversity etc.) indicating the urgency to take effective and authoritative action to change the way we utilize the natural capital of our planet. Likewise, there have been many wake-up calls urging similar action [1–9]. In response to this urgent need

for action there are thousands of small not-for-profit projects around the world addressing local issues, some aggregating into alliances (e.g., Global EverGreening Alliance, Healthy Planet Alliance, Earth Team, etc.). Many such initiatives are being championed by the Earthshot Foundation. Notwithstanding these positive initiatives, there are calls to recognize the role of history in the inequality of opportunity [10] and the need for dialogue [11]. However, in contrast to the past, there is a need to recognize that appropriate policies must also address social and economic issues at different scales, ranging from planetary, to regional and to local.

2. Issue of Scale

To address the needs of people and planet, policy interventions must meet the requirements of multiple scales.

2.1. Planetary Scale

The causes and concerns around land degradation are complex and not always well recognized. They are often symptoms of wider and more pervasive issues that can be traced back to governance systems. Typically, these are based on colonial history and population growth arising from the industrial revolution and globalized export/import economies. Anthropogenic land degradation is usually associated with reduction or loss of biological productivity, ecological integrity and/or value to humans. This is especially true when reliance on natural resources is associated with poverty [12]. As a result, the world is torn by deforestation, land degradation, hunger, malnutrition, poverty, loss of wildlife habitat, loss of biodiversity, climate change, zoonotic pandemics, illegal migration and social injustice.

An examination of how far this damage has progressed has identified that we have now exceeded six of the nine planetary boundaries [6]. The authors conclude that anthropogenic impacts on earth systems must therefore be considered in a systemic context to capture geosphere-biosphere-anthroposphere interactions. Gupta et al. [13] have also reported the transgression of seven out of eight boundaries required for human dignity and an escape from poverty. In seeking a solution to these serious anthropogenic failures, a recent study with UK-based African refugees has examined the complex interactions between the breakdown of natural, social and human capital that have led to land degradation, climate change and loss of wildlife habitat, social injustice and conflict, hunger and malnutrition, disease and ill-health and ultimately to migration [14,15]. The agricultural consequences of these capital breakdowns have been loss of yield, creating 'yield gaps'. This loss of productivity is common in staple food crops [16], in which the actual yield achieved by farmers can be as low as 15% of potential yield. Yield gaps are also found in cash crops [17] and even pasture [18]. Furthermore, loss of land cover on watersheds results in erosion and downstream flooding as well as landslides and silt deposition due to erosion.

The consequence of this complex set of crucially important collapsing capitals is that farmers in many tropical countries suffer from a lack of access to appropriate infrastructure, livelihood support and to social justice. Together these in turn result in serious deprivation of opportunity and hence to their inequality with other members of society. However, farmers have indicated that they seek local opportunities for income generation and empowerment to diversify both their livelihoods and farming systems. Denning [19] thus sees the requirement for informed, responsive and courageous multi-sectorial leadership comprising a portfolio of global, regional and national interventions in market infrastructure, postharvest stewardship, healthy diets and social protection. These are needed to reduce land degradation, the loss of natural ecosystems and biodiversity loss, greenhouse gas emissions and critically to increase food availability.

The big agroecological problems can be traced back to the breakdown of natural capital—especially forests and woodlands, soils, water and wildlife [20,21]. This is especially true of farming systems in the tropics where natural capital is severely degraded by loss of wildlife habitats and biodiversity. This traps small-scale subsistence farmers in declining staple food production with yields as low as 10–15% of the potential yield of modern crops—described as ‘land failing’. Land failing also leads to human-wildlife conflicts in the national parks and other protected areas that have typically been created independently from farming.

2.2. Development Scale in Tropical and Subtropical Regions

Despite widespread recognition that the Green Revolution has had numerous benefits for humanity there is also real concern about its undesirable impacts on smallholder farmers, especially in Africa [22,23]. These reviews recommend a paradigm shift to focus on the provision of economic development in Africa. However, there are conflicting interests and disagreements between the income-rich nations and the most impacted income-poor nations about who should take responsibility for the enormous costs. This is compounded by a divergence of opinion about ‘what to do’ and ‘how to do it’. The resulting stalemate and lack of progress in such issues as climate change, hunger and illegal migration has arisen despite decades of research and development on practices such as agroforestry and sustainable land use [24,25]. Furthermore, this impasse has been confused by the development of numerous named initiatives for sustainable multifunctional land use. Many of these primarily focus on nature-based solutions for environmental restoration to combat deforestation, land degradation and climate change (Table 1). In some instances there are additional concerns about the altruistic value of commercial organizations engaged in the establishment of carbon offsets to compensate for their GHG emissions. Unfortunately, when taken together, this proliferation of different approaches and initiatives confuse both advocates for change and to decision makers seeking to find a way forwards. Furthermore, the initiatives compete for funding and public/policy recognition. The associated protectionism of these different specific areas of focus also stagnates public discussion and understanding.

Table 1. Some of the named approaches aimed at sustainable land use and multifunctional agriculture [14,15,20,26,27].

Multifunctional Agriculture	Citation
Agroforestry	[20,24,28,29]
Agroecology	[30–33]
Regenerative agriculture	[34–37]
Permaculture	[38,39]
Climate smart agriculture	[40–42]
Carbon farming	[43,44]
Conservation Agriculture	[45–47]
Ecoagriculture	[48,49]
EverGreen Agriculture	[50,51]
Agriculture diversified by neglected and underutilized species (NUS)	[52–55]
Organic agriculture	[56–58]

Despite the international policy inertia, there have been some positive steps due to national pledges to restore 350 million hectares of degraded land under the Bonn Challenge—for example, pledges by 34 African countries under the African Forest Restoration Initiative [59]. Typically, this is associated with national governments creating Min-

istries and Departments with responsibility for land restoration through agroforestry and other forms of sustainable land use, e.g., India [60] and Mexico [61].

2.3. Local Scale in Communities and on Farms

The challenge facing global society is therefore to find practical and pragmatic ways to ‘reboot our planet’. One of the big issues is to find ways to generalize the complex set of often site-specific interacting factors [62,63] in ways that can lead to appropriate responses by political and corporate decision makers. This is because complex environmental systems are often intertwined with complex social systems involving governance, community actions, knowledge systems, power and authority [64,65]. These can also include a range of different livestock systems.

A study of the social–ecological dynamics of seventeen cases in Africa aimed at sustainable natural resource restoration and livelihood improvement found varying degrees of success due to the motivation and capacity of different stakeholders [63]. A highlight of this study was the need in low-income situations for practices to create incentives for participation with strengthened partnerships over the long term. Thus, interventions are needed at different levels of governance to achieve long-term system transformation that reverse the integration of resource degradation with poverty. The challenge is therefore to find ways to address these big issues.

Importantly, in contrast to the proposed interventions by the Royal Society [66], which are dominated by biotechnology, there is now growing recognition of the need for socially appropriate inputs in the future of food and farming.

For decades, international reports have been concluding that ‘business as usual is no longer an option’. Despite this there is still a need for a new model to achieve the much-needed increased investment in the five commonly recognized capitals of sustainable development (natural, social, human, physical, financial) especially in tropical and subtropical land use. Hopefully this would then encourage a rebalancing of the political/corporate will (a sixth capital), which currently is dominated by small-scale high input monocultures that fail to feed and meet the household needs of subsistence farmers [67].

Described as ‘land sharing and land sparing’ there has been recent international debate about the need to both regenerate agroecosystems and conserve the biodiversity needed for ecological functions in degraded and underperforming farmland [32,68]. The philosophy of ‘land sparing’ involves keeping intensive agriculture separate from the conservation of natural habitats. On the other hand, ‘land sharing’ seeks farming systems that are both productive and wildlife-friendly. To progress ‘land sharing’, many slightly different land restoration approaches have been developed to reduce the environmental impacts of agricultural practices (Table 1). These approaches are broadly encompassed by the terms ‘agroforestry’, ‘agroecology’ and ‘regenerative agriculture’; all aimed at more sustainable and restorative approaches to agriculture.

The concept of Land Mxing, in congruence with Bennett [69], emphasises the need to go beyond the ‘land sparing’ and ‘land sharing’ philosophies and to focus on ways in which agriculture can additionally improve human well-being [67]. The development of this Land Mxing concept has been the focus of an award-winning (National Geographic/Bufet Prize, 2012; UN Equator Prize, 2010; World Future Council award for outstanding practice in agroecology, 2019) programme in Cameroon since 1994.

