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TAFORI NEWLETTER

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TABLE OF CONTENT

TABLE OF CONTENT 2

VEGETATIVE PROPAGATION OF *MILICIA EXCELSA* AND *KHAYA ANTHOTHECA* INDIGENOUS TREES SPECIES: A POTENTIAL TECHNIQUE FOR PRODUCING PLANTING MATERIALS IN TANZANIA.....3

IMPORTANT BEEKEEPING PLANTS IN KILOSA DISTRICT, TANZANIA 9

AUTOMATION OF LIBLARY SERVICES AT TANZANIA FORESTRY RESEARCH INSTITUTE HEARDQUATERS.....15

THE USE OF PLANT STEAM THERAPY IN FIGHTING AGAINST COVID- 19: A CATALYST IN CONSERVATION OF NATURAL FORESTS IN TANZANIA.....19

"WHEN LOCAL DEMOCRACY MEETS WITH EXPERTISE": A CONTESTED ELECTION OF VILLAGE NATURAL RESOURCES COMMITTEE IN MACHEMBA VILLAGE, TUNDURU DISTRICT, TANZANIA 22

PINE WOODCHIPS: AN EMERGING BUSINESS VENTURE IN URBAN AREAS 26

COMMUNITY INVOLVEMENT IN ON-FARM TREE PLANTING FOR SUSTAINABLE FOREST RESERVES ENHANCEMENT IN HANDENI DISTRICT, TANZANIA.....29

CAN IRON FRAMES BE AN ALTERNATIVE MATERIAL TO MAKE FRAMES OF BEEHIVES IN TANZANIA? 32

TAFORI HOSTS A SUCCESSFUL INTERNATIONAL CONFERENCE ON FOREST AND HONEYBEE PRODUCTS VALUE CHAINS FOR DEVELOPMENT OF SUSTAINABLE LIVELIHOODS AND INDUSTRIAL ECONOMY 35

NEWS IN PICTURES 46

ANNOUNCEMENTS 49

VEGETATIVE PROPAGATION OF *Milicia excelsa* AND *Khaya anthotheca* INDIGENOUS TREES SPECIES: A POTENTIAL TECHNIQUE FOR PRODUCING PLANTING MATERIALS IN TANZANIA

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Introduction

Demand of hardwood from valuable indigenous tree species in Tanzania cannot be underestimated as they have attractive wood properties with multipurpose uses. The indigenous tree species with high social and economic importance are threatened to near extinction. *Khaya anthotheca* and *Milicia excelsa* are among the threatened indigenous tree species due to overexploitation. In addition, to date many people are convinced that indigenous tree species grow slowly and therefore are not suitable as plantation species. Back in the 1890s, forest plantations were establishment in Tanzania in order to supplement wood supplies from natural forests. This was followed by large scale industrial forest plantations establishment between 1920 and 1961. The plantations are dominated by exotic tree species which are fast growing and are easy to manage as their silvicultural protocols were already developed. With the introduction of the fast growing exotic tree species, most of the indigenous tree species have been ignored, and their great potential has been overlooked. Indigenous tree species were thought to grow slowly and not much was known on their establishment and management.

Despite the socio-economic and environmental potentials of indigenous tree species, there has been relatively little attention devoted to their vegetative propagations. The application of vegetative propagation techniques are considered as alternative solution for improving the availability of good quality wood products of indigenous trees. The main advantage of vegetative propagation techniques is that the new plants contain the genetic material of only one parent, so they are essentially clones of the parent plant with the desirable traits. This is

important for commercial tree growers who want to reproduce the highest-quality plants and ensure consistency of a variety of plants.

In this aspect, it is essential that the declining valuable timber tree species needs to be domesticated using vegetative propagation techniques to increase supply of wood product as well as reducing pressure to the natural forests. Thus, Tanzania Forestry Research Institute (TAFORI) conducted a study to examine the vegetative propagation (cutting) potential of *Milicia excelsa* and *Khaya anthotheca* indigenous and valuable tree species at TAFORI Headquarters and Kibaha Lowland Afforestation Research Centre (KLARC) tree nurseries. The research is important to provide information on the initial growth performance of *Milicia excelsa* and *Khaya anthotheca* cuttings for promotion of establishment of plantations using indigenous tree species through vegetative propagation technique.

