EVALUATION OF EFFICIENCY OF THE SAWN TIMBER VALUE CHAIN IN ZIMBABWE

By

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INTRODUCTION

- The world produced approximately 3.8 billion m^3 roundwood in 2014 and about 4.0 billion m^3 in 2018
- Africa contributed 744 million m^3 of roundwood in 2018
- 90% of roundwood removals are used as fuelwood, and only 10% are used in the sawmilling industry
- Africa's forests cover more than 624 million hectares, representing 20.6% of the continent's landmass
- Zimbabwe commercial plantations cover about 66,919 hectares occupying 0.2% of the total area of as of December 2021.
- This area has steadily declined due to unlawful land invasions, veld fires, climate change, and other natural disasters like the 2019 Cyclone Idai.
- Zimbabwe's forestry sector contributes about 3% to the National Gross Domestic Product (GDP)

THE SAWN TIMBER INDUSTRY IN ZIMBABWE

- The sawn timber industry in Zimbabwe is dominated by a few large companies in primary production.
- Secondary and tertiary levels of the value chain are occupied by a mix of both large-scale and small-scale actors
- The sawn timber value chain contributes to the country's economy by providing valuable employment opportunities and generating income through local trade and exports

TIMBER PRODUCTION IN ZIMBABWE

- In 2021, timber production in Zimbabwe included 525,000 m^3 of pine and 95,000 m^3 of eucalyptus roundwood

- 12,866 m^3 of harvested natural roundwood, including 758 m^3 of mukwa, 535 m^3 of mahogany, and 11,573 m^3 of teak

STUDY OBJECTIVES AND JUSTIFICATION

SPECIFIC OBJECTIVES

1) Mapping of the value chain: identifying the range of actors in the value chain
2) Undertake efficiency studies on the various operations in the value chain
3) Assess the industrial roundwood material availability and ways to make it meet demands for sawn timber on a sustainable basis
4) Identify the governance structures at each level of the sawn timber value chain, how they operate and how they can be made more efficient
5) Explore other determining factors and approaches that constrain efficiency and/or could be employed for increased efficiency of the sawn timber value chain
6) Based on the findings on (a) to (e), propose recommendations for improving the sawn timber value chain in ways that are environmentally and socially sound, and gender inclusive

JUSTIFICATION OF STUDY

•The evaluation can inform policy recommendations and strategies to improve the efficiency and sustainability of the sawn timber value chain in Zimbabwe

•This will not only benefit the industry but also contribute to the country's economic development

MATERIALS AND METHODS

Study Sites and Sampling Procedure

- The study was conducted in the Manicaland, Matebeleland North, and Harare Provinces of Zimbabwe, and the forests were stratified into natural forest and exotic forest plantations.

- One province was selected from each stratum based on the highest sawn timber output per annum, with Manicaland representing plantations, Matebeleland North representing natural forests, and Harare representing retailers.

- Study participants were stratified by their role in the value chain and scale of operation, and the actors were purposively selected.

MATERIALS AND METHODS

Data Collection Methods

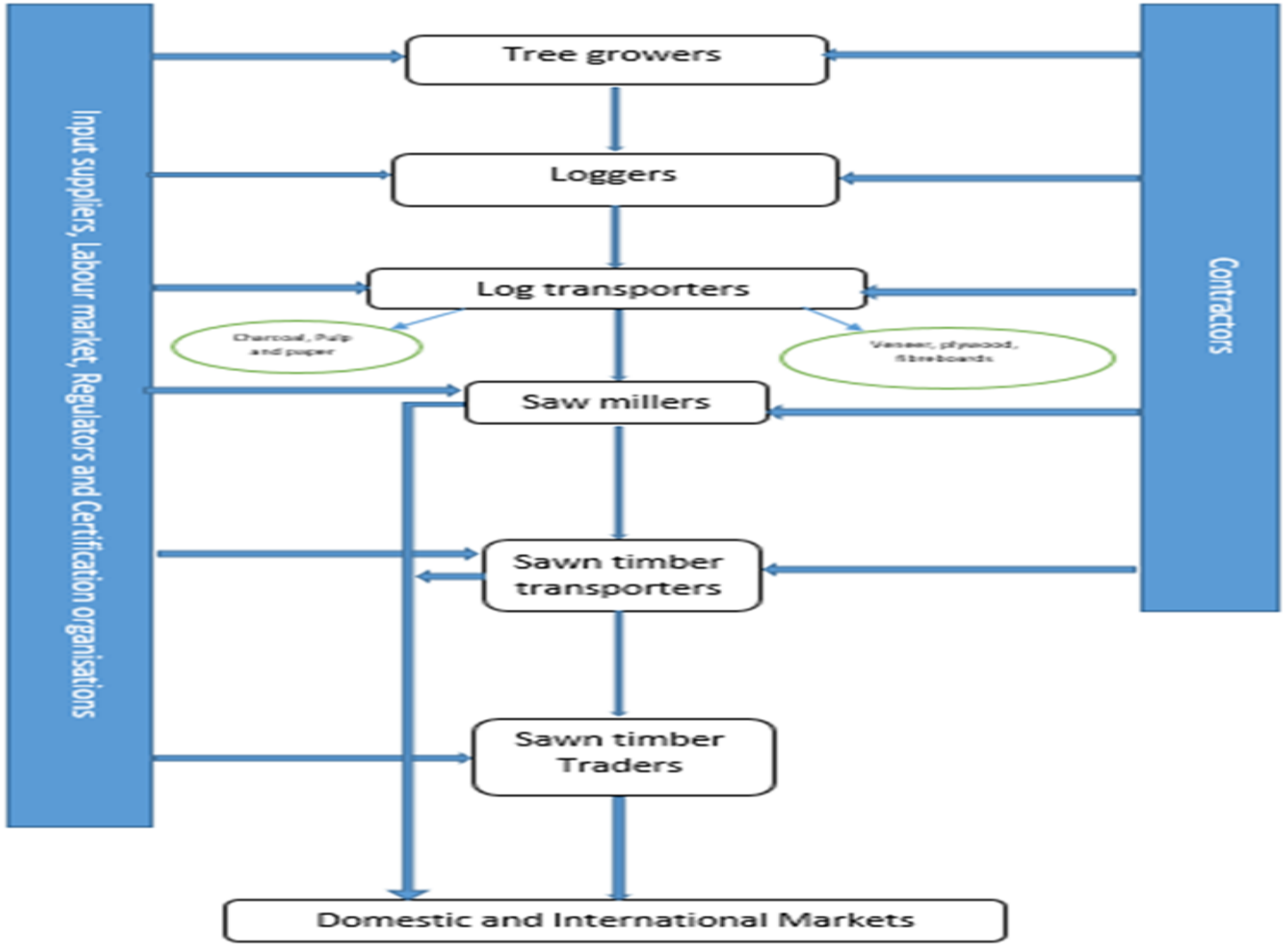
- The data collection methods included a literature review, focus group discussions, and key informant interviews.
- The literature review gathered information on sawn timber value chains, stakeholders, chain linkages, and coordination mechanisms from existing literature.
- Three Focus Group Discussions (FGDs) were conducted, and key informant interviews were stratified into tree growers, loggers, transporters (log and sawn timber), saw millers, and traders.
- The key informant interviews were done physically and telephonically using interview guides.

Data Analysis Methods

- Descriptive statistics and value chain analysis were used to analyze the data.
- The non-parametric approach using the DEA model was used to evaluate the efficiency of the sawn timber value chain due to its ability to handle multiple inputs and outputs.
- Physical outputs were converted to their respective market prices, and physical inputs required to produce round wood and sawn timber were identified.
- A cost efficiency input-oriented DEA model was used to calculate technical efficiency under the assumption of constant returns to scale.

RESULTS

SAWN TIMBER VALUE CHAIN IN ZIMABABWE



AVERAGE COSTS OF SILVICULTURE OPERATIONS IN ZIMBABWE COMMERCIAL TIMBER PLANTATIONS

Activity	Labour units (LU)/ha	Units cost peer LU	Average costs (USD)/ha
Seedlings (once off)	ha	0.10	133.00
Land preparation (once-off)	35.8	5.00	179.00
Marking and pitting (once off)	5.0	5.00	25.00
Wet planting (once off)	2.8	5.00	14.00
Gel planting (once off)	5.0	5.00	25.00
Plant watering (once off)	3.94	61.7	243.06
Spot weeding (once off)	3.2	5.00	16.00
Chemical weeding (once off)	5.0	5.00	25.00
Complete slashing (once off)	4.0	5.00	20.00
Clearing for access (once off)	4.0	5.00	20.00
First pruning (once off)	5.0	5.00	15.00
Second pruning (once off)	5.0	5.00	15.00
Third pruning (once off)	4.5	5.00	22.00
First Thinning (once off)	8.0	5.00	40.00
Fireguard maintenance and fire protection	80.0	5.00	400.00
Road slashing	4.0	5.00	20.00
Total (Gel planting)			**1153.06**
Total (Wet planting)			**899.00**

COST, LIFETIME AND DEPRECIATION CHARGE OF FOREST HARVEST EQUIPMENT

Equipment	Average cost (USD)	Salvage value (USD)	Equipment lifetime (Years)	Yearly Depreciation Charge (USD)
Chainsaws	1000	200	1	800
Cable Skidders	160000	32000	10	12800
Taro logger	75000	15000	10	6000
Grapple skidders	250000	50000	10	20000
Skoggers	90000	18000	10	7200
Front end loader	160000	32000	10	12800

RETURN ON INVESTMENT FOR COMMERCIAL SAWN TIMBER VALUE CHAIN ACTORS IN ZIMBABWE

Actor	Total Costs (USD)/m^3	Total Revenue (USD)/ m3	Gross Margin (USD)/ m3	Return on Investment (ROI)
Growers	35.00	44.00	9.00	26%
Loggers	18.00	23.00	5.00	28%
Saw millers	210.00	280.00	70.00	25%
Sawn timber Transporters	0.06/km	0.12/km	0.06	50%
Traders	318.00	340.00	22.00	7%

INDIGENOUS HARDWOOD SAWN TIMBER PRODUCTION COSTS AND PRICES

- The average price concession holders pay to RDC and the Forestry Commission for standing timber (stumpage value) is USD33/m^3.

- The average cost of logging and dragging is USD18/m^3.

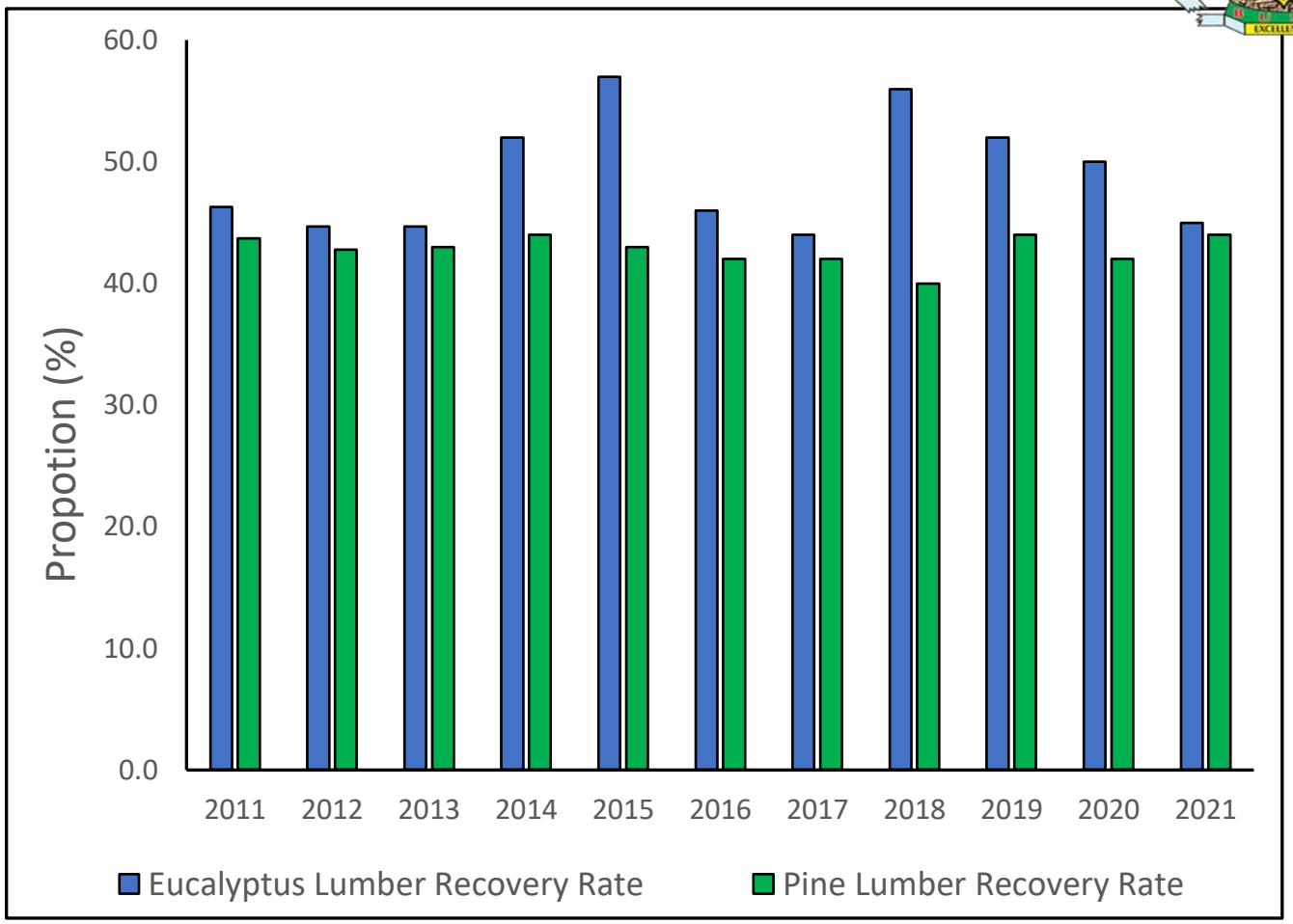
- The average milling cost of rough-sawn timber is USD35.00/m^3.

- The sawn timber is either air-dried or kiln-dried.

- Air-dried timber is sold at an average price of USD 490.00 and 510.00 per cubic meter at sawmill and the Bulawayo depot, respectively.

- The kiln-dried timber is sold for USD 660.00 and USD 900.00 per cubic meter in Bulawayo and Harare, respectively.

LUMBER RECOVERY RATE FOR SAWMILLS



- The lumber recovery rate for circular sawmills in natural forests ranges from 36% to 40%, while for band saws, it ranges from 46% to 48%.

TECHNICAL EFFICIENCY OF VALUE CHAIN ACTORS IN THE SAW TIMBER VALUE CHAIN

Actor	Scale	Minimum TE	Maximum TE	Average TE
Growers	Large	0.87	1.00	0.90
Loggers	Large	0.48	1.00	0.67
	Small	0.20	0.58	0.37
Saw millers	Large	0.85	1.00	0.93
	Small	0.80	1.00	0.93
Traders	Large	0.67	1.00	0.89
	Small	0.12	1.00	0.41

FOREST MANAGEMENT IN ZIMBABWE

•The sawn timber industry in Zimbabwe comprises two major sectors: plantation and natural forest

•The Forestry Commission & Rural District Councils- Concession holders, and regulators and

• Few other private actors are the leading formal players in the indigenous hardwood timber industry

•The Rural District Councils involved in natural timber extraction are Nkayi, Kusile (Lupane), and Umnguza (Tsholotsho)

•The rural district councils are responsible for awarding concessions to the highest bidders (concession holders) with the capacity to harvest standing timber and transport and process the harvested sawlogs

•The commercial/plantation forestry sector is comprised of five large companies

GOVERNANCE STRUCTURE IN THE SAWN-TIMBER VALUE CHAIN IN ZIMBABWE

•Zimbabwe's forestry sector has a complex institutional arrangement system with multiple stakeholders and interests.

•The forestry industry also attracts interest from other sectors of the economy, creating a complex network of institutions.

•Zimbabwe recently approved the National Forest Policy
•Zimbabwe has seven major legislations that govern forest resources, including:

i. The Forestry Act,
ii. Communal Forest Produces Act,
iii. Environmental Management Act,
iv. Parks and Wildlife Act,
v. Rural District Councils Act,
vi. Museums and monuments act and
vii. Traditional Leaders Act.

GOVERNANCE STRUCTURE IN THE SAWN-TIMBER VALUE CHAIN IN ZIMBABWE

•Zimbabwe is a signatory to several international treaties related to forestry, including:

i. Convention on Biological Diversity (CBD),
ii. United Nations Convention to Combat Desertification (UNCCD),
iii. United Nations Framework Convention on Climate Change (UNFCCC),
iv. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),
v. United Nations Forum on Forest (UNFF), and
vi. Southern African Development Community (SADC) Protocol on Forests.
vii. Paris Agreement

- Zimbabwe also participates in international initiatives related to forestry, such as the Forest Stewardship Council (FSC) and activities organized by the African Forest Forum (AFF).
- Timber Producers' Federation represent the industry's interests to the government and other parties.

GOVERNANCE STRUCTURE IN THE SAWN-TIMBER VALUE CHAIN IN ZIMBABWE

•Within the forest governance structure, there are societal subgroups and institutions that use informal rules to secure compliance and punish offenders.

•There are potential conflicts due to differences in priorities among stakeholders.

•Many stakeholders argue that the current legal framework is outdated and does not promote principles of good governance such as participation and equity.

•It is critical to revise legislation in consultation with all stakeholders to minimize future conflicts in the management of forest resources.

CHALLENGES IN THE SAWMILL INDUSTRY IN ZIMBABWE

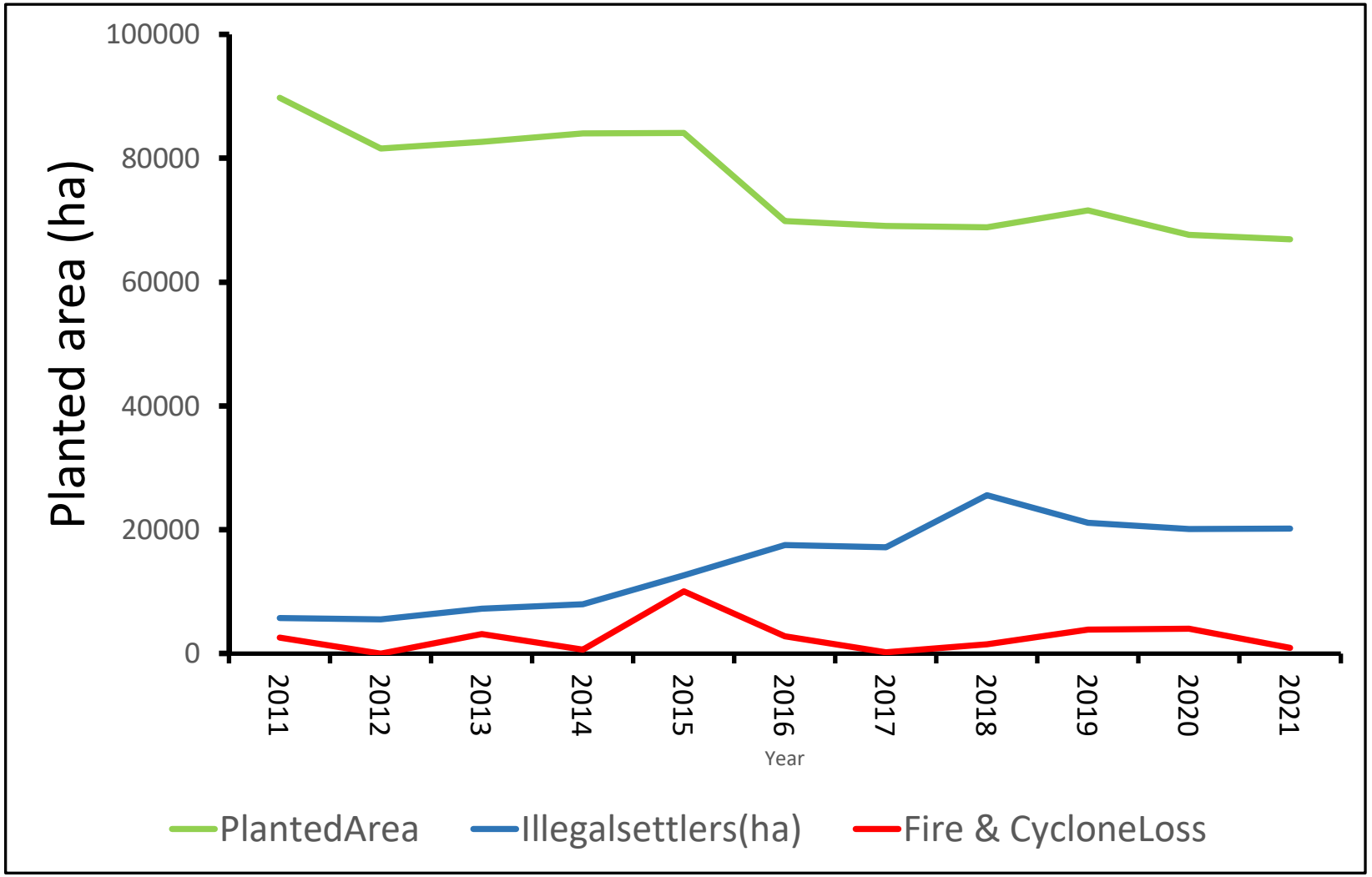
•The sawn timber industry in Zimbabwe faces several challenges that hinder its growth and sustainability

•Illegal logging, inefficient processing techniques, poor access to markets, and dependence on a few key markets are some of these challenges

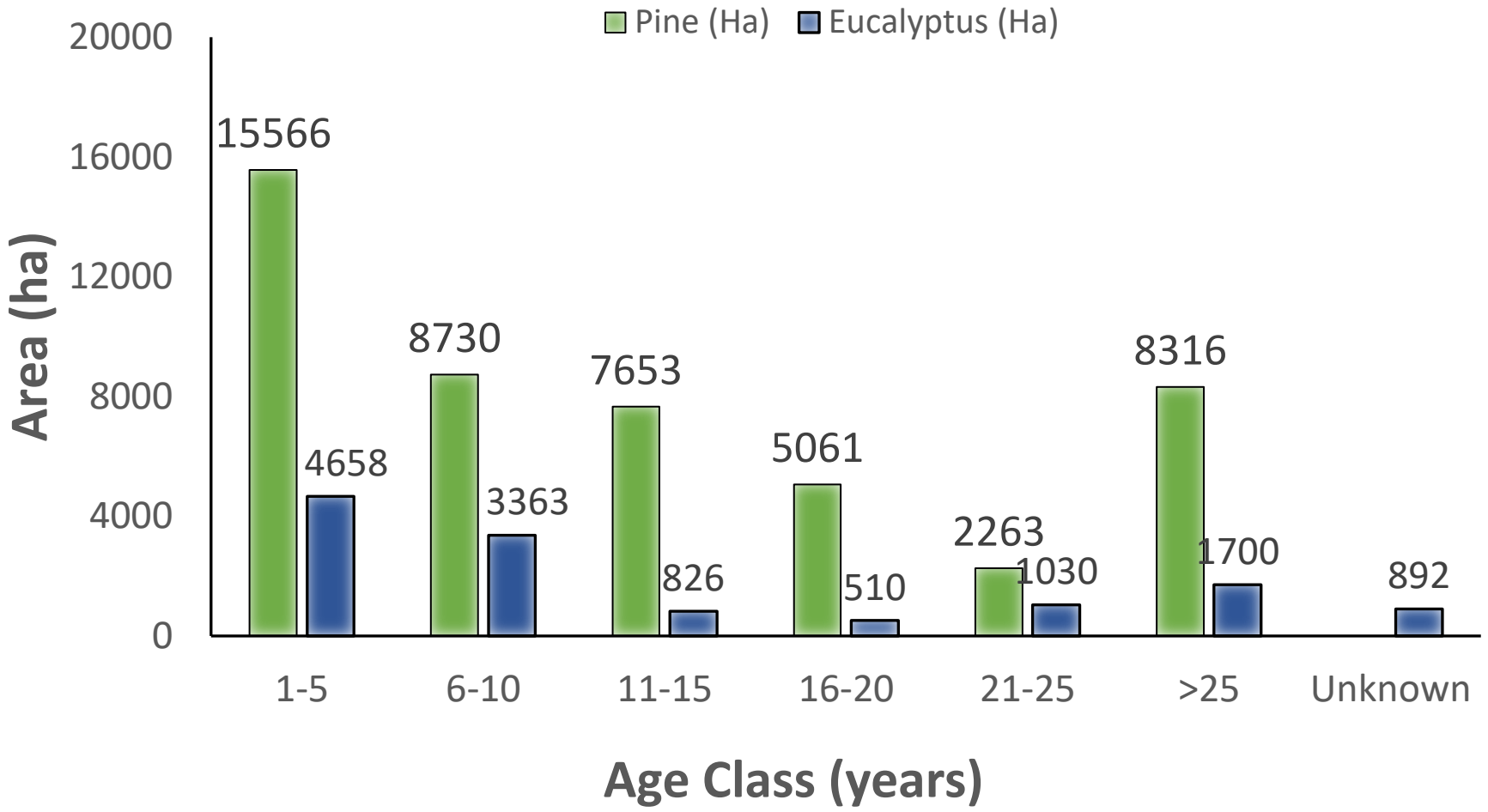
•Forests and woodlands in Zimbabwe are threatened by illegal land invasion, veld fires, deforestation, forest degradation, climate change, and other natural disasters

•Zimbabwe's timber industry is characterised by a high proportion of informal and small-scale operations

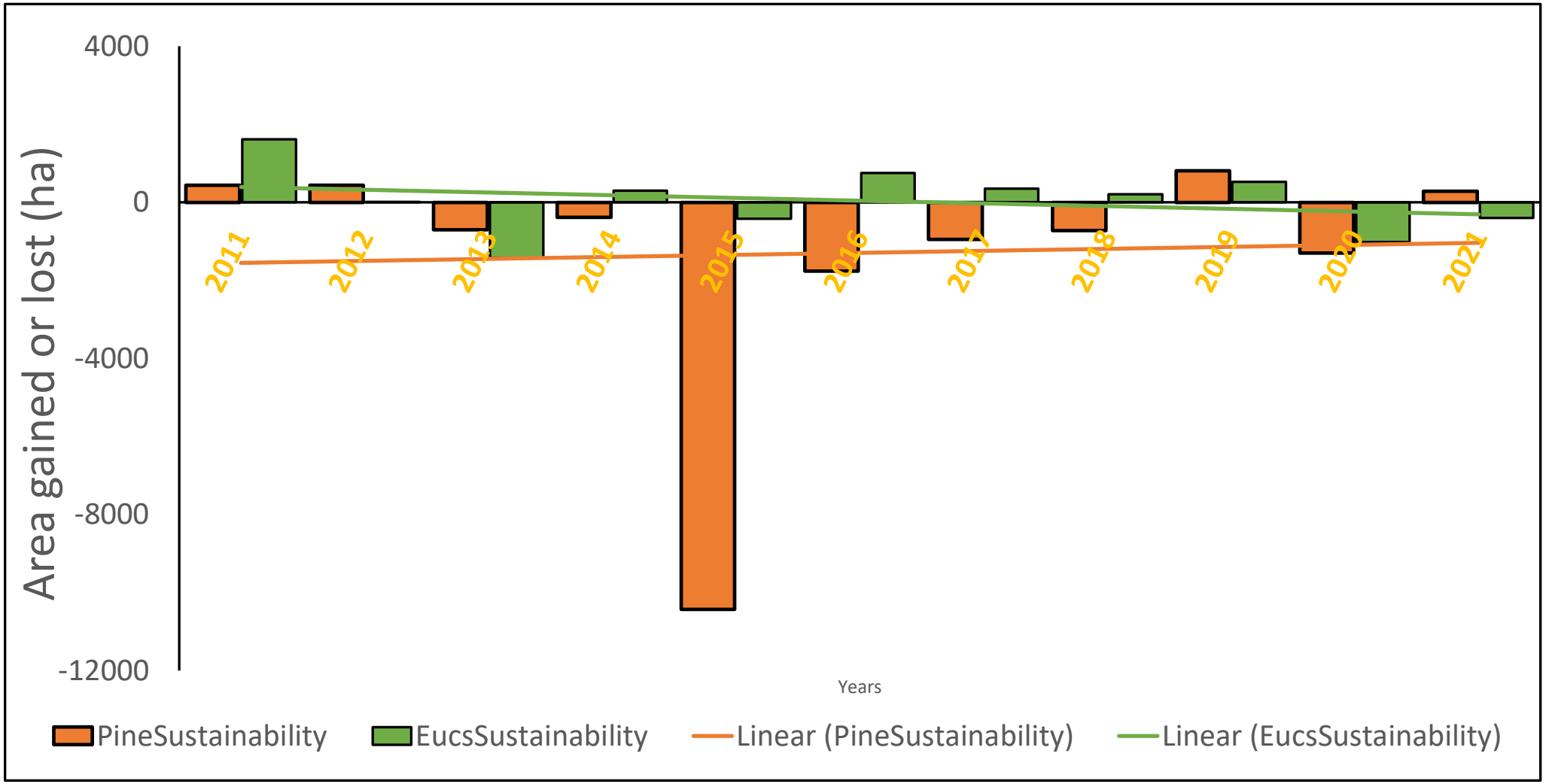
TOTAL PLANTED AREA AND LOSSES IN COMMERCIAL PLANTATIONS



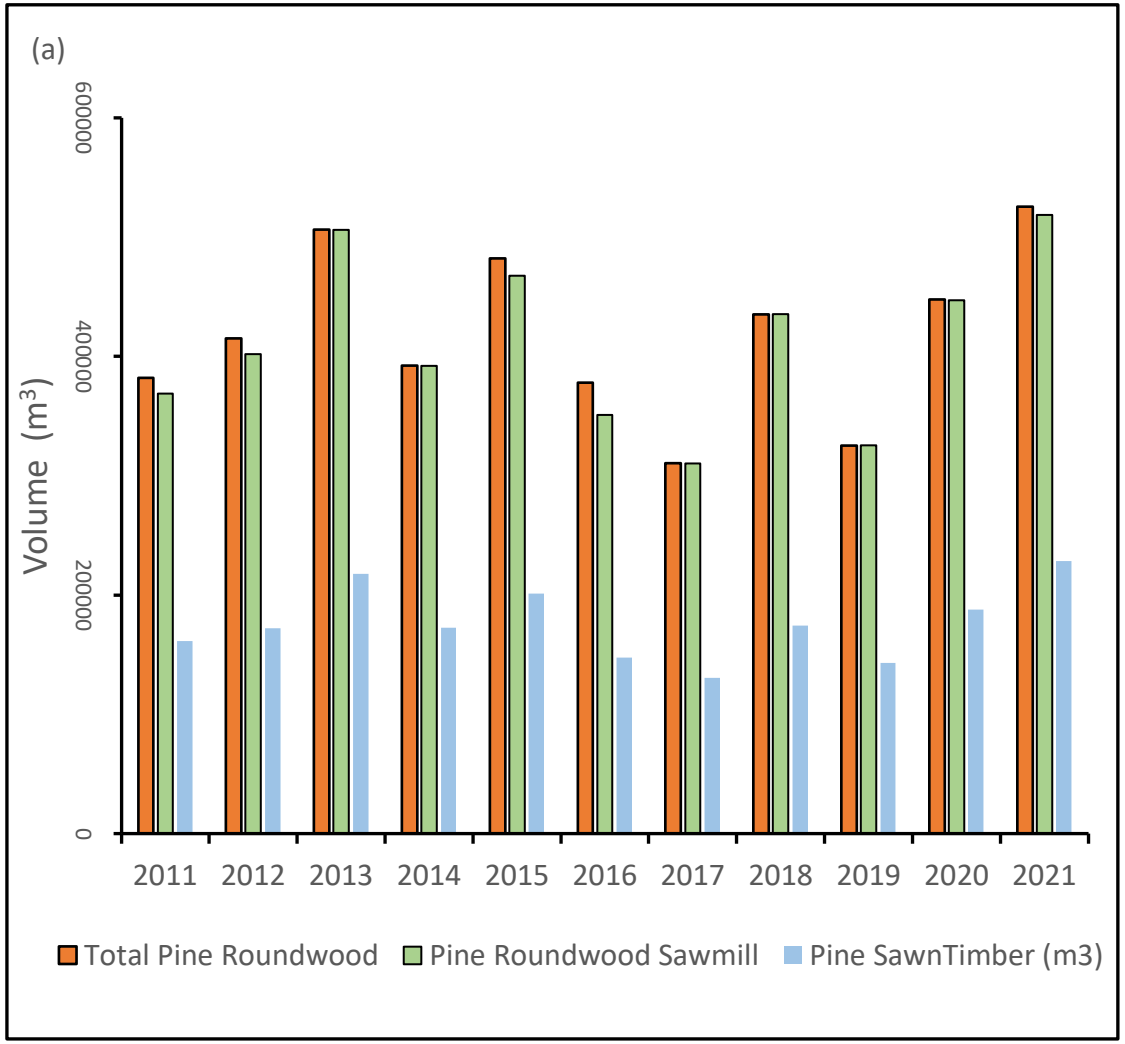
AREA AGE STRUCTURE FOR PINE AND EUCALYPTUS SPECIES IN COMMERCIAL PLANTATIONS

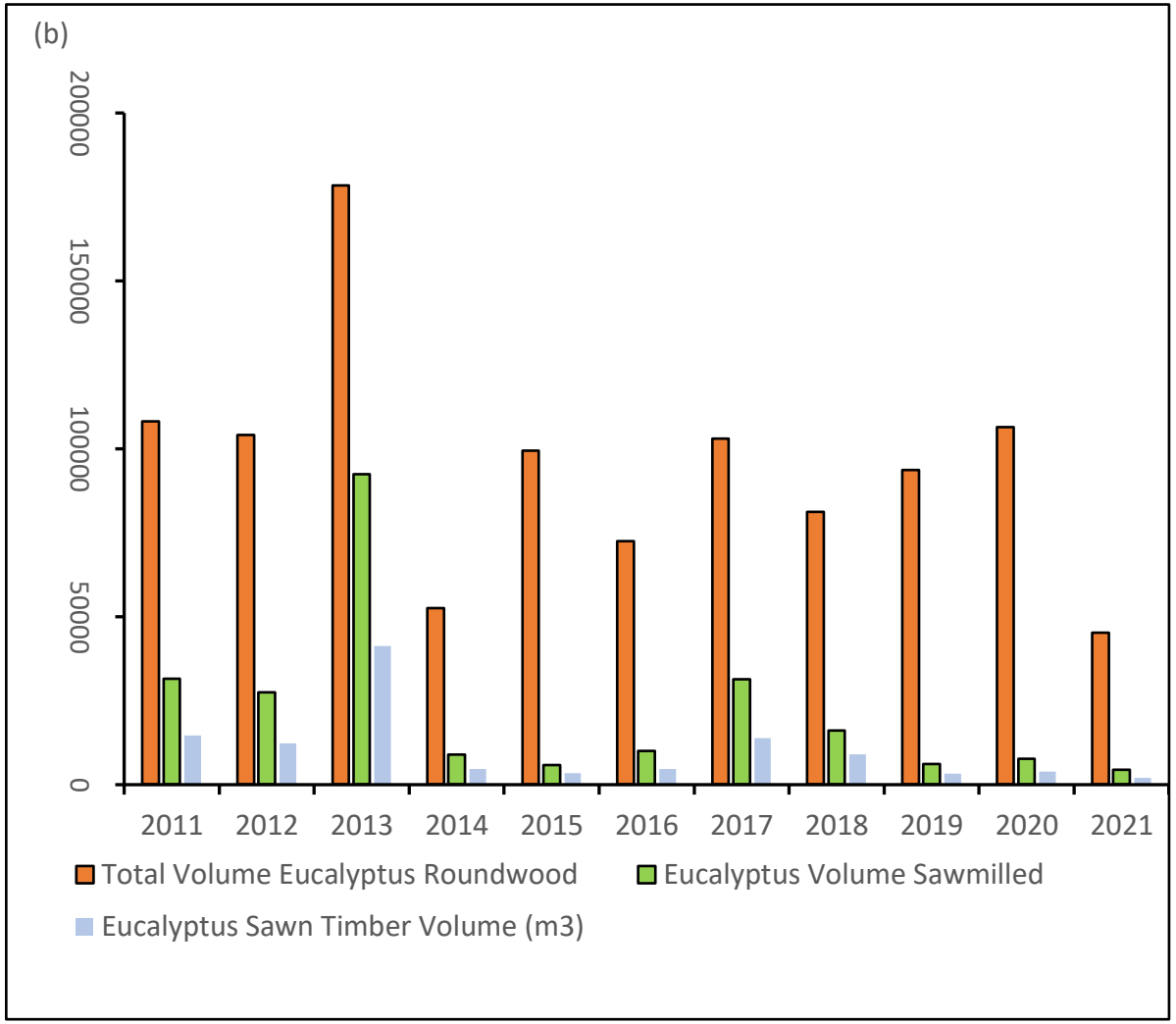


DIFFERENCES BETWEEN PLANTED AND REMOVALS OF PINE AND EUCALYPTUS SPECIES



Total volume of pine (a) and eucalyptus (b) roundwood used for sawn timber production





STRATEGIES FOR ENHANCING SUPPLY OF ROUND WOOD IN ZIMBABWE

- A policy to ensure forest plantations are harvested sustainably should be put in place
- Severe fines for overharvesting and losing more of plantations to veld fires and other natural catastrophes
- Strictly following the area age structure
- Creating out-grower schemes as a solution to reduce the problem of illegal settlers and veld fires
- Replanting

STRATEGIES FOR ENHANCING SUPPLY OF ROUND WOOD IN ZIMBABWE

- Contract farming and out-grower schemes as legal agreements that guarantee a company's supply of goods from certain farmers or groups of farmers

- Proper construction and maintenance of fireguards and fire traces

- Purchasing fire-fighting tools and equipment to put out veld fires

- Purchasing Protective clothing

- Training of personnel on veld fire management

STRATEGIES FOR ENHANCING THE EFFICIENCY OF THE SAWN TIMBER VALUE CHAIN ACTORS IN ZIMBABWE

- The efficiency of the sawn timber value chain in Zimbabwe can be improved through:
  - the use of improved seedling varieties, logging and hauling equipment
  - better transportation networks, and
  - partnerships between value chain actors to improve efficiency and reduce costs.

- Financing options for the sawn timber value chain in Zimbabwe should include:
  - Government loans and grants,
  - Foreign Direct Investment,

- Creation of an Sawn Timber Investment Promotion Agency, and

- Establishing Sawn Timber Special Economic Zones.

CONCLUSION

•The sawn timber industry in Zimbabwe is important for the economy, but faces technical inefficiencies and restrictive monetary policies.

•Challenges facing the sawn timber value chain in Zimbabwe include illegal settlers and veld fires, use of outdated technologies, which can be addressed through stakeholder workshops, stricter laws, corrective actions, financing and out-grower schemes for smallholder timber producers.

•Improving efficiency in the sawn timber value chain can be achieved through capacitation of employees, use of improved seedling varieties, logging, sawmilling and hauling equipment, better transportation networks, partnerships between value chain actors.

•There is need for concerted effort from all stakeholders to enhance the supply of round wood and the efficiency of the sawn timber value chain in Zimbabwe.

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