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## Table of Contents

TAFORI Board of Directors .....	2
TAFORI Held Scientific Conference on Forestry Research for Sustainable Industrial Economy in Tanzania .....	3
Twelve Billion Eucalyptus Trees in Tanzanian Landscape: Water- Forest Linkage Triggering the Need for Water Use License .....	7
New Rotation Age for Pines and Teak: An Avenue for Availability of Wood for Timber in Tanzania .....	10
Bamboo as an Alternative Woody Supplement in Tanzania .....	12
Thrice of Iringa Region Size Burned in Tanzania in 2017 .....	17
Insect Pests Threatening Commercial Tree Species in Tanga Region, Tanzania .....	19
Invasive Alien Plants: A Problem that Calls for Immediate Solution in Tanzania.....	23
The Research and Publication Committee of TAFORI Board of Directors Visits Dodoma, Kibaha and Lushoto Research Centres. ....	29
Quick Tips for Writing Newsletter Articles.....	32
Former Deputy Minister of Natural Resources and Tourism (MNRT) Hon. Hasunga Visits TAFORI. ....	34
News in Pictures.....	35
Acknowledgements.....	37
Announcements.....	37

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## TAFORI Held Scientific Conference on Forestry Research for Sustainable Industrial Economy in Tanzania

By Drs. Chelestino Balama and Pilly Kagosi

The 1<sup>st</sup> TAFORI scientific conference on forestry research for sustainable industrial economy was held on 24<sup>th</sup> and 25<sup>th</sup>, April, 2018 at TAFORI HQ. The conference was supported by Tanzania Forest Fund (TaFF). The two days conference brought together 85 (Plate 1) forestry stakeholders drawn from various institutions. The conference was officiated by the Minister for Natural Resources and Tourism, Hon. Dr. Hamisi Kigwangalla (MP). Keynote address was given out by the Director of Forest and Beekeeping, Dr. Ezekiel Edward Mwakalukwa. The objective of the conference was to communicate forestry research findings to stakeholders for sustainable industrial economy in Tanzania. The main theme of the conference was; “Forestry Research for Sustainable Industrial Economy”. This theme had five sub-themes;

- i) Forestry research on solving deforestation and forest degradation;
- ii) Forestry research for propelling industrial economy;
- iii) Forestry research under climate change scenario;
- iv) Financing forestry research for achievable industrial economy;
- v) Coordination and regulation of forestry research in Tanzania. In this conference 15 papers were presented covering the five sub - themes. The conference was financially supported by Tanzania Forest Fund (TaFF).



**Plate 1:** Conference participants in a group photo

The 1<sup>st</sup> TAFORI Scientific Conference on forestry research for sustainable industrial economy was very important for stakeholder’s understanding on the current useful research findings and shared experiences among forestry stakeholders (Plate 2). It is known that forest sector contribute significantly to national industrial economy. Therefore, decision makers need to have wright forest research data for the wright decisions in the forest sector.



**Plate 2:** Conference participants listening to presentation

To facilitate coordination and organization of the conference, TAFORI Management nominated six people to constitute a conference preparation committee (Table 1). Among conference organizing committee, five members were from TAFORI and one from TaFF.

**Table 1:** Conference committee members

SN	NAME	INSTITUTION	POSITION
1	Dr. Chelestino Balama	TAFORI	Chairperson
2	Dr. Pilly Kagosi	TAFORI	Secretary
3	Dr. Siima Bakengesa	TAFORI	Member
4	Dr. Nancy Pima	TAFORI	Member
5	Mr. Elieza Mwakilla	TaFF	Member
6	Mr. Siwa Ernest	TAFORI	Member

The organizing committee conducted six conference meetings between February and April, 2018. During these meetings committee approved conference theme and sub-themes. The committee members appointed potential paper presenters who were assigned special topics. One to five papers per sub-theme were identified making a total of 15 papers which were presented during the conference. On the other hand there were 10 TAFORI posters displayed during the conference.

Similarly, conference publicity was achieved by mailing, calling forestry stakeholders and the conference call advertisement was posted in the TAFORI website. In addition to calling and mailing to the relevant forestry stakeholders, conference advertising sign boards, banners, and abstract booklets, writing pens with TAFORI and TaFF logos were prepared. The conference advertising sign boards were displayed in Morogoro Municipal (at Msamvu and Min – bus keep left areas) and at TAFORI Headquarters. On top of that TAFORI Acting Director General and the Chairman for Conference Organizing were

interviewed on the conference purpose and objectives by local media Television and radio stations; namely TBC1 (Plate 3), ITV, TBC Taifa Radio and Top Radio FM.



**Plate 3:** TAFORI Acting Director General (Dr. Revocatus Petro Mushumbusi) and the Chairman for Conference Organizing Committee (Dr. Chelestino Peter Balama) at TBC1 for interview.

Conference participants deliberated on 22 issues which need several actions to be taken by different stakeholders. Among the actions include; Setting aside at least 10% of TaFF funds to support forestry research in TAFORI; Developing dissemination strategies and mobilize funds for regular dissemination of research findings; Studying

impacts of climate change on species shift gradient, phenology and tree growing behaviour; Creating windows for funding training programs in Tree Breeding, Pathology, Entomology and Soil science. Others are; Researching for actual contribution of Forest Sector to the Gross Domestic Product; Quantifying the amount of highly demanded Non-Timber Forest Products available in the country for

promoting investment, Developing and creating awareness on efficient charcoal production technologies; and Setting quality standards for wood products and certifying forestry production practices (Table 2). The conference was officially closed on 24<sup>th</sup>, April, 2018 by the Director of Forest and Beekeeping, Dr. Ezekiel Edward Mwakalukwa.

**Table 2:** Conference deliberations

Issue	Action to be taken	Main Actor(s)
Insufficient funding for Forestry Research	Establishment of legal framework to ensure a fixed percentage of forest revenues is set aside for research	TFS
	Revise funding regulations to allow setting aside at least 10% of TaFF funds to support forestry research in TAFORI	TaFF
	TAFORI should develop strong proposals to attract funding from different donor	TAFORI
Poor dissemination of research findings	TAFORI should develop dissemination strategies and mobilize funds for regular dissemination of research findings	TAFORI
	Translate available research findings in user friendly languages for wider public use.	TAFORI
Poor performance of trees planted during National tree planting campaigns	Provide tree planting training just before National tree planting day	TAFORI, LGAs
	Establish mechanisms to manage and monitor survival of trees planted during National Tree Planting Campaigns	TFS, TAFORI, LGAs
	Establish database of planted and surviving trees (showing species planted, acreage and location)	TFS
Low recognition of the contribution of forest sector in the GDP	Need for research on actual contribution of Forest Sector to the GDP	TAFORI, SUA,
	Emphasize proper collection and documentation of forest revenues	TFS
Insufficiency of data on existing NTFP resources to attract industrial investment	Quantify the amount of highly demanded NTFP available in the country for promoting investment	TAFORI, TFS
Use of poor and inefficient charcoal production technologies	Develop and create awareness on efficient charcoal production technologies	TAFORI
	Develop Biomass Utilisation Energy Strategy	TFS, TATEDO
Use of unsuitable tree species for urban forestry	Develop Guidelines for Tree Planting in Urban Areas	TAFORI, TTSA
	Create awareness on problems caused by using unsuitable trees in urban areas	TAFORI, TTSA
Uprooting of <i>Terminalia</i> species due to religious	Prepare a Press release on <i>Terminalia catappa</i> and <i>T. mantaly</i> and government position on the uprooting	TAFORI