3. Cameroon Case Study

The need to address poverty with low-risk interventions that create incentives for long-term participation and strengthened community partnerships necessitates a new paradigm for rehabilitation. By seeking new and socially appropriate opportunities for

income generation, a programme of participatory tree domestication in Cameroon [70–74] has demonstrated a way forwards based on ‘socially modified’ new tree crops to create numerous environmental and socio-economic benefits [14,15]. This approach grew from the recognition that many indigenous trees produce foods and medicines (Figure 1) of day-to-day importance to local people and that they could be cultivated as new crops. Naturally adapted candidate species are found in all ecological zones. Indeed, these wild species are genetically very diverse intra-specifically with great potential to be domesticated. As new crops they can fortify farming systems while enhancing local livelihoods, generating income and making food production more sustainable, especially in Africa [27,67].



Figure 1. Some examples of food products from indigenous tropical trees being domesticated as new crops under the concept of Land Maxing. Species names: (a) *Terminalia kaernbachii*, (b) *Adansonia digitata*, (c) *Barringtonia procera*. (d) *Dacryodes edulis*, (e) *Vitellaria paradoxa*, (f) *Irvingia gabonensis*, (g) *Allanblackia stuhlmannii*, (h) *Garcinia kola* and (i) *Sclerocarya birrea*.

The central philosophy underpinning this initiative in Cameroon was based on capacity building at Rural Resource Centres set within the local community [70–78] to develop village tree nurseries to implement a decentralized, bottom-up, participatory domestication of indigenous trees [73,79]. The Rural Resource Centres help the communities to become self-supporting and self-motivating through crucial training in tree propagation and production, selection of elite trees as candidates for domestication, product marketing and community management [73,79]. This role of community capacity building in improved land use concurs with its importance as recognized by Jahel and Lambin [63]. However, for real impact such community engagement needs to be linked with government support [80].

Low-tech methods of vegetative propagation appropriate for remote villages without access to piped water or electricity were used to capture the superior characteristics of elite trees arising from the very substantial tree-to-tree variation found in wild populations of indigenous trees [14,15,20]. For example, in *Dacryodes edulis*, the tree-to-tree variation in fruit length is 4-fold but goes up to 36-fold for multiple traits such as fruit size and flavour as indicated by the amount consumers are prepared to pay in the market. These

socially appropriate low-tech systems promote farmer adoption of tree domestication in remote communities. This was found to be important for the transfer of technologies to remote neighbouring communities through farmer-to-farmer interactions. In particular, these appropriate technologies assisted the scaling up of the domestication initiative and its expansion to different communities for wider benefits. Interestingly, more recent evidence indicates that there is similar tree-to-tree variation in biochemical traits such as fatty acid profiles, medicinal ingredients, etc. This is of great interest for the development of new markets and new nutraceutical, medicinal, cosmetic and functional food industries [14,15]. Capturing the potential of this variation can be achieved by the identification of market-oriented Ideotypes to create 'designer tree' cultivars for the development of new businesses and industries for income generation. These are needed to create employment opportunities. As exemplified by cocoa and coffee, some species with unpalatable raw products only have crop potential following processing such as fermentation and roasting.

This Cameroon project stands out for its grassroots approach. It focuses on creating new tree crops that yield traditional and culturally significant food and non-food items for village consumption. Importantly, the community-based approach uses low technology techniques within a bottom-up participatory programme in which the farmers themselves are both the drivers of innovation and the beneficiaries of their work. This self-help philosophy has been found to promote trust and the 'buy-in' of the community and their wholehearted participation in the creation of new 'socially modified' crops. These create sources of expanding income and enhanced livelihoods that create a cascade of positive production, environmental and social impacts. Together this combination acts as a strong incentive for community engagement [14,15,71,74]. Thus, capacity building in rural communities was fundamental to improving livelihoods from the generation of new sources of income. This income also allows farmers to improve crop production through access to labour and agrichemicals. These benefits are especially important for the people of Africa [67].

Over a period of 12 years, adoption and growth of this programme rose from 20 farmers in 2 villages to 10,000 farmers in 500 villages [14]. Sadly, however, a damaging civil war has now led to farmers abandoning their farms and fleeing from the countryside. Nevertheless, the dramatic growth over 12 years does demonstrate that this participatory domestication of new indigenous tree crops provides a quick, socially appropriate and relatively cheap entry point into Land Mxing.

The results from Cameroon clearly demonstrated the income generation resulting from the programme with average farm-gate income rising over 12 years from nearly nothing to USD 22,000 per community. Much of this income was from tree nursery sales in the early years. Income was also derived from the development of local businesses in urban communities. This engaged in both the development of simple equipment for product drying, grinding and packaging and their use by women's groups preparing products for market [81]. The result, interestingly, was that some youths in participating communities reported that they could now see a future in their home villages rather than migrating to urban areas in search of employment. It is widely recognized that for farming families increased household income is crucial for access to better seeds, fertilizers, agrichemicals, labour and extension services that contribute to staple food crop production. This creates an incentive for engagement in the programme.

Before the civil war in Cameroon, it became clear that the multiple outputs of the participatory tree domestication programme were fundamental to closing the yield gaps in crop production. Consequently, as originally foreseen in 1992 [14,15], the domestication of culturally important indigenous food trees has become a global initiative applied to a wider range of species, including fodder trees for livestock [75,77,82–86]. Likewise, there is

now a focus on medicinal species [87] and the neglected orphan crops that can be grown together with indigenous trees [53,88].

Due to the loss of Traditional Knowledge with the passage of time, there is some urgency to advance the domestication of indigenous foods before too much local knowledge is lost. With this scenario, steps are being taken towards the slower and more costly centralized approach using modern genetic technologies [85]. These tools are also relevant to the future targeting of biochemical traits for specific markets/industries [89].

4. 'Land Mxing' as a Remunerative Approach to Regenerative and Productive Subsistence Agriculture

Income generation is crucially important at the value chain: landscape nexus [90]. The focus of the Cameroon case study on income generation is fundamental to the concept of Land Mxing for enhanced social and economic benefits from fortified subsistence farming. *Informed by ethnobotany, Land Mxing adds community-based domestication of indigenous tree species and the commercialisation of their non-timber products to agroecological interventions that restore soil fertility, biodiversity and ecological resilience. This is aimed at:*

- Increasing farm production for food and nutritional security
- Regenerating natural capital for local and global environmental health
- Remunerating farmers and local entrepreneurs by building social, human, physical and financial capital through new local business developments.

Land Mxing, first reported in 2019 [91], offers an important solution to the very serious problems facing farmers that arise from the combination of land degradation, social deprivation and poverty [14,15]. Specifically, it is aimed at maximizing the multiple long-term benefits and interest flows from community investments to restore natural, social and human capital in tropical and sub-tropical agriculture and to create new physical and financial capital supporting economic growth (Figure 2).