Procedure for acquiring appropriate planting materials

Collection of propagating materials

Plus trees of *Milicia excelsa* and *Khaya anthotheca* were selected from Morogoro (Kimboza Forest Reserve) and Lindi (Rondo Plantation) of which seedlings were raised for mother plants. The selection of plus trees was based on phenotype/morphology of the tree (e.g. straightness) (Plate 1). Collected seeds were sown at TAFORI HQ and (KLARC) tree nurseries to obtain seedlings for mother block establishment. The mother blocks were the sources of cuttings for production of *K. anthotheca* and *M. Exelsa* plantlets

Plate 1: Selection of plus tree (*Milicia excelsa*) at Kimboza Forest Reserve

Establishment of Milicia excelsa and Khaya anthotheca Mother Blocks

Two tree nurseries were estblished; one at TAFORI HQ and the other at KLARC (Plate 2). After twelve months, cuttings were harvested from these mother plants to obtain seedlings (Plate 3). Mother blocks are the source of cuttings for production of *K. anthotheca* and *M. excelsa* plantlets. The growth of plantlets was assessed at nursery level.

Plate 2: Established Mother blocks for cuttings production at TAFORI HQ and KLARC

Plate 3: Clonal cuttings of *Milicia excelsa* and *Khaya anthotheca* in the tunnels at TAFORI Headquarters Morogoro

Preliminary performance of Milicia excelsa and Khaya anthotheca cuttings

Khaya anthotheca and *Milicia excelsa* cuttings were first harvested from the mother blocks in February 2020. After progressive monitoring, *M. excelsa* cuttings started to sprout after 2 weeks while *K. anthotheca* cuttings sprouted on the 3rd week. After three months, roots of *K. anthotheca* and *M. excelsa* were observed out of the pots implying that the sprouted cuttings have formed adeaquate roots. *Milicia exselsa* formed many roots than that of *K. Anthotheca* (Plate 4). The three-months roots of *M. excelsa* spread all over the root collar while roots of *K. Anthotheca* were few and not normally distributed around the root collar (Plate 5).

Plate 4: *M. excelsa* and *K. anthotheca* cuttings

Plate 5: Roots of *M. excelsa* and *K. anthotheca* cuttings after three months at KLARC

At TAFORI HQ, cuttings from mother plant of one-year-old had good performance where by *M. excelsa* had many roots while *K. anthotheca* had few roots (Plate 6). *M. excelsa* had more roots than *K. anthotheca* (Figure 1) indicating that *M. excelsa* have good performance at field than *K. athotheca.*

Plate 6: Roots of *M. excelsa* and *K. anthotheca* cuttings after three months at TAFORI HQ

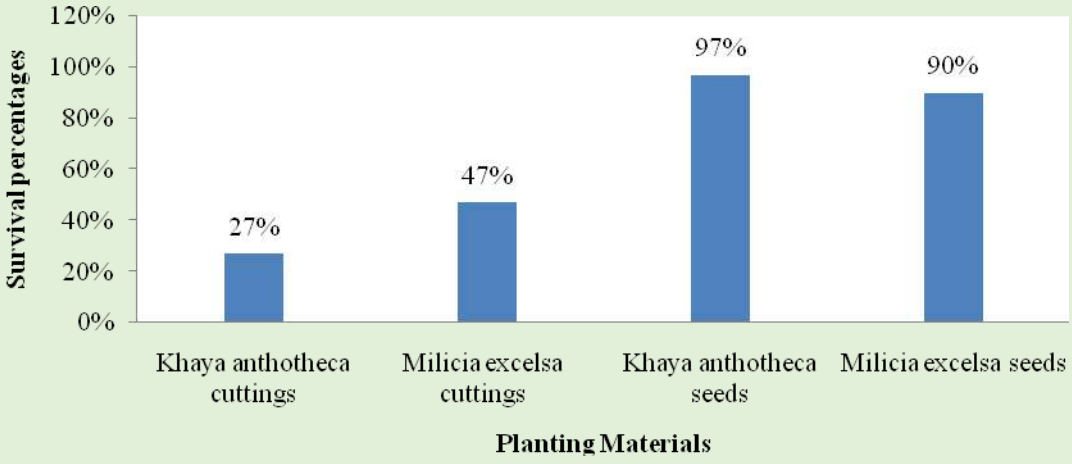

Figure 1: Three months survival rates of the planted cuttings and seeds of *M. excelsa and K. anthotheca*