controversial beliefs	Provide alternative benefits that can offset the misconceptions	
Impact of climate change on distribution of forest tree species	Provide current status of climate change impacts on forestry	TAFORI, SUA, IRA, ARDHI UNIVERSITY
	Study the impact of climate change on species shift gradient, phenology and tree growing behaviour	
	Study the adaptation strategies by different tree taxa	
Inefficient wood processing and utilization technologies	Set standards to ensure efficient processing of Wood products by reviewing and enforcing forest laws and regulations	TFS
	Identify and promote incentives for adopting improved wood processing technologies.	
Lack of market differentiation based on quality of wood products	Set quality standards for wood products and certify forestry production practices	TAFORI, TFS
	Create awareness to the public on the use of quality wood products	
Unauthorized production, importation and exportation of tree seeds.	Develop Tree Seed Act to regulate seed production and supply	TFS, TPRI, TAFORI
	Establish and maintain seed orchards as seed sources	TTSA
Inadequate experts in some forestry research areas	Create windows for funding training programs in Tree Breeding, Pathology, Entomology and Soil science	COSTECH, TAFORI, SUA
	Develop a coordinated training program to increase human resources	TAFORI, SUA
Uncoordinated research activities in the country	Prepare research guidelines and circulate to stakeholders and ensure they strictly adhere to guidelines	TAFORI
Honey quality in tobacco growing areas claimed to have high amount of nicotine and hence affecting its market	Inform stakeholders on the amount of nicotine in honey after further research	TAFORI, TBS
	Expand the research on nicotine contents to include other honey producing areas	TAFORI
Adoption of new technical orders on rotation ages	Develop Technical Orders to address reduced rotation age for Pines and Teak, once research is concluded	TAFORI, TFS
Limiting use of fuel wood as source of energy to industries	Create awareness of existing laws and regulations that allows market of fuelwood from legal sources	FBD
Stimulate wood based industries	Create awareness on different forest products available in the forests.	TFS
	Emphasis planting more trees growing	TFS
Wood products trade deficit	Regulate importation and exportation of wood products to reduce trade imbalance deficit	TRA
Declining capacity for Agroforestry research and development in Tanzania	Give priority to Agroforestry research and dissemination	TAFORI, ICRAF, SUA
	Review Agroforestry strategy for Tanzania	TAFORI, ICRAF
Low rate of using indigenous tree species in woodlots/plantations and tree planting campaign	Conduct more researches on Improvement, Tree Breeding and Silviculture methods for indigenous tree species	TAFORI
	Promote establishment of plantations of native tree species	TFS, LGAs, VPO
	Develop regulations that will enforce the use of indigenous tree species during tree planting campaigns	TFS, LGAs, VPO
Low Public Private Partnership in Forestry Sector	Create a forum for Private Public Partnership involvement in research and promotion of forestry products	PFP, TAFORI, FDT

# Twelve Billion Eucalyptus Trees in Tanzanian Landscape: Water- Forest Linkage Triggering the Need for Water Use License

By Dr. Bakengesa, S. Siima

## Introduction

Efforts to increase wood based products are coupled with increase in tree planting efforts. Tree planting can be in woodlots, on farm, or in plantations. The focus has been to use fast growing tree species. In Tanzania, Eucalypts is among the fast growing genus. However, the water use of Eucalyptus and impact on water resources is a controversial issue. Guided plantings can reduce the effects. Eucalyptus trees provide needed wood products such as pulp, fuelwood, timber, essential oils, and transmission poles among other products. Eucalyptus tree species can contribute to bridging the biomass gap of 19.5 million m<sup>3</sup>. The gap is estimated based on the national forest resource assessment which gave out data in 2015. The data showed that total annual supply of wood at national level is estimated at 83.7 million m<sup>3</sup>. The result recommended harvesting of up to 42.8 million m<sup>3</sup> of wood per year, which is the allowable cut. However, the wood volume cut in 2010 was 62.3 million m<sup>3</sup> that culminates in the gap, translating into high deforestation and degradation rates.

## Water- forest linkage

Water is accessed by eucalypts trees through the photosynthesis process. Photosynthesis is a complex process by which green plants and some other organisms use sunlight to

synthesize nutrients from carbon dioxide and water. Different organic molecules are produced and used by plant or combined to form glucose, sucrose, and other carbohydrates and oxygen which some is used with the plant but mostly expelled in the atmosphere. In this process water is being extracted through tree roots from underground strata, used in photosynthesis process and then expelled into the atmosphere. The cycle forms forest –water interactions. In order to understand the extent of tree planted in the landscape, Saikku of Openforis Calc software was used to help in extraction and visualization of data from the NAFORMA database at TAFORI headquarters. Thereafter QGIS software was used to produce a map of spatial distribution of Eucalyptus species in Tanzania.

## Number and types of planted Eucalypts in Tanzania.

Tree planting in plantations and woodlots comprise of about 500,000ha. The numbers are on the rise and investment in forest value chain is increasing too. Data indicate that *E. camaldulensis*, *cloeziana*, *globulus*, *grandis*, *maculata*, *maidenii*, *saligna*, *tereticornis* and other Eucalyptus are grown in the country.





Plate 1a: Eucalyptus woodlot



Plate 1b: Eucalyptus trees

Table 1: Distribution of Eucalyptus trees grown in Tanzania.

Re.Cod	Region	Eucalyptus species									Total	Rank
		<i>E. camaldulensis</i>	<i>E. cloeziana</i>	<i>E. globulus</i>	<i>E. grandis</i>	<i>E. maculata</i>	<i>E. maidenii</i>	<i>E. saligna</i>	Other Eucs	<i>E. terreticornis</i>		
11	Iringa	50,960,983.00		35,378,627.00	232,044,399.00		3,020,319,871.00	251,212,556.00			3,589,916,437.00	1
22	Njombe		231,212,858.00		170,081,573.00	382,661,228.00	448,443,508.00	160,958,244.00	1,166,390,805.00		2,559,748,220.00	2
3	Kilimanjaro				143,102,923.00		1,489,059,841.20		85,925,488.00		1,718,088,253.00	3
12	Mbeya	30,594,091.00			7,378,017.39		764,023,802.00	35,195,904.00	47,349,304.00	6,081,224.00	890,622,345.40	4
20	Mara				730,663,507.00	57,200,897.00	12,874,489.10	16,216,937.00			816,955,832.20	5
18	Kagera	33,024,048.00			91,169,507.00		66,845,363.00	160,379,955.00	406,061,055.00		757,479,930.80	6
5	Morogoro					2,628,631.00	147,339,419.00		400,404,865.00		550,372,917.40	7
16	Kigoma						59,493,158.00	362,809,762.00	12,543,023.00		434,845,944.80	8
15	Rukwa						280,931,273.00			8,228,777.00	289,160,051.30	9
19	Mwanza						187,010,684.00		54,240,225.00		241,250,910.40	10
10	Ruvuma					25,447,291.00		168,596,203.00			194,043,494.50	11
14	Tabora	156,006,928.00									156,006,928.50	12
4	Tanga							152,094,500.00			152,094,500.40	13
21	Manyara						45,737,782.00	9,048,163.00			54,785,945.87	14
13	Singida							14,180,277.00		15,066,680.00	29,246,957.82	15
1	Dodoma								28,170,467.00		28,170,467.43	16
	Total	270,586,050.00	231,212,858.00	35,378,627.00	1,374,439,926.39	467,938,047.00	6,522,079,190.30	1,330,692,501.00	2,201,085,232.00	29,376,681.00	12,462,789,136.82	

Source: National Forest Resources Monitoring and Assessment (NAFORMA) Database

In order to be able to visualize the extent of Eucalyptus planting, a Visual map was developed. This is indicated in Figure 1.

