



# Comparative Analysis of Land Policy Instruments to Tackle Land Fragmentation

Knowledge Series No. 1

**Land Governance II Project**

From fragmentation to future: empowering communities,  
transforming agriculture & improving governance



## Foreword

In an era marked by changing climate, population growth, and increased pressure on natural resources, the issue of land fragmentation has emerged as a critical challenge facing the Ethiopian highlands. As we navigate the complexities of land tenure, land use and development, understanding the effectiveness of various land policy instruments to tackle land fragmentation becomes paramount.

This study, „Comparative Analysis of Land Policy Instruments to Tackle Land Fragmentation,“ provides a compelling overview of the critical issue of land fragmentation in Ethiopia and the urgent need for comprehensive government policy action. The research, as outlined, goes beyond the conventional focus on land consolidation and explores a diverse array of policy instruments, from voluntary land exchanges and market-based transactions to cluster farming and cooperative formation, to tackle the multifaceted challenges posed by fragmented land parcels. By scrutinizing the advantages and disadvantages of these strategies, the study provides valuable insights for tailor-made interventions for various geographic and agro-ecological contexts, offering a foundation for informed decision-making and policy formulation.

The research is not merely an academic exploration; it is a roadmap for policymakers, planners, and scholars seeking pragmatic solutions to enhance land management and mitigate the adverse effects of land fragmentation in the diverse agro-ecological landscapes of the Ethiopian highlands.

Land fragmentation poses substantial hurdles to sustainable development, agricultural productivity, and environmental conservation. The urgency of addressing this matter is underscored by its implications for food security, biodiversity, and the resilience of communities in the face of global challenges such as climate change.

I commend Abebaw Abebe for his dedication to advancing our understanding of land fragmentation and its potential remedies. His meticulous research and insightful analysis pave the way for a more sustainable and resilient future, where the land is not merely a means of agricultural production but a shared resource that binds communities and ecosystems alike. I also express my sincere appreciation to the Ministry of Agriculture Lead Executive Office, led by Ato Tigistu Gebremeskel, for his support and valuable inputs to the research.

I invite readers to delve into the richness of this study, to explore the nuances of land policy instruments to tackle land fragmentation, and to draw inspiration from the diverse approaches presented herein.



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## Impressum

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## Acronyms

ACC	Agricultural Commercialisation Clusters
FAO	Food and Agriculture Organisation of the United Nations
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
LaGo	GIZ Land Governance Project
LC	Land Consolidation
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure





## Executive Summary

Land fragmentation has several manifestations, including but not limited to the existence of very small parcels, having an awkward shape, scattered with a considerable distance between parcels, and the absence of road access for each land parcel. It is a serious problem in Ethiopia. Landholders own numerous, geographically scattered, relatively small, and fragmented parcels of land, typically ranging from 4 to 5 parcels. On average, their total landholding size amounts to approximately 1.5 hectares, which translates to an average of 0.3 hectares per parcel. It is reaching a critical point that calls for government policy action. Most of the research in this regard concentrated on fragmentation as a problem and farmland consolidation as a solution. Others also revolve around technical issues that need to be considered to implement farmland consolidation. There is no study, as far as I review and I know, on different land fragmentation tackling policy tools apart from land consolidation; and the legal regimes and institutional issues for managing land fragmentation. The main objective of this research is, therefore, to prepare a comparative analysis of different land policy instruments to tackle land fragmentation in Ethiopia and assess the legal and institutional situation of their application. Secondary data through a literature review is conducted using a systematic literature review approach. As the primary source, laws related to land consolidation are reviewed. The research revealed that land consolidation is not the only mechanism to manage land fragmentation, there are various policy instruments. While many instruments involve the re-organization of landholding (e.g., voluntary land exchanges, various forms of land consolidation, market-based land transactions, land banking, expropriation & compensation), others focus on the consolidation of land use (cluster farming, cooperative formation). Some of the alternative policy tools may be used as preparatory initiatives for land consolidation, while others can be taken as standalone management tools. Other measures, like determining minimum parcel size, encouraging voluntary land exchange that will bring holding consolidation or mitigate distance fragmentation, prohibiting land redistribution, revisiting inheritance rules, cluster farming, and so on could be considered. It is imperative to have comprehensive and full-fledged policies and laws for managing land fragmentation. Besides, it is essential to establish a land fragmentation management organization, the details to be investigated, which should include a land consolidation commission or unit to oversee national land fragmentation management initiatives. Moreover, there should be an understanding that not all land fragmentations are problems. Research, education, training, and awareness creation on farmland fragmentation and its management tools, one of which is land consolidation, are very important.

# 1. Introduction

## 1.1. Background

Land fragmentation presents a significant administrative, productivity, and investment challenge, constraining the utilization of modern agricultural machinery and thus impacting productivity (Bezabih & Goshu, 2022). Ethiopia is not exempt from this issue, especially evident in its highland regions (Yimer, 2014) (Alemu et al., 2017; Leta et al.) (Zewdie & Tamene, 2020); (Gedefaw et al., 2019); (Gudina, 2011); (Beyene, 2019); (Wang et al., 2022); (Alemu et al., 2019). Although land fragmentation is particularly severe in the highlands, it also significantly affects the plains of southern Ethiopia, such as Woliata and Kebata zones, and certain areas of western Shewa. Moreover, land fragmentation is escalating in the Gamo Highlands of southwest Ethiopia (Cholo et al., 2018).

It stands as a key constraint to Ethiopia's socio-economic development, notably impeding rural development and the pivotal task of enhancing agricultural productivity. According to the Ethiopian Statistical Service, approximately 7.4 million landholders (34%) possess an average landholding of 0.1-0.5 hectares, each averaging four parcels. In contrast, 2.8 million landholders (13%) own less than 0.1 hectares of land. Data from the National Rural Land Administration Information System (NRLAIS) reveal average parcel sizes of 0.44, 0.66, and 0.64 hectares in Amhara, SNNPR, and Oromia regional states respectively (Amsalu, 2023). Other studies indicate even more severe levels of fragmentation than reported in this study, underscoring the gravity of the issue. Despite its significance, little has been done to address this fragmentation problem (IMG, 2019).

## 1.2. What is Land Fragmentation?

Land fragmentation is defined as the situation in which a single farm or ownership consists of numerous spatially separated and non-contiguous land plots scattered over a wide area (Bentley, 1987); (Balogun & Akinyemi, 2017). It profoundly impacts various aspects such as rural development, land management, land use, land administration, and natural resource protection. This issue exacerbates poverty and conflict perspectives, rendering it a matter of great concern (IMG, 2019). In Ethiopia, land fragmentation is prevalent, characterized by numerous small parcels with irregular shapes (Demetriou et al., 2013), (King & Burton, 1982), scattered with considerable distances between parcels. The absence of road access for each land parcel makes cultivation laborious, time-consuming, and very difficult to apply modern agricultural practices. The main shortcomings associated with land fragmentation include the small size and irregular shape of the land parcels, parcel dispersion, and, particularly, the large potential distance between parcels and the owner's farmstead.

In general, as pointed out by Amsalu (2023):

*Land fragmentation has a significant negative impact on production and productivity contributing significantly to the nation's food insecurity. The cost of inaction (in tackling land consolidation) is a lot. Land Fragmentation Index, the number of parcels held by a household, and the distance*

*between parcels have adversely affected crop productivity. Analysis of the costs of land fragmentation in Ethiopia and failure to act on land consolidation has revealed that, apart from the negative social and ecological implications, the country is likely to lose several thousands of tons of grain yearly due to land fragmentation. In this regard, the analysis made on grain loss due to land fragmentation has indicated an estimated annual loss ranging from 31,403 tons to 281,073 tons at the national level, and the estimated grain loss due to parcels distance from homestead ranged from 15,702 tons to 202,023 tons (Amsalu, 2023).*

### 1.3. Types of Land Fragmentation

Pieces of literature categorize land fragmentation into four distinct types: (1) fragmentation of land ownership, (2) fragmentation of land use, (3) fragmentation within a farm, and (4) separation of ownership and use (Dijk, 2003). Additionally, there are four fundamentally different types of land fragmentation stemming from various reasons:

- Unavoidable fragmentation due to natural conditions
- Fragmentation arising from physical conditions resulting from human activities unrelated to agriculture (e.g., construction of roads, railways, canals, etc.)
- Agricultural rational fragmentation (aimed at minimizing the potential risks of climatic and natural disasters, enhancing soil and crop diversity, accommodating different growing conditions, and varied harvesting schedules depending on altitudes)
- Agriculturally irrational fragmentation, not falling within the first two categories. Hence, it is not feasible or necessary to address all instances of land fragmentation.

Ownership and land use fragmentation are also noteworthy, with the former denoting situations where agricultural land ownership is divided among numerous owners of small and often irregularly shaped parcels, while the latter pertains to the actual utilization of the land.

### 1.4. Causes of Land Fragmentation

Land fragmentation arises from several factors. Population growth contributes to parcel fragmentation, negatively impacting production efficiency (UNICEF, 2009). This fragmentation is caused by inheritance, exchange, alienation (Ram et al., 1999), donation, land redistribution (Thein, 1997), and heterogeneous land quality (Bezabih & Goshu, 2022). Moreover, causes of land fragmentation are categorized into four: socio-cultural variations (inheritance laws, population growth, marriage, etc.), variations in economic efficiencies (land market, land transactions); (3) physical variations (soil qualities, topography, location), and operational variations (land redistribution) (Hartvigsen, 2014).

In Ethiopia, the root cause of the issue lies in the nation's land inheritance tradition. The 1975 'Land to the Tiller' reform, supported by distributive and redistributive rules of farmlands, exacerbated land fragmentation through repeated distribution and redistribution of peasant farmlands. This resulted in frequent resizing of farmlands, leading to the current state of land fragmentation. The fragmented plots are sometimes referred to as 'starvation plots' to signify the subsistence nature of landholding typical in rural Ethiopia. While land fragmentation can be seen as a risk management strategy for landholders, allowing for diversification of production in various agro-ecological zones, it hinders mechanization, causes time loss, and restricts plant growth monitoring due to long distances between plots.

In addition to parcel fragmentation, increasing fragmentation of agricultural production is observed in Ethiopia. It is anticipated that the number of small agricultural enterprises with less than 2 hectares, particularly those with less than 0.5 hectares, will increase exponentially in the coming years. This significantly reduces the competitiveness of Ethiopian small-scale farmers against larger agricultural producers in Ethiopia and against imports from abroad.

Despite numerous studies in the country on land fragmentation and land consolidation as a tool to manage it, there is no comprehensive study on a comparative analysis of different land policy instruments to tackle land fragmentation in Ethiopia.

## 1.5. Land fragmentation as a land management risk mitigation mechanism

Land fragmentation is often characterized as a constraint to efficient crop production and agricultural modernization (Sundqvist & Andersson, 2007). Conversely, studies argue that small family farms can be as efficient as large farms by enhancing intensification, facilitating crop diversification, and serving as a risk aversion mechanism. There is no consensus that fragmentation is strictly negative. Indeed, land fragmentation can be viewed as a tool for land management. Farmland fragmentation is not inherently problematic (Ntihinyurwa & de Vries, 2020). Landholders utilize fragmentation as a strategy to address vulnerability to climate impacts and fluctuating market prices. While enacting land consolidation and other fragmentation management laws, it is crucial to understand that not all fragmentations may necessitate consolidation. This point should be explicitly stated in the strategy document, with detailed and specific criteria. Intentional fragmentations made by households serve as responsible land management tools for crop diversification, climate change adaptation, mitigation, and risk management strategies (de Vries & Chigbu, 2017; Ntihinyurwa & de Vries, 2020). High land fragmentation also promotes crop diversification, manure application, and terracing (Cholo et al., 2018). Nevertheless, there exists a minimum amount of land that is efficient and productive. The potential benefits of fragmentation must be weighed against the potential costs. A thorough examination is necessary to understand the consequences of fragmentation in the face of climate change. By quantifying associated risks, valuable insights into expected losses and damages can be gained. It is crucial to acknowledge perceived risks, which may differ from quantifiable ones. Incentives should be provided to avoid further fragmentation below the efficiency line. This necessitates a clear and transparent land policy responsive to local contexts and demands, with incentive clauses allowing land as collateral and efficient transactions (Thein, 1997).

### 1.5.1. Advantages

- It allows farmers to cultivate a diverse range of crops, serving as an insurance mechanism against various soil and growing conditions. This practice effectively mitigates the risk of complete crop failure by providing farmers with multiple options for soil and growing conditions (Blarel et al., 1992) (Gedefaw et al., 2019).
- It facilitates crop rotation in multiple eco-zones (Gedefaw et al., 2019).
- Different plots enable farmers to grow a wider mix of crops, which is important for nutritional balance, food quality, and food sustainability as components of food security (Galli et al., 2020).

NB: These advantages apply if the situation remains unchanged and without the application of any other policy measure, not just LC.

### 1.5.2. Disadvantages

- It poses a constraint to efficient crop production and agricultural modernization in small and irregularly shaped fields, hindering economies of scale and farm mechanization.
- Considerable distances between parcels and the absence of road access for each land parcel make cultivation time and labor-intensive, rendering larger-scale productive investment unfeasible.
- Management, supervision, and securing of scattered plots can also be more difficult, time-consuming, and costly.
- Supervision of farm activities becomes challenging.
- Leads to greater post-harvest losses.
- Inefficient allocation of resources (labor and capital).
- Increases production costs (e.g., transportation costs).
- Small and scattered plots waste land area and require more land for fencing, border constructions, and paths and roads, resulting in high boundary and land waste.
- Increases the risk of disputes between neighbors.
- Discourages the development of infrastructure such as transportation, communication, irrigation, and drainage (Mwebaza & Gaynor, 2002).
- Banks are reluctant to accept small, scattered land holdings as collateral, hindering farmers from obtaining credit for investments (Mwebaza & Gaynor, 2002).

## 2. Objective & Methodology

### 2.1 Objective of the assignment

The overarching aim of the study is to conduct a comparative analysis of various land policy instruments aimed at addressing land fragmentation in Ethiopia and evaluate the legal and institutional landscape regarding their implementation.

The specific objectives are to:

- Analyze different policy instruments applicable to tackling farmland fragmentation.
- Evaluate Ethiopia's legal framework concerning the application of diverse policy instruments for addressing farmland fragmentation.
- Assess the institutional setup of the country concerning the implementation of various land fragmentation management policy instruments.

### 2.2 Methodology

In this study, secondary sources, involving desk-based research, are utilized. Data are gathered from secondary sources, which encompass laws, previous studies, and reports from land administration offices at both federal and regional levels. A review of federal and regional laws pertaining to land fragmentation is conducted. Additionally, a literature review is employed to scrutinize and evaluate numerous studies in specific topical areas. Platforms such as Library Genesis, Scie-Hub, Google Scholar, and direct search platforms are employed to identify related literature. A preliminary systematic search using the aforementioned platforms revealed thousands of secondary literature on the subject matter. The search focused on three areas of interest: (1) Land fragmentation; (2) policy tools to address land fragmentation, including but not limited to the definition and concepts of land consolidation; and (3) advantages and disadvantages of each policy tool. Key terms used during the search include land fragmentation, causes of land fragmentation, policy tools to address land fragmentation, land consolidation, land consolidation in Ethiopia, benefits of land consolidation, types/approaches of land consolidation, legal frameworks for land consolidation, and institutional arrangements for land consolidation. Initially, by critically reviewing all titles and abstracts of the collected articles, several hundred relevant materials were selected for full-text review. Additionally, other frequently cited articles in these selected materials were searched backward using a spider backward literature search technique. Furthermore, laws related to land fragmentation, encompassing land consolidation, were reviewed as the primary source.

## 3. Land Policy Tools to tackle Land Fragmentation

In transitioning to a market economy, the farm structure and economies of farm size hold significant importance (Thein, 1997). The size of farms and the amount of machinery owned are closely related, as they can generate extra income through hiring out machinery, in addition to their own use. The „Land to the tiller“ policy, along with inheritance traditions and rules due to population growth, has resulted in fragmented, small, and uneconomical farm sizes, which, in the long term, impact land efficiency.

International practice and academic discourse delve into various land policy instruments to tackle the development challenges posed by land fragmentation. While many instruments involve the reorganization of landholding (e.g., voluntary land exchanges, various forms of land consolidation, market-based land transactions, land banking, expropriation & compensation), others focus on consolidating land use (land use consolidation, yield clustering, cooperative formation). While these land policy instruments share common objectives and partly overlapping approaches, they each possess specific comparative advantages and disadvantages, contingent upon the geographic and socio-economic context and their compatibility with agricultural development strategies.

Given the diverse landscapes and food production systems in Ethiopia, it is imperative to recognize that different land policy instruments must be applied and combined within a comprehensive strategy to address land fragmentation. Presently, there is limited widespread knowledge of the variety of individual instruments at the decision-makers' level in Ethiopia, and only a limited understanding of their advantages and disadvantages. To enhance understanding of the land policy instruments available to tackle land fragmentation and to assess the legal landscape of their application in Ethiopia, an analysis and overview must be conducted. In summary, the following are some of the policy tools that can be utilized to manage land fragmentation problems.

### 3.1. Land Consolidation

Pieces of literature have categorized land fragmentation into four distinct types: fragmentation (1) of land ownership, (2) of land use, (3) within a farm, and (4) separation of ownership and use (Dijk, 2003). One of the pivotal tools to address this pressing issue is land consolidation, alongside other fragmentation management tools (Gudina, 2011); (Tenagne, 2018); (Ntihinurwa et al., 2019); (Gedefaw et al., 2019); (Beyene, 2019); (Alemu et al., 2019); (Ortiz-Becerra, 2021).

Land consolidation involves the process of exchanging small land parcels or shares for one or more larger parcels that hold approximately equivalent land value to the original holding. It aims to create parcels of more economically and rationally sized, shaped, and located lands. This approach aids in improving the tenure structure to support rural development by tackling land fragmentation (STUDIES, 2003). It contributes to uniting fragmented lands, reducing the

number of parcels, increasing fragment sizes, and reshaping fragment shapes (Tumer et al., 2010). Land consolidation is closely tied to land tenure and property rights issues, utilizing land tenure information (existing landowner, type of ownership, and 3Rs: Rights, restrictions, and responsibilities) to identify existing situations, potential changes, and updates (Rubanje, 2016).

Practically, the experience of researchers has revealed various benefits of land consolidation and ways to address its shortcomings in different scenarios, which legislation should consider. These benefits are closely linked to land tenure and property rights. Land consolidation reduces travel time, energy, and production costs. It decreases the number of oxen required for ploughing parcels and reduces energy consumption in carrying ploughing materials between parcels. It minimizes boundary disputes by reducing the number of neighboring landholders and boundaries post-consolidation. Additionally, it facilitates close management of crop residuals for animal feeding and organic fertilizer preparation, reduces post-harvest crop losses by enabling harvesting at the same location, and prevents the tragedy of anti-commons by creating public and communal areas like roads and green spaces. Overall, land consolidation presents an innovative tenure arrangement approach that offers numerous benefits within the context of Ethiopia's land fragmentation challenges.

There is no universally defined or approached to land consolidation; different countries employ various models and objectives (Food & Nations, 2003). Different approaches to land consolidation, including voluntary (100% landholders' acceptance), simple majority (50%+1 landholders or area), absolute majority (at least 75% of landholders or area), and mandatory-based approaches, may be considered, with selection dependent on specific geographic and socio-economic contexts and national policies.

Legal frameworks and institutional arrangements must align with a multi-purpose approach to land consolidation, extending beyond agricultural development to encompass community development, environmental initiatives, and infrastructure projects (HARTVIGSEN et al., 2019). It is imperative to clarify that land consolidation does not involve the expropriation of land and properties. Individuals should not be dispossessed of their land during land consolidation projects. However, in countries with a freehold tenure arrangement, land consolidation may offer opportunities for landowners to sell their land voluntarily. The primary focus of land consolidation in Ethiopia should be on enhancing land structure and infrastructure to improve agricultural productivity and integrate with broader economic and rural development objectives.

The enactment of context-oriented land consolidation legislation is essential for implementing land consolidation programs. Legislation should encompass competent dispute settlement and grievance redress mechanisms among other essential elements for Fit for Purpose land consolidation. Understanding this, the Food and Agriculture Organization (FAO) has assessed good practices on land consolidation legislation and published a Legal Guide on Land Consolidation (HARTVIGSEN et al., 2019). Many countries have implemented land consolidation laws to improve land management and utilization systematically, leading to more effective outcomes. The FAO legal guide identifies six principles of the land consolidation legal framework, including respect for and protection of legitimate tenure rights, sustainability and environmental protection, participatory approaches, gender equality, and transparency. Gender equality should extend beyond gender equality and encompass other aspects of social inclusion. Respect for and protection of legitimate tenure rights necessitates registration and titling programs in areas where land consolidation is implemented, ensuring a smooth consolidation program implementation in Ethiopia.



Establishing an appropriate institutional arrangement is crucial for the successful implementation of land consolidation programs. There is no pre-existing, one-size-fits-all institutional arrangement; instead, the specific arrangement required depends on the consolidation initiative's objectives and the country's unique circumstances. A public Lead Agency is vital for determining land consolidation policy and establishing a comprehensive legal framework, ensuring fairness, transparency, and effective outcomes. The decision-making and approval of re-allotment plans can be conducted through administrative or judicial approval approaches, with the public lead agency upholding fairness and transparency throughout the process.

Public participation plays a pivotal role in the context of land consolidation. It encompasses various consultation methods and information mechanisms, ensuring that community perspectives and concerns are considered. Public involvement empowers the community, gathers valuable insights, fosters transparency, and enhances project quality. By actively engaging stakeholders, decision-makers can address conflicts, mitigate adverse impacts, and achieve more informed and effective outcomes.

### 3.1.1. Advantages

- Facilitates the creation of competitive agricultural production arrangements by enabling farmers to have farms with fewer parcels that are larger and better shaped, allowing the farmer to introduce better farming techniques.
- Improves natural resource management and environmental conservation.
- Reduces traveling time, energy, and post-harvest loss.
- Creates competitive farming, for example, through the promotion of commercially viable family farms.
- Results in substantial changes in land tenure arrangements.
- Improves rural development in general.
- Enhances the efficiency and cost-effectiveness of public and private investments in transportation and communication networks, utilities, and irrigation systems
- Reduces disputes by minimizing boundaries.
- Enhances opportunities for mechanization and concomitant increases in land productivity.
- Improves labor productivity arising from effective work organization and supervision.
- Enhances transport efficiency to and from residential places.
- Enables better utilization of farm equipment and other fixed assets.
- Reduces average costs of farm inputs and enhances profitability of farm enterprises.
- Increases opportunities for public and private investments in agriculture-related infrastructure (TMG, 2019).
- Attracts young people into farming and agribusiness.
- Enhances the efficiency of monitoring farm activity.

### 3.1.2. Disadvantages

- Land consolidation may not always be a fitting or the sole solution for land fragmentation.
- Despite its economic efficiency, it might not always be socially efficient. The implementation of land consolidation policies faces numerous shortcomings and challenges. Some of these include limited budgets, challenges related to the valuation of land and properties, difficulty obtaining approval from landowners and achieving landowner consensus, and the potential for future subdivisions and fragmentation of holdings (Yuliastuti et al., 2021), among others.
- Initial investments for land consolidation projects are both costly and time-consuming. In Serbia, for instance, costs were excessively high and even exceeded the land price. However, it is crucial to recognize that such projects should be regarded as significant social measures. Once implemented, these projects yield comparatively high returns on investment and increase the price of land vis-a-vis the land market.
- Land consolidation may carry its own risks by reducing the variety of soils and growing conditions. This contradicts diversification efforts and may pose environmental risks in terms of family-level food security.
- It could negatively impact smallholders by decreasing the need for agricultural laborers due to increased dependence on mechanization. As a result, it may contribute to rural-urban migration if off-farm jobs are not created.

## 3.2. Voluntary Parcel Exchange

This approach is considered a soft alternative to land consolidation (Teijeiro et al., 2020). Conceptually, it falls under the umbrella of land consolidation. However, voluntary parcel exchange alone cannot achieve large-scale land consolidation results, as it is limited to the parties involved in the exchange. This voluntary exchange of parcels can be employed to address issues of distance fragmentation and parcel fragmentation. Policies can incorporate various incentive mechanisms to encourage voluntary land exchange, thereby reducing land fragmentation. Voluntary parcel exchange can be particularly beneficial in restructuring holdings when a significant number of owners participate (Teijeiro et al., 2020).

### 3.2.1. Advantages

- Address distance fragmentation and parcel fragmentation issues effectively.
- Particularly beneficial in restructuring holdings when a large number of owners participate.

### 3.2.2. Disadvantages

- Voluntary parcel exchange may not yield large-scale land consolidation results, given its limitation to parties exchanging their parcels.
- It can become challenging since it involves many people in isolation, unlike land consolidation, which employs a comprehensive approach.

### 3.3. Farmland Subdivision Restrictions and Creation of Family Farms

This principle restricts or forbids the subdivision of agricultural land during various transactions. For example, some countries limit the right to purchase or sell parts of agricultural real estate (Jacoby, 1959). Moreover, since the subdivision and fragmentation of land partly stem from inheritance based on succession laws (Ram et al., 1999), it is important to restrict or prevent subdivisions of agricultural businesses and land to curb further fragmentation. Farmland subdivisions fragment farms and jeopardize their future viability. Countries employ this mechanism as one solution to combat farmland fragmentation. For instance, federal and regional rural land laws include provisions that establish minimum parcel sizes, prohibiting parcel division below this threshold for any reason (inheritance, donation, rent, etc.). This may involve streamlining legacy transfer to one inheritor and setting a minimum land plot size that cannot be divided (Kurylo et al., 2017). Conversely, restrictions on land subdivision, whether through inheritance or sale, may result in joint ownership by heirs and subsequently cooperative farming.

Switzerland employs Farmland Subdivision Restrictions as a policy tool to address fragmentation. The law incorporates exceptions into inheritance laws and land-market regulations, prohibiting parcel fragmentation to maintain competitive family farms. It aims to safeguard the structure of Swiss agriculture by prohibiting parcel fragmentation and splitting whole estates. Agricultural parcels cannot be divided into segments smaller than 25 Ares (a quarter hectare) (Schmidt et al., 2019). During inheritance, the legal estate is assigned to one heir, who must compensate other heirs, requiring substantial investment, or opt for a family farm. In Ethiopia, certain regional states have adopted a similar approach. For instance, the Amhara National Regional State has integrated subdivision restrictions into its land law. However, these restrictions do not always prevent farmers from dividing their land, whether through formal means (court decisions favoring subdivisions) or informally (without registering further subdivisions). Consequently, this model faces enforcement challenges and lacks significant impact. To address this issue, a robust institutional framework is necessary to ensure strict adherence to the law.

#### 3.3.1. Advantages

- Farmland subdivision restrictions may lead to cluster development and the creation of larger family-owned farms, which are efficient and conducive to mechanization.

#### 3.3.2. Disadvantages

- This may limit liberty and, as a result, be legally and politically contested.
- Women's land rights might be at stake during divorce if such subdivision restrictions apply.
- Monitoring can pose a challenge and potentially push landholders toward operating informally. Additionally, it has the potential to escalate conflicts within families who are forced to jointly own land.

### 3.4. Land Sale/Land Swapping

This is one aspect of the land fragmentation management policy tool, involving land contract transfer used to combine small fragmented land parcels into larger ones to achieve land use consolidation (You, 2010). Larger farms can be formed through sale, leasing, or other transactions (Platonova & Jankava, 2011). Some countries, like Germany, incentivize this kind of

consolidation through land sale and swapping. In the Slovak Republic, there is an official land price during land consolidation. This price is utilized by the state to purchase the land that owners offer for sale through the Slovak Land Fund or the trustee (Peráček et al., 2022).

#### 3.4.1. Advantages

- This could enable someone to sell their small plot elsewhere and purchase another near their larger parcel or homestead, potentially leading to land consolidation.
- Uneconomical and excessively small plots could be transferred to the most efficient hands.

#### 3.4.2. Disadvantages

- Mostly benefit those with better bargaining power and capital.
- It may potentially result in an influx of individuals without land ownership residing in rural regions.

### 3.5. Expropriation

Expropriation measures are necessary to make land available for enlarging farms (Jacoby, 1959). This mechanism involves the government applying forced purchase or expropriation on small plots and consolidating them with neighboring parcels to create larger, more suitable agricultural land. The forced sale of agricultural land can be considered a broader public purpose aimed at consolidating land. Laws can be developed to empower the government to expropriate fragmented parcels to achieve the public goal of creating more convenient fields for mechanization and commercialization. Forced rent to large farm owners can also be used as a short-term solution. The concept of expropriation differs from land banking as it allows for forceful implementation without the need for landowners' consent. In contrast, land banking is a voluntary approach that refrains from imposing on landowners, who may require additional support through promotion and awareness initiatives.

#### 3.5.1. Advantages

- Can create available land for the government to allocate to the most efficient use.
- Uneconomical and very small plots could be forcefully purchased by the government and allocated to the most efficient purpose.

#### 3.5.2. Disadvantages

- A very complex task demanding both commercial, legal, and administrative capacities.
- May create corruption and injustice throughout the process.

### 3.6. Agricultural Zoning as a Farmland Protection Tool

This policy tool implies that areas possessing good agricultural soils and a viable farming industry are prime candidates for agricultural zoning. This practice is common in countries like Georgia (Franzen & Center, 2006) and the United States (Cordes, 2001). Agricultural zoning involves designating land exclusively or almost exclusively for agricultural purposes, based on its land use. This zoning is supplemented by farmland subdivision restrictions up to a size

appropriate for farming. Agricultural zoning permits the use of the land solely for agricultural purposes, allowing only a limited amount of non-farm-related development such as compatible or accessory buildings. Residential farm dwellings are not permitted as they contribute to one form of land fragmentation (Franzen & Center, 2006).

### 3.6.1. Advantages

- Results in the preservation of large tracts of land for farming.
- Inexpensive way to protect large areas of agricultural land.
- Familiar and widely used method of regulating land use.
- Mostly accepted by the public. Agricultural zoning is a cost-effective and planning-based approach that enhances the productivity of landholders and promotes economically sustainable agriculture. This, in turn, enables landowners to settle in specific areas with improved social and economic infrastructures (Franzen & Center, 2006). This is also very easy to explain to landowners who are farmers and are familiar with agricultural zoning.
- It is flexible and can be adapted to changing circumstances very easily.

### 3.6.2. Disadvantages

- Increases farmers' travel time from the center to their farmlands.
- Potential legal challenges may arise due to perceived unfairness in limiting residential and commercial developments.
- Susceptible to change under increased development pressure, rendering them not a permanent land preservation method.
- Difficult to monitor and enforce on a day-to-day basis.
- Only impacts certain types of fragmentation, necessitating combination with other methods to effectively address various aspects of fragmentation.

## 3.7. Land Use Consolidation

This process does not entail consolidating a single holding; instead, it focuses on consolidating the land use of various parcels owned by different individuals. In this endeavor, the aim is to streamline and optimize the utilization of multiple land parcels, each owned by separate individuals. Rather than merging these parcels into a single entity, the focus is on harmonizing their land use practices. By consolidating the land use of these diverse parcels, we can enhance efficiency, maximize productivity, and ensure a more cohesive approach to their management. This consolidation process allows for better coordination and utilization of resources, leading to improved outcomes for all stakeholders involved. Furthermore, this approach promotes collaboration and cooperation among landowners, fostering a sense of unity and shared purpose. It enables the pooling of expertise, resources, and efforts, resulting in a more effective and sustainable land use strategy. The following are the types of land use consolidation.

### 3.7.1. Cluster Farming

This is also referred to as Crop Consolidation, which is the consolidation of the use of agricultural lands, in terms of unifying the cultivated crop. This is one of the tools for managing land fragmentation challenges. Cluster farming has been particularly useful in employing mechanization technologies and preventing post-harvest losses. Cluster Farming creates real profit by merging several smallholder farms, helping farmers to increase harvest, agricultural productivity, and value chain products, and boost food security. Nevertheless, the drawback with this policy tool is it does not solve the problem of land waste because of many boundaries and ditches, which still are inefficient in terms of the use of natural resources.

In Ethiopia, cluster farming involves about 30–200 smallholder farmers with adjacent farm plots who voluntarily pool a portion of their land to benefit from targeted government support and cluster economic agglomeration (Dureti et al., 2023).

#### 3.7.1.1. Advantages

- Useful in employing mechanization technologies and preventing post-harvest losses.
- Creates real profit by merging several smallholder farms.
- Increases harvest, agricultural productivity, and value chain products.
- Better able to access market information.

#### 3.7.1.2. Disadvantages

- It does not address the problem of land waste due to numerous boundaries and on-field ditches, leading to inefficient use of natural resources.
- Producing similar crops contradicts food security principles.
- It can only alleviate the distance/traveling time problem if mechanization is universally available and applied throughout the entire farming cycle.
- Managing land becomes complex for farmers, particularly when their parcels are scattered across various clusters over a wide area.
- This process incurs high transaction costs due to extensive coordination requirements, and it necessitates continuous public support for success.

### 3.7.2. Cooperative Farming

Cooperative Farming is a land fragmentation management tool wherein landholders form a cooperative, bringing their parcels together, with or without amalgamating them, to cultivate jointly and share input costs and products based on predetermined criteria such as parcel size and fertility. Participating households voluntarily contribute finances and land for production according to a shared plan, process, and form of farming with similar input and output markets. Cooperative farming requires farmers to invest capital, which facilitates commercialization (Huggins, 2013). It entails changing intercropping techniques to prioritize mono-cropping. The government can assist the cooperative in selling, processing, distributing, and marketing agricultural products, thereby incentivizing farmers to engage in cooperative farming (Kathiresan, 2012). Cooperative farming may also involve contract farming.

Unlike other land use consolidation methods like cluster farming, this approach establishes a distinct legal entity for the cooperative. This unique characteristic empowers the cooperative to function cohesively as a single entity.

This collaborative approach enhances efficiency and mutual benefit among members. By pooling resources and expertise, the cooperative can optimize agricultural practices and maximize yields. Additionally, shared costs help alleviate financial burdens on individual farmers. Agreed-upon criteria ensure fairness and transparency in both input and output distribution. This cooperative model fosters community and teamwork while promoting sustainable and profitable farming practices.

In Ethiopia, farmer cooperatives have a long and debated history characterized by a coercive top-down approach that compelled farm households to join cooperatives and place individual land holdings under cooperative control (Dureti et al., 2023).

#### 3.7.2.1. Advantages

- Cooperative farming enables access to government incentive mechanisms for selling, processing, distributing, and marketing agricultural products, benefiting the cooperative.
- It enhances the adoption of agricultural inputs and livelihoods among cooperative members.
- Cooperative farming provides access to larger markets and promotes healthy competition, driving overall improvement in agricultural practices and outcomes.

#### 3.7.2.2. Disadvantages

- Strict management is necessary to prevent disputes and the dissolution of the cooperative.
- Cooperative farming demands an initial investment of capital from participating farmers.
- There's a risk of exclusion of poorer farmers from marketing cooperatives, especially in decision-making processes.
- Corruption among cooperative leaders can undermine the integrity and effectiveness of the cooperative.
- Some farmers may have sentimental attachments to their lands, leading to reluctance in releasing them to the cooperative for better management.

#### 3.7.3. Contract Farming

It is a well-defined practice in which agricultural producers enter into agreements with buyers or companies for a given period to cultivate and supply specific crops or livestock. This provides a framework for both parties to outline their respective roles, responsibilities, and expectations. Farmers commit to producing a predetermined quantity and quality of agricultural products within a specified timeframe. In return, buyers or companies offer various forms of support, such as technical assistance, inputs, and ensuring a guaranteed market for the produce. This collaboration fosters a sense of security and stability for farmers, as they can rely on a predetermined price and market for their goods. By formalizing agreements and establishing clear expectations, this practice promotes sustainable agricultural practices, enhances productivity, and fosters economic growth for all parties involved.

This potentially attractive tool for land commercialization is being implemented in Ethiopia through Agricultural Commercialization Clusters (ACC) contract farming. This is a potential tool that can be used as a land fragmentation management tool. It facilitates contract farming-based large-scale land investment through consolidating smallholder farms under a crop/commodity of specialization (Bezabih & Goshu, 2022). For instance, in Rwanda, foreign agricultural investment involves contract-farming arrangements with cooperatives, which are facilitated by the state, which when necessary, uses coercive mechanisms as well as highly interventionist strategies (such as regional crop specialization policies and mandatory land use consolidation) to create an ‘enabling environment’ for agricultural investment (Huggins, 2013). This can be an alternative to expropriation and allows direct control of production by corporations, without creating dispossession/displacement on landholders (Kathiresan, 2012).

#### **3.7.3.1. Advantages**

- Attractive tool for land commercialization, and facilitates large-scale land investment
- Can be an alternative to expropriation and leasing of land to investors, as it does not create dispossession and displacement of landholders
- Often introduces new modern farming technology, improved inputs, and promotes the transfer of knowledge and expertise from companies to farmers, enabling farmers to learn new methods of production
- Provides managerial, technical, and extension services to farmers
- Leads to increased income for farmers, as they can negotiate fair prices and avoid the uncertainties of fluctuating market conditions.

#### **3.7.3.2. Disadvantages**

- Tends towards mono-crop, which affects crop diversification
- May lead to risks of market failure and production problems
- Companies may prioritize maximizing production at the cost of the environment, using hazardous chemicals if regulatory frameworks are not strong enough.



## 4. Summary Table

N°	Policy Instruments	Description	Advantages	Disadvantages	Legal situation of application in Ethiopia
1	Land Fragmentation	Land fragmentation shall include plot size, the shape of individual plots, the distance of plots from farm buildings, and the distances between plots	<ul style="list-style-type: none"> <li>• It enables farmers to grow a wider variety of crops which may be used as an insurance mechanism from</li> <li>• Variety of soil and growing conditions that reduce the risk of total crop failure by giving the farmer a variety of soil and growing conditions.</li> <li>• facilitates crop rotation</li> <li>• Multiple Ecozones.</li> <li>• Different plots enable farmers to grow a wider mix of crops.</li> </ul>	<ul style="list-style-type: none"> <li>• Inappropriate land structures constraints efficient crop production and economies of scale, non-feasibility for mechanization agricultural modernization, and larger scale investment.</li> <li>• Considerable distance between parcels and the absence of road access for each land parcel makes it time and labor-consuming; high boundary waste via border construction; more land for fencing, and paths and roads.</li> <li>• Difficulty of supervision of farm activities</li> <li>• Leads to post-harvest loss</li> <li>• Difficult to manage, supervise, and secure scattered.</li> <li>• Increases the risk of disputes between neighbors</li> <li>• Discourage the development of infrastructure like transportation, communication, irrigation, and drainage</li> <li>• Banks are sometimes unwilling to take small, scattered land holdings as collateral, which prevents farmers from obtaining credit to make investments</li> </ul>	<p>The heart of the Ethiopian land legal regime seems equity that encourages land fragmentation; despite there is a tendency to set minimum parcel sizes.</p>

N°	Policy Instruments	Description	Advantages	Disadvantages	Legal situation of application in Ethiopia
2	Land consolidation	It is the process through which small land parcels or shares in land are exchanged for one or more larger parcels that are approximately equivalent in value to the original holding. It creates parcels of more economic and rational size, shape, and location.	<ul style="list-style-type: none"> <li>Creates larger and better-shaped farms for better farming techniques, such as mechanization, leading to competitive agricultural production</li> <li>Improves natural resource management, environmental conservation, and rural development in general</li> <li>Reduce traveling time, post-harvest loss, and disputes by reducing boundaries, and average costs of farm inputs</li> <li>Improve efficiency &amp; cost-effectiveness of public and private investments in transportation &amp; communication networks, utilities, and irrigation systems.</li> <li>Improves labor productivity; better utilization of farm equipment and other fixed assets;</li> <li>Attract young people into farming and agribusiness.</li> <li>Efficiency of monitoring farm activity</li> </ul>	<ul style="list-style-type: none"> <li>Costly and time taking.</li> <li>Reduce a variety of soils and growing conditions, which is against product diversification</li> <li>It would negatively affect smallholders, in terms of decreasing the need for agricultural laborers due to increased dependence on mechanization – as a result may increase rural-urban migration if off-farm jobs are not created.</li> </ul>	Despite not being fully established, legal frameworks and provisions are present in rural land administration and use laws, enabling the consolidation of land. Nevertheless, it requires a full-fledged law that governs the necessary aspects of land consolidation (See section 6 below about the Ethiopian legal environment regarding land consolidation).
2.1.	Voluntary land consolidation	This is one type of land consolidation solely based on the consent of landholders/owners.	<ul style="list-style-type: none"> <li>It takes all the advantages of land consolidation stated above.</li> <li>As this is based on the consent of landholders, it will have a long-lasting and sustainable impact.</li> </ul>	<ul style="list-style-type: none"> <li>It takes all the disadvantages of land consolidation stated above.</li> <li>Due to the reliance on landholders' consent, achieving a comprehensive agreement for the implementation of land consolidation may prove challenging.</li> </ul>	
2.2.	Majority-based land consolidation	Individuals from minority groups, who may hold reservations about consolidation will be obliged to accept the decisions made by the majority	<ul style="list-style-type: none"> <li>It takes all the advantages of land consolidation stated above.</li> </ul>	<ul style="list-style-type: none"> <li>It takes all the disadvantages of land consolidation stated above.</li> <li>This compels individuals who are unwilling to accept the decision of the majority regarding land consolidation.</li> </ul>	

N°	Policy Instruments	Description	Advantages	Disadvantages	Legal situation of application in Ethiopia
2.3.	Mandatory Land Consolidation		<ul style="list-style-type: none"> <li>It takes all the advantages of land consolidation stated above.</li> </ul>	<ul style="list-style-type: none"> <li>This is purely mandatory and may face obstacles during implementation.</li> <li>This is against one of the basic principles of governance, i.e. participation.</li> </ul>	
3	Voluntary Parcel Exchange	This approach is considered a soft alternative to land consolidation.	<ul style="list-style-type: none"> <li>Manage distance fragmentation and parcel fragmentation issues.</li> <li>Very useful in restructuring holdings when a large number of owners participate</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary parcel exchange may not yield significant land consolidation outcomes or effectively enhance land structures, as it is restricted to parties exchanging their parcels.</li> <li>It may easily become challenging as it involves many people in isolation, unlike land consolidation which applies a comprehensive approach.</li> </ul>	Despite not being fully established, legal frameworks and provisions are present in rural land administration and use laws, enabling land consolidation. Nevertheless, it requires a full-fledged law that governs the necessary aspects of land consolidation (See chapter 5)
4	Farmland Subdivision Restrictions and Creation of Family Farms	The aim is to restrict or prevent the subdivision of agricultural businesses and agricultural land to safeguard against further fragmentation.	<ul style="list-style-type: none"> <li>Farmland subdivision restrictions may lead to cluster development and the creation of bigger family-owned farms.</li> <li>It can improve land structures.</li> </ul>	<ul style="list-style-type: none"> <li>This may limit liberty.</li> <li>Legally and politically contested.</li> <li>Women's land rights might be at stake during divorce if such subdivision restrictions apply during divorce.</li> </ul>	There are subdivision restrictions in the Ethiopian land laws.
5	Land sale/land swapping	A contract of land sale used to combine small fragment land parcels into large ones to realize land use consolidation.	<ul style="list-style-type: none"> <li>This could allow one to sell his small plot somewhere and buy another near his big parcel or homestead which may improve land structures.</li> <li>Uneconomical &amp; small plots could be transferred to the most efficient hand.</li> </ul>	<ul style="list-style-type: none"> <li>Mostly benefit those who have better bargaining power and capital</li> </ul>	In Ethiopia, land is not subject to sale and other means of exchange. As a result, it requires policy and legal change. Besides, the maximum holding rule is against this principle.
6	Expropriation	The state uses its power to forcefully acquire land for enlargement of farms and infrastructure.	<ul style="list-style-type: none"> <li>Can create better land structures.</li> <li>Uneconomical and small plots could be forcefully purchased by the government and allocated to the most efficient purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Very complex task demanding both commercial, legal, and administrative capacities.</li> <li>May create corruption and injustice through the process.</li> </ul>	The public purpose in the Ethiopian Legal framework does not cover the expropriation of land for LC tasks. Still, there is a possibility to amend the law to broaden it so that it can include LC as a public-purpose matter.

N°	Policy Instruments	Description	Advantages	Disadvantages	Legal situation of application in Ethiopia
7	Cluster Farming	It is the consolidation of the use of agricultural lands, in terms of unifying the cultivated crop.	<ul style="list-style-type: none"> <li>Useful in employing mechanization technologies and the prevention of post-harvest losses.</li> <li>Creates real profit by merging several smallholder farms</li> <li>Increase harvest, agricultural productivity, and value chain products</li> </ul>	<ul style="list-style-type: none"> <li>It does not overcome the problem of land waste due to numerous boundaries and on-field ditches, and thus the inefficient use of natural resources.</li> <li>Producing similar crops is against food systems.</li> </ul>	Despite the absence of a clearly defined legal framework, it is important to note that this activity is not explicitly prohibited. However, it is crucial to establish a comprehensive and well-defined regulatory structure to address this matter effectively.
8	Cooperative Farming	Bringing together parcels of land, cultivating them collectively, and sharing input costs and products according to pre-established criteria.	<ul style="list-style-type: none"> <li>They can get the government incentive mechanism in selling, processing, distributing, and marketing agricultural products for the cooperative</li> <li>This collaborative approach allows for increased efficiency and mutual benefit among members</li> </ul>	<ul style="list-style-type: none"> <li>It requires strict management to avoid disputes and dissolution of the cooperative.</li> <li>It requires an investment of capital from farmers</li> </ul>	Even though the Ethiopian Cooperatives law can apply to this context, still it requires context-specific provisions applicable to cooperative farming.
9	Contract Farming	Contract farming is a well-defined practice in which agricultural producers enter into agreements with buyers or companies to cultivate and supply specific crops or livestock.	<ul style="list-style-type: none"> <li>Attractive tool for commercialization</li> <li>Facilitates contract farming-based large-scale land investment</li> <li>Can be an alternative to expropriation and leasing of land to investors</li> <li>It does not create dispossession and displacement on landholders</li> <li>It often introduces new technology and enables farmers to learn new methods of production</li> <li>It promotes the transfer of knowledge and expertise from buyers or companies to farmers, empowering them with valuable skills and insights.</li> </ul>	<ul style="list-style-type: none"> <li>Tended towards mono-crop which affects crop diversification</li> <li>Companies want to maximize their production at the cost of the environment using hazardous chemicals if regulatory frameworks are not strong enough.</li> </ul>	Ethiopia has adopted contract farming proclamation number 1289/2022. As a result, the policy tool has legal backing
10	Agricultural Zoning	It is zoning land exclusively or almost exclusively for agricultural purposes, according to the land use.	<ul style="list-style-type: none"> <li>Results in the preservation of large tracks of land for farming</li> <li>Familiar and widely used method of regulating land use</li> <li>Mostly, accepted by the general public</li> </ul>	<ul style="list-style-type: none"> <li>It increases travel time of farmers from the center to their farmlands</li> <li>Potential legal challenges to the restrictions due to the perceived unfairness of limiting the residential and commercial developments.</li> <li>They are susceptible to change when development pressure increases, as a result, they are not a permanent land preservation method</li> </ul>	There are provisions that restrict construction of dwelling houses on farmlands. The Amhara Kebele Centre Directive is meant for this.

## 5. Does Ethiopia have the required Land Fragmentation Management Policy Tools and institutional Frameworks?

### 5.1 Land Fragmentation Management Tools in Ethiopia

According to the FAO legal guide, land consolidation law promulgation and implementation can either be centralized or decentralized based on the country's specific situation. Ethiopia seems to follow a hybrid approach where the power of legislation is given to the federal government; whereas implementation is to the regional states. As per Art. 51(5) of the constitution, the federal government shall enact laws for the utilization and conservation of land and other natural resources (FDRE, 1995). As per Art. 52 (2(d)) of the same constitution, regional states have been granted the power to administer lands under their jurisdiction, based on the law that the federal government has promulgated (FDRE, 1995). Despite this, the Federal Government may, when necessary, delegate to the States powers and functions granted to it by Article 51 of this Constitution (Art 50(9)). According to the powers entrusted to it by Article 51 of this Constitution, the federal government has enacted rural land administration and use Proclamation No. 456/2005 (FDRE, 2005). To effectively administer their lands, the federal government delegated regional states the authority to enact detailed laws as per article 50(9) of the constitution and article 17 of the federal Rural Land Administration and Use Proclamation 456/2005. We can say that, as land consolidation and other land fragmentation management policy tools are one type of land management, utilization, and conservation systems, the power to enact rules related to these aspects is entrusted to the federal government, and the administration and implementation of these land consolidation rules to the regional states. The federal government can either promulgate all types of land fragmentation management tools including land consolidation laws (proclamation, regulation, and directive), or delegate all or some of the laws mentioned to the regions.

Historically the 1975 “land to the tiller” policy and laws played a huge role in the current land fragmentation. As a result, individuals typically possess approximately 4-5 parcels that are widely dispersed. These parcels are fragmented and relatively small, with an average total holding size of about 1.5 hectares, equating to an average of 0.3 hectares per parcel (Amsalu, 2023). Ethiopia does not have a comprehensive land policy unless otherwise it is inferred from the constitution, different sectoral policies, and other subordinate legal frameworks. Article 40 of the constitution enshrines governing provisions about the ownership and administration of land. However, it is silent about land fragmentation and its management policy tools. Other sectoral policies, including, but not limited to, agricultural rural development policies, strategies, and tactics do not even mention the word “land consolidation” and other land fragmentation land management policy tools. It describes land use consolidation, consolidating the land use of fragmented parcels for large-scale agricultural investment. According to the existing Agricultural Rural Development Policy, this can be achieved through rental contract arrangements between landholders having small parcels and investors. The policy overlooked landholding consolidation where smallholder farmers can exchange their parcels voluntarily and create comparatively bigger-sized holdings suitable for agricultural farming. The policy also tried to balance landlessness and land re-distribution. It stated that there might be a need to redistribute land considering the negative impact of it, tenure insecurity. This is one major

cause of land fragmentation, and its mitigation strategy is not boldly included in the policy.

„Policy-led efforts at land consolidation have been only in their infancy in Ethiopia” (Bezabih & Goshu, 2022). A draft agricultural and rural land policy is submitted to the Council of Ministers for approval. This policy is meant to compensate for the drawbacks of the previous policy. One of the problems is issues regarding land consolidation. The draft policy considers land fragmentation, both locational and size fragmentation, as a threat to agricultural production and productivity; and brought the concept of voluntary land consolidation as a fragmentation management tool. The main objective of this land consolidation, according to the policy, is to make it simple to apply modern agricultural technologies and practices, increase agricultural production, productivity, and quality, responsible natural resource use, etc.

As stated above, subsequent legislations have a policy and enforceable legal provisions regarding land management and administration. Both the federal and regional legislations govern these matters. Settlement and villagization programs to be undertaken at the request and participation of the community should be undertaken taking into account the objective of land consolidation. However, this provision is not clear regarding the implementation of land consolidation during resettlement and villagization programs (FDRE, 2005), Art 11(5). Besides, the law puts restrictions on the fragmentation of parcels by proclaiming a minimum size of holding (Ibid, Art. 11 (2&3)). Landholders are also encouraged to voluntarily exchange their farmlands to make small farm plots convenient for development (Ibid, Art. 11(3)). Other than these general provisions, the federal framework law does not have detailed provisions that guide farmland fragmentation management policy tools including land consolidation. Regional land laws have very few provisions regarding land fragmentation and its management tools, including land consolidation.

The Oromia rural land administration and use proclamation number 248/2023, talks about the consolidation of farm plots. The merging of farm plots shall be made based on the consensus and willingness of the holders. This implies that voluntary land consolidation is chosen from the approaches. As per article 23 of the proclamation minimum farm plot size is determined to be 0.5 hectares for annual crops, and 0.25 hectares for irrigation and perennial plants. This plot size is also applicable during inheritance and renting of private holding. This is meant to mitigate further land fragmentation.

The Amhara National Regional State Revised Rural Land Administration and Use Determination Proclamation No.252/2017 also enshrined provisions about land consolidation and other land fragmentation management measures. It talks about holding exchange (art. 20(1)). Rural landholders may agree on their holdings individually to make small plots adjoined/consolidated and suitable for development (art 20(2)). The regulation further explained this and prescribes that any landholder can exchange his or her land with the view to making his land contiguous and consolidating his or her farm (art. 8 (1-4)). This is one form of land fragmentation management measure (Ntihinyurwa et al., 2019). This holding/parcel voluntary exchange can be used to manage distance fragmentation and parcel fragmentation issues. Updating of land information for land exchange transactions that have the effect of land consolidation is made free of payment. This is meant to encourage land consolidation. As discussed by Ntihinyurwa et al., 2019, there is also another defragmentation (fragmentation management) measure; among them is farmland subdivision restrictions.

The Amhara rural land law partially adopted it. Minimum Plot Size is defined in the proclamation as the least plot of land to be given to as holding (art. 2(14)). Based on this definition the regulation enshrined 0.25, 0.06, and 0.02 hectares as a minimum plot/parcel size for parcels

cultivable by rain, cultivatable through irrigation, and for the construction of a dwelling house respectively (art. 5(1)). It is in no case prohibited to give a plot of land, which is below this size (art. 5(2) of the regulation). Farmland subdivision restrictions are also applicable during inheritance. Heirs cannot divide the inheritance farmland if their share will be below the minimum plot size determined above, instead, they can use it commonly (art. 17(9) of the proclamation). Hartvigsen, M., 2014 explained that land re-distribution is one cause of land fragmentation. Land re-distribution prohibitions could be taken as one form of land fragmentation management measures. Understanding this the Amhara land law prohibited land re-distribution (art. 6(1) of the regulation) except irrigated for lands. This is a very important measure to mitigate further land fragmentations, in addition to the purpose it has in strengthening tenure security. The regional land law goes further in achieving subdivision restrictions on parcels, which would be below the determined minimum plot size. Parcels divided against the subdivision restrictions are ineligible to be registered and certified (art 35(7) of the proclamation) except those parcels known to have existed before the enactment of the revised proclamation (art. 26(5) of the regulation). This is one further step in implementing subdivision restrictions.

The federal government has been amending the rural land administration and use Proclamation 456/2005, which is now approved by the Council of Ministers. The new draft proclamation has very few provisions regarding land consolidation and other defragmentation measures. It seems the draft law adopted two land consolidation approaches: consent-based land consolidation as a principle, and exceptionally mandatory land consolidation in irrigation areas where the government or partners build the infrastructure. Other defragmentation measures include; ordering regions to promulgate land provisions on minimum plot size, parcel exchange (which could be used to manage distance fragmentation), prohibition of further land re-distribution activities, land rent (it can manage land use fragmentation), etc. Except for the federal, Amhara, and Oromia land laws, other regional land laws do not have that many exemplary land consolidation provisions.



Figure 1: FAO land consolidation legal guide principles: adapted from (HARTVIGSEN *et al.*, 2019).

These six principles serve as evaluation criteria to assess the Ethiopian land consolidation regime. Significant gaps are evident in the limited provisions related to land consolidation. The existing legal frameworks do not fulfill the six FAO land consolidation legal guide principles. The land consolidation provisions are silent about respecting and protecting legitimate tenure rights. The fate of communal landholders during land consolidation is unclear. From the outset, the provisions only allow for individual-level initiatives of land exchanges but not on a larger scale. Respecting and protecting legitimate tenure rights imply the need for some sort of registration and titling program in areas where land consolidation is implemented. This does not mean that unregistered rights and interests should be ignored. The land consolidation law should consider all tenure types (including formal and informal, primary and secondary users, and the like). The Rural Land Administration and Use Laws do not reflect these issues. Principles such as „at least as well off,“ sustainability and environmental protection, the participatory approach, gender equality, and transparency are not adopted in those provisions. Land consolidation must pay attention to environmental protection and sustainable development. The provisions do not cover major thematic areas of land consolidation such as valuation and rural infrastructure.

Additionally, the land consolidation provisions have the following significant gaps.

- The existing legislation remains ambiguous regarding the approach it takes for land consolidation, whether it is voluntary or mandatory. It appears that the law has favored a more straightforward and uncomplicated method, relying on land exchange as the primary means of achieving consolidation. However, it should be noted that when exploring the contrast between voluntary and mandatory actions, it is essential to acknowledge that there may be intermediate stages in the process that fall into either category.
- The existing provisions lack clarity regarding the mandatory procedures that must be followed before land consolidation can take place. These crucial procedures encompass, among others, public consultation and participation, along with prior registration. It is imperative to address these procedural requirements to ensure a comprehensive and transparent process.
- The scope/unit and purpose of land consolidation are not reflected in the law. The scale of land consolidation (woreda/kebele/sub-kebele) is also essential to be determined by the law. It could be enshrined on a case-by-case basis, but still, the law should have provisions that determine the unit of land consolidation. However, the process of land consolidation does not necessarily have to align with administrative units. Drawing from global experiences, land consolidation areas can encompass a specific village or area, multiple villages, extending beyond municipal borders, and in some cases, even involving more than one regional state. However, this particular scenario can be quite complex within the Ethiopian context.
- The law should also cover whether communal and state holdings on one hand and residential holdings on the other will be part of farmland consolidation programs or not. As creating new residential areas is costly, and landholders are not happy leaving their long-lived residential areas, excluding residential areas from the scope of farmland consolidation programs will be of paramount importance. In this case, the theory called relational ontology is very important. It advocates for the considerations of traditional practices, the spiritual nature of the land, and traditional knowledge during project implementation (Datta, 2015). For instance, people may not need the land consolidation project to affect their residential areas because of spirituality.



In Ethiopia, pilot programs are started without full-fledged farmland consolidation laws, and trying to develop a legal framework from the pilot result. Instead of this approach, it would be nice if there is a law at the beginning, and the pilot should test this law as well and modify the law based on the findings of the pilot. This is a „learning by doing“ approach. This approach can create a solid legal framework. Other countries follow this approach and become successful. They did several major amendments to their legislation after implementing the first land consolidation projects.

However, there is confusion about the difference between land use clustering/land use consolidation on one hand and land consolidation on the other. The former brings together the land use of different parcels without necessarily consolidating holding rights. The purpose is to cultivate similar crops by different adjoining landholders without combining holding rights. The boundaries of the parcels still exist, and there will be no mixing of the products produced. On the other hand, land consolidation is bringing together different neighboring/adjoining parcels into a single holding through different mechanisms, exchange, for instance. While enacting land consolidation law, it is crucial to understand that not all land fragmentations may require land consolidation as a management strategy. Farmland fragmentation is not necessarily a problem. There are intentional fragmentations made by households as a coping strategy for crop diversification, climate change adaptation and mitigation, and risk management strategies (Ntihinyurwa & de Vries, 2020). This is also true in our country, and land consolidation decisions should be taken on a case-by-case basis.

When evaluating the legal status of land fragmentation management instruments, apart from land consolidation, significant gaps become apparent. Currently, only land clustering and cluster farming are granted legal status in the draft federal Rural Land Administration and Use law, which has been submitted to the House of Peoples' Representatives for approval (Article 19 of the draft Proclamation). Furthermore, the legal aspects surrounding certain measures aimed at addressing land fragmentation, such as expropriation, cooperative farming, and Agricultural Zoning, remain ambiguous. These approaches lack a specific legal framework and often operate within a gray area, neither explicitly forbidden nor explicitly permitted. However, it is important to note that the law unequivocally prohibits Land Sale/Land Swapping. Therefore, it is crucial to address the lack of legal recognition for other land fragmentation management tools. These instruments play a vital role in promoting efficient land use and sustainable development. By acknowledging their importance and granting them legal status, we can ensure comprehensive and effective land management practices. The current draft federal Rural Land Administration and Use law represents a step in the right direction. It recognizes the significance of land clustering as a means to address land fragmentation issues. However, it is essential to broaden the scope and consider incorporating other effective management instruments into the legal framework. By doing so, we can enhance the overall effectiveness of land management strategies and foster a more sustainable and productive use of land resources. This will not only benefit individual landowners but also contribute to the economic growth and environmental sustainability of our nation. To bridge the existing gaps, policymakers should thoroughly evaluate and assess the potential of various land fragmentation management instruments. This evaluation should consider their effectiveness, feasibility, and compatibility with existing laws and regulations. By conducting a comprehensive analysis, we can identify the most suitable approaches and ensure that all relevant instruments receive the legal recognition they deserve.

## 5.2 Institutional Arrangements on Land Fragmentation Management Tools

It is a commonly accepted view that institutional structure is one of the most important indicators of property rights and that there is an interaction between it and economic growth (Haydaroglu, 2015). Institutional arrangements are key to implementing policies and legal frameworks. Land fragmentation management policy tools are not exceptions to this principle. According to the legal guide provided by the FAO, there is no pre-existing institutional framework for land consolidation and other policies aimed at managing land fragmentation. The implementation of such tools depends on the specific objectives a country wishes to achieve and its unique local circumstances.

The federal Rural Land Administration and Use Lead Executive Office, under the Ministry of Agriculture, is responsible for coordinating rural land-related activities, among which is implementing farmland fragmentation management policy tools. There is currently no dedicated institution or department established within this ministry to address the matter at hand. Under the lead executive, there is no team and even an expert who is responsible for the implementation of farmland fragmentation management policy tools. A thorough evaluation was undertaken to assess the job descriptions of all experts operating under the lead executive. The findings revealed a notable absence of any designated individual responsible for farmland consolidation and other land fragmentation management techniques. This indicates that there is neither an institution nor an expert at the federal level who coordinates land fragmentation and its management approaches activities and supports regional states on the matter.

Implementation power is given to regional states (institutions from region down to kebele level). Still, regional states do not have a specific unit/section or expert dedicated to the implementation of farmland fragmentation management policy tools. The lower-level land administrators, Kebele Land Administration experts, and Kebele Land Administration and use committees, do not have express power on it. This shows that farmland fragmentation management mechanisms are at their infant stage both from their legal and institutional arrangement perspective in Ethiopia. Education and training on land consolidation, from the grass-roots level to officials, remains an ambiguous domain. A significant gap in awareness and knowledge regarding this subject matter persists.

## 5.3 What needs to be done?

Ethiopia should develop its own home-grown fit-for-the-purpose farmland fragmentation management legal frameworks and institutional arrangements. Legal frameworks and institutional arrangements of different countries can be assessed and used as a lesson, but transplanting these experiences without taking into account the country's situation will cause problems other than bringing solutions.

I have developed my own farmland fragmentation management legal and institutional framework model called the "12 P rules" that should be taken into account and, follow during the farmland fragmentation management law promulgation and institutional arrangement.

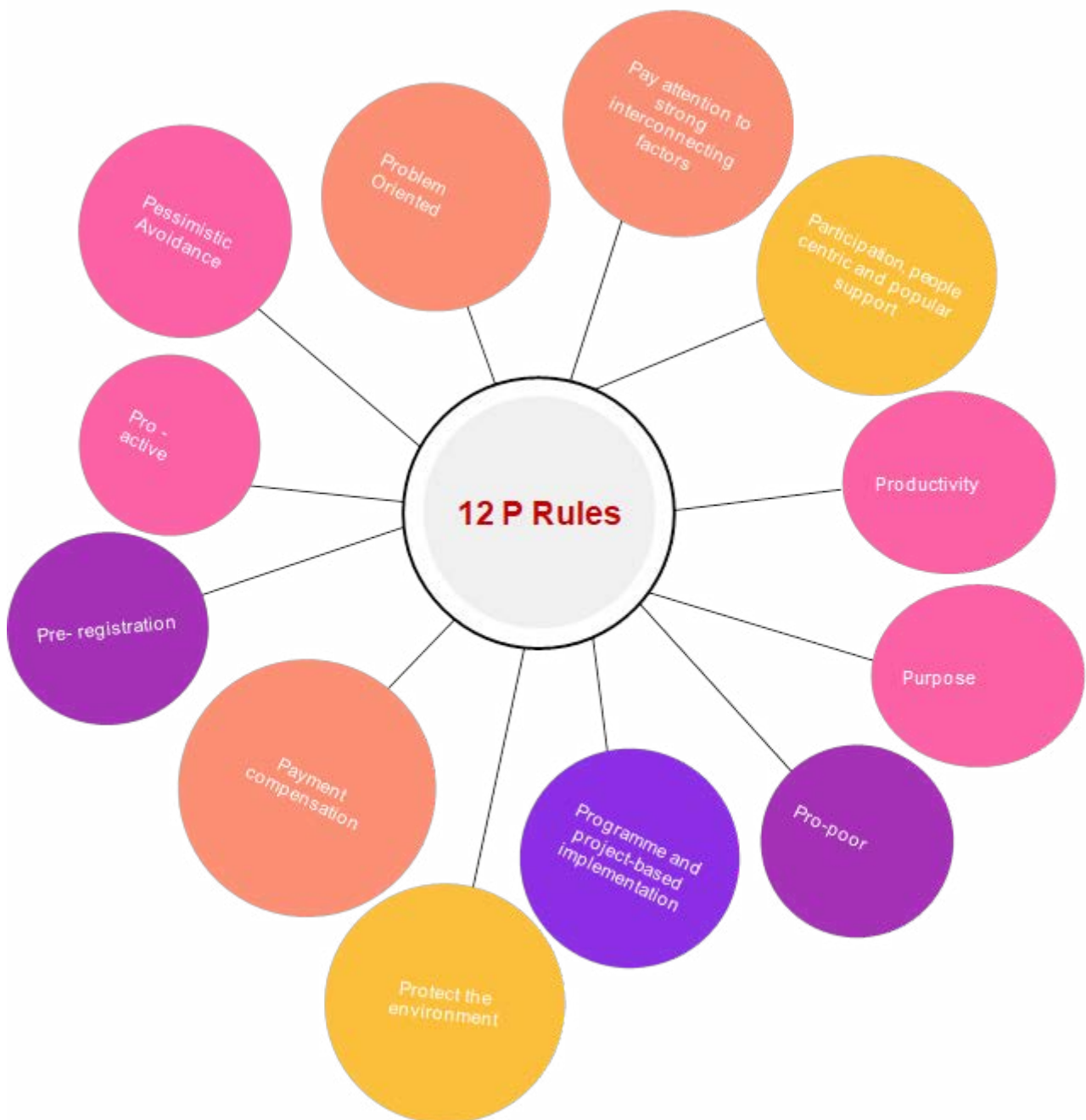
- 1. Participation, People Centric and Popular Support:** The law should have clauses for the participation of people, as this is key for the sustainability of the program. Implement land fragmentation policy alternatives only when they have been accepted by the people; otherwise, they will fail. Competent dispute settlement and grievance redress mechanisms need to be established, and representatives of the public should be members. Land

fragmentation policy tools should be implemented to solve societal problems and achieve their needs. Effective land fragmentation policy tools prioritize the needs and well-being of individuals, ensuring their success. However, failure becomes the narrative when these tools neglect the people they are meant to serve.

2. **Pay attention to spirituality and other strong interconnecting factors:** Some individuals may argue against including their residential areas in land consolidation and other land fragmentation management programs due to their deep emotional attachment and spiritual significance. Therefore, the legal framework must address these concerns to ensure the success of such programs.
3. **Productivity:** Productivity should be among the major objectives of land fragmentation management tools. As part of this, irrigation areas developed by the government should follow a mandatory land consolidation and clustering approach, for instance, as these areas are labor-intensive. Nevertheless, this mandatory nature of land consolidation and clustering should be discussed and agreed upon before the irrigation projects are implemented. Other than these areas, the law better follows different land fragmentation management policy approaches, as the case may be, (voluntary, simple majority, absolute majority, and mandatory). The law should encourage a voluntary land fragmentation management policy approach.
4. **Purpose:** Concentrate on the fit-for-purpose land fragmentation management policy tools instead of adopting the comprehensive one; villagization, big infrastructure, etc. could be implemented over time. A Fit-for-purpose land fragmentation management policy implementing institution that is aligned with other functions of land administration is also vital. A decentralized and multi-professionalism approach is also key to achieving the objective. It requires, among others, land surveyors, land consolidation, land registration, valuation, geographers, engineers, architects, lawyers, and the like. Research and capacity-building activities should also be part of the institutional arrangement. Land fragmentation management policy implementing institutions need to be supported by an e-government approach: land information systems and complement digital solutions (valuation, re-adjustment, partition, surveying. Land information system).
5. **Pro-poor:** The process and output of land fragmentation management policy tools should be pro-poor, benefiting and protecting the rights of the poor and vulnerable segments of society. Women and other vulnerable groups (orphans, elderly, disabled, destitute, etc.) should be provided special care and support during implementation of land fragmentation management policy approaches. For instance, individuals should be granted land that is conveniently located near essential infrastructures such as water sources and roads, following land consolidation efforts. Furthermore, the implementation of land fragmentation management policy tools should take into account all types of tenures, whether formal or informal.
6. **Payment of compensation:** Ensuring fairness and addressing the consequences of land re-adjustment are vital aspects of effective land fragmentation management policies. In this regard, it is imperative to provide appropriate compensation for properties affected by the process. Land re-adjustment, a fundamental tool in managing land fragmentation, entails the transfer or adjustment of land ownership or holdings. To uphold the principle of equity, it is only fitting that individuals who have acquired land through re-adjustment bear the responsibility of compensating those whose properties have been impacted.

- 7. Pessimistic Avoidance:** We must carefully consider the adverse effects of land fragmentation management policy tools. These tools may have the potential to negatively impact traditional insurance systems, crop diversification, and environmental hazard mitigation mechanisms for rural landholders. It is crucial, therefore, to thoroughly study these implications before proceeding with the implementation of such policy tools in a pessimistic manner.
- 8. Problem Oriented:** Not all instances of fragmentation are necessarily problematic. However, if it does pose a problem, the solution may not be limited to a single aspect of land fragmentation management policy. Consequently, the implementation of a land fragmentation management policy tool should only occur when it is the appropriate solution for the specific issue at hand.
- 9. Project and program-based implementation:** Many of the tools used to manage land fragmentation are costly and require various projects and programs that receive support from both the government and development partners.
- 10. Protect the environment:** Sustainability and environmental protection should also be at the center of the law.
- 11. Pre-registration:** Before embarking on the implementation of land fragmentation management policy tools as a project, it is crucial to ensure that parcels are registered using modern land registration surveying instruments. This step is essential to guarantee accuracy and efficiency in the management of land fragmentation. By utilizing advanced land registration surveying instruments, we can ensure the precise demarcation and documentation of parcels.
- 12. Pro-active:** Implementing a land fragmentation management policy requires a continuous effort rather than a one-time endeavor. It is crucial to take proactive measures to prevent or minimize future land fragmentation activities. One effective approach is to incorporate subdivision restriction provisions into the law, setting a minimum standard that must be met. This ensures that land fragmentation is controlled and regulated effectively. By adopting such measures, we can maintain the integrity of our land resources and promote sustainable land management practices.

## The 12 P's for farmland fragmentation management





## 6. Conclusions and Policy Implications

Land fragmentation manifests in various ways, including but not limited to the presence of very small and numerous parcels, irregularly shaped plots, scattered parcels with significant distances between them, and lack of road access for each parcel. Ethiopia's land fragmentation has reached a critical juncture that necessitates government policy intervention.

Numerous land fragmentation management tools exist, among which is land consolidation. Although land consolidation is costly and time-consuming, once implemented, it yields a comparatively high return on investment and fosters comprehensive rural development. It is a transformative process that requires substantial upfront investments. However, the long-term benefits it offers justify the endeavor. Upon completion, consolidation significantly reduces costs and alleviates financial burdens associated with other forms of land use consolidation. Nevertheless, it is important to recognize that various approaches to land use consolidation entail recurring transactional costs, borne by both the administration/cooperatives responsible for extension services and diligent farmers themselves. Farmers invest significant time and effort in coordinating and negotiating production steps and other essential activities. By streamlining these processes, land consolidation optimizes land utilization and reduces financial and operational complexities associated with land use consolidation. Exploring alternative land fragmentation management policy tools is also viable. Some alternatives may serve as preparatory initiatives for land consolidation, while others can stand alone. Some tools may necessitate policy changes, such as land sale/swapping.

Farmland fragmentation may not inherently pose a problem; it can facilitate crop diversification, climate change adaptation, mitigation, and risk management strategies. However, it can also impede economic efficiency. Ethiopia lacks comprehensive policies, legal frameworks, and institutional arrangements for farmland fragmentation management tools. Based on research findings, the following recommendations are proposed:

- Land consolidation is not the sole mechanism to manage land fragmentation. Other measures, such as determining minimum parcel size, promoting voluntary land exchange to consolidate holdings or mitigate distance fragmentation, prohibiting land redistribution, re-evaluating inheritance rules, cluster farming, etc., should be considered.
- Comprehensive policies and laws for managing land fragmentation are imperative.
- Establish a land fragmentation management organization, including a land consolidation commission or unit, to oversee national land consolidation initiatives.
- Adopt a case-by-case approach to land consolidation, recognizing that not all land fragmentations pose problems.
- Conduct research and provide education, training, and awareness-raising on land fragmentation challenges and land consolidation, as well as other farmland fragmentation management strategies.

## 7. References

- Alemu, G. G., Atsbeha, E. A., & Weigelt, L. S.-B. J. (2019). Opportunities for voluntary land consolidation in Ethiopia: Farmers' perspectives.
- Alemu, G. T., Berhanie Ayele, Z., & Abelieneh Berhanu, A. (2017). Effects of land fragmentation on productivity in Northwestern Ethiopia. *Advances in Agriculture*, 2017.
- Amsalu, T. (2023). Final Report on Meta-Analysis of Socio-Economic Impacts of Land Fragmentation in Ethiopia [Baseline Study]. GIZ, Land Governance (LaGo) Project.
- Balogun, O. L., & Akinyemi, B. E. (2017). Land fragmentation effects on technical efficiency of cassava farmers in South-West geopolitical zone, Nigeria. *Cogent Social Sciences*, 3(1), 1387983.
- Bentley, J. W. (1987). Economic and ecological approaches to land fragmentation: In defense of a much-maligned phenomenon. *Annual Review of Anthropology*, 16, 31-67.
- Beyene, A. (2019). Land consolidation, canals and apps: Reshaping agriculture in Ethiopia. Nordiska Afrikainstitutet.
- Bezabih, M., & Goshu, D. (2022). Land issues in Ethiopia: Trends, constraints and policy options. Ethiopian Economic Association (EEA).
- Blarel, B., Hazell, P., Place, F., & Quiggin, J. (1992). The economics of farm fragmentation: Evidence from Ghana and Rwanda. *The World Bank Economic Review*, 6(2), 233-254.
- Cholo, T. C., Fleskens, L., Sietz, D., & Peerlings, J. (2018). Is land fragmentation facilitating or obstructing adoption of climate adaptation measures in Ethiopia? *Sustainability*, 10(7), 2120.
- Cordes, M. W. (2001). Agricultural zoning: Impacts and future directions. *Northwestern University Law Review*, 22, 419.
- Datta, R. (2015). A relational theoretical framework and meanings of land, nature, and sustainability for research with Indigenous communities. *Local Environment*, 20(1), 102-113.
- de Vries, W. T., & Chigbu, U. E. (2017). Responsible land management: Concept and application in a territorial rural context. *fub. Flächenmanagement und Bodenordnung*.
- Demetriou, D., Stillwell, J., & See, L. (2013). A new methodology for measuring land fragmentation. *Computers, Environment and Urban Systems*, 39, 71-80.
- Dijk, T. (2003). Dealing with central European land fragmentation: A critical assessment on the use of Western European instruments. Technische Universiteit Delft.
- Dureti, G. G., Tabe-Ojong, M. P. J., & Owusu-Sekyere, E. (2023). The new normal? Cluster farming and smallholder commercialization in Ethiopia. *Agricultural Economics*.
- The Federal Democratic Republic of Ethiopia Constitution (1995).



- Federal Democratic Republic of Ethiopia Rural Land Administration and Use Proclamation Number 456/2005. (2005).
- Food and Agriculture Organization of the United Nations. (2003). The design of land consolidation pilot projects in Central and Eastern Europe. FAO.
- Franzen, E., & Center, U. R. B. (2006). Agricultural zoning as a farmland protection tool in Georgia. University of Georgia, Atlanta.
- Galli, F., Grando, S., Adamsone-Fiskovica, A., Bjørkhaug, H., Czekaj, M., Duckett, D. G., Almaas, H., Karanikolas, P., Moreno-Pérez, O. M., & Ortiz-Miranda, D. (2020). How do small farms contribute to food and nutrition security? Linking European small farms, strategies and outcomes in territorial food systems. *Global Food Security*, 26, 100427.
- Gedefaw, A. A., Atzberger, C., Seher, W., & Mansberger, R. (2019). Farmers' willingness to participate in voluntary land consolidation in Gozamin District, Ethiopia. *Land*, 8(10), 148.
- Gudina, D. (2011). Farmland fragmentation and its impact on food production in highland villages of Seru District, Oromia Regional State, South Eastern Ethiopia.
- Hartvigsen, M. (2014). Land reform and land fragmentation in Central and Eastern Europe. *Land Use Policy*, 36, 330-341.
- HARTVIGSEN, M., VERSINSKAS, T., VIDAR, M., MITIC, K., ARSOVA, F. V., & GORGAN, M. (2019). FAO recommendations on land consolidation legislation. World Bank Conference on Land and Poverty, Washington, DC.
- Haydaroglu, C. (2015). The relationship between property rights and economic growth: An analysis of OECD and EU countries. *DANUBE*, 6(4), 217-239.
- Huggins, C. (2013). Consolidating land, consolidating control: State-facilitated 'agricultural investment' through the 'Green Revolution' in Rwanda. Land Deal Politics Initiative (LDPI) Working Paper, 16.
- Jacoby, E. H. (1959). Land consolidation in Europe.
- Kathiresan, A. (2012). Farm land use consolidation in Rwanda. Republic of Rwanda, Ministry of Agriculture and Animal Resources, Kigali.
- King, R., & Burton, S. (1982). Land fragmentation: Notes on a fundamental rural spatial problem. *Progress in Human Geography*, 6(4), 475-494.
- Kurylo, V., Pantalienenko, P., Bogdanets, V., & Ovcharuk, S. (2017). Land fragmentation in Ukraine: Agricultural land-use management and jurisprudence issues. *Problems and Perspectives in Management*, 15(2), 102-109.
- Leta, T. B., Berlie, A. B., & Ferede, M. B. (n.d.). Current land tenure and households' perspectives to voluntary land consolidation in South East Ethiopia. SSRN 3745224.
- Mwebaza, R., & Gaynor, R. (2002). Land sector analysis: Land market, land consolidation, and land re-adjustment component. Rural Development Institute, The Government of the Republic of Uganda.

- Ntuhinyurwa, P. D., & de Vries, W. T. (2020). Farmland fragmentation and defragmentation nexus: Scoping the causes, impacts, and the conditions determining its management decisions. *Ecological Indicators*, 119, 106828.
- Ntuhinyurwa, P. D., de Vries, W. T., Chigbu, U. E., & Dukwiyimpuhwe, P. A. (2019). The positive impacts of farm land fragmentation in Rwanda. *Land Use Policy*, 81, 565-581.
- Ortiz-Becerra, K. (2021). Land consolidation and rural labor markets: Theory and evidence from Colombia.
- Peráček, T., Srebalová, M., & Srebala, A. (2022). The valuation of land in land consolidation and relevant administrative procedures in the conditions of the Slovak Republic. *Administrative Sciences*, 12(4), 174.
- Platonova, D., & Jankava, A. (2011). Research on the preconditions of land consolidation in rural districts. *Economic Science for Rural Development*, 26, 174-181.
- Ram, K. A., Tsunekawa, A., Saha, D., & Miyazaki, T. (1999). Subdivision and fragmentation of land holdings and their implication in desertification in the Thar Desert, India. *Journal of Arid Environments*, 41(4), 463-477.
- Rubanje, I. (2016). Linking land use, tenure and consolidation in Rwanda. University of Twente.
- Schmidt, A., Mack, G., Möhring, A., Mann, S., & El Benni, N. (2019). Stricter cross-compliance standards in Switzerland: Economic and environmental impacts at farm-and sector-level. *Agricultural Systems*, 176, 102664.
- Serbia, S. M. Montenegro: The State of Land Fragmentation and Land Management. Retrieved from [http://www.fao.org/fileadmin/user\\_upload/Europe/documents/Events\\_2004/Land2004/SerbiaMontenegro\\_paper.pdf](http://www.fao.org/fileadmin/user_upload/Europe/documents/Events_2004/Land2004/SerbiaMontenegro_paper.pdf)
- Shaw, D. J. (2007). World food summit, 1996. In *World Food Security: A History since 1945* (pp. 347-360). Springer.
- Studies, L. T. (2003). The design of land consolidation pilot projects in Central and Eastern Europe. *FAO Land Tenure Studies*, 6.
- Sundqvist, P., & Andersson, L. (2007). A study of the impacts of land fragmentation on agricultural productivity in Northern Vietnam. *Nationalekonomiska Institutionen*.
- Teijeiro, D., Rico, E. C., Porta, J., Parapar, J., & Doallo, R. (2020). Optimizing parcel exchange among landowners: A soft alternative to land consolidation. *Computers, Environment and Urban Systems*, 79, 101422.
- Tenagne, K. (2018). Land consolidation practices and possibilities in Amhara region: The case of Koga Irrigation Project.
- Thein, M. (1997). The economics of farm size and land policy in the transition to a market economy. *Sojourn: Journal of Social Issues in Southeast Asia*, 124-134.
- TMG, W. (2019). Opportunities for voluntary land consolidation in Ethiopia: Farmers' perspectives.

- Tumer, E., Keskin, A., & Birinci, A. (2010). Analysis of factors affecting land fragmentation in Erzurum Province, Turkey. *African Journal of Business Management*, 4.
- UNICEF. (2009). Population growth and rapid urbanization: Food insecurity on the rise in urban settings. Joint Meeting of the Executive Boards of UNDP/UNFPA, UNICEF and WFP.
- Wang, J., Yu, C., Fang, X., Li, G., & Cao, Y. (2022). Does land tenure fragmentation aggravate farmland abandonment? Evidence from big survey data in rural China. *Journal of Rural Studies*, 91, 126-135.
- Yimer, F. A. (2014). Fit-for-purpose land consolidation: An innovative tool for re-allotment in rural Ethiopia. University of Twente.
- You, L. (2010). Analysis of land fragmentation in PR China: Case study in Taizhou City of Zhejiang Province. University of Twente.
- Yulastuti, N., Haryanto, R., & Bima, F. (2021). Challenges for the land consolidation program and the role of community participation in residential areas. *E3S Web of Conferences*.
- Zewdie, Y., & Tamene, L. D. (2020). Toward an inclusive and evidence-based approach to farmland consolidation in Ethiopia.





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