Conclusion

The preliminary findings at nursery level indicate that cuttings of *M. excelsa* from one year mother block have good performance than *K. Anthotheca* cuttings as *M. excelsa* have large numbers of roots. Thus, *M. excelsa* cuttings are potential planting materials than *K. anthotheca* cuttings. More research is required for *K. anthotheca* cuttings to be able to provide planting material for plantations establishment.

IMPORTANT BEEKEEPING PLANTS IN KILOSA DISTRICT, TANZANIA

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Introduction

Beekeeping is the management of honey bee colonies for pollination of crops and production of bee products. It is an ancient and wide spread profession, whereby, here in Tanzania it is carried out using traditional methods that account for 99% of the total production of honey and beeswax. Approximately 95% of all hives are traditional ones including log and bark hives. In Kilosa District, beekeeping is practiced in areas with extensive forest cover and woodlands. The district lies between latitudes $6^0$00′S and $8^0$00′S and longitudes $36^0$30′E and $37^0$30′E. The district is characterized by a variety of vegetation types which are ecologically important as they provide habitats for many species of mammals, birds and insects. The plants are grouped into five main use categories: nectar and pollen producing plants, plants used for baiting, plants used for honey harvesting, plants used for hive siting and plants used for hive construction.

Nectar and pollen producing plants

In order to survive, prosper and be productive, honeybee colonies must have a supply of both nectar and pollen in adequate quantities. While foraging, they act as agents of pollination and provide a vital service to agriculture. Sixty-one plant species are a source of nectar and pollen for the honeybees in Kilosa District (Table 1).

Table 1: Important bee forage species in Kilosa district

SCIENTIFIC NAME	VERNACULAR NAME	IMPORTANCE
Acacia brevispica	Msega (Kag)	Nectar
Acacia nilotica	Chimwinye (Kag)	Nectar, pollen
Acacia sp.	Mtalula (Sag)	Nectar
Acacia tortilis	Mkungugu/Mwaliganza (Kag)	Nectar, pollen

Afzelia quanzensis	Mkomba (Kag)	Nectar
Adansonia digitata	Mpela (Kag)	Nectar
Albizia anthelmintica	Mgutani (Kag)	Nectar, pollen
Azanza garckeana	Mlundulundu (Sag); Mtoyo (Kag)	Nectar
Bidens pilosa	Pumbwiji (Kag.)	Nectar, pollen
Brachystegia boehmii	Muyombo (Sag)	Nectar
Brachystegia bussei	Msani (Kag); Mtelela Sag)	Nectar
Brachystegia spiciformis	Mtondoro/Mhangala (Kag); Mhani (Sag)	Nectar
Cajanus cajan	Mbaazi (Kisw)	Nectar
Carica papaya	Mpapai (Kisw)	Nectar
Combretum molle	Mulama (Kag)	Nectar
Combretum padoides	Igonantembo (Kag)	Necatr
Combretum schumannii	Mgonankolongo/Mplulu (Kag)	Nectar
Conyza welwitshii	Chisongati (Kag)	Pollen
Cyphostemma sp.	Lwenjeloo (Sag)	Nectar, pollen
Dalbergia melanoxylon	Mpingo (Kisw)	Nectar
Deinbolia borbonica	Msurupi (Saga)	Nectar
Dichrostachys cinerea	Mchenjeza (Sag)	Nectar
Diplorynchus condylocarpon	Mtogo (Sag)	Nectar
Dombeya acutangula	Msinavachi (Sag)	Nectar, pollen
Dombeya kirkii	Msagusa (Kag)	Nectar, pollen
Dombeya rotundifolia	Mlwati (Kag)	Nectar
Dombeya taylorii	Mtowo (Sag)	Nectar
Duosperma crenatum	Ngelula (Kag); Mgelulwa (Sag)	Nectar
Eleusine carocana	Uwele (Kisw)	Pollen