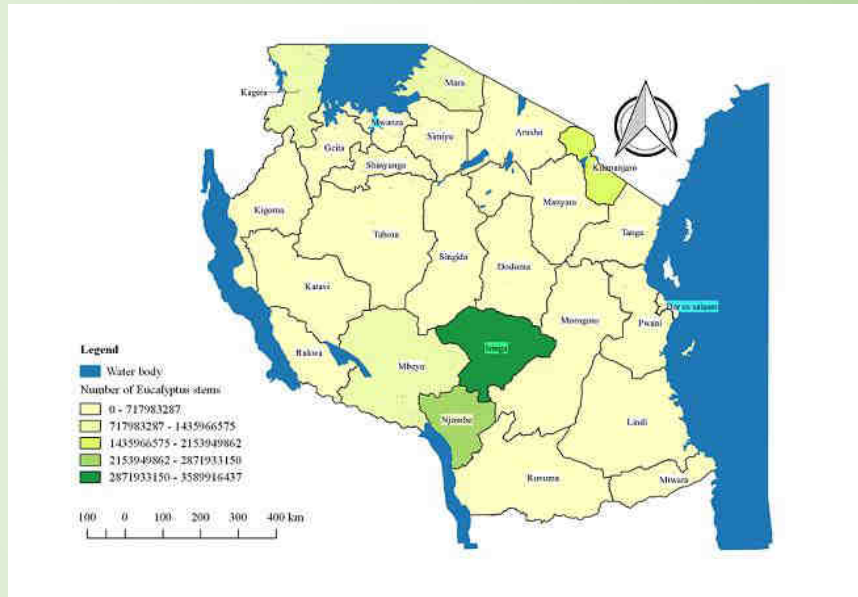


Figure 1: Visual presentation of Eucalyptus trees in Tanzania.

### Legislation and Application of Research

While visiting South Africa, it was noted that timber growers need to apply for planting permits to establish new commercial plantations. The permit is supported through legislations under which all water users are required to register and license and pay for their use of water. Payment for water used by plantation forests is being developed from forest hydrological research. In the country, the Water Act 2009 does not single out water users for commercial plantations, it is an avenue that can be explored. In South Africa, commercial plantation forestry is classified in the Water Act as a streamflow reduction activity, defined as “... any activity (including the cultivation of any particular crop or other vegetation) ... (that) ... is likely to reduce the availability of water in a watercourse to the Reserve, to meet

international obligations, or to other water users significantly” Under this new water-use licensing system, planning authorities (catchment management agencies) predict the likely hydrological impacts of afforestation and limit the spread of further afforestation in catchments where available water resources are already committed. Such need is of paramount importance in regions with high rates of afforestation especially in Njombe, Iringa, Kilimanjaro and Mbeya regions.

### Conclusion

Efforts to bridge biomass gap through afforestation for supply of wood products need to consider also their hydrological impact by introducing a water use license and hence borrowing a leaf from South Africa that stands as a role model in developing commercial plantations

## New Rotation Age for Pines and Teak: An Avenue for Availability of Wood for Timber in Tanzania

By Dr. Chelestino Balama and Mr. Francis Laswai.

In Tanzania, Pine species (*Pinus patula*, *P. caribaea*, *P. tecunumanii* and *P. kesiya*) and Teak (*Tectona grandis*) are the dominant exotic timber tree species grown in large scale both in public and private plantations and currently provide valuable wood for various end uses mainly timber for construction, furniture and flooring. Pines (Plate 1a) are grown to serve softwood timber industry mainly for construction while Teak (Plate 1b) is as substitute of indigenous hardwood timber industry for construction, furniture and flooring.



**Plate 1a:** *Pinus caribaea* in Buhindi Forest Plantation, Mwanza Region



**Plate 1b:** *Tectona grandis* in Mtibwa Forest Plantation, Morogoro Region

There are concerns that Pines and Teak for timber can be harvested and utilised at age below prescribed rotation age of 25 for pines and 40 years for teak. In that regards TAFORI in collaboration with the College of Forestry, Wildlife and Tourism of the Sokoine University of Agriculture (SUA) and Tanzania Forest Service (TFS) Agency carried out studies to understand the new rotation age of the Pines and Teaks grown in public forest plantations and in farms based on growth, yield, wood properties, and economic analysis. Previous Technical Orders on rotation age were not based on these considerations. Therefore to achieve the goal; growth, yield, wood properties (Plate 2), revenue, and management costs data were used in determining rotation age of Pine and Teak species.



**Plate 2a:** Wood sample collection process



**Plate 2b:** Wood sample collection process

Growth and yield results showed that for *Pinus patula*, *P. caribaea*, *P. tecunumanii* and *P. kesiya* the equity point of mean annual increment (MAI) and current annual increment (CAI) were achieved at between 16 and 17 years with the maximum MAI being maintained until about 20 years. On the other hand, For *Tectona grandis* the equity points are site dependent and they are 16, 17 and 18 years for site classes I, II, and III respectively. After those years, the maximum MAIs were maintained to about 22 years before dropping very gently for all site classes. Basing on strength properties, strong wood for Pines was achieved at when trees attain age of 16 to 21 years old and for Teak 15 to 20 years old. Based on economic analysis, Pines can be harvested at age above 16 years old because they revealed higher Net Present Value (NPV). Findings on economic rotation age of Teak suggested that the trees can be harvested at age from 15 years old and above.

Based on considerations of growth and yield, wood properties and economics of

rotation age, Pine species (*Pinus patula*, *P. caribaea*, *P. tecunumanii* and *P. kesiya*) and Teak (*Tectona grandis*) are recommended to be harvested at 18 years and 20 years, respectively with irrespective of site class. With proper thinning, trees will attain the recommended mean diameter and thus improve recovery. Reduction of rotation age has significantly increased raw materials to sawmill industries and increased supply of wood products in the markets hence minimizing trend of harvesting of immature trees.

## Bamboo as an Alternative Woody Supplement in Tanzania

By Dr. Chelestino Balama and Mr. Francis Laswai

Bamboos are among forest resources with significant importance to the livelihoods of the people in the country. Bamboo has more than 1500 documented uses including: constructions, furniture, food, basket making and lamp holder containers making. The bamboo products are also potential for export and domestic market which can offer significant opportunities for the development of bamboo industries in Tanzania. Bamboos cover an estimated area of 127,000 ha. The bamboo vegetation is mainly found in the following regions: Iringa, Mbeya, Morogoro, Tanga, Lindi, Kilimanjaro and Kagera. This resources need to be developed and promoted in order to bridge a gap to supplement wood in the country.

Forest resources in Tanzania Mainland cover about 48.1 million ha equivalent to 55% of total land surface area (MNRT, 2015). The main types of forests are montane (2.1%), lowland (3.4%), mangroves (0.3%), plantations (1.2%), closed woodlands (18.2%) and open woodlands (74.8%). In terms of the growing stock, it is estimated that 3.3 billion m<sup>3</sup>, of which closed forests account for 11.3% while woodlands account for 73.9% of the growing stock. The remaining 14.8% comes from trees on farm. The total annual supply of wood at national level is estimated at 83.7 million m<sup>3</sup>. For sustainable utilization, Tanzania may harvest up to 42.8 million m<sup>3</sup> of wood per year, which is the allowable cut. However, the wood volume cut in 2010 was 62.3 million m<sup>3</sup> that is 19.5 million m<sup>3</sup> above the allowable cut which translate into high deforestation and degradation rate taking place in both reserved and unreserved forests. It is in that perspective that bamboo resources if efficiently utilized could contribute to the prevailing wood balance.

Bamboo is a fast re-growing raw material for sustainable rural industrial development and has the strategic advantage that it

is economically and environmentally viable. In this way, bamboo can be the starting point for small and medium scale industries creating job opportunities with a high rate of employment. The economic and development potentials for bamboo as an alternate “cash” crop are numerous and could contribute as well to the fight against forest deforestation and degradation. Bamboo can serve for building & constructions, furniture, energy, food and utensils/basketry.

**Construction and furniture:** Bamboo has proven its potential as a wood substitute traditionally for building & construction, fencing poles, furniture, flooring and roofing (**Plate 1**). Bamboo is extremely strong, light in weight and flexible making it ideal for various uses. Once bamboo is fully utilised could contribute a lot on

prevailing wood balance in the country. What is important so far is to increasing awareness on it and also calls for transfer of appropriate technology like suitable low-cost measures for bamboo preservation against insects and fungi and basic machinery and tools to improve productivity and product quality is essential to promote bamboo as a valid wood substitute.