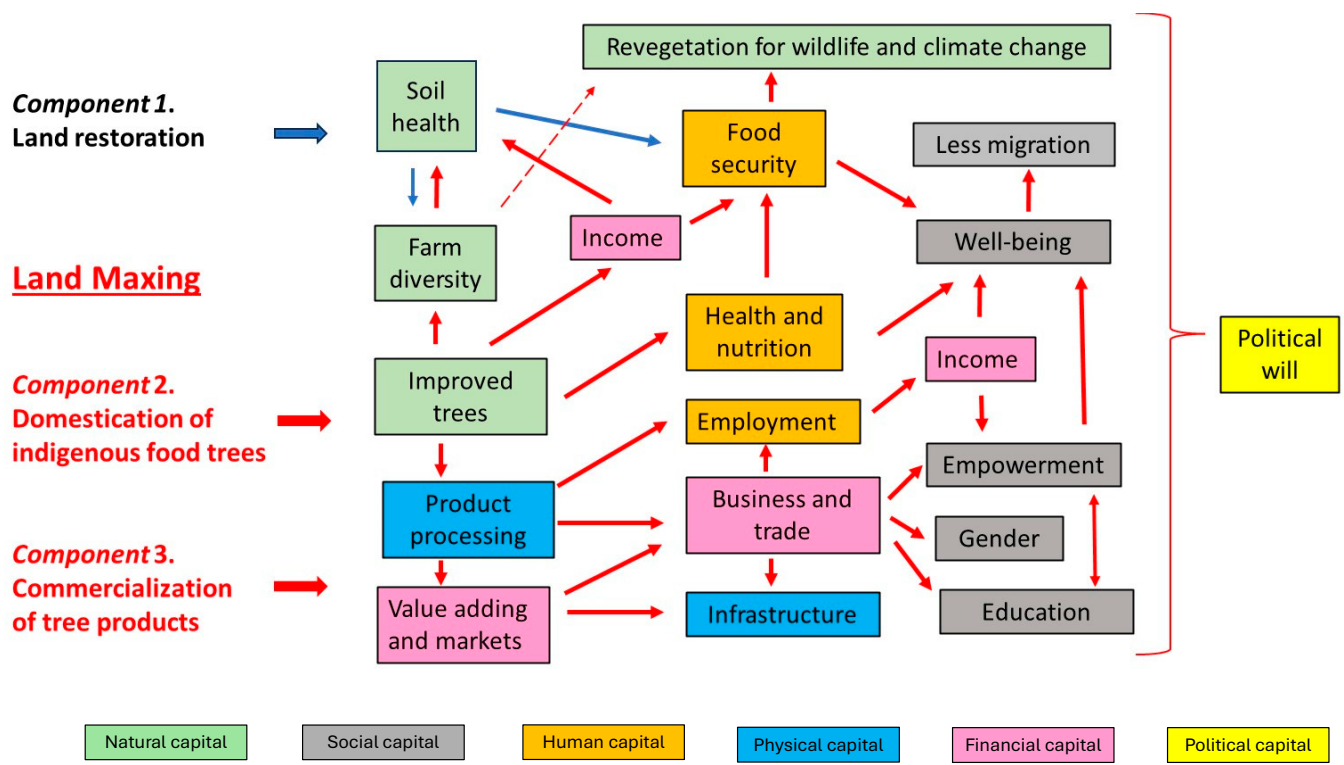


Figure 2. Schematic diagram of the multiple benefits of investment in 'Land Mxing' to restore and fortify the six capitals of sustainable development through tropical and subtropical agriculture.

Utilizing appropriate, community-based interventions, Land Maxing enhances land restoration interventions by adding two components to the often critical first component of land restoration and diversification (Figure 3):

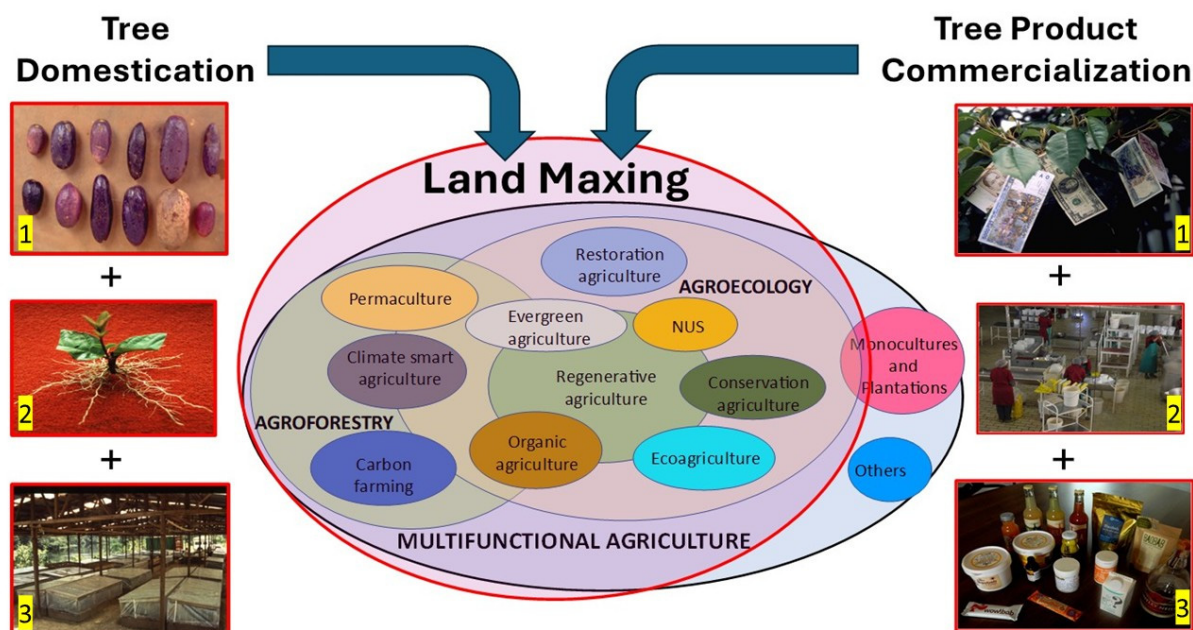


Figure 3. The contribution of ‘Land Maxing’ to the fortification of some named approaches to the restoration of degraded land. Photos: *Domestication*: 1. selection of elite trees, 2. vegetative propagation, 3. non-mist propagators in village nursery; *Commercialization*: 1. business opportunities, 2. factory processing, 3. packaged products for market.

- (i) The **domestication** of a wide range of culturally important indigenous food crop trees, which enhance nutrition and diversify diets. This involves a decentralised and appropriate horticultural approach implemented at the community level even in remote areas. The cultivation of these perennial crops further diversifies farming systems to recreate the ecological niches necessary for above- and below-ground biodiversity. These are needed to restore the food chains and life cycles important for the nutrient, carbon and hydrological cycles. This crop diversification with trees initiates an agroecological succession for improved crop yields and greater food production so that monocultural food crops can occupy a smaller area of land in the rural landscape. By reducing the area of cultivated land, it is additionally possible to restore woody vegetation (e.g., agroforests, forest gardens and dry zone parklands) for carbon sequestration and wildlife habitat [27] within landscape mosaics.
- (ii) The **commercialisation** of these new indigenous food tree crops through the processing, value-addition and packaging of their products to generate substantial income and to create new local businesses (Figure 4). Their trade will diversify and stimulate the rural economy addressing the severe constraints posed by the abject poverty facing subsistence households. Importantly, this approach also has the potential to close the yield gaps in staple food and cash cropping systems by generating income to purchase inputs such as phosphate and potassium fertilizers. These are needed to restore crop production beyond the level that can be achieved biologically using leguminous trees and shrubs. Importantly, this income also allows farmers to purchase inputs such as casual labour, tools and mechanization, irrigation, etc., and to access small loan schemes.



Stages in the marketing and value chain of indigenous tree products.

(a) Traditional village market (b) Cottage industry stall (c) Processed products for formal trade

Figure 4. Commercialization of the food products from indigenous tropical trees to enhance value chains: from traditional markets to cottage industries and to new processing industries.

5. The Innovations

To face the current and future challenges of tropical agriculture, the unique and innovative aspects of Land Maxing are:

1. A comprehensive goal to address the growing environmental risks and global changes resulting from the decades-long neglect of the interdependent economic, social and ecological drivers of land degradation and climate change, especially in subsistence farming. **This is achieved through the ecological, social and economic fortification** of interventions such as agroforestry/agroecology and other means of diversifying farming landscapes for their regenerative and remunerative functions. When adequately scaled, these benefits can also produce spin-offs for planetary and public health.
2. A ‘big picture’ focus on a highly adaptable generic model to address the complex interactions underpinning the breakdown of natural, social and human capital. This is targeted on the key leverage points of farm production failures such as ‘yield gaps’ and declining livelihoods. These issues are both prevalent in many different physical and socio-economic situations around the tropics and subtropics.
3. A central pillar to **introduce and cultivate indigenous food and medicinal trees as new crops** to create farm and off-farm income. These trees are basically wild but locally appreciated species in tropical ecosystems with huge potential as new crops for diversified farming systems. These trees have been overlooked by modern agriculture and should be recognized as the providers of very many of the day-to-day needs of local people. Furthermore, through expanded local markets and wider trade, physical and financial capitals arise from investments in new businesses and industries.
4. The initiation of processes for the domestication and cultivation of **selected cultivars of indigenous tree species producing domestically useful and marketable products**. This harnesses the capacity of indigenous trees to initiate an ecological succession in degraded farmland. This succession is driven by the diversification of the above- and below-ground niches in an agroecosystem. Importantly, the succession of colonizing organisms creates functional life cycles and food chains that drive the nutrient, carbon and hydrological cycles to restore resilience. Neglected orphan crops also diversify the understorey of agroecosystems. If sufficiently scaled to address the big issues, there is also potential to influence rainfall patterns through the recreation of biotic pumps. While this focus is on the cultivation of crops, there is no restriction on the integration of livestock systems.
5. A **genuinely ‘bottom-up’ approach to community-based participatory domestication** of indigenous food trees that creates incentives for community engagement and adop-

tion in rural development. This can be fostered through farmer-to-farmer exchange. Subsequently, the highly nutritious, domestically useful and marketable non-timber tree products can be processed for wider and out-of-season trade. This enhances food sovereignty by diversifying diets, markets and trade leading to greatly expanded economic returns from the indigenous foods. Then, the initiation of new ‘in-country’ commercial ventures to process these farm products adds value so promoting the local economy and reducing reliance on the overseas export of raw materials. In other words, a shift from globalization towards localization.

6. A **community engagement** approach based on a philosophy of participatory bottom-up capacity building for rural development specifically aims to increase food sovereignty and production while diversifying landscape mosaics, incomes, lifestyles, household diets and local markets. These **farmer-driven changes are then expected to beneficially impact some of the big global public-goods issues**, like climate change, loss of biodiversity, social injustice, illegal migration, etc.
7. A focus on income generation for better crop husbandry and access to farm inputs promotes the **closure of yield gaps by increased crop production. This allows vital staple foods to be produced on a smaller area of land** so creating space within existing farmland to establish tree crops that should address both adaptation to, and mitigation of, climate change and loss of biodiversity.
8. The delinking of agricultural intensification from the so-called ‘inevitable trade-offs’ causing the breakdown of natural, social and human capital. By deliberately addressing the apparent trade-offs they in effect can be converted to policy ‘trade-ons’ offering a future for agrifood systems. By delinking serious environmental and socio-economic trade-offs from high-input agricultural intensification, Land Maxis concurs with the CGIAR’s Food Systems Countdown Initiative’ for change in food systems [92]. As this does not exclude the use of existing technologies, it adds to the returns on the already large investment in the Green Revolution.
9. The progress along a continuum from land failing to ‘Land Maxis’ (Figure 5). This is due to its **inclusion of income generation, social reform and commercial development in subsistence landscapes**. Importantly income generation has been recognized recently as crucially important at the value chain: landscape nexus.
10. The development of a holistic, remunerative and unifying force to integrate and fortify the numerous named approaches to the development of multifunctional farming in tropical and subtropical landscapes (Figure 3). By transforming the local economy in non-industrial countries, it could help to geographically rebalance the global economy.
11. The growing recognition of the importance of a highly adaptable and holistic approach to addressing the issues found at the nexus of the big global issues such as climate change, deforestation, land degradation, social deprivation and loss of wildlife habitat. This offers **a more efficient use of international development dollars, one acceptable to a broad range of stakeholders and donors**. Consequently, it provides an integrating cross-sectoral alternative to the current dominant silo mentality of international policies on environmental issues.
12. The socio-economic investments in staple, cash crop and livestock fodder systems to initiate a new and more remunerative paradigm of sustainable agricultural intensification in resource-poor smallholder communities. This is aimed at stimulating investments in new physical and financial capital for overall growth within a growing economy (Figure 2) by building on investments in the restoration of natural, social and human capital.
13. Ultimately, the strength of Land Maxis is its **foundation on adaptability and diversity** for:

- A. **Natural resilience** arising from new crops with:
 - (i) the extensive genetic diversity from wild trees of indigenous species, and
 - (ii) the creation of extensive and balanced ecological diversity for functional resilience to environmental shocks.
- B. **Social resilience** arising from:
 - (i) recognition of ethnic and cultural diversity arising from ethnobotanical and Traditional Knowledge,
 - (ii) the satisfaction of community desires for engagement and empowerment through self-help, and
 - (iii) income generation for self-sufficiency and enhanced livelihoods.
- C. **Human resilience** arising from the satisfaction of food and nutritional needs arising from enhanced productivity and better diets.
- D. **Economic resilience** arising from:
 - (i) need-based demand for expanded markets with business opportunities and relatively low costs of implementation and crop cultivation,
 - (ii) expanded community supporting infrastructure.
- E. **Political resilience** based on adoption of wisdom and common sense.

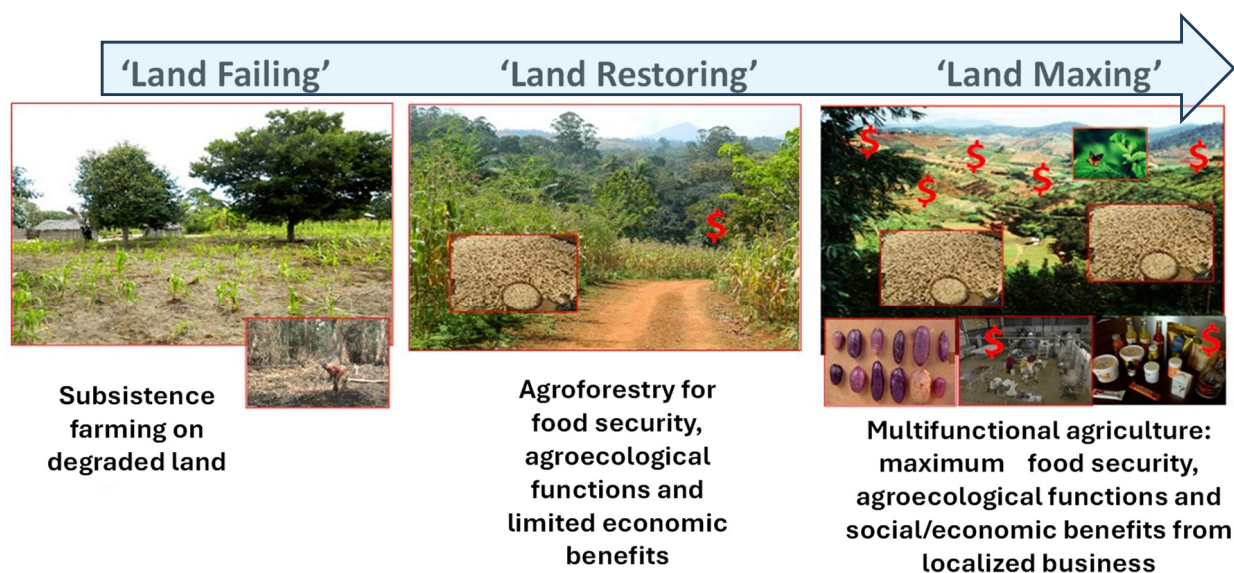


Figure 5. Stages along the restoration pathway for degraded farmland to reboot tropical and subtropical agriculture (modified from: [15]). (\$) = source of income generation).

Adding the two Land Maxing steps to land restoration activities (Figure 2) creates income. This adds remuneration to regeneration so transforming the lives of farming households in the tropics and sub-tropics. Consequently, it uniquely addresses the big global issues of environmental degradation, hunger, malnutrition, poverty, social injustice, with secondary benefits on climate change, and the loss of wildlife habitats. By addressing the issues that result from population growth, exploitative farming and poor international governance, it is foreseen that improved land management will reduce damage to freshwater and marine habitats from siltation and pollution.

The bottom line in the face of burgeoning population growth is that Land Maxing shows potential to be a critically important addition to the policy arsenal for global land restoration and the needs of humankind, especially in the tropics and sub-tropics [67]. With the delivery of multiple benefits for farmers, landowners, communities, trade and

entrepreneurs this supremacy over natural forest is surprising given that natural forests used to be considered the ultimate and unattainable goal for sustainable land use.

At the practical level of Development Programmes, the Mission of the Tropical Agricultural Association International (TAAI) (<https://taa-international.org> (accessed on 20 June 2025)) is to rectify the historically derived inequity in the global economy by finding ways to help the poorest and most food insecure communities to produce the food and income they deserve and need. Thus, to test the adaptability of Land Maxing to different environments, the TAAI is currently planning to implement a Land Maxing Development Programme (<https://taa-international.org/land-maxing-project-introduction/> (accessed on 20 June 2025)). This will add Land Maxing to existing land restoration and/or agroforestry projects in a number of African countries with very different physical and ethnic conditions.

To support burgeoning human and livestock populations in the tropics and subtropics this programme will also test the hypothesis that by investing in the first five capitals of sustainable development it is indeed possible to greatly increase multiple environmental, social and economic services derived from agricultural land at the community level. It will also seek to quantify how these services can exceed those from natural forests.

6. Land Maxing's Holistic Approach Conforms with Recent Thinking

Through its domestication of indigenous trees as new crops, Land Maxing conforms to:

1. The call by World Food Prize Laureates for 'transformation of annual to perennial crops, development of new and overlooked crops' [8].
2. The CGIAR's 'Food Systems Countdown Initiative' (FSCI) for desirable change in food systems [92]. It highlights governance actions as entry points with emphasis on interactions between diets, environment, livelihoods, governance and resilience indicators with the objective of assisting the understanding of different actors when navigating towards desirable change in food systems. Typically, these interactions can involve both trade-offs and some synergies. However, to provide entry points for governance action towards positive change Land Maxing deliberately seeks to convert the environmental and social 'trade-offs' to policy 'trade-ons' offering a better future for agrifood systems [93]. This should help to avoid systemic conflicts such as environmental degradation and landholder inequality associated with the intensification of cropping and livestock systems. The FSCI especially recognizes and highlights the importance of indicators reflecting the importance of livelihoods and governance and distinguishing between synergies and trade-offs. These important concepts are now starting to be recognized in national policies—for example, in Mexico [61].
3. The World Bank's '*Recipe for a Livable Planet*', which has a specific focus on the agrifood system needed to address climate change [94]. There are now numerous calls for increased attention to add social and economic issues to potential solutions to the big global environmental issues.
4. China's Revitalization Policy [95] and its REDD+ programme [96] both concur with Land Maxing as an effective way to restore degraded landscapes to maximize carbon, ecological, social and economic benefits while conserving biodiversity and enhancing the financial stability of farmers. Specifically, China's Rural Revitalization Policy seeks to provide policymakers and researchers working on rural development initiatives with insights in regard to long-term sustainability and climate resilience strategies. Within this policy, there is support for the importance of using Traditional Knowledge as part of the domestication of indigenous food crops. This is to improve food and nutritional security, create new market opportunities for smallholders and promote economic advancement [95]. The rural development and revitalization policy place

particular significance on enhancing synergistic relationships between poverty alleviation, environmental sustainability, food security initiatives, product marketing and climate resilience. Furthermore, for some time now, the role of wild genetic resources has been recognized as important to combatting climate change [97].

5. The ten policy steps based on ‘Regenerative Good Growth’ promoting a pathway of ‘nature-based systems’ that rebuild the five renewable capitals [98]. They promote greater recognition of the impacts of greenhouse gas emissions from industrialized countries on environmental sustainability to counter the common view that environmental policies come at a cost to economic growth and human welfare.
6. Recognition of the importance of local knowledge for the greater resilience of regenerative agriculture to environmental and livelihood pressures [37].
7. In congruence with the UN ‘One Health’ Programme the concept of ‘Land Mxing’ is unique in that it identifies a new set of crops that have virtually untapped potential as a source of income and new business specifically for the poorest agricultural communities in global society [14,15,27,91,93]. The integration of these new indigenous crops into farming systems represents a highly adaptable, generic fix against the breakdown of natural, social and human capital, and the formation of new physical and financial capital. This targets ways that both close the common yield gaps of subsistence agriculture and enhance livelihoods, well-being, empowerment and social justice.

All this adds up to a unique approach to the practical restoration of natural, social and human capital and the creation of new physical and financial capital. It is hoped that this will lead to increased investments in the reshaping and rebalancing of the sixth vital capital—political and corporate will—to adopt this holistic approach to land restoration and promote future funding for necessary implementation.

In the last 30 years, since the initiation of indigenous tropical food tree domestication [14], there has been very considerable adoption and growth of tree domestication research around the tropics. In Africa, for example, there are over 530 research teams in 34 African countries (see the supplementary data in [85]) working on about 60 indigenous tree species for the creation of new crops. This is important for the expanded adoption of Land Mxing. Likewise, there has also been considerable uptake in Africa regarding the understanding of the role of trees in multifunctional landscapes [99].

However, there are still very few examples of the five globally recognized capitals for sustainable development being achieved within a single Development Programme. It is therefore encouraging that the Tropical Agriculture Association International is currently planning to establish a Development Programme in a number of African countries to implement Land Mxing with local communities.

7. Conclusions

In a divided and dysfunctional world of ‘haves’ and ‘have-nots’, agriculture has serious impacts on the global economy and our planet through enormous social disparities and environmental damage. After decades of uncertainty, we propose a tried and tested way forwards, for the poorest smallholder farmers. This will be implemented as a ‘proof of concept’ by the Tropical Agriculture Association International. It is practical, pragmatic and appropriate to their needs. Importantly it increases agricultural productivity by investing in the rehabilitation of degraded natural, social and human capitals—and stimulates investment in new and appropriate physical and financial capitals. Hopefully this will change the mindsets of international decision makers and create the much needed sixth capital of political/corporate will to rebalance the global economy and reboot the planetary environment [14,15,27].

Uniquely the concept of ‘Land Maxing’ identifies a new set of crops that have virtually untapped potential as a source of income and new business for the poorest agricultural communities in global society [14,15,27,91,93]. The integration of these new indigenous crops into farming systems represents a highly adaptable, generic fix in ways that close the common yield gaps of subsistence agriculture, enhance livelihoods and well-being, and empower social justice by investing in capitals needed for sustainable development. But there is a major caveat: the implementation of Land Maxing must be genuinely ‘bottom-up’ and part of new ‘in-country’ commercial ventures that process raw materials locally for economic growth.

By simultaneously addressing the multiple, pervasive and highly interactive ‘big issues’ affecting tropical and subtropical agriculture, Land Maxing consolidates many of the existing approaches to environmental restoration. This adds resilience to Green Revolution by delinking the common negative impacts of agricultural intensification on natural, social and human capital. This supports the evaluation of ‘net outcomes’ as a means of determining the success of new initiatives [100].

Finally, is it possible to build consensus around the incorporation of traditionally important indigenous food trees of the tropics and subtropics—the ‘*Trees of Life*’—into local farming systems as a keystone to rebuilding the natural, social, human, financial and physical capital required for a sustainable planet? If so, their products and critical ecological and social services can provide the very many day-to-day needs of both local people and wildlife. The achievement of consensus might then create the political and corporate will—the 6th capital of sustainable development. This dramatic change is needed to rebalance global governance and reverse the impacts of land degradation on natural resources, agricultural productivity and community livelihoods. Thus, by decoupling food production from deforestation, land degradation, poverty and social injustice, Land Maxing can be expected to add secondary benefits on climate change and wildlife habitat restoration to the primary benefits on greater food production and better living standards for millions of poor people. So, perhaps we are on the cusp of reversing agriculture’s damaging impacts and building a more sustainable planet [101].

Author Contributions: Conceptualization, R.R.B.L. and P.E.H.; Writing—original draft preparation, R.R.B.L.; Writing—review and editing, P.E.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Steffen, W.; Richardson, K.; Rockström, J.; Cornell, S.E.; Fetzer, I.; Bennett, E.M.; Biggs, R.; Carpenter, S.R.; de Vries, M.; de Wit, C.A.; et al. Planetary boundaries: Guiding human development on a changing planet. *Science* **2015**, *347*, 1259855. [CrossRef] [PubMed]
2. UNCTAD. *Wake Up Before It Is Too Late: Make Agriculture Truly Sustainable Now for Food Security in a Changing Climate*, UNCTAD Trade and Environment Review 2013; Hoffman, U., Ed.; UN Publications: Geneva, Switzerland, 2013; pp. 192–198.
3. Peduzzi, P. The disaster risk, global change, and sustainability nexus. *Sustainability* **2019**, *11*, 957. [CrossRef]
4. Dooley, K.; Keith, H.; Larson, A.; Catacora-Vargas, G.; Carton, W.; Christiansen, K.L.; Enokenwa Baa, O.; Frechette, A.; Hugh, S.; Ivetic, N.; et al. The Land Gap Report 2022. 2022. Available online: <https://www.landgap.org> (accessed on 18 June 2025).

5. Merz, J.J.; Barnard, P.; Rees, W.E.; Smith, D.; Maroni, M.; Rhodes, C.J.; Dederer, J.H.; Bajaj, N.; Joy, M.K.; Wiedmann, T.; et al. World scientists' warning: The behavioural crisis driving ecological overshoot. *Sci. Prog.* **2023**, *106*, 00368504231201372. [CrossRef] [PubMed]
6. Richardson, K.; Steffen, W.; Lucht, W.; Bendtsen, J.; Cornell, S.E.; Donges, J.F.; Drüke, M.; Fetzer, I.; Bala, G.; Von Bloh, W.; et al. Earth beyond six of nine planetary boundaries. *Sci. Adv.* **2023**, *9*, eadh2458. [CrossRef]
7. Ripple, W.J.; Wolf, C.; Gregg, J.W.; Rockström, J.; Mann, M.E.; Oreskes, N.; Lenton, T.M.; Rahmstorf, S.; Newsome, T.M.; Xu, C.; et al. The 2024 state of the climate report: Perilous times on planet Earth. *BioScience* **2024**, *74*, 812–824. [CrossRef]
8. World Food Prize Foundation. Hunger's Tipping Point: An Urgent Call to Transform Food and Nutritional Security. 2025. Available online: <https://www.worldfoodprize.org/index.cfm?nodeID=96854&audienceID=1> (accessed on 18 June 2025).
9. te Wierik, S.; Rockström, J.; Norberg, A.; Vermeulen, S.; van Vuuren, D.; DeClerck, F.; de Vries, W.; Schulte-Uebbing, L.; Beusen, A.; Springmann, M.; et al. Identifying the safe operating space for food systems. In Proceedings of the EGU General Assembly 2025 (EGU25-16769), Vienna, Austria, 27 April–2 May 2025.
10. Nathan, D. Knowledge and global inequality since 1800: Interrogating the present as history. In *Cambridge Elements in Development Economics*; Cambridge University Press: Cambridge, UK, 2024.
11. Kalibata, A.; Nebarro, D. Food systems and transformation through dialogue. *Nat. Food* **2024**, *5*, 883–885. [CrossRef]
12. Olsson, L.; Barbosa, H.; Bhadwal, S.; Cowie, A.; Delusca, K.; Flores-Renteria, D.; Hermans, K.; Jobbagy, E.; Kurz, W.; Li, D.; et al. Land degradation. In *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*; Cambridge University Press: Cambridge, UK, 2022; pp. 345–436.
13. Gupta, J.; Bai, X.; Liverman, D.M.; Rockström, J.; Qin, D.; Stewart-Koster, B.; Rocha, J.C.; Jacobson, L.; Abrams, J.F.; Andersen, L.S.; et al. A just world on a safe planet: A Lancet Planetary Health–Earth Commission report on Earth-system boundaries, translations, and transformations. *Lancet Planet. Health* **2024**, *8*, e813–e873. [CrossRef]
14. Leakey, R.R.B. *Living with the Trees of Life—A Practical Guide to the Rebooting of the Planet Through Tropical Agriculture and Putting Farmers First*; CABI: Wallingford, UK, 2024; 250p.
15. Leakey, R.R.B. A Multifunctional Future for Tropical Agriculture: Scoring Multiple Sustainable Development Goals Simultaneously? *Agric. Dev.* **2024**, *47*, 22–46.
16. Sileshi, G.; Akinnifesi, F.K.; Debusho, L.K.; Beedy, T.; Ajayi, O.C.; Mong'omba, S. Variation in maize yield gaps with plant nutrient inputs, soil type and climate across sub-Saharan Africa. *Field Crops Res.* **2010**, *116*, 1–13. [CrossRef]
17. Amponsah-Doku, B.; Daymond, A.; Robinson, S.; Atuah, L.; Sizmur, T. Improving soil health and closing the yield gap of cocoa production in Ghana—A review. *Sci. Afr.* **2022**, *15*, e01075. [CrossRef]
18. Lopes dos Santos, M.; Menezes Santos, P.; Barioni, L.G.; Pereira, B.H.; Cuadra, S.V.; Pequeno, D.N.; Marin, F.R.; Sollenberger, L. Yield gap analysis framework applied to pasture-based livestock systems in Central Brazil. *Field Crops Res.* **2024**, *314*, 109416. [CrossRef]
19. Denning, G. Sustainable Intensification of Agriculture: The Foundation for Universal Food Security. *NPJ Sustain. Agric.* **2025**, *3*, 7. [CrossRef]
20. Leakey, R.R.B. *Multifunctional Agriculture: Achieving Sustainable Development in Africa*; Academic Press: San Diego, CA, USA, 2017; 480p.
21. Isaac, M.E.; Sinclair, F.; Laroche, G.; Olivier, A.; Thapa, A. The ties that bind: How trees can enhance agroecological transitions. *Agrofor. Syst.* **2024**, *98*, 2369–2383. [CrossRef]
22. Bjornlund, V.; Bjornlund, H.; van Rooyen, A.F. Why food insecurity persists in sub-Saharan Africa: A review of existing evidence. *Food Secur.* **2022**, *14*, 845–864. [CrossRef]
23. Bjornlund, V.; Bjornlund, H. Reviewing the Green Revolution strategy in view of lessons from Mexico and India—Africa. *Int. J. Water Resour. Dev.* **2024**, *41*, 229–273. [CrossRef]
24. Sanchez, P.A. Ecology. Soil fertility and hunger in Africa. *Science* **2002**, *192*, 2019–2020. [CrossRef]
25. van Noordwijk, M.; Coe, R.; Sinclair, F.L.; Luedeling, E.; Bayala, J.; Muthuri, C.W.; Cooper, P.; Kindt, R.; Duguma, L.; Lamanna, C.; et al. Climate change adaptation in and through agroforestry: Four decades of research initiated by Peter Huxley. *Mitig. Adapt. Glob. Change* **2021**, *26*, 18. [CrossRef]
26. IAASTD. *Agriculture at a Crossroads: International Assessment of Agricultural Science and Technology for Development, Global Report*; McIntyre, B.D., Herren, H.R., Wakhungu, J., Watson, R.T., Eds.; Island Press: Washington, DC, USA, 2009; p. 590.
27. Leakey, R.R.B. A re-boot of tropical agriculture benefits food production, rural economies, health, social justice and the environment. *Nat. Food* **2020**, *1*, 260–265. [CrossRef]
28. Nair, P.K.R. *Tropical Agroforestry Systems and Practices, Tropical Resource Ecology and Development*; John Wiley: Chichester, UK, 1984; pp. 1–23.
29. Young, A. *Agroforestry for Soil Conservation*; CAB International: Wallingford, UK, 1989; 276p.
30. Altieri, M.A. *Agroecology: The Science of Sustainable Agriculture*, 2nd ed.; CRC Press: Boca Raton, FL, USA, 2018; 432p.

31. Gliessman, S. Defining agroecology. *Agroecol. Sustain. Food Syst.* **2018**, *42*, 599–600. [\[CrossRef\]](#)
32. Wezel, A.; Herren, B.G.; Kerr, R.B.; Barrios, E.; Gonçalves, A.L.R.; Sinclair, F. Agroecological principles and elements and their implications for transitioning to sustainable food systems. *Agron. Sustain. Dev.* **2020**, *40*, 40. [\[CrossRef\]](#)
33. Munoz-Araya, M.; Williams, S.R.; Geoghan, P.; Ortiz-Gonzalo, D.; Marshall, K.N.; Brewer, K.M.; Alston-Stepnitz, E.; Reboloso McCullough, S.; Wauters, V.M. A knowledge creation framework for academia toward agroecological transformations of food systems. *Front. Sustain. Food Syst.* **2024**, *8*, 1336632. [\[CrossRef\]](#)
34. Elevitch, C.R.; Mazaroli, D.N.; Ragone, D. Agroforestry Standards for Regenerative Agriculture. *Sustainability* **2018**, *10*, 3337. [\[CrossRef\]](#)
35. Giller, K.E.; Hijbeek, R.; Andersson, J.A.; Sumberg, J. Regenerative agriculture: An agronomic perspective. *Outlook Agric.* **2021**, *50*, 13–25. [\[CrossRef\]](#) [\[PubMed\]](#)
36. Rodale Institute. *The Original Principles of Regenerative Agriculture*; Rodale Institute: Kutztown, PA, USA, 2022.
37. Sher, A.; Li, H.; Ullar, A.; Hamid, Y.; Nasir, B.; Zhang, J. Importance of regenerative agriculture: Climate, soil health, biodiversity and its socioecological impact. *Discov. Sustain.* **2024**, *5*, 462. [\[CrossRef\]](#)
38. Mollison, B. *Permaculture: A Designer's Manual*; Ten Speed Press: Tagari, Tasmania, 1988.
39. Suh, J. Permaculture principles, practices, and environmentalism. In *Sustainable Agriculture Reviews 58: Phosphorus Use Efficiency for Sustainable Agriculture*; Springer International Publishing: Cham, Switzerland, 2022; pp. 1–23.
40. Wollenberg, E.K.; Campbell, B.M.; Holmgren, P.; Seymour, F.; Sibanda, L.M.; Braun, J.V. *Actions Needed to Halt Deforestation and Promote Climate-Smart Agriculture*; International Emissions Trading Association: Geneva, Switzerland, 2011.
41. Lipper, L.; Thornton, P.; Campbell, B.M.; Baedeker, T.; Braimoh, A.; Bwalya, M.; Caron, P.; Cattaneo, A.; Garrity, D.; Henry, K.; et al. Climate-smart agriculture for food security. *Nat. Clim. Change* **2014**, *4*, 1068–1072. [\[CrossRef\]](#)
42. FAO. *Climate-Smart Sourcebook*, 2nd ed.; FAO: Rome, Italy, 2017.
43. Toensmeier, E. *The Carbon Farming Solution: A Global Toolkit of Perennial Crops and Regenerative Agriculture Practices for Climate Change Mitigation and Food Security*; Chelsea Green Publishing: White River Junction, VT, USA, 2016.
44. Sharma, M.; Kaushal, R.; Kaushik, P.; Ramakrishna, S. Carbon Farming: Prospects and Challenges. *Sustainability* **2021**, *13*, 11122. [\[CrossRef\]](#)
45. Dumanski, J.; Peiretti, R.; Benetis, J.; McGarry, D.; Pieri, C. The paradigm of conservation tillage. *Proc. World Assoc. Soil Water Conserv.* **2006**, *P1*, 58–64.
46. Farooq, M.; Siddique, K.H. *Conservation Agriculture: Concepts, Brief History, and Impacts on Agricultural Systems*; Springer International Publishing: Cham, Switzerland, 2015; pp. 3–17.
47. Kassam, A.; Friedrich, T.; Derpsch, R. Global spread of Conservation Agriculture. *Int. J. Environ. Stud.* **2018**, *76*, 29–51. [\[CrossRef\]](#)
48. McNeely, J.A.; Scherr, S.J. *Ecoagriculture: Strategies to Feed the World and Save Wild Biodiversity*; Island Press: Washinton, DC, USA, 2012.
49. Scherr, S.J.; Buck, L.; Willemsen, L.L.J.M.; Milder, J.C. Ecoagriculture: Integrated landscape management for people, food and nature. In *Encyclopedia of Agriculture and Food Systems*; Academic Press: London, UK, 2014; Volume 3, pp. 1–17.
50. Swaminathan, M.S. An evergreen revolution. *Crop Sci.* **2006**, *46*, 2293–2303. [\[CrossRef\]](#)
51. Garrity, D.P.; Akinnifesi, F.K.; Ajayi, O.C.; Weldesemayat, S.G.; Mowo, J.G.; Kalinganire, A.; Larwanou, M.; Bayala, J. Evergreen Agriculture: A robust approach to sustainable food security in Africa. *Food Secur.* **2010**, *2*, 197–214. [\[CrossRef\]](#)
52. Mayes, S.; Massawe, F.M.; Alderson, P.G.; Roberts, J.A.; Azam-Ali, S.N.; Hermann, M. The potential for underutilized crops to improve security of food production. *J. Exp. Bot.* **2012**, *63*, 1075–1079. [\[CrossRef\]](#)
53. Mabhaudhi, T.; O'Reilly, P.; Walker, S.; Mwale, S. Opportunities for underutilised crops in southern Africa's post-2015 development agenda. *Sustainability* **2016**, *8*, 302. [\[CrossRef\]](#)
54. Azam Ali, S.N. *Ninth Revolution: Transforming Food Systems for Good*; World Scientific Publishing: London, UK, 2021.
55. Termote, C.; McMullin, S.; Hendre, P. From discovery to food system diversification with African neglected and underutilized species. In *Orphan Crops for Sustainable Food and Nutrition Security*; Routledge: London, UK, 2021; pp. 78–87.
56. Balfour, E.B. *The Living Soil and the Haughley Experiment*; Palgrave Macmillan: London, UK, 1976; ISBN 9780876632697.
57. Reganold, J.; Wachter, J. Organic agriculture in the twenty-first century. *Nat. Plants* **2016**, *2*, 15221. [\[CrossRef\]](#)
58. Willer, H.; Trávníček, J.; Schlatter, B. (Eds.) *The World of Organic Agriculture. Statistics and Emerging Trends 2024*; Research Institute of Organic Agriculture FiBL, Frick, and IFOAM—Organics International: Bonn, Germany, 2024.
59. Ndoye, O.; Shiferaw, M. *Forest Landscape Restoration in the AFR100: Reconciling Natural Resource Conservation and Human Well Being, AUDA-NEPAD Information Note*; AUDA-NEPAD: Johannesburg, South Africa, 2022.
60. Chavan, S.B.; Keerthika, A.; Dhyani, S.K.; Handa, A.K.; Newaj, R.; Rajarajan, K. National Agroforestry Policy in India: A low hanging fruit. *Curr. Sci.* **2015**, *108*, 1826–1834.
61. Gonzalez-Moctezuma, P.; Rhamtulla, J.M. National agroforestry program in Mexico faces trade-offs between reducing poverty, protecting biodiversity and targeting forest loss. *Environ. Res. Lett.* **2024**, *19*, 104002. [\[CrossRef\]](#)

62. Lejano, R.P.; Ingram, H.M.; Whiteley, J.M.; Torres, D.; Agduma, S.J. The importance of context: Integrating resource conservation with local institutions. *Soc. Nat. Resour.* **2007**, *20*, 177–185. [\[CrossRef\]](#)
63. Jahel, C.; Lambin, E.F. Reversing degradation of social–ecological systems: Explaining the outcomes of interventions in Africa. *Sustain. Sci.* **2024**, *20*, 439–468. [\[CrossRef\]](#)
64. Berkes, F. *Navigating Social-Ecological System: Building Resilience for Complexity and Change*, 1st ed.; Cambridge University Press: Cambridge, UK, 2008.
65. Berkes, F.; Folke, C.; Colding, J. *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*; Cambridge University Press: Cambridge, UK, 2000.
66. Royal Society. *Innovating Agriculture Exploring the Science and Innovation Aiming to Transform the Future of Food and Farming*; Transforming our Future Series; Royal Society: London, UK, 2025; 51p.
67. Leakey, R.R.B.; Mabhaudhi, T.; Gurib-Fakim, A. African lives matter: Wild foods matter for livelihoods, justice, and the environment—A policy brief for agricultural reform with new crops. *Sustainability* **2021**, *13*, 7252. [\[CrossRef\]](#)
68. Phalan, B.; Onial, M.; Balmford, A.; Green, R.E. Reconciling food production and biodiversity conservation: Land sharing and land sparing compared. *Science* **2011**, *333*, 1289–1291. [\[CrossRef\]](#)
69. Bennett, E.M. Changing the agriculture and environment conversation. *Nat. Ecol. Evol.* **2017**, *1*, 0018. [\[CrossRef\]](#)
70. Tchoundjeu, Z.; Asaah, E.K.; Anegbeh, P.; Degrande, A.; Mbile, P.; Facheux, C.; Tsobeng, A.; Atangana, A.R.; Ngo-Mpeck, M.L.; Simons, A.J. Putting participatory domestication into practice in west and central Africa. *For. Trees Livelihoods* **2006**, *6*, 53–69. [\[CrossRef\]](#)
71. Tchoundjeu, Z.; Degrande, A.; Leakey, R.R.B.; Simons, A.J.; Nimino, G.; Kemajou, E.; Asaah, E.; Facheux, C.; Mbile, P.; Mbosso, C.; et al. Impact of participatory tree domestication on farmer livelihoods in west and central Africa. *For. Trees Livelihoods* **2010**, *19*, 219–234. [\[CrossRef\]](#)
72. Degrande, A.; Tadjio, P.; Takoutsing, B.; Asaah, E.; Tsobeng, A.; Tchoundjeu, Z. Getting trees into farmers’ fields: Success of rural nurseries in distributing high quality planting material in Cameroon. *Small-Scale For.* **2013**, *12*, 403–420. [\[CrossRef\]](#)
73. Degrande, A.; Gyau, A.; Foundjem-Tita, D.; Tollens, E. Improving smallholders’ participation in tree product value chains: Experiences from the Congo Basin. *For. Trees Livelihoods* **2014**, *23*, 102–115. [\[CrossRef\]](#)
74. Asaah, E.K.; Tchoundjeu, Z.; Leakey, R.R.B.; Takoutsing, B.; Njong, J.; Edang, I. Trees, agroforestry and multifunctional agriculture in Cameroon. *Int. J. Agric. Sustain.* **2011**, *9*, 110–119. [\[CrossRef\]](#)
75. Simons, A.J.; Leakey, R.R.B. Tree domestication in tropical agroforestry. *Agrofor. Syst.* **2004**, *61*, 167–181.
76. Dawson, I.K.; Leakey, R.R.B.; Clement, C.R.; Weber, J.C.; Cornelius, J.P.; Roshetko, J.M.; Vinceti, B.; Kalinganire, A.; Tchoundjeu, Z.; Masters, E. The management of tree genetic resources and the livelihoods of rural communities in the tropics: Non-timber forest products, smallholder agroforestry practices and tree commodity crops. *For. Ecol. Manag.* **2014**, *333*, 9–21. [\[CrossRef\]](#)
77. Jamnadass, R.; Ofori, D.; Dawson, I.; Tchoundjeu, Z.; McMullin, S.; Hendre, P.; Gaudal, L. Enhancing Agric. Syst. through tree domestication. In *Sustainable Development Through Trees on Farms: Agroforestry in Its Fifth Decade*; World Agroforestry (ICRAF) Southeast Asia Regional Program: Bogor, Indonesia, 2019; pp. 45–59.
78. Leakey, R.R.B.; Prabhu, R. Towards multifunctional agriculture—An African initiative. In *Multifunctional Agriculture: Achieving Sustainable Development in Africa*; Leakey, R.R.B., Ed.; Academic Press: San Diego, CA, USA, 2017; pp. 395–416.
79. Degrande, A.; Tchoundjeu, Z.; Kwidja, A.; Fongang Fouepe, G. Rural resource centres: A community approach to extension. Note 10. In *GFRAS Good Practice Notes for Extension and Advisory Services*; GFRAS: Lindau, Switzerland, 2015.
80. Asiam, K.O.; Voss, W.; Bennett, R.; Rubanje, I. Land consolidation activities in Sub-Saharan Africa towards the agenda 2030: A tale of three countries. *Land Use Policy* **2021**, *101*, 105140. [\[CrossRef\]](#)
81. Leakey, R.R.B.; Asaah, E.K. Underutilised Species as the Backbone of Multifunctional Agriculture—The Next Wave of Crop Domestication. *Acta Hort.* **2013**, *979*, 293–310. [\[CrossRef\]](#)
82. Raj, A.J.; Lal, S.B. *Agroforestry Theory and Practices*; Scientific Publishers: New Delhi, India, 2014.
83. Akinnifesi, F.K.; Leakey, R.R.B.; Ajayi, O.C.; Sileshi, G.; Tchoundjeu, Z.; Matakala, P.; Kwesiga, F.R. (Eds.) *Indigenous Fruit Trees in the Tropics: Domestication, Utilization and Commercialization*; CABI International: Wallingford, UK, 2008; 438p.
84. van Damme, P. The Role of Tree Domestication in Green Market Product Value Chain Development in Africa. *Afr. Focus* **2018**, *31*, 115–128. [\[CrossRef\]](#)
85. Leakey, R.R.B.; Tientcheu Avana, M.-L.; Awazi, N.P.; Assogbadjo, A.E.; Mabhaudhi, T.; Hendre, P.S.; Degrande, A.; Hlahla, S.; Manda, L. The future of food: Domestication and commercialization of indigenous food crops in Africa over the third decade (2012–2021). *Sustainability* **2022**, *14*, 2355. [\[CrossRef\]](#)
86. Gorman, J.; Pearson, D.; Wurm, P. Old Ways, New Ways—Scaling Up from Customary Use of Plant Products to Commercial Harvest Taking a Multifunctional, Landscape Approach. *Land* **2020**, *9*, 171. [\[CrossRef\]](#)
87. McMullin, S.; Njogu, K.; Wekesa, B.; Gachuri, A.; Ngethe, E.; Stadlmayr, B.; Jamnadass, R.; Kehlenbeck, K. Developing fruit tree portfolios that link agriculture more effectively with nutrition and health: A new approach for providing year-round micronutrients to smallholder farmers. *Food Secur.* **2019**, *11*, 1355–1372. [\[CrossRef\]](#)

88. van Zonneveld, M.; Kindt, R.; McMullin, S.; Achigan-Dako, E.G.; N'Danikou, S.; Hsieh, W.; Lin, Y.; Dawson, I. Forgotten food crops in sub-Saharan Africa for healthy diets in a changing climate. *Proc. Natl. Acad. Sci. USA* **2023**, *120*, e2205794120. [\[CrossRef\]](#)
89. Hendre, P.S.; Muthemba, S.; Kariba, R.; Muchugi, A.; Fu, Y.; Chang, Y.; Song, B.; Liu, H.; Liu, M.; Liao, X.; et al. African Orphan Crops Consortium (AOCC): Status of developing genomic resources for African orphan crops. *Planta* **2019**, *250*, 989–1003. [\[CrossRef\]](#)
90. Schimetka, L.R.; Ingram, V.J. Leveraging the value chain-landscape governance nexus for non-wood forest products and tropical forest restoration. *For. Policy Econ.* **2024**, *169*, 103340. [\[CrossRef\]](#)
91. Leakey, R.R.B. From Ethnobotany to Mainstream Agriculture—Socially-modified Cinderella Species Capturing ‘Trade-ons’ for ‘Land Maxing’. In Special Issue on Orphan Crops. *Planta* **2019**, *250*, 949–970. [\[CrossRef\]](#)
92. Schneider, K.R.; Remans, R.; Bekele, T.H.; Aytakin, D.; Conforti, P.; Dasgupta, S.; DeClerck, F.; Dewi, D.; Fabi, C.; Gephart, J.A.; et al. Governance and resilience as entry points for transforming food systems in the countdown to 2030. *Nat. Food* **2025**, *6*, 105–116.
93. Leakey, R.R.B. Converting ‘trade-offs’ to ‘trade-ons’ for greatly enhanced food security in Africa: Multiple environmental, economic and social benefits from ‘socially modified crops’. *Food Secur.* **2018**, *10*, 505–524. [\[CrossRef\]](#)
94. Sutton, W.R.; Lotsch, A.; Prasann, A. *Recipe for a Livable Planet: Achieving Net Zero Emissions in the Agrifood System*; Agriculture and Food Series; World Bank: Washington, DC, USA, 2024; Available online: <http://hdl.handle.net/10986/41468> (accessed on 18 June 2025).
95. Wang, Y.; Firdaus, R.B.R.; Xu, J.; Dharejo, N.; Jun, G. China’s Rural Revitalization Policy: A PRISMA 2020 Systematic Review of Poverty Alleviation, Food Security, and Sustainable Development Initiatives. *Sustainability* **2025**, *17*, 569. [\[CrossRef\]](#)
96. Lu, S.; Lu, H.; Zhang, C.; Miao, C.; Kizos, T. Quantitative Impacts of Socio-economic Changes on REDD+ Benefits in Xishuangbanna Rainforests. *Forests* **2025**, *16*, 120. [\[CrossRef\]](#)
97. Moore, G.; Hawtin, G. International mechanisms for conservation and use of genetic resources. In *Plant Genetic Resources and Climate Change*; Jackson, M., Ford-Lloyd, B., Parry, M., Eds.; CABI Publishers: Wallingford, UK, 2013; pp. 98–113.
98. Pretty, J.; Garrity, D.; Badola, H.K.; Barrett, M.; Butler Flora, C.; Cameron, C.; Grist, N.; Hepburn, L.; Hilburn, H.; Isham, A.; et al. How the concept of “Regenerative Good Growth” could help increase public and policy engagement and speed transitions to net zero and nature recovery. *Sustainability* **2025**, *17*, 849. [\[CrossRef\]](#)
99. Chirwa, P.W.; Syampungani, S.; Mwamba, T.M. *Trees in a Sub-Saharan Multi-Functional Landscape: Research, Management and Policy*; Springer Nature: London, UK, 2024.
100. Atkins, T.B.; Duffus, N.E.; Butler, A.J.; Nicholas, H.C.; Zu Ermgassen, S.O.S.E.; Addison, P.; Milner-Gulland, E.J. A Pragmatic Framework for Local Operationalisation of National-Level Biodiversity Impact Mitigation Commitments. 2025. Available online: <https://ecoevorxiv.org/repository/view/8697/#!> (accessed on 18 June 2025).
101. Richie, H. *Not the End of the World: How We Can Be the First Generation to Build a Sustainable Planet*; Chatto & Windus: London, UK, 2024.

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.