Erythrina abyssinica	Mhemi (Sag)	Nectar
Eucalyptus spp	Mikaratusi (Kisw)	Nectar, pollen
Euphorbia tirucalli	Minyaa (Kisw)	Propolis
Ficus sycomorus	Mkuyu (Kisw)	Pollen, propolis
Flueggea virrosa	Mkwambe (Sag)	Nectar
Glycine wightii	Funa (Sag)	Nectar, pollen
Grevillea robusta	Mgrivea (Swa)	Nectar
Helianthus annuus	Alizeti (Kisw)	Nectar, pollen
Ipomea kituensis	Mahata (Kag)	Nectar
Julbernardia globiflora	Mpiniti (Sag)	Nectar
Lannea schweinfurthii	Chuwasi (Kamb); Mumbu (Kag)	Nectar
Leucas tettensis	Nungalulongo (Kag)	Nectar
Lonchocarpus bussei	Mkunguga (Sag)	Nectar, pollen
Maerua angolensis	Mtozi (Sag)	Nectar
Mangifera indica	Mwembe (Kisw)	Nectar
Margaritaria discoidea	Msakalung'wale (Sag)	Nectar
Moringa oleifera	Mlonge (Kisw)	Nectar
Musa paradisiaca	Mgomba (Kisw)	Nectar
Percopsis angolensis	Mmanga (Sag)	Nectar, pollen
Piliostigma thonningii	Msegesi (Sag)	Nectar
Salacia madagascariensis	Mweleka (Kag)	Nectar
Schinus molle	Mpilipili (Kisw)	Nectar
Senna singuena	Mkisingwi (Kag)	Nectar
Sorghum bicolor	Mtama (Kisw)	Pollen
Tamarindus indica	Msisi (Sag)	Nectar

Thylachium africanum	Mdudu (Kag)	Nectar
Trichilia emetica	Msukulilo (Sag)	Nectar
Triumfeta sp.	Mkole (Sag)	Pollen
Tylosema fassoglensis	Mbia (Sag)	Nectar, pollen
Vernonia glabra	Itugutu (Kag); Itukutu (Sag)	Nectar , pollen
Vitex doniana	Mfuru (Kisw)	Nectar
Zea mays	Mahindi (Kisw)	Pollen

Key: Kag = Kaguru; Kisw = Kiswahili; Sag = Sagara

Plants used for hive baiting

Apart from beeswax, beekeepers also use plants to bait their beehives. Beekeepers select trees that bear flowers to attract wild swarms. That means they know what type of plants can be used for attracting bees. Plants which are commonly used as hive bait are *Ocimum kilimandischaricum, Duosperma crenatum and Schinus molle*. Plants used for baiting are characterized by sweet scents that attract bees. They are used when beeswax is not available especially when honey is sold crude. Parts of the plants which are mostly used by beekeepers are leaves. Fresh leaves are crushed and smeared in the hive and when dry leaves are used, they are burnt and smoked into the hive.

Plants used in honey harvesting

Since bees are vicious, beekeepers in different parts of the world have developed a mechanism of calming them. Plants that are commonly used range from herbs to trees (Table 2).

Table 2: Plants used in honey harvesting

Scientific name	Vernacular name	Part used
Aspilia pluriseta	Vifasa (Kag)	Stem
Euphorbia bussei	Mnangali (Kag)	Stem
Ficus sycomorus	Mkuyu (Kisw)	Stem, twigs

Helianthus annuus	Alizeti (Kisw)	Stem
Musa paradisiaca	Mgomba (Kisw)	Leaf midrib
Ricinus communis	Nyonyo (Kisw)	Stem
Sorghum bicolor	Mtama (Kisw)	Stem
Vernonia glabra	Itugutu (Kag); Itukutu (Sag)	Stem
Xerophyta spekei	Isheyu (Kag)	Stem

Plant parts which are used are stems/twigs and to a lesser extent the leaves. Stems/twigs are chopped, tied together lit and used as a bee smoker. Plants which are selected are those which can produce heavy smoke for a long period during the operation. However, the heavy smoke produced may be a source of contamination in honey.