**Plate 1:** Use of bamboo in roofing as was observed in households adjacent to Udzungwa Mountains, Kilolo District

Bamboo species most suitable for construction are the *Arundinaria alpina* (African green mountainous bamboo), and *Oreobambus buchwaldii*. The *Arundinaria alpina* (**Plate 2a**) is found at altitudes between 2,290 and 3,360 m a.s.l. with average density of 5,000 culms/ha. It is common in Mount Meru, Mbulu (Manyara), and Mbeya Regions. It is also found in Udzungwa and Uluguru Mountains in Iringa and Morogoro regions. On the other hand, *Oreobambus buchwaldii* (**Plate 3**) is found inhabiting the Northern and Southern Highlands as well as East Coast zone. It is a medium sized yellow hollow culm bamboo found at altitude between 450 – 1000 m a.s.l. in solitary clumps in more open parts of evergreen forests of the East Usambaras (Tanga Region) and Tukuyu (Porotos) highlands in Mbeya Region. Other clumps occur scattered in Ifakara vegetation at 300 m.a.s.l.



**Plate 2a:** Clumps of *Arundinaria alpina*

**Energy:** Bamboo is used as source of energy for cooking. They are used as firewood or charcoal. In some cases production of bamboo charcoal has been taking place. According to the types of raw material, bamboo charcoal can be classified as raw bamboo charcoal and bamboo briquette charcoal. Raw bamboo charcoal is made of bamboo plant parts such as culms, branches, and roots. Bamboo briquette charcoal is made of bamboo residue, for example, bamboo dust, saw powder etc., by compressing the residue into sticks of a certain shape and carbonizing the sticks. The bamboo briquettes charcoal has high calorific value. This calls for various investors to invest on bamboo value addition technologies.



**Plate 2b:** Bamboo charcoal

**Food:** Bamboo produces juice which after continuous fermentation attains certain amount (%) of alcohol called *Ulazi*. This is consumed by human being. Tapping is normally done on *Oxytenanthera braunii* Syn. *O. abyssinica* (**Plate 2c**) which is semi solid bamboo species in young culms and becoming solid in older culms. This bamboo species is commonly found in open forests often around rivers in Iringa, Njombe, Mbeya, Ruvuma, Lindi, Kigoma, Kagera, and Pwani regions.



**Plate 2c:** Clumps of *Oxytenanthera abyssinica* being tapped for bamboo juice

On the other hand, bamboo shoots from different species are edible and tasty treat. They contain protein, fat, glucose, calcium, phosphorus, iron, thiamine, and fibre with the protein and amino acid content highest when shoots are still underground. However, consumption of bamboo shoots is not common in Tanzania; this has been mostly observed in Asia particularly in China. This calls for technology transfer on how to add value on bamboo shoots. Adoption of Bamboo shoots as a food source could contribute in enhancing the nutritional status and improving food security in the communities involved.

**Utensils/basketry:**

Bamboo is also used in basketry industries e.g. making household utensils. The flexibility of bamboo allows it to be converted into different household utensils. These utensils have been useful as alternative to plastic bags for handling and storage goods. Plastic bags are not good to the environment as are not renewable; bamboo

products are good and can therefore contribute to pollution reduction. Therefore there is a need for innovative technologies to design and produce different utensils for domestic use, thus reducing dependence on plastic bags.



**Plate 3a:** Processed bamboo for making different utensils including baskets



**Plate 3b:** Bamboo baskets ready for use

**Research on bamboo:** Bamboo research in Tanzania dates back between 1902 -1930 when plantations of the Amani Botanical Garden were established. Among the plants that were introduced and planted as small plots ranging from 0.1 to 1 Ha were the bamboo species. Bamboo species were introduced for different reasons including soil stabilization, ornamental, agroforestry and for wood production. A large number were planted on steep slopes to stabilize the soil and road banks. In early 1980s another introduction was made in the West Usambara close to the Lushoto Silviculture Research

Centre. Although the performance of almost all introduced species was good, there are no records of effort to scale up.

Research on bamboo focused on testing exotic species in order to identify suitable species for increased product diversity in the country. Research done include introduction of *Bambusa vulgaris* var. *striata* (the golden yellow green and stripped, low altitude bamboo) at Amani arboretum in Muheza District, Tanga Region. Other bamboos (of Asian origin) tested at Amani arboretum and that have shown adaptability to Tanzanian conditions include; *Bambusa multiplex*, *B. nutans*, *B. multiplex*, *Chimonobambusa hookeriana*, *Dendrocalamus strictus*, *D. giganteus*, *Gigantochloa aspera*, *Phyllostachys aurea*. The only large-culmed bamboo that has shown good growth at Amani arboretum is *Bambusa bambos* from Thailand.



This species has also been planted on a smaller scale at Mzinga in Morogoro Region. Another trial recently established focusing on spacing and weeding is of *Dendrocalamus membranaceus* cv. *grandis* (Plate 4) in Kibaha, Pwani Region. Upon the end of the research, the bamboo species will further be recommended to planting in areas with similar climatic conditions.



**Plate 4:** A *Dendrocalamus membranaceae* CV *grandis* bamboo was transplanted on 3<sup>rd</sup> April 2018 in Kibaha, Pwani Region (Photo was taken on 17<sup>th</sup> April 2018)

Available bamboo resources in the country not only signify contribution to livelihoods of the people but also are important for wood balance in various utilities. This calls for different investors to invest in bamboo development through different innovative technologies.

## Thrice of Iringa Region Size Burned in Tanzania in 2017

By Siwa Ernest Nkya

Fire has long been used by human being to support her livelihood from millions of years ago. Human being has been using fires for cooking, hunting, honey harvesting, heating homes, stimulating grasses for grazing, and farm preparations. But, if fire is not properly managed it becomes a disaster causing death of human and livestock, and burning of ecosystems and properties. It is estimated that about 8.5 - 11 million km<sup>2</sup> of Tanzania land surface burned each year. Due to this, fire needs a proper management.



**Fire burning 400 Ha of Sao Hill Forest Plantation in September 2018**

But, a proper management of wildfire needs a wildfire monitoring in order to get information that could guide it. Due to this, Tanzania Forestry Research Institute (TAFORI) is monitoring fire occurrence in the country by using Earth Observation data. Researchers at Tanzania Forestry Research Institute (TAFORI) revealed 100903 km<sup>2</sup>, which is about three times of Iringa Region area, burned in Tanzania for the year 2017. Monitoring findings were published in her annual burned area report that is produced in her website.

“It is paramount to monitor wildfire so as to support decision makers and planners in designing and implementing good policies and plans for the sustainable development of Africa” Monitoring for Environment and Security in Africa (MESA) Programme indicated. MESA was a continental programme to

support policy making for advancing sustainable development in Africa.

TAFORI is receiving Earth Observation data at her wildfire station comprising of dish and receiving computer. Earth observation data are obtained from the satellites that capture various data on the Earth Surface. The use of these data in monitoring of various

phenomena e.g. wildfire has enhanced better decision making for the management of phenomena, thus contributing to sustainable development.

In 2017, researchers revealed that regions which had most burned area in Tanzania were Lindi (16100 km<sup>2</sup>), Katavi (14319 km<sup>2</sup>), Mbeya (11352 km<sup>2</sup>), Tabora (11145 km<sup>2</sup>) and Ruvuma (10701 km<sup>2</sup>). Also, most of burned area were recorded in the months from June to October, with the peak fire activity in July, within the first part of the dry season. This indicated deliberate early burning measures for management purpose to reduce fuel during the peak season. The spatial distribution of burned area by month revealed a west to east transition of fire events from early to late burning. Late burning occurs in the month of September and October, and used to prepare farmlands and encourage new grass growth for grazers in anticipation of the rains. Katavi, Mbeya and Tabora regions lie in Western; while Lindi and Ruvuma regions lie in Southern of Tanzania.

The researchers also revealed that burned areas were largely accounted by the Gazetted lands – lands that have been demarcated by the government for various purposes. Burned area in the gazetted lands were about 70144 km<sup>2</sup>, wherein; 42025 km<sup>2</sup> burned in Game Reserves, 18099 km<sup>2</sup> burned in Forest Reserves, 10003 km<sup>2</sup> burned in National Parks and 17km<sup>2</sup> burned in Ngorongoro Conservation Area. This implies that fires events in Tanzania are mostly wild.

Various studies indicates that most of these fires are caused by local communities rather than gazetted lands managers. Local communities are setting fires deliberately; and setting fires during traditional and illegal hunting of wildlife, and farming practices. The gazetted lands managers are using fire as a management tool, however they lack fire management plans to guide them on the use of fire. This cause difficulty in differentiating between fires that are caused by gazetted lands managers and local communities.

TAFORI recommended that fire management practices should be assessed in the gazetted lands, management of forests in unreserved land should be enhanced, and education on fire

management should be given to communities in the fire prone areas in order to mitigate the negative impacts of forest fires in Tanzania.

However, TAFORI didn't provide information on the economic impacts of these wildfires. The information on the economic impacts of wildfires in Tanzania is scanty, despite its availability in some of forest plantations. This information is important in showing value of efforts used in managing wildfires, and value of resources and properties lost due to wildfire occurrences for formulation of wildfire policy for management of wildfire in Tanzania. This implies that scientists and gazetted lands managers should work together in gathering these data on economic impacts of wildfire in our gazetted lands.

As an African proverb says "Fire is always a good maid, but a bad boss". A proper management of wildfire is highly needed in Tanzania to reduce its adverse effects

## Insect Pests Threatening Commercial Tree Species in Tanga Region, Tanzania

By Merss. Orestus Kinyero, Enock Mbungu, David Benjamin and Dr. Revocatus Petro

### Introduction

In recent years there has been an increase of plantation of exotic tree species in Tanzania to cover the increasing wood deficit. Exotic tree species are regarded as fast growing thus can supply wood products within the short rotation. The efforts to expand exotic tree species plantation goes concurrently with the improvement of tree germplasm, such as production of clonal plantlets that are of high quality and that further shorten the rotation of trees in supplying wood products. However, these efforts will be in vain if the health of established woodlots and woodlots will not of high consideration.

### Insect pests threatening commercial tree species in Tanga Region

In recent years there has been a concern from the tree growers in Tanga Region - especially those purchasing exotic tree germplasm from Tanzania Forestry Research Institute (TAFOR) - about insect pest infestations to Eucalyptus clones and Teak. Due to this, TAFORI researchers conducted a field visit in August 2017 to Pongwe, Mlingano, Kwamdulu Farm and TFS - Fuel Wood Project in Handeni.

The aim of the field survey was to provide information that could develop management strategies for insect pests affecting eucalyptus woodlots and forest plantations in Tanga region. Field surveys were conducted on TAFORI clients – those purchasing seedlings from TAFORI - woodlots and plantation established in Pongwe in Tanga town/City, Kibaranga (Mlingano) located in Muheza, Kwamdulu Farm Estate located in Korogwe and TFS Fuel Wood Project in Handeni. In the surveys, Researchers held discussions with site managers on pests infestations, and assessed affected trees to determine insect or symptoms of the pests. The survey found that Eucalyptus trees and clones was attacked by insects pests such as *Thaumastocoris peregrinus* and

*Paranaleptes reticulate*.

The attack by *T.peregrinus*, a sap sacking insect that feeds on eucalyptus leaves was moderately and appeared during the dry period. *Paranaleptes reticulate* affect trees species by girdling them to provide suitable breeding material for the larvae. The pest pupate in fallen stems (Plate 6). The peculiar thing observed at this area was that the insect damage most of trees within the range of 3 – 8 cm diameters. Some of the trees were debarked/girdled at DBH whereas others were debarked above the DBH of tree. The easy solution to eradicate *Paranaleptes reticulate* is to collect and burn girdled dead branches. Currently, TAFORI is doing research to discover type of chemicals that can be used to control the girdling beetle.

**Table showing insect attack per site and the recommended control.**

Site	Tree species	Age (years)	Insect attack	Control
Pongwe	Eucalyptus clones	3	<i>Thaumastocoris peregrinus</i> , Bronze bug (Hemiptera: <i>Thaumastocoridae</i> )	Early treatment of insecticide using Cohinor
	<i>Tectona grandis</i> (Teak)	3	-	-
Kibaranga Mlingano	- Eucalyptus clones	≤ 3	<i>Thaumastocoris peregrinus</i> , Bronze bug (Hemiptera: <i>Thaumastocoridae</i> )	Early treatment of insecticide using Cohinor
	<i>Tectona grandis</i>	≤ 3	-	-
	<i>Cedrella odorata</i>	≤ 3	-	-
Kwamdulu Farm Estate	Eucalyptus clones	-	<i>Paranaleptes reticulata</i> (Cashew stem girdler) (plates 1 and 2)	Cleaning of plantation, following better silviculture practices, and applying the Australian parasitic wasp <i>Cleruchoides noackae</i> (Mymaridae: Hymenoptera)

<i>Tectona grandis</i>	-	-	-
<i>Cedrella odorata</i>	-	-	-
<i>Pines</i>	-	-	-

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TFS Project	Fuelwood	<i>Eucalyptus terticonis</i>	3	<i>Paranaleptes reticulata</i> (Cashew stem girdler)	Cleaning of plantation, following better silviculture practices and applying the Australian parasitic wasp <i>Cleruchoides noackae</i> (Mymaridae: Hymenoptera)
		<i>Cedrella odorata</i>		-	-
		<i>Grevillea robusta</i>		-	-
		<i>Azalia quanzensis</i>		-	-
		<i>Khaya nyasica</i>		-	-
		<i>Terminalia ivorensis</i>		-	-

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**Plate 1:** Girdled *Eucalyptus camaldensis*



**Plate 2:** Girdled *Eucalyptus camaldensis*

Fungal infection was only observed in Teak (*Tectona grandis*) woodlot established in 2014 at Pongwe. Researchers recommended the cut and burn of affected stems to limit the spread of fungal disease to other stems (Plate. 3).



**Plate 3:** Teak Infestation

From the field made and other experiences it is advised that cleaning of woodlots and plantation should be done to remove dead branches, good silvicultural practices to be followed, and regular insect surveys should be done to control and combat insect pests.

The control of insect pests and diseases is vital for the establishment, development and management of forest woodlots and plantations in Tanzania. Regular field surveys in tree nurseries, forest plantation and woodlots, and natural forest are needed to determine insect species composition and population densities will iron out the problems facing tree growers and motivate them towards tree farming.

# Invasive Alien Plants: A Problem that Calls for Immediate Solution in Tanzania

By Dr. John R. Mbwambo

## Introduction

Invasive alien species (IAS) are species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health. Among the serious IAS are the plants, which include woody plants, grasses, herbs and climbers. In most cases, people confuse between weeds and invasive alien plants (IAPs). While all IAPs are weeds, not all weeds are IAPs, because many of them are native to the regions or ecosystems they occur. A weed is a plant that is out of place and which has not been sown intentionally. Some of the attributes that enable plants to become invasive include; absence of natural enemies in area of introduction, ability to grow in a wide range of edaphic and climatic conditions, rapid maturity and seed production in large quantities, possession of efficient and effective modes of dispersal.

Although forest, woodland and grassland ecosystems in Tanzania are known for their high biodiversity and endemism, they suffer from tens of IAPs. Some of the worst known IAPs in the World are also present in Tanzania and causing lots of problems including displacement of native flora (*Parthenium hysterophorus*), death to trees (*Landolphia ovariensis*), changing grazing habits of wildlife and livestock (*Chromolaena odorata* and *Prosopis juliflora*), and hamper water transport and fishing related activities (*Eichhornia crassipes*). All these have significant impact to the country economy and thus peoples livelihoods. Tanzania as a Contracting Party of the Convention of Biological Diversity (CBD) is required to prevent introduction of, and/or control or eradicate alien species which are known to threaten ecosystems, habitats, or species. However, the fact is countries with limited resources like Tanzania cannot make any significant progress to address the requirements of CBD if they try to manage hundreds of IAS at a goal. The aim of this article is therefore to provide details of three most serious

invasive alien plants in Tanzania that require immediate mitigation measures to rescue biodiversity and ecosystems that are key to our livelihoods and economy of the nation. The three species are *Prosopis juliflora* (threatening grazinglands), *Parthenium hysterophorus* (agricultural landscapes) and *Eichhornia crassipes* (fresh water ecosystems). The article also highlights management measures and distribution of the species in Tanzania.

## Procedure to collate information

Published articles, books and online compendia on IAS such as CABI ([isc.cabi.org](http://isc.cabi.org)) and BioNET ([www.keys.lucidcentral.org](http://www.keys.lucidcentral.org)) were reviewed to get information on species descriptions, biology and ecology, distribution and their management options in Tanzania and elsewhere. Opinions from experts working on IAS were also synthesized and their experience on managing



IAPs documented to form part of this article. Field data and experience from the Woody Weeds project ([www.woodyweeds.org](http://www.woodyweeds.org)) that works in Amani and Moshi

were also used to provide additional information particularly on the invasive species *Prosopis juliflora*.

## Synthesis

### Box 1: Detail information of *Prosopis juliflora*

#### Taxonomic information

Scientific name

*Prosopis juliflora* (Sw.) DC.

Other names

Mesquite (English), Mrashia, Mathenge (Swahili).

Origin

Mexico, Central and northern South America.

#### Description and Identification

*P. juliflora* is a tree 3-12 m tall evergreen small tree, sometimes shrubby. It can easily be differentiated from other thorny leguminous shrub by its spreading evergreen branches.

#### Pictures



**Figure 1:** Mechanical removal of *Prosopis juliflora* in Kahe Moshi

#### Biology and Ecology

Invaded habitats and its dispersal

It is generally found in areas where water and soil fertility are the principal agents limiting plant growth, and is able to survive, and even thrive, on some of the poorest land, unsuitable for any other tree species. *P. juliflora* dominates in dry, or seasonally dry, watercourses or depressions, and is often found in coastal flats and dunes. *Prosopis* reproduces through seed, often once they have passed through the digestive tract of browsers - such as goats, cattle, camels and some wild herbivores. It spreads along water courses and run-off areas during periods of rain and then spreads laterally from these sites.

## Distribution in Tanzania

Prosopis is abundant in some areas of Kilimanjaro, including Kahe Moshi, Mwanga, Himo, Kifaru, around Nyumba ya Mungu dam and parts of Tanga along Horohoro road to Mombasa. The introduction of Prosopis to Tanzania in 1988 was accidental, by traders between Taveta County (Kenya) and Mwanga District. It has been suggested that the donkeys used as a means of transport between the two areas fed on Prosopis pods and spread the seeds with their dung.

## Impacts

*Prosopis juliflora* can be a very aggressive invader and replaces native vegetation and takes over rangelands. Negative effects include complete loss of pasture and rangelands for both domestic and wild ruminants, losses due to access to water and the destruction of fishing nets by the thorns, and illness and death of livestock due to eating *P. juliflora* pods and being pierced by the sharp and stout thorns. Other impacts are loss of cropland, the costs of repairing tyres punctured or destroyed by thorns, and doctor's bills for treating thorn wounds. Dense stands of *P. juliflora* can block irrigation channels, obstruct roads and block smaller trails completely affecting access to pasture, croplands, water sources and fishing areas.

## Management options

Chemical control using Triclon 480 g/l can be an effective control method and it is being tested in Kahe, Moshi by the Woody Weeds Project. Farmers around Kahe control Prosopis by cutting the trees and removing the stump up to 50 cm below ground. This is a very tedious work which may not be sustainable. In sugar plantations they control by using chemical.

## Box 2: Detail information of *Parthenium hysterophorus*

### Taxonomic information

Scientific name

*Parthenium hysterophorus* L.

Other names

congress weed; barley flower; carrot grass; bastard feverfew (English), Gugu karoti (Swahili)

Origin

Native to Mexico, Central, South America and the Caribbean.

### Description and Identification

*P. hysterophorus* is an annual herb, which is much-branched with vigorous growth habit, aromatic, herbaceous plant with a

deep taproot. Flower heads are both terminal and axillary, pedunculate and slightly hairy, being composed of many florets formed into small white capitula, 3-5 mm in diameter. Each head consists of five fertile ray florets (sometimes six, seven or eight) and about 40 male disc florets.

## Pictures



**Figure 2:** Invasion of *Parthenium hysterophorus* around Olmotonyi in Arusha region.

## Biology and Ecology

### Invaded habitats and spread

It is particularly aggressive in degraded or disturbed pastures in semi-arid environments. It is also found in disturbed sites, riparian zones (banks of watercourses), on roadsides, along railways and in pastures, seasonal floodplains, grasslands, open woodlands, waste areas, lawns, gardens and crops. *P. hysterophorus* is a weed of semi-arid, subtropical, tropical and warmer temperate regions.

### Distribution in Tanzania

It has invaded many parts of Arusha and some areas of Kilimanjaro that border Arusha and it is also common around Arusha and Moshi town.

## Impacts

*Parthenium hysterophorus* has been reported to cause skin rashes (dermatitis), on those parts of the body that come in contact with the weed on a regular basis, watery eyes, swelling and itching of the membranes of the mouth and nose, constant coughing especially at night, continually running nose and sneezing, itching of the roof of the mouth and fatigue. Allergy-prone people are particularly susceptible to both the dermatitis and respiratory problems.

## Management options

- To control this weed, it is recommended to pull out the plants before they flower, making sure to remove all of the root system to avoid regrowth from root remnants. Use lightweight, long sleeved garments and cotton gloves to avoid contact with the skin.
- Also controlling by maintaining good grass growth to maximize competition is considered the best. This requires exclusion of grazing livestock until grass has become re-established, followed by reduction in stocking rates to prevent reinvasion by the weed.

**Box 3. Detail information of *Eichhornia crassipes***

**Taxonomic information**

Scientific name

*Eichhornia crassipes* (C.Mart.) Solms

Other names

Water hyacinth (English); Magugu maji (Swahili)

**Origin**

This species originated in tropical South America (north-eastern Brazil, French Guiana, Guyana, Surinam and Venezuela).

**Description and Identification**

Description

*Eichhornia crassipes* is a large water-floating woody plant (up to 2 m above the water and 1 m below) floating freshwater plant with hollow, expanded leaf stalks (petioles) and "roots" (rhizoids) that trail underwater in a dense mat or in long hanging strands. Stems may be in the form of short runners (stolons) or upright (erect) flowering stems (up to 60 cm or more tall).

**Picture**



**Figure 3:** Harvesting of Water hyacinth for animals feeds – a practice that is strictly prohibited because it contributes to further spread in new areas.

## **Biology and Ecology**

### **Invaded habitats and spread**

*E. crassipes* is a floating weed of tropical and sub-tropical freshwater lakes and rivers, especially those enriched with plant nutrients. It may also be a weed in flooded rice. It grows well in still or slow-moving water. It can withstand extremes of nutrient supply, pH level, temperature, and can even grow in toxic water. Water hyacinth invasion is facilitated by water bodies that are enriched by agricultural chemicals, sediments from catchment erosion, domestic effluents and plant nutrients.

### **Distribution in Tanzania**

In almost all large water bodies around Lake Victoria, Tanganyika and Nyasa.

### **Impacts**

By shading the water, these plants can deprive native freshwater plants of sunlight and animals of oxygenated water. As the mats decay, there is a sharp increase in nutrient levels in the water, which spark off algal growths that further reduces oxygen levels. *E. crassipes* can disrupt waterbodies in many ways. It clogs waterways preventing river travel, blocks irrigation canals, destroys paddy rice fields and ruins fishing grounds.

### **Management options**

Several biological control agents, notably two weevils (*Neochetina bruchi* and *Neochetina eichhorniae*) have been released against water hyacinth and in many cases have given excellent and sustained control. Several other insects (moths, other beetles, and grasshoppers), mites and fungi (rusts) have been successfully introduced for hyacinth control in various countries.

*Manual and Mechanical removal by cutting the plant and removal is also done to manage Water hyacinth used by individuals and companies*

## The Research and Publication Committee of TAFORI Board of Directors Visits Dodoma, Kibaha and Lushoto Research Centres.

By Dr. Siima Bakengesa

### Introduction

Research and Publication Committee made a visit to selected TAFORI Research Centres of Dodoma, Kibaha and Lushoto. The aim of the visit was to assess the status of research trials recently established through Tanzania Forest Fund (TaFF) support. The Institute had received a total of TZS 180 m to revive research trial plots in 100 ha. The Committee further, ascertained the status of other trials managed by TAFORI. The field visit was conducted from 14<sup>th</sup> to 19<sup>th</sup> March, 2018. Findings which were reported back to TAFORI board of Directors.

### Observation In the field

In Dodoma, the institute has established three trials with 11ha at at Mtumba Secondary School. A trial planted with two eucalyptus clones grown to assess performance for

timber and power transmission poles production, a trial planted with *Gmelina arborea* for timber and poles production in arid and semi-arid lands and a trial planted with *Afzelia quanzensis* to assess growth, survival and performance in relation to age for timber production. The Committee had chance to ascertain on other Research trials managed by Dodoma Research Centre. These were both at Mtumba Secondary School in Dodoma and at Mwanzi Primary school in Manyoni Singida. These are replica trials on different planting technologies (Pit size and spacing) project both supported by TaFF. The trials are planted with 7 species (*Gmelina arborea*, *Vachellia nilotica*, *Trichilia ementica*, Eucalyptus clones, *Afzelia quanzensis*, *Melia azedarach*, and *Acrocarpus flaxinofolius*) with different pit sizes (60X60cm, 50X50cm, 40X40cm, 60X50cm and 30X30cm) and three spacing sizes (2.5x2.5m, 3X3m, and 3.5X3.5m).

At Kibaha Research Centre, the Committee was informed that 23ha have been planted with *Khaya anthotheca* (5ha), *Gmelina arborea* (6ha), *Acacia mangium* (6ha) Eucalyptus (6ha) as planned in Rondo station in Lindi region. The Eucalyptus trial has been planted with 7 clones (GC 785, GC 514, GC 584, GC 940, GC 15, GC167 and GT529). The *Gmelina arborea* and *Khaya anthotheca* trials will involve 4 spacing (2.5x2.5m, 3x3, 2.5x3m and 3.5 x3.5m) while the Eucalyptus clones was planted at 2.5x2.5m spacing. Furthermore, a 3ha piece of land has been prepared at Fipu Kibaha ready for planting 1 ha with 300 Bamboo (*Dendrocalamus giganteus*) seedlings and 2ha planting with 4000 seedlings for *Khaya anthotheca* (2ha) at the onset of rain. The Committee observed these seedlings in the nursery ready for planting. The Bamboo trial (1ha) will involve four weeding treatments (Total weeding, chemical weeding, spot weeding and slashing and 6x6m and 7x7m spacing).

At Lushoto Centre, the Committee observed in the tree nursery a total of 4000 and 9970 seedlings of *C.lusitanica* and *P.patula* for planting in the revival of the trials project. The Committee visited a 3ha site in Magamba which was under preparations for establishing seed orchard. The Committee was further informed that site preparations at Sungwi (3ha) has been completed and is ready for planting before the end of April, 2018. The Committee was informed on other three projects supported by TaFF and was able to visit Fuelwood woodlot managed by Lushoto Prison. The project has positive spillover effects as the excess seedlings were provided to other stakeholders and planted in Kongei Primary schools(2,000 seedlings), Korogwe prison(2000 seedlings) Mlalo prison (1000 seedlings) and District Council (2100 seedlings) and staff (3700 seedlings). The major challenge to this project noted was weed management. Other projects were: mechanism

for Incentives for community conservation of trees, this project promotes community participation in natural forest conservation through in Lushoto. However, the project has faced unnecessarily delay in implementation due to unsatisfactory reporting. The other project was on establishment of seed orchard in collaboration with Southern Highlands Research Centre. The project aims at establishing seed orchards of *Grevillea robusta*, *E. saligna* and *C. lusitanica* in Magamba Nature Reserve. A total of 6,000 seedlings have been raised in Lushoto nursery as planned. However, the project has faced unnecessary delay in project implementation due to delay in reporting, and submission of an unsatisfactory report. The Committee further received briefing on more than ten research trials. The Committee visited an *E.saligna* spacing trial in Lushoto site. In Kwamarukanga, the Committee visited a CAMCORE trial plot of drought resistance clonal nursery facility and Eucalyptus clonal coppicing trial. The Committee noted the high demand for Eucalyptus clones and other tree seedlings.

The Committee also visited the CAMCORE teak trial in Longuza Forest Plantation and visited and noted outstanding performance of introduced Teak provenances.

The Committee was briefed on the Teak International Provenance Trial established in Longuza in 1965. The trial covers an area of 2ha and has 12 provenances replicated in 4 blocks. Over the years, the trial has been the source superior planting materials raised from seeds from the best provenances both locally and internationally. The best provenances have provided planting materials for Longuza, Mtibwa, Kilombero Valley Teak Plantations and other stakeholders.



**Plate 1:** RPC team members at International Provenance trial

However, for several years, an increasing number of trees in the trial have displayed poor performance as indicated by death of crown and eventually falling over. It was noted that such trees when examined, had big heart-rot.



**Plate 2a:** Teak stumps of Teak with Heart rots.



**Plate 2b:** Teak stumps of Teak with Heart rots.

Because of this challenge and that the trial was over 52 years old; a decision was made by TAFORI management in November 2017 to salvage harvesting of one block with 103 trees, leaving three blocks with 430 trees standing. Other criteria for salvage harvesting of the block were declining seed production, a neighboring power line, and that trees falling from the trial were blocking accessibility of the road to nearby villages.

The Committee was further informed and convinced that removal of this trial will have no consequence on the supply of superior teak planting materials in the Tanzania for the several reasons. First, the best materials from International Provenance Trial have been used to establish 10 ha breeding seed orchard in Mtibwa Forest Plantation, and another 20 ha seed source stand has been established at Kihuwi in Longuza Forest Plantation. Also, a 50 ha stand has been set aside within the Longuza Forest Plantation for seed collection. Moreover, TAFORI is establishing a 1 ha stand with 15 families from seed collected from the best performing teak trees from clear-felled block. The seedlings have already been raised and are available for planting before the end of April, 2018. In addition, superior materials from the old trial are included in the 5 ha CAMCORE teak trial that also includes superior provenances from other countries. Based on the above, the Committee therefore recommends that the remaining 3 blocks be harvested and sold to provide funds to support TAFORI activities.

The committee gave very constructive comments to the TAFORI staff on how best to deliver on forestry research. Their recommendations touched on improvement of infrastructure, staff welfare and quality research. The management is very grateful for this visit and looks forward for more field visits.



## Quick Tips for Writing Newsletter Articles

By Geoffrey Njovangwa

The following are the tips for writing an effective newsletter article

1. **Think from an audience perspective**

What do you enjoy reading? Why? Readers want to learn something new that is important and relevant to them. Does the article offer anything new for readers such as information, tips, advice, resources, or benefits? Give readers reasons to read and they will.

2. **Use journalism style of writing**

A well-written article will reflect a news-style of writing. The five W's and H (who, what, where, when, why, and how) should all be contained in an interesting opening statement. The remaining information should be answered in the subsequent paragraphs.

Example: You are writing on the four little rabbits

○ **Who was involved?**

The four little rabbits (the first rabbit, the second rabbit, the third rabbit and the fourth rabbit) and The Big Notorious Tiger (a.k.a. Big T).

○ **What happened?**

Each rabbit constructed a house out of different materials (straw, sticks, papers and bricks). Tiger threatened to blow over their houses and is believed to have destroyed both the straw and stick homes at this time. Rabbit one, two and three were able

to flee to the brick house, where they remain at the moment. We're still waiting to hear from local authorities, but it looks like the Tiger may have been injured while attempting to enter the brick house.

○ **Where did it take place?**

Outside a straw house, a stick house and a brick house.

○ **When did it take place?**

On Wednesday evening.

○ **Why did it happen?**

Apparently the Big Notorious Tiger was trying to eat the rabbits. Several eyewitnesses recall the Tiger taunting the rabbits before he destroyed the straw and stick homes by chanting, "Cute rabbits, cute rabbits, let me in." The rabbits apparently scoffed at the Tiger's idle treats, saying "Not by the hair of our chin, chin chins." It's believed this angered the Tiger and led to him blowing the houses down.

○ **How did it happen?**

It would appear the first two homes were not built to withstand the Tiger's powerful breath. The incident inside the brick house is still being investigated, but early indications suggest the Tiger fell into a boiling pot of water when trying to enter the house through the chimney.

3. **Do your homework**

Research and gather any necessary facts, conduct interviews, survey, find resources, etc.

4. **Use Quotes, Facts, & Statistics**

Use direct quotes from interviews and supplement articles with interesting facts and statistics. This will offer useful information for readers and add credibility to your article.

5. **Writing should be straightforward**

Use simple language and active verbs. Avoid using jargons or expressing personal opinions, except in direct quotes.

6. **Keep it short and concise.**

Be BRIEF - use bullets, lists, short sentences, and lots of paragraphs. Give readers the info they need in the fewest words. That means you can't offer great detail, but you can give people an overview. If the topic is complex, suggest additional resources or offer a contact for more information.

7. **Use images/pictures to support an article**

Choose pictures/images that will enhance your article. Avoid using images for the sake of having one. Always provide the photographer's name and include a caption for each photo. You can also use a maximum of four pictures that will portray what you have written.

8. **Use lively, interesting headlines.**

The purpose of this is to grab readers' attention. Hence avoid headlines that

are too wordy. You can try using an active noun or a verb; offer a benefit, new development, etc.

Ex. 5 quick tips for losing weight; 8 ways to conserve environment; Recycling event raises \$10,000 for 10 days; Environmental workers awarded for collecting papers; Wind power proving to be economical; Climate change linked to heavy rains

9. **Pay attention to copyright issues**

Cite sources and provide references to quotations and facts when used. This will help you avoid the copy writing issues because any information that you have borrowed from a book, paper, magazine or blogs you will have to write down the source as to where you have obtained that information.

10. **Proof read, proof read!**

Nothing is more distracting than an article with spelling mistakes and typos. Have a colleague or friend proof read your draft and always use spell check. This will help you reduce errors from your work because a third eye tend to capture more errors than only using two eyes.

**NB:** It is not necessary to follow all the tips mentioned above; you can even use only 5 tips depending on how effective you want your article to be. Eg: A newsletter article might not have any image but it does not mean that it does not qualify to be a newsletter article.

**Source:**

*nbhub.org and blog.journalistics.com*

## Former Deputy Minister of Natural Resources and Tourism (MNRT) Hon. Hasunga Visits TAFORI.

By Geoffrey Njovangwa

It all happened on August 10<sup>th</sup> 2018 at TAFORI HQ, when it was announced that the Former Deputy Minister of Ministry of Natural Resource and Tourism, Hon. Japhet Hasunga is coming to visit TAFORI and have a sit down with the management for the aim of discussing the institute's performance and noting down all the challenges that TAFORI currently faces.



**Plate 1:** Hon. Japhet Hasunga addressing TAFORI management

The moment he arrived, everybody stood up, and welcomed the Former Deputy Minister of Ministry of Natural Resource and Tourism, Hon. Japhet Hasunga at TAFORI HQ. Then an introduction was done by every management member to Hon Hasunga.

The acting director general of TAFORI, Dr. Revocatus Petro was the key person, whereas in the meeting he gave a brief report on the institute's performance and outlined all the key challenges that being faced by TAFORI. After a brief presentation by the acting director general, Hon. Japhet Hasunga responded to some of the challenges and others were

taken for further review and promised that all the challenges will be worked on but he further congratulated and encouraged the management to continue keeping up the good work that they are doing.



**Plate 2:** Acting Direct General of TAFORI giving a presentation

It was a wonderful experience and an honor to have Hon. Hasunga at TAFORI HQ and the management was very happy and grateful for the meeting that they had with the Former Deputy Minister of Ministry of Natural Resource and Tourism Hon. Japhet Hasunga.

## News in Pictures



The meeting between TAFORI and WWF that took place at TAFORI HQ On 26<sup>th</sup> of September 2018 with the aim of strengthening collaboration in solving forestry challenges



On 19 September 2018, TAFORI welcomed researchers from Ethiopian Environment and Forest Research Institute who were very much interested to know more about the state of the art techniques for tree seed quality improvement used by TAFORI researchers.



The stakeholders' consultations meeting on the review of TAFORI Act No. 5 of 1980. Meeting with TAFORI Board of Directors and TAFORI Management that was held on 26<sup>th</sup> of October 2018 at TAFORI Headquarters Morogoro.



Acting Director General of TAFORI, Dr. Revocatus Petro (the 5<sup>th</sup> person from right) representing Tanzania at Polyphagous Shot Hole Borer (*Euwallaceae nr fornicatus*) Workshop held at the University of Pretoria, South Africa on 27-30 November, 2018.

## Acknowledgements

We wish to acknowledge Tanzania Forest Fund for financial support. Authors for their contribution and editors for their editorial work.

## Announcements

### i) TAFORI Conference halls:

*Looking for a meeting venue? Welcome to TANZANIA FORESTRY RESEARCH INSTITUTE (TAFORI) located at Kingolwira area along Morogoro - Dar e salaam Highway, Morogoro municipality.*



Tanzania Forestry Research Institute has two conference halls, one board room and one study room namely; Evarist Sabas Hall, Ladslaus Nshubemuki Hall, Karanja Murira Board Room and Library Special Room, with capacity of accommodating 150, 15, 30 and 8 people respectively. The full package price per participant, VAT inclusive is Tshs 40,000/=; Tshs 50,000/= and Tshs 5,000/= for Sabas and Nshubemuki Halls; Murira Board Room and Library Special Room respectively. This price package covers the hall facilities, Breakfast, Lunch and evening tea, Note books, Pens, Sweets and two (2) 500ml bottles of Mineral water, Except the Library Special Room has no packages and services like Breakfast, Lunch, evening tea, etc.

Services that can be obtained at a separate price out of full package and as per client's request are:

- Projector: Tshs 50,000/= per day.
- Public address system: Tshs 200,000/= per day.
- Internet service: Tsh 8,000/= per participant per day.

**Hours of operation:**

The Halls and Board room will normally be open for seven days a week and services begin at 8:00 am up to 06:00 pm every day; with the exceptional of Library Special Room that operates only weekdays from 8:00 am to 3:20 pm.

**Contact person:**

**Name:** Mr .Charles Wikes.

**Mobile:** 0715 155 409

**E-mail:** charles.wikes@tafori.or.tz

**Note:** Any Food or drink from outside is strictly not allowed

**ii) Miche Bora Iliyofanyiwa Utafiti**

Taasisi ya Utafiti Wa Misitu Tanzania (TAFORI) inawatangazia wananchi wote upatikanaji wa miche bora iliyofanyiwa utafiti aina mbalimbali kama vile:

- a) Miche ya Makaratusi ya clone inayotoa mavuno ya haraka kuanzia miaka 7.
- b) Miche ya miti ya mbao hasa ya ukanda wa joto.
- c) Miche ya miti ya matunda aina mbalimbali.
- d) Miche ya miti ya kutunza mazingira

Bei zetu ni nafuu sana na bustani inapatikana Maili Kumi, km 15 kutoka Segerea – kama unaelekea Korogwe utaona bango katikati yam situ.

Kwa mawasiliano, piga namba ya simu: **0719 416 969/ 0757 972 389** au tutumie barua pepe: **tafori@tafori.or.tz**