



Potential and challenges of small- holder tree plantations in supplementing the wood market : the case of Kenya timber moratorium

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Background

- Public forest plantations are the main sources of commercial industrial wood raw material
- Public forests cover about 135,000 ha, and supplies approx. 1 million m³ of sawn wood
- The public forests has a projected supply deficit of 26.5% of industrial wood



P. Patula plantation

Background cont...

- However, about 5000 ha of public plantations are depleted annually due to governance challenges
- Moratorium on logging activities in public forests was imposed in 2018 to streamline the challenges
- The small-holder forestry supplement wood supply deficit



C. lusitanica plantation

Smallholder plantation as wood supplement

- Farm forestry wood output has increased by about 48% since 1990s, thus, it has potential in meeting the national wood demand
- The moratorium led to immediate shortage of wood, and led to switch of wood supply by most commercial enterprises to private farms
- Information on the effects of moratorium on farm tree resources, price dynamics, trade and farmers' income are have not been documented



Eucalyptus , Gravelia and Cypress wood sawn on-farm

Objectives and purpose

Assess effects of the moratorium on the farm-based forest resources

Determine wood resource quantity and quality
available on-farm

Determine market dynamics of farm tree products trade

Understand the potential of smallholder farm forests to complement wood from
public plantations in the future

Methodological approach

Study area



Eldoret & Nakuru outlets

Purposive
sampling of tree
growers



Sold trees before ban

Sold tree after the ban



Random
selection from
movement
permits

Data collection



Household survey

Key Informant Interview

Standing trees and stump inventory

Permit movement record

Data analysis

- Descriptive analysis of household data
(land under trees, preferred and planted trees, business trends , perception and effects of the ban on tree investment and income)
- Trend analysis of standing tree density, basal area and volumes of both trees and stumps
- Case study analysis of wood products volumes and market analysis (Nandi)

Results and Discussion

1. Farm characteristics

- Most tree species on-farms - *Cupressus lusitanica* (43%), *Eucalyptus* sp (40%), *Pinus patula*, *Gravillea robusta* and *Acacia mearnsii*
- Agroforestry systems; woodlots (60%), boundary planting (38%), natural regeneration(2%)
- Generally, *C. lusitanica* is planted in boundaries (52%) while, *Eucalyptus* as woodlot (88%)



C. lusitanica boundary planting

Results and Discussion

2. DBH, Density and volumes of standing tree resources on-farm

- Mean density of trees (1659 ± 107 stems/ha), and volumes 192 ± 17.56 m³/ha (previously 17.58 m³/ha reported)

Characteristics of tree species across the sites

Species site	DBH	Density (stems)	Volume
Cypress	13.40 \pm 1.15	1774 \pm 151	220.35 \pm 29.92
Eucalyptus	12.20 \pm 1.94	1676 \pm 198	158.73 \pm 18.75
Nakuru	13.40 \pm 1.03	1774 \pm 150	205.55 \pm 823.87
Uasin gishu	14.89 \pm 2.11	1358 \pm 146	158.07 \pm 24.61

Results and Discussion

3. Diameter and age distribution of standing trees on-farm

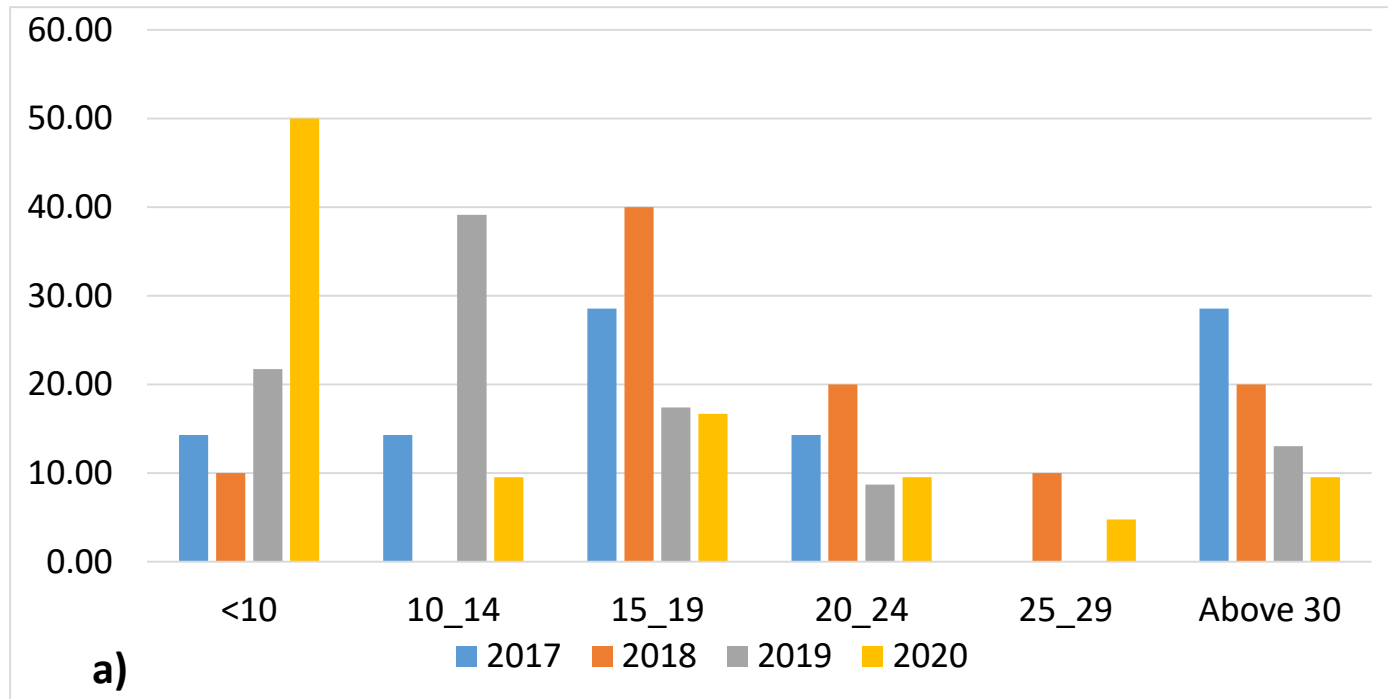
- Most tree on farms are below 5 years (37%) and 86% are below 15 years,
- most trees are dominated by tree with DBH below 19.9cm (82 %) with a mean DBH of 14.17 ± 1.06 cm
- New plantings occurred in 2018 immediately after the ban (604 ± 250) trees\household compared to 260 ± 185 in 2017 before the ban.



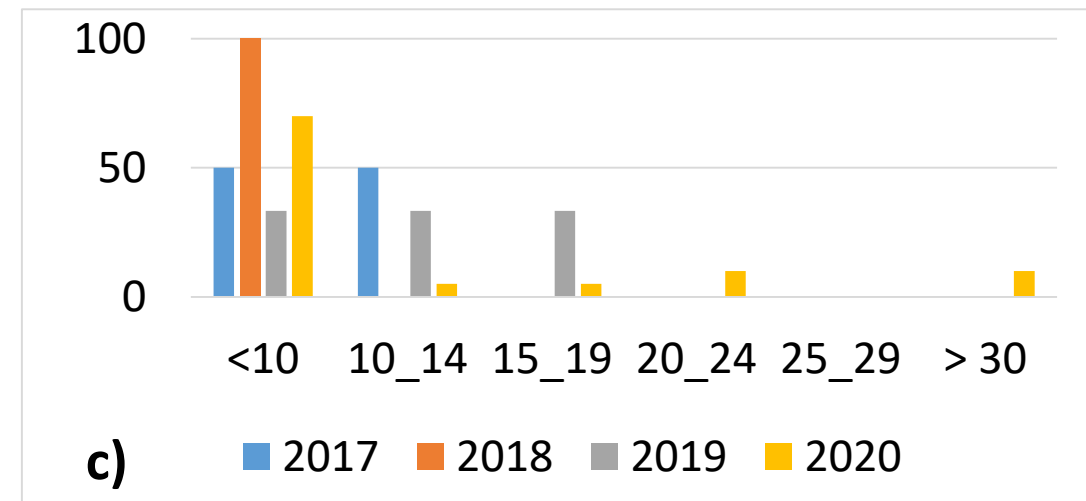
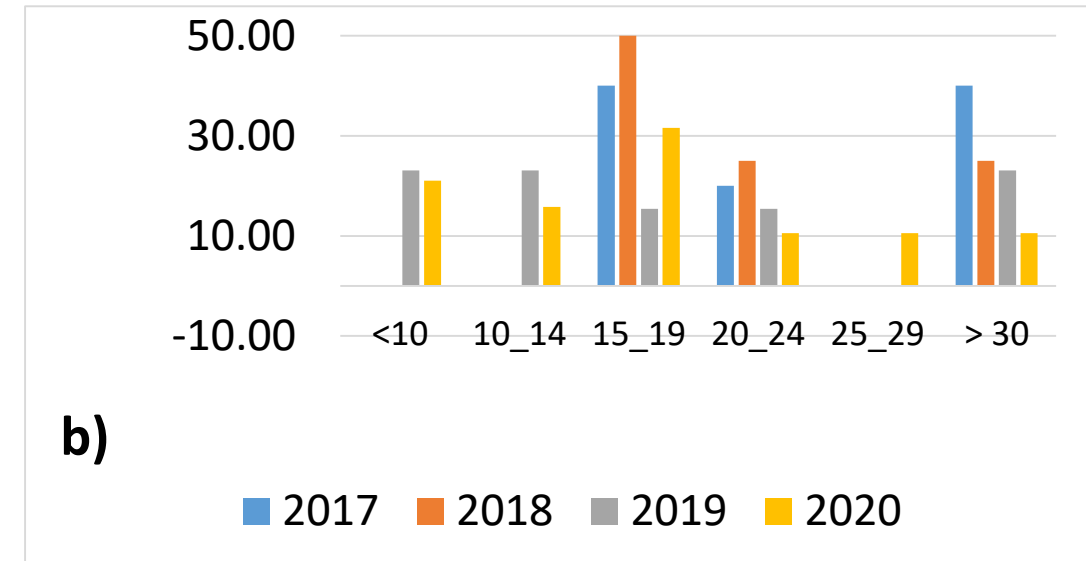
Young woodlot of C. lusitanica

Results and Discussion

4. Age distribution of harvested tree resources



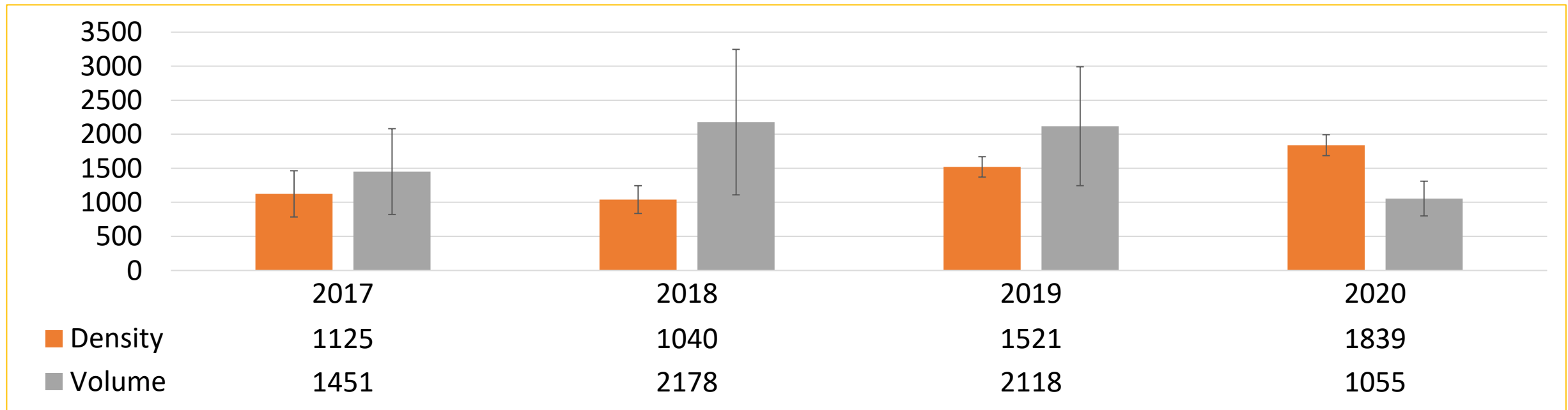
a) Overall age class of harvested trees per year, b) Cypress harvest age class distribution per year, c) Eucalyptus Sp. harvest age class distribution per year)



Results and Discussion

5. Density and volumes of stumps

- Rate of tree harvesting on-farm gradually increased since 2017 as evidenced by density of trees harvested per year and declining stump diameter.
- Mature trees harvested above 30cm stump diameter was about 70% in 2017 but only 28% in 2020

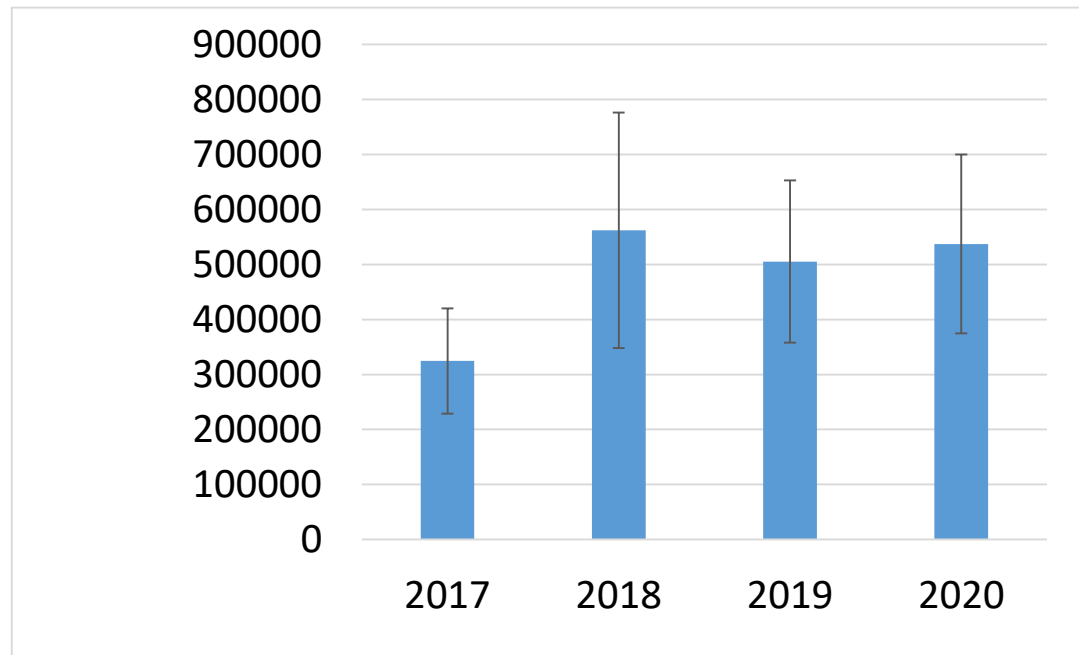


Densities and respective volumes of tree extractions over time

Results and Discussion

6 . Income from wood products

- Wood sold increased in value preceding the ban (rising demand, increase in wood prices and quantities sold)
- Highest value was in 2018- KES. 562,109± 214,089 per Household



Results and Discussion

7 . Market of wood products-Nandi County case

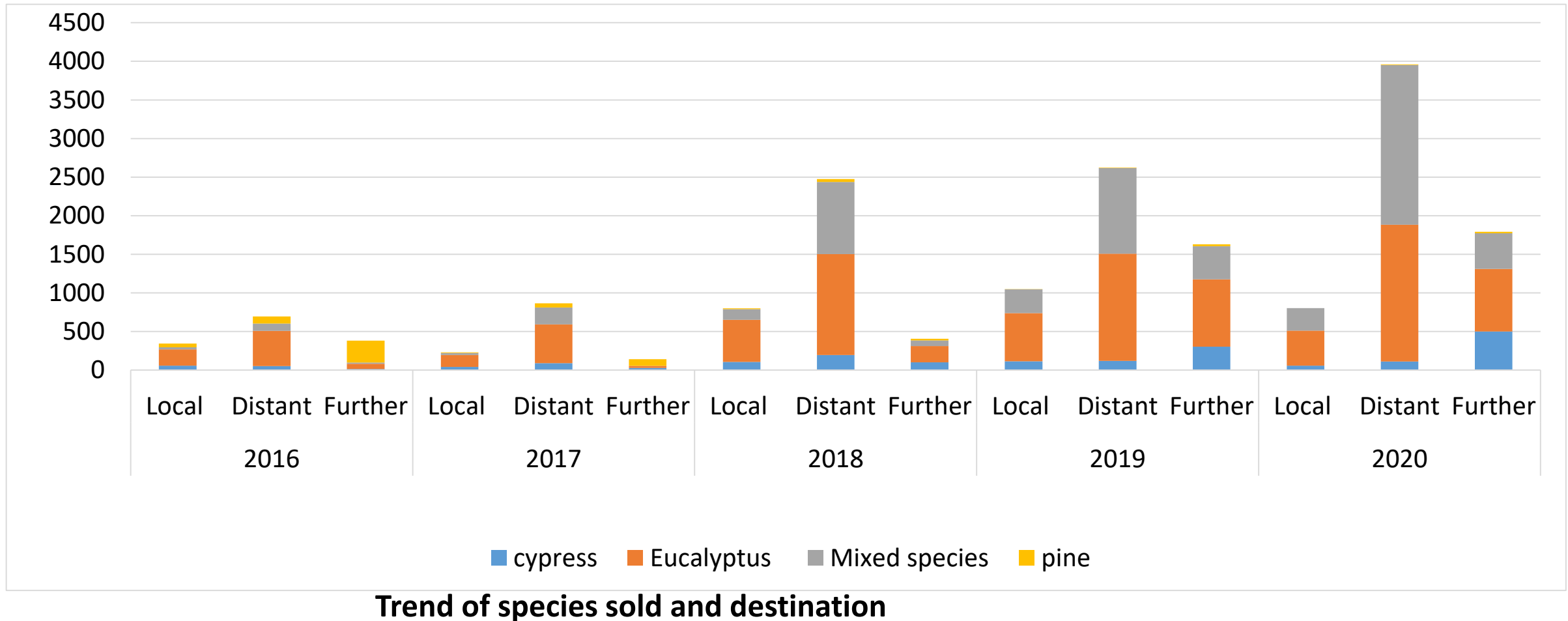
- Wood material harvested on-farm increased over time (107,718.35 m3 as of August 2020)
- Eucalyptus sp was the most harvested tree species

Species	2016	2017	2018	2019	*2020
Overall	30,746.20	31,423.29	75,350.32	103,960.28	107,718.35
Cypress	3,918.18	5,263.64	10,100.00	12,063.64	11,625.00
Eucalyptus	17,024.03	17,789.28	44,136.78	55,674.68	53,020.33
Gravelia	111.48	75.41	29.51	757.38	213.11
Pine	6,578.15	2,490.76	1,929.41	445.38	557.98
Other species	3,114.36	5,804.21	19,154.62	35,019.21	42,301.92

Results and Discussion

7 . Market of wood products-Nandi County case

- Most materials are sold in distant and further markets Vs local markets



8 . Challenges of on-farm tree growing

Results and Discussion



1. Poor spacing



Poorly pruned Cypress

Results and Discussion

8 . Challenges of on-farm tree growing

2. Poor silvicultural practices-lack of thinning and pruning
 3. Use of poor planting materials-
 4. Pests and diseases
 5. Poor market information- leading low stumpage value
- challenges

Conclusion and recommendation

Conclusion

- Most farmers are willing to invest in trees growing
- Commercial trees mostly planted –*C. lusitanica*, *Eucalyptus* sp, *P. patula*, *G. robusta* and *A. mearnsii*–*P. patula* is least grown, future resources are uncertain
- On-farm trees can supply substantial amount of industrial wood (192 m³ per ha)
- Intensive on-farm tree harvesting has led to depletion of mature trees
- Increased income from trees has incentivized farmers to enhance tree planting

Conclusion and recommendation

Conclusion

- The scarcity of wood force farmers to sell the available immature trees with low value.
- Poor silvicultural practices - poor quality materials
- Generally, the existing tree resources on-farm cannot sustain the demand from processing industry



Poor quality material being harvested-deformed & young

Conclusion and recommendation

Recommendation

1. Enhance improved access to information on management, suitable gerplasm etc.
2. Registration and certification of tree nurseries
3. Sites species matching and silvicultural management
4. Need for innovations in processing technology
5. Linkage of farmers to stable consumer markets -possibility of contract farming
6. Diversification and introduction of fast growing high value tree species
7. Need for provision of valuation advice

Acknowledgement

- KEFRI & KFS
- Tree growers
- Local administration
- Field data collection team

THANKS



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Thank you