Tree species used for hive siting

Beekeepers in Kilosa District prefer to site their hives on *Adansonia digitata*, *Brachystegia spiciformis*, *Erythrina abyssinica*, *Dombeya rotundofolia* and *Julbernardia globiflora* for the following reasons: *Adansonia digitata* is preferred because it has strong and many branches which can accommodate many beehives. *B. spiciformis* and *J. globiflora* also are strong and have good canopy which provide shade and fodder for the honeybees. *Erythrina abyssinica* is preferred due to its thick spreading branches which can withstand the load. The tree is also thorny and thus discourages pests such as honey badger. *Dombeya rotundifolia* is preferred because it regularly attracts bees though it can accommodate few beehives.

Trees species used for hive construction

Seventeen tree species are used for hive construction preferred due to their durability, non-odour production which could either repel honeybees or add unacceptable odours to honey. Other features include: resistant to rotting, termite resistant, warp-proof and lightness, hence easy to lift during beekeeping operations. For instance, hives made from a sausage tree (*Kigelia africana*) may last for over 40 years. The frame hives made from Cypress or Pine timber last for about 10 to 15 years while log hives can stay up to 50 years.

Table 3: Tree species preferred for hive construction

Scientific name	Vernacular name	Hive type

Acacia polyacantha	Muwindi (Kag); Mkambaa (Sag)	Log
Acacia tortilis	Mkungugu/Mwaliganza (Kag)	Log
Afzelia quanzensis	Mkomba (Kag)	Log
Albizia adianthifolia	Mkalala (Sag)	Log
Albizia amara	Mhogolo (Kag)	Log
Albizia gummifera	Mkenge (Kag)	Log
Bersama abyssinica	Mtanga (Sag)	Log
Bombax rhodognaphagon	Msufi pori (Kisw)	Log
Brachystegia bussei	Msani (Kag); Mtelela Sag)	Log, bark
Cussonia holstii	Idondo (Kag)	Log
Deinbolia borbonica	Msurupi (Saga)	Log
Ficus sycomorus	Mkuyu (Kisw)	Log
Kigelia africana	Mwegeya (Kag)	Log
Pterocarpus angolensis	Mninga (Kisw)	Log
Schinus molle	Mpilipili (Kisw)	Log
Sterculia appendiculata	Mgude (Sag)	Log
Sterculia quinqueloba	Mhembeti/Mlenya (Sag)	Log

Conclusion and way forward

This article highlighted important bee plants in Kilosa District grouped into five groups namely nectar and pollen producing plants, plants for hive baiting, plants used for honey harvesting, trees used for hive construction and trees used for hive siting. It is recommended that studies on the chemical composition and effects of bee plants used as fuel for calming bees be studied. Furthermore, studies on the phenology, nectar quantity and quality of bee fodder plants are also suggested. Therefore, known plants with high yields of nectar and pollen will be encouraged to be incorporated in farms so as to increase bee products and agricultural crops.

AUTOMATION OF LIBLARY SERVICES AT TANZANIA FORESTRY RESEARCH INSTITUTE HEARDQUATERS

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Introduction

The wide spread use of computer and communication technologies, which are referred to as information and communication technology (lCT) have affected almost all aspects of human life including library. Libraries have been looking forward for better technologies even before the onset of the computers. Now in the information era, in order to avoid obsolescence of information, Tanzania Forestry Research Institute (TAFORI) library and ICT staff are applying advanced technologies to enable users to get the right information at the right time. In order to achieve this objective, TAFORI library has started service automation of material (Proceedings, newsletters, technical reports, journals, books, book chapters, policy briefs, research guidelines, and annual reports) whereas integrated library automation package is being utilized. The utilized library automation package is called Koha software which is hosted by Tanzania Commission for Science and Technology (COSTECH).

Automation Process

Automation of TAFORI library using Koha software was supported by COSTECH as an effort to increasing the effectiveness in managing research information that is housed in these research institutions including TAFORI. The Koha software was originally built up and developed in New Zealand. The Integrated Library Software Solution was first deployed in January, 2000 for Horowhenua Library Trust. Since then, with the successful installation and implementation, the software solution has become popular and has been adopted by thousands of libraries worldwide.

How Koha software operates:

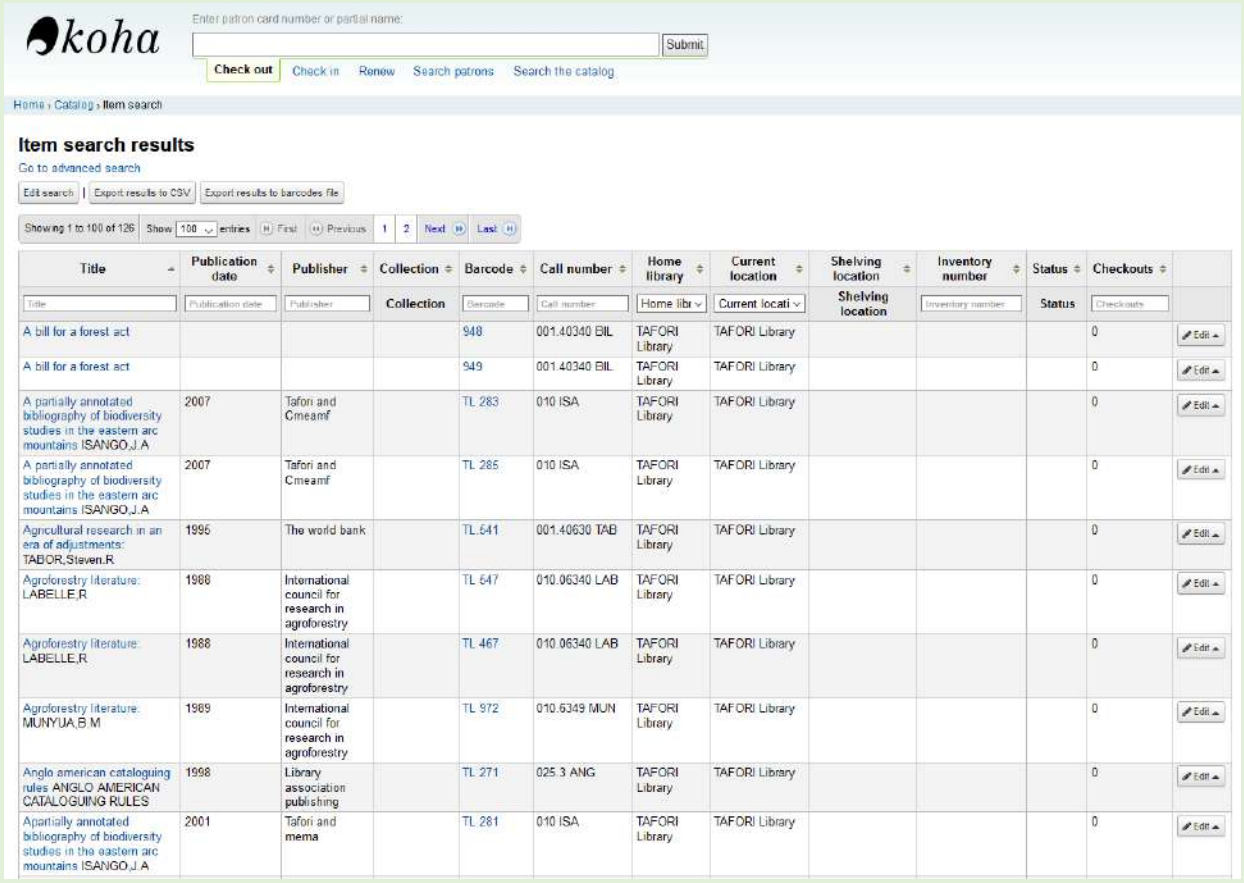
Koha has a login page as shown in plate 1.

Plate 1: Login page of Koha

The login page allows librarian to update the books information that are currently stored in Koha software and among other useful operations like user management, displaying of reports can also be performed after logging in to Koha software. Other features are described as follows:

- **Acquisitions:** In Koha software there is an acquisition module that offers functions like recommendation, ordering, receiving, invoicing, budgeting, book funding, setting suppliers and exchange rates.
- **Circulation:** This is another feature of Koha, it includes customized circulation rules that suit any kind of library; it also has a fully automated mechanism of borrowing and management of library items.
- **Online Public Access Catalogue (OPAC):** This feature found in Kohaacts as an online gateway to library's collection with a simple and clear interface. Meaning that, it facilitates the searching and retrieval of item materials information that are found in the library.
- **Flexible reporting:** This is another feature of Kohathatprovides access to the Relational Database Management System (RDBMS), so that reports can be easily customized and prepared as per the individual needs.
- **Metadata:** Koha has a potential to generate a qualitative metadata. This feature offers the use of a full text indexing engine that allows a speedy and authoritative searching of metadata as shown on plate 2.

- **Automated overdue notices:** This is another key feature that Koha offers. It facilitates the sending of email or Short Message Service (SMS) ofoverdue notices to users who have borrowed books from the library and over stayed with these books past the allowed time that was agreed upon.



Title	Publication date	Publisher	Collection	Barcode	Call number	Home library	Current location	Shelving location	Inventory number	Status	Checkouts	
A bill for a forest act				948	001.40340 BIL	TAFORI Library	TAFORI Library				0	Edit
A bill for a forest act				949	001.40340 BIL	TAFORI Library	TAFORI Library				0	Edit
A partially annotated bibliography of biodiversity studies in the eastern arc mountains ISANGO,J.A	2007	Tafori and Cmeamf		TL 283	010 ISA	TAFORI Library	TAFORI Library				0	Edit
A partially annotated bibliography of biodiversity studies in the eastern arc mountains ISANGO,J.A	2007	Tafori and Cmeamf		TL 285	010 ISA	TAFORI Library	TAFORI Library				0	Edit
Agricultural research in an era of adjustments: TABOR,Steven.R	1995	The world bank		TL 641	001.40630 TAB	TAFORI Library	TAFORI Library				0	Edit
Agroforestry literature: LABELLE,R	1988	International council for research in agroforestry		TL 647	010.06340 LAB	TAFORI Library	TAFORI Library				0	Edit
Agroforestry literature: LABELLE,R	1988	International council for research in agroforestry		TL 467	010.06340 LAB	TAFORI Library	TAFORI Library				0	Edit
Agroforestry literature: MUNYUA,B.M	1989	International council for research in agroforestry		TL 972	010.6349 MUN	TAFORI Library	TAFORI Library				0	Edit
Anglo american cataloguing rules ANGLO AMERICAN CATALOGUING RULES	1998	Library association publishing		TL 271	025.3 ANG	TAFORI Library	TAFORI Library				0	Edit
Apartially annotated bibliography of biodiversity studies in the eastern arc mountains ISANGO,J.A	2001	Tafori and mema		TL 281	010 ISA	TAFORI Library	TAFORI Library				0	Edit

Plate 2: Books information on Forestry stored in Koha software

Advantages of Koha at TAFORI Library

Much of the works involved in library are repetitive, tedious, and mechanical in nature requiring accurate updating of records in files. The same bibliographic record in a library is used to perform multiple operations. Each operation may concern with individual copies of a title. A bibliographic record created at the time of ordering a document is first used for its acquisition, then for technical processing and subsequently for library OPAC, circulation, binding, etc. Hence, the Koha advantages are as follows:

- The automation has permitted decentralized access to a bibliographic record by multiple users as shown on plate 2. A staff member in a TAFORI library at any centre can now verify the status of an order without maintaining duplicate files or without making an

enquiry. Users can also check to see if a book is out on loan or available. The application of information technology in TAFORI library has resulted in increased operational efficiency. It has ensured ease of functioning, accuracy and economy in human labour with greater speed;

- The library staff, especially the younger ones, finds use of computers interesting and exciting. Use of computers at TAFORI library has motivated all the library staff members and they are now enjoying their work more than before;
- The introduction of Koha has increased productivity of TAFORI library staff. It has relieved professional staff from clerical chores and now they are fruitfully used for user-oriented library services;
- The introduction of Koha has also improved the quality of services rendered by the TAFORI library;
- The introduction of Koha has provided room forTAFORI Library users to easily track library facilities online; and
- The introduction of Koha has promoted TAFORI Library facilities to other research institutions in Tanzania.

Conclusion and way forward

Koha is productive library software and this can be clearly seen from a number of advantages that it has brought to TAFORI library. Introduction of Koha at TAFORI, has attracted more users for the financial year 2020/2021 (average of 54 users) to the library compared to the previous financial year 2018/2019 (average of 24 users) when the library had no automated system (Koha) in place. It is emphasized that for more optimal results from Koha, it should be well maintained and kept up to date with current information that is to be entered on regular basis. Last but not least, is the acknowledgement to COSTECH for this state of the art software and to TAFORI management for granting permission to TAFORI library staff to adopt Koha for institutional uses. Furthermore, this should also be a wake up call to other institutions with libraries, to adopt Koha for more effectiveness of their libraries.

THE USE OF PLANT STEAM THERAPY IN FIGHTING AGAINST COVID- 19: A CATALYST IN CONSERVATION OF NATURAL FORESTS IN TANZANIA

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Introduction

Corona virus Disease of 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) affecting many countries globally. It was first identified in December 2019 in Wuhan, China, and has since spread globally including Tanzania, resulting in an ongoing pandemic. The disease spreads through small droplets from the nose or mouth, which are expelled when a person with COVID-19 coughs, sneezes, or speaks. Other people can get the virus if breathe in these droplets from a person infected with the virus or touching objects or surfaces where droplets with virus landed on, and then touching their eyes, nose or mouth.

As the spread of the diseases is very fast across the globe, nobody is neither certain nor confident of his/her safety. Due to this pandemic, social, audio-visual, electronic and printable media are flooded with messages educating people about social distancing, cleaning hands with running water and soap or alcohol-based hand rub (sanitizer), and wearing mask in public, and staying at home. Generally, life style of all people (being a rich or poor, white or black, celebrity or ordinary, officer or farmer, land lords or tenants) had changed all over sadden; borders of many countries were closed, no international flights, no football leagues, no parting, and even some worshiping houses were closed.

Fighting against COVID - 19 using plants for steam therapy

Immediately after the disease being discovered, there was neither cure nor vaccine. As the result, some people had attempted to use alternative remedies. For instance, in Tanzania, some people had started to use steam therapy; inhaling a steam of boiled plant leaves.

Proponents of the treatment claimed that a heat from the steam plus chemicals produced by plant leaves can kill the virus within the body of infected person; being in mouth, nose, throat or lungs. They further claimed that such treatment is traditional and it has been practiced by many ethnic groups for remedy of several diseases, including respiratory diseases (e.g. cold). The steam therapy is known as *Fukiza* in Swahili, *Nyungu* in Zaramo, and K*uyovechela* in Ngoni to mention a few.

The practice had become popular following a speech of the President of the United Republic of Tanzania, the late Hon. Dr. John Pombe Magufuli on 22nd April, 2020. In his speech to the nation he argued Tanzanians to try using traditional ways of treating respiratory diseases, including steam therapy. On30th April 2020, the former Minister of President's Office Regional Administration and Local Government (PORALG), Hon. Selemani Said Jaffo (MP) proposed to have a "Steam Therapy Week" (Wiki ya Nyungu). Since then, a hot debate emerged in social media on which plant species are suitable for steam therapy. Consequently, plants which have been used by different tribes for remedy of respiratory diseases were mentioned. These include *Eucalyptus* spp, *Ocimum suave* (Mzumbasha), *Venonia losiopus* (Mhasha), *Asparagus aspargoides* (Shangamzinga), *Plectranthus barbatus* (Mzughwa), *Lantana camara* (Mvuti), *Vangueria tomentosa* (Mvilu), *Rhus natalensis* (Mhunguu), *Zehneria scabra* (Fuiza), *Psidium guajava* