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Review Article

The Role of Forest Ecosystems for Carbon Sequestration and Poverty Alleviation in Ethiopia

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The objective of the review was to examine and document the contributions of forests in Ethiopia to both climate change mitigation and poverty alleviation. A comprehensive analysis was conducted, encompassing several research articles from reputable journals and international report papers. The findings of the review reveal that Chilimo-Gaji forest exhibited the highest levels of above- and belowground biomass carbon sequestration, while the Egdu forest area demonstrated the highest soil organic carbon content. The variations in carbon sequestration capacity among forest areas can be attributed to several factors, including forest density, variation in diameter at breast height (DBH) among trees, tree height classes, altitude, slope, and aspect, which significantly influence carbon concentration. Furthermore, discrepancies in the application of allometric models to estimate forest biomass also contribute to these variations. In addition to their role in climate change mitigation, forests play an invaluable role in poverty alleviation, particularly in developing countries. Ethiopia has implemented various afforestation strategies to enhance the contribution of forest ecosystems to climate change mitigation and poverty alleviation.

1. Introduction

Forest is the most important part of terrestrial ecosystems and the largest carbon pool [1, 2]. It plays a significant role in mitigating climate change by sequestering carbon dioxide from the atmosphere through photosynthesis [3]. Approximately 2.3 Gt of carbon is absorbed by terrestrial ecosystems [4]. Tropical forests, which account for about 60% of the global forest cover [5, 6], contribute a significant carbon pool compared to other biomes [7]. These forests store an estimated 229 Pg C [8] to 263 Pg C in aboveground biomass [5].

The forest ecosystem has played a significant role in maintaining ecosystem functioning in Ethiopia. According to Moges et al. [9], the aboveground biomass of forest resources in Ethiopia sequesters approximately 2.76 billion tons of carbon. The authors also reported that Ethiopia's high forests contribute the largest carbon stock. However, deforestation and forest degradation are increasing at an alarming rate [10]. Anthropogenic activities such as deforestation, urbanization, agriculture, transportation, and energy production serve as the largest source of greenhouse gases [11, 12]. According to the IPCC [13] report, cumulative CO_2 emissions resulting from anthropogenic factors between 1750 and 2011 amounted to 2040 ± 310 Gt CO_2. Deforestation alone accounts for approximately 70% of total emissions [4]. Moreover, tropical deforestation has contributed to an estimated annual carbon emission of 1-2 billion tons [14].

Despite carbon sequestration, forest resources are used to reduce poverty [15, 16], specifically in developing countries [17–23]. Thus, international donors such as World Bank Group are advocating forest-based poverty alleviation strategies [24]. Moreover, the economic contribution of the forest investment contributes to this goal [22]. The forest sector contributes about US $75–100 billion annually to different infrastructure projects such as water, road, and hospital construction [25]. Approximately 20% of the global population relies on forests and forest products to support some portion of their livelihoods [26, 27]. The majority of the population living near forests in developing countries remains below the poverty line [28]. As a result, forest products such as gum and resin, firewood, charcoal, and construction materials serve as the major source of income in Ethiopia [20, 21, 29–31]. Similarly, about 93% of total household energy consumption comes from forest biomass [32]. Forest products support the livelihoods of households through subsistence and cash income [19–21, 31, 33–35].

However, various fragmented efforts are dedicated to disseminating information regarding the contribution of forest ecosystems to carbon sequestration and livelihood improvement. Compiling the fragmented works on forest ecosystem services is essential for the sustainable management of natural forests. The aim of this review, therefore, was to determine the contributions of the forest ecosystem to climate change mitigation and adaptation as well as the improvement of community livelihoods. It is also important to provide necessary information related to the ecosystem services of forest to policymakers, forestry experts, and planners for management intervention.

2. Materials

In order to review and procure information on forest carbon sequestration, climate change mitigation, and the roles of forests for poverty alleviation in Ethiopia, a literature search was carried out using Web of Science, Google Scholar, Research Gate, as well as reports from the Ethiopian Ministry of Environment, Forest, and Climate Change. From the collected papers, the most relevant articles were selected based on their publication years and reputable journals such as Springer, Elsevier, Forests, Hindawi, and Taylor and Francis publishing group. Unpublished documents such as theses, report, and the Global Forest Survey were used to manipulate this review.

The literature searches were conducted using key search terms that are comprised of biomass, forest ecosystem, poverty alleviation, carbon sequestration potential, above- and belowground biomass, climate change, Ethiopia, and natural forest by using databases from 2011 to 2021. The key words were selected based on the scope of the study. The selection of relevant studies included in this study is based on year of publication, relevance, and reputable journal. Theses, dissertations, reports, and other unpublished documents were excluded to ensure the quality of the review. A total of 74 studies were obtained from different databases. Screening was conducted based on the relevance, their title, abstract, and keyword assessment. About 14 studies were unpublished documents and excluded from further screening. Finally, only 16 studies were selected for final screening, and the others were removed based on exclusion criteria.

3. Results and Discussion

3.1. The Role of Forests for Climate Change Mitigation. According to the IPCC, climate change mitigation refers to the interventions conducted by human beings to minimize the adverse impact of climate change on the social, ecological, and the economy. Activities such as reducing the number of particulates in the atmosphere and addressing other sources of pollutants are crucial in mitigating the impact of climate change. These activities play a vital role in reducing or maintaining greenhouse gases concentration in the environment. Therefore, forest ecosystems are important elements in mitigating climate change globally.

International conferences and reports have emphasized the contribution of forest ecosystems in combating the impacts of climate change, especially in developing countries; for instance, reports such as the FAO [36], UNFCCC [37], the Kyoto Protocol [38], and Watson et al. [39]. Highlight the role of forests in climate change mitigation through the preservation and expansion of carbon stocks within forests.

Forests serve as carbon sinks, absorbing carbon dioxide (CO_2) from the atmosphere through photosynthesis and storing it in trees and soil. This carbon sequestration function of forests aids in mitigating greenhouse gas emissions. Deforestation and forest degradation are significant contributors to global emissions, accounting for around 10–15% of total greenhouse gas emissions [5]. Conserving and restoring forests not only mitigate emissions but also safeguard and enhance biodiversity, bolstering the resilience of ecosystems. In addition, forests offer a sustainable and renewable source of wood and biomass products that can be used as alternatives to fossil fuels and materials with higher carbon footprints [13]. Forests also play a crucial role in helping communities adapt to the impacts of climate change by providing shade, reducing heat island effects in urban areas, and serving as windbreaks that protect against extreme weather events.

3.2. Forest Carbon Emissions and Sequestration. Carbon sequestration involves the long-term storage of carbon in various terrestrial ecosystems, such as plants, soils, geologic formations, and the ocean. According to the IPPC [13] report, the gross annual emissions were estimated to be between 8.4 and 10.3 $GtCO_2eq$. The report also stated that these emissions, which contribute approximately 8% of the world's total carbon emissions, amount to 4.1 $GtCO_2e$/yr. Forest fire, peat fire, and peat decay, raised net emission by 11% [13]. Furthermore, the increasing demand for fuel wood as an energy source has also led to a rise in net emissions [40].

Between 1990 and 2007, temperate forests sequestered carbon at an average rate of 2.6 $GtCO_2e$/yr, while boreal forests sequestered at a rate of 1.8 $GtCO_2e$/yr [5]. The Global Carbon Project reported that global forests remove approximately 10.6 ± 2.9 $GtCO_2$ per year from the atmosphere, which represents around 29% of annual anthropogenic CO_2 emissions from fuel burning, cement manufacturing, and deforestation [41]. Ethiopia has a potential forest carbon stock of approximately 168 Mt·C, as reported by Brown [42]. In addition, at the national level, Gibbs et al. [11] reported a carbon stock of 867 Mt·C.

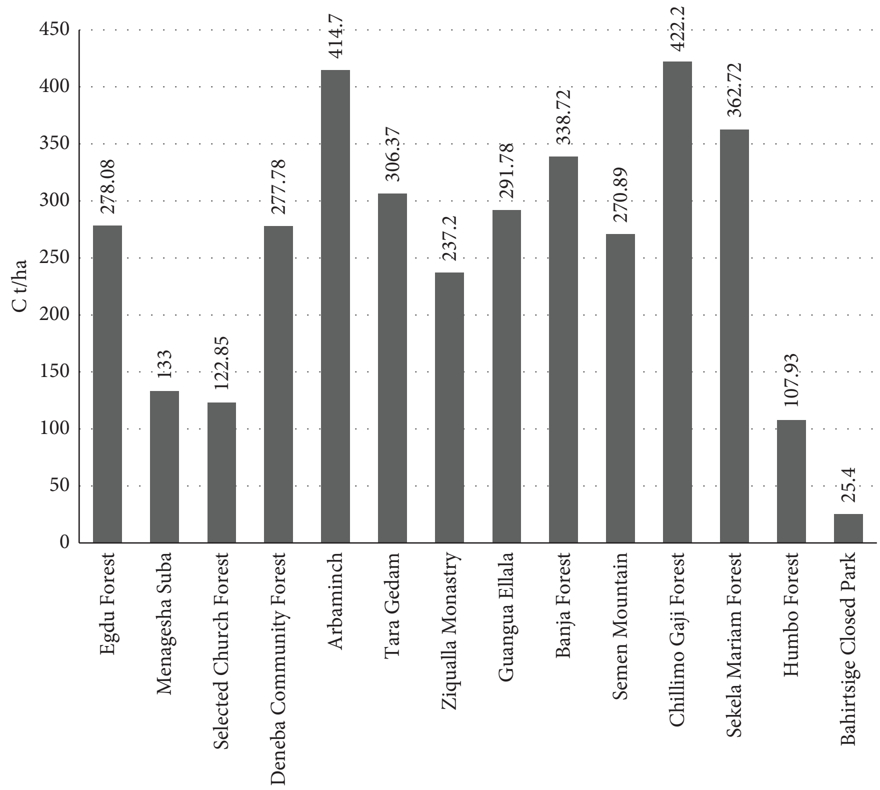

Figure 1: Aboveground carbon stocks in tons ha^{-1} of different forest areas in Ethiopia. Source: generated by analyzing secondary data.

3.3. Aboveground Biomass Carbon (AGC) Stock of Different Forests in Ethiopia. When conducting the review, we obtained information on aboveground carbon stock for fourteen forest systems in Ethiopia (Figure 1). This stock was estimated using a generic equation developed by Chave et al. [43] and Brown et al. [44] (Figure 2). Figure 1 provides a summary of the forest systems and their respective aboveground biomass carbon stocks. Most of these forests are found in dry Afromontane forests, which rank as the second most diversified vegetation type in Ethiopia. Among the forest systems, the Chilimo-Gaji dry Afromontane forest accumulated the highest carbon stock, followed by the Arba Minch groundwater forest. Conversely, the Bahirtsige closed park exhibited the lowest carbon stock per hectare. Thus, management intervention is crucial to enhancing the carbon sequestration potential of this forest.

A study conducted by Ewunetie et al. [45] revealed that the mean aboveground biomass and carbon stock in trees and shrub species of the Sekela Mariam forest were estimated to be 725.45 ± 442.11 tha^{-1} and 362.72 ± 221.06 tha^{-1}, respectively. Siraj [46] used the MacDicken [47] formula to estimate the carbon stock potential of Chilimo-Gaji forest, and the result showed that the total carbon stocks of the study area were about 422.2 $t{\cdot}C{\cdot}ha^{-1}$. In addition, the aboveground biomass carbon content of Egdu forest was 278.08 $t{\cdot}ha^{-1}$ [48], Menagesha Suba forest was 133 $t{\cdot}ha^{-1}$ [49], Church forest was 122.85 $t{\cdot}ha^{-1}$ [50], the Humbo forest was 30.77 $tons{\cdot}ha^{-1}$ [51], and the mean aboveground biomass carbon of woody plants of Arba Minch groundwater forest was 414.70 $tons{\cdot}ha^{-1}$ [52]. In comparison, the mean AGC stock of the Chilimo-Gaji forest area was greater than the mean AGC stock of all other forest areas.

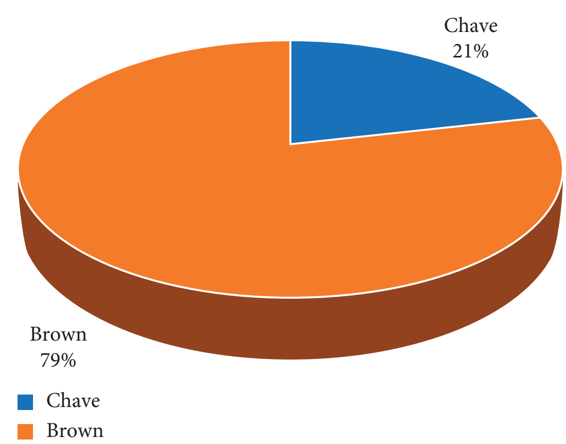

Figure 2: Biomass models used to estimate aboveground biomass of the forest in Ethiopia. Source: generated by analyzing secondary data.

The carbon sequestration potential of woody tree species varied depending on soil conditions, water availability, altitude, and slope gradients. For example, a research conducted by Wodajo et al. [53] showed that the aboveground biomass (ABG) carbon stock density of Gara–Muktar forest, West Hararghe zone of Eastern Ethiopia ranged from 102.13 ± 31.16 to 214.73 ± 54.73 $t{\cdot}C{\cdot}ha^{-1}$ in the higher and lower altitudinal gradients, respectively. Environmental variability influenced the variation in tree diameter at breast

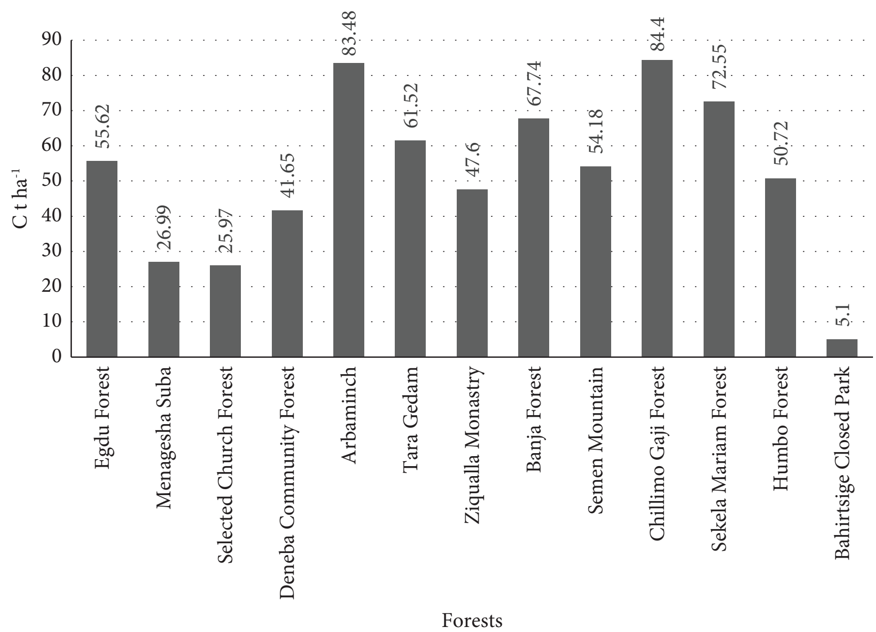

Figure 3: Comparison of belowground carbon stocks in tons per hectare of different forest areas. Source: generated by analyzing secondary data.

height (DBH), height classes of trees and shrubs, and density of trees. Furthermore, the choice of allometric model used to estimate forest biomass could also contribute to the variation in biomass among trees [54]. Based on these findings, it can be concluded that there is a decreasing trend in mean above- and belowground biomass carbon with increasing altitude. This trend may be attributed to the absence of the tallest trees with the maximum DBH in higher elevation gradients.

3.4. Belowground Biomass Carbon (BGC) Sequestration. Belowground carbon (BGC) of different forest types is summarized in Figure 3. BGC is an important carbon pool for many vegetation types and land use systems, accounting for about 20% of the total biomass [55]. The highest BGC content was recorded in Chilimo-Gaji forest and Arba Minch groundwater forest compared with other forests. A low amount of biomass carbon was found to be sequestered in Bahirtsige closed park. Consequently, the mean belowground biomass and carbon stock in tree and shrub species of Sekela Mariam Forest were estimated to be 145.11 ± 88.32 and $72.55 \pm 44.16\,\mathrm{t{\cdot}ha^{-1}}$, respectively, resulting in the sequestration of $266.28 \pm 162.24\,\mathrm{t{\cdot}ha^{-1}}$ of CO_2eq. The study conducted by Adugna and Soromessa [48] and Sahle [49] revealed that the belowground carbon (BGC) content of Egdu and Menagesha Suba forests were $55.62\,\mathrm{ha^{-1}}$ and $26.99\,\mathrm{ha^{-1}}$, respectively. The variation observed in BGC could be attributed to the variation in aboveground carbon (AGC) within the study area, as the belowground biomass of trees and shrubs is influenced by the root-to-shoot ratio of aboveground biomass. In addition, variations in belowground and aboveground biomass carbon stock may be due to differences in estimation methods and personal error.

3.5. Soil Organic Carbon (SOC). Figure 4 presents a summary of soil organic carbon levels across various types of forests. All the research reported in this document utilized the Pearson et al. [56] formula to calculate the soil carbon stock. According to Pearson et al., the soil organic carbon (SOC) content was determined by multiplying the bulk density with the depth of the sample and the percentage of carbon concentration. Based on this methodology, the carbon concentration in Tara Gedam Forest was found to be $274.32\,\mathrm{tons{\cdot}ha^{-1}}$ [57], while the lowland area of Simien Mountains National Park registered $242.5\,\mathrm{tons{\cdot}ha^{-1}}$ of carbon [58]. The Egdu forest area soil exhibited a high soil carbon content, estimated at approximately $277.56\,\mathrm{tons{\cdot}ha^{-1}}$ [48], whereas the Banja forest had a soil carbon content of $230.82\,\mathrm{tons{\cdot}ha^{-1}}$ [59].

Topographic factors such as altitude, slope, and aspect are known to regulate carbon storage in forest ecosystems [60, 61]. Consistent with this notion, the average total soil carbon stock density of Gara–Muktar forest in West Hararghe ranged from 58.03 ± 7.56 to 156.13 ± 45.64 tons of carbon per hectare (C $\mathrm{ha^{-1}}$) in the lower and higher altitudinal classes, respectively [53]. In addition to altitudinal differences, carbon storage potential also varies with different land use types [62]. According to research conducted by Mekuria and Aynekulu [63] and Bikila et al. [64], it has been established that restoring rangeland soils and ecosystems with permanent vegetation holds considerable potential for sequestering soil carbon. Supporting this argument, the mean values of soil organic carbon within regions of protected natural vegetation were $16.60 \pm 4.45\,\mathrm{ton{\cdot}ha^{-1}}$, whereas communal grazing lands recorded $13.76 \pm 4.76\,\mathrm{ton{\cdot}ha^{-1}}$ (authors not provided).

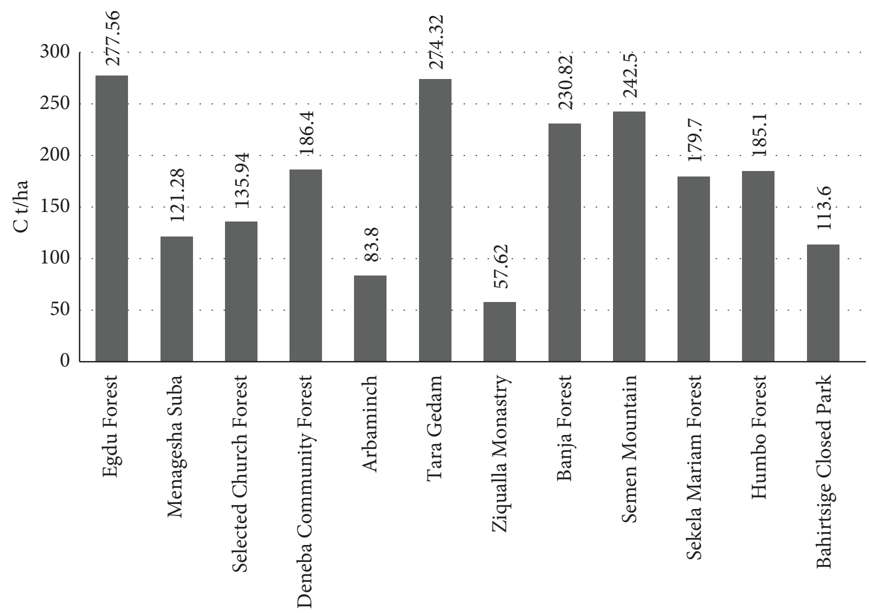

Figure 4: Comparison of soil organic carbon stocks in tons per hectare of different forest areas. Source: generated by analyzing secondary data.

Gedefaw et al. [57] discovered that the slope of the study area significantly influenced the litter carbon and soil organic carbon (SOC) in Tara Gedam Afromontane Forest of Ethiopia. On the contrary, the effects of slope on Banja Forest carbon stocks were minimal, and the relationships were insignificant for all carbon pools. These findings align with similar studies conducted in the Apennine Beech Forest in Italy [65] and the Danaba Community Forest in Ethiopia [66].

3.6. Litter Fall Biomass Carbon. The term leaf litter refers to all dead organic surface material on top of the mineral soil. The litter fall carbon is determined by multiplying the oven-dried biomass of the leaves with the carbon fraction measured in the laboratory. As indicated in Table 1, the highest amount litter carbon was observed in Humbo forest, amounting to17.85 t·ha^{-1} [51]. The research conducted by Girma et al. [67] and Sahle [49], revealed that Ziqualla monastery and Menagesha Suba forests had litter fall carbon contents of 6.49 and 5.26 t·ha^{-1} of carbon, respectively. The variation in these values can be attributed to the small difference between the fresh weight and oven-dry weight of the litter subsamples, which occurred due to the dry air conditions at the time.

3.7. Role of Forests in Rural Livelihoods. According to the International Union for Conservation of Nature report [25], globally, 1.6 billion people depend on forests for their livelihoods. Forests are used for generating income and meeting subsistence needs through various forest products. Forests also contribute to improving the livelihoods of communities by providing safety nets, supporting current consumption, and offering potential pathway out of poverty [70]. The global value of goods and services provided by forests is estimated to be between US $75–100 billion per year [25]. In developing countries forests play an important role in generating income for the households [24, 71, 72]. For instance, in Ethiopia, gum and resin production provides income not only for drought-prone areas but also for the national and regional economies on a large scale [20, 30, 73].

Table 1: Comparison of carbon stocks in tons ha^{-1} in different forest areas.

Study place	AGC	BGC	LC	SOC	Sources
Egdu forest	278.08	55.62	3.47	277.56	[48]
Menagesha Suba	133	26.99	5.26	121.28	[49]
Selected church forest	122.85	25.97	4.95	135.94	Tura 2011
Deneba community forest	277.78	41.65	1.06	186.40	[66]
Arbaminch	414.70	83.48	1.28	83.80	[52]
Tara Gedam	306.37	61.52	0.90	274.32	[57]
Ziqualla Monastry	237.20	47.60	6.49	57.62	[67]
Guangua Ellala	291.78	*	*	*	[68]
Banja forest	338.72	67.74	2.58	230.82	[59]
Semen mountain	270.89	54.18	0.019	242.5	[58]
Chilimo-Gaji forest	422.2	84.4	*	*	[46]
Sekela Mariam forest	362.72	72.55	2.01	179.7	[45]
Humbo forest	107.93	50.72	17.85	185.1	[51]
Bahirtsige closed park	25.4	5.1	5.17	113.6	[69]

*Not addressed by the study. AGC: aboveground carbon, BGC: below-ground carbon, LC: litter fall carbon, and SOC: soil organic carbon. Source: generated by analyzing secondary data.

The African Miombo forest provides for over 100 million people in both urban and rural areas [74]. The plantations surrounding Chilimo forest are used as a source of income, fuel, construction materials, and farming tools [75]. The total income generated from forest resources in Ethiopia during the period of 2012-2013 was estimated to be USD 16.7

billion, which accounts for 12.86% of the country's GDP [76].

More specifically, scholars have made efforts to quantify the common contribution of forest resources to household income in various regions of Ethiopia. For instance, Mamo et al. [72], Asfaw et al. [77], and Yemiru et al. [18] estimated that approximately 39%, 32.6%, and 34% of the communities' total income, respectively, is generated from forest in Dendi District, the range of mountains, and the Bale Highlands. Consequently, Worku et al. [29] reported that 34.8% of income in the Liben Zone and 35.2% in the Afdher Zone were generated from forest resources. This income mainly comes from the sale of gum and resins, firewood and charcoal, construction wood, medicinal plants, and forest food. In comparison to other forest types, dry forests contribute 26% to the total subsistence income of households in the Liben Zone and 18% in the Afdher Zone.

3.8. The Role of Forests for Poverty Alleviation. In Ethiopia, over 85% of the population relies on rainfed agriculture, including traditional crop and livestock production [78]. As a result, this sector is more vulnerable to the impacts of climate change. The frequent occurrence of drought and other extreme events in the past few decades has led to increasing starvation and migration in Ethiopia as people search for food.

In contrast, between 2010/11 and 2015/16, about 5.3 million people were lifted out of poverty [24]. Nonetheless, there are still over 22 million people living below the national poverty level [79]. The government of Ethiopia has developed various strategies and plans to reduce poverty and improve living conditions, such as the millennium development goal, sustainable development goal, GTP 1, and GTP 2.

The forest sector is a significant component in reducing poverty and improving the livelihoods of local communities. However, the sustainable utilization of forest resources must be considered to ensure their long-term sustainability. Forests also play an important role in reducing income inequality and alleviating poverty in rural communities [19, 34].

According to reports from MEFCC [80], Ethiopian forests generate approximately USD 16.7 billion in economic benefits annually, contributing around 12.9% to the country's GDP. In addition, a report by UNEP [81] highlights that forest ecosystems generate an income of USD 2.34 billion. FAO [36] emphasizes that forests and woodlands have even greater importance, both biologically and socioeconomically, in arid lands compared to other areas. In Africa's drylands, rangelands, agroforestry, parklands, and trees outside forests are essential components that significantly impact the livelihoods of local communities.

A study by Worku et al. [29] found that excluding forest income from annual income increases the number of households living below the poverty level from 41.05% to 65.45%. Furthermore, the income earned from selling gum and resin reduces poverty occurrence by 23%–48% in the dry lands of eastern Africa [21]. The authors also state that gum and resin incomes contribute to reducing income inequality among households within rural communities.

Overall, in addition to the role of forest ecosystem for carbon sequestration, the forest sectors play a vital role to reduce poverty and contributing to a more robust national economy of the country. About 90% of people living in extreme poverty depend on forests for their livelihoods [82]. Moreover, the forest sectors also play an indispensable role in creating job opportunities and reducing unemployment. For instance, the Ethiopian forest sector has created about eight types of forest-related employment services [83].

3.9. Afforestation Strategies in Ethiopia. Ethiopia has implemented a range of afforestation strategies with the aim of enhancing the role of forest ecosystems in mitigating climate change, alleviating poverty, addressing environmental challenges, and promoting sustainable development. Some of the key afforestation strategies in Ethiopia include:

The Ethiopian Climate Resilient Green Economy (CRGE) Strategy which aims to build a climate-resilient and green economy by implementing large-scale afforestation and reforestation programs. It focuses on increasing forest coverage and improving land management practices to mitigate climate change and enhance ecosystem services. The National Afforestation Program is another strategy to restore forest ecosystem. This program aims to restore degraded lands, increase forest cover, and promote sustainable forest management [84]. Participatory forest management: This strategy encourages communities to actively participate in tree planting, forest protection, and sustainable utilization of forest resources [85]. Farmer-managed natural regeneration (FMNR): FMNR is a community-led approach that involves the systematic regrowth and management of trees on degraded lands. It promotes the regeneration of indigenous tree species, agroforestry practices, and sustainable land management techniques [86]. Sustainable land management (SLM): SLM approaches in Ethiopia focus on rehabilitating degraded lands, combating desertification, and promoting sustainable agriculture [87].

3.10. Constraints and Future Prospects of the Review. To evaluate the significance of forest ecosystems in addressing climate change and enhancing community well-being in various regions of Ethiopia, a comprehensive examination was conducted. Forest resources play a crucial role in mitigating climate change by absorbing carbon dioxide from the atmosphere and enhancing the resilience of neighboring communities. It is imperative to minimize deforestation resulting from land use changes to optimize the forest's capacity for carbon sequestration. Employing sustainable approaches to forest management and utilization, implementing integrated fire management practices, ensuring forest health and vitality, promoting biodiversity conservation, and effectively managing protected areas and wildlife all contribute to climate change mitigation by facilitating the absorption of carbon from the surrounding environment.

In addition to addressing climate change, forests play a crucial role in improving the well-being of nearby communities. The rural population, particularly those with low incomes, rely on forest resources for both sustenance and income generation. Forests have thus significantly contributed to poverty reduction by providing economic opportunities for the local community. However, it is essential to manage the utilization of forest resources carefully to ensure their long-term sustainability.

To enhance the forest's function in terms of climate change mitigation and poverty reduction, it is necessary to restore degraded forests through activities such as reforestation, area enclosure, participatory forest management, and community involvement. These measures help to increase the forest's ability to mitigate climate change and provide livelihood benefits to the community.

Assessing the role of forests in climate change mitigation and poverty alleviation is crucial for convincing policymakers. It requires conducting thorough studies to determine the economic importance of forests. However, gathering sufficient information for our specific area of interest proved challenging. We tried to incorporate all available research on the role of forest ecosystems in climate change mitigation. This review serves to identify gaps in this area for future researchers and provides valuable input for policymakers in developing forest management strategies.

Considering the global significance of climate change, it is crucial to prioritize mitigation measures. Inclusive research involving forest research organizations, academia, and other stakeholders is essential for the development of comprehensive forest management strategies. This review serves as a fundamental reference for future endeavors concerning forest ecosystem services across Ethiopia.

4. Conclusions

This review has an implication to compile different fragmented work on the role of forest ecosystem for carbon sequestration and poverty alleviation. It is also important to highlight the limitations of different research work. Moreover, we understand from this review that the productivity of the different forest in Ethiopia is getting decline. This could be because of deforestation and forest degradation due to anthropogenic activities. This review also emphasized that forest products provide different services like food, construction material, fuel wood, furniture, and an income source for the community. Besides, forests have an essential role for reserving carbon. Thus, quantifying the amount of carbon sequestered in different forest types is essential to forest managers, policymakers and other stakeholders for implementing different management interventions. Accordingly, the summary of the carbon sequestration potential of each forest is an important input for management interventions.

Therefore, we strongly recommend that improving carbon sequestration potential and creating other means of income for the local community nearby the forest are imperative to ensure the sustainability of natural forests.

Abbreviations

IPCC:	Intergovernmental Panel on Climate Change
IUCN:	International Union for Conservation of Nature
UNDP:	United Nations Development Program
WBG:	World Bank Group
WB:	World Bank
UNEP:	United Nations Environment Programme
FAO:	Food and Agricultural Organization of the United Nations
MEFCC:	Ministry of Environment and Climate Change
GDP:	Gross domestic product
USD:	United States Dollar
NMA:	National Metrology Agency
UNFCCC:	United Nations Framework Convention on Climate Change
GTP:	Growth and transformation plan.

Data Availability

The data supporting this review are from previously reported studies, which have been cited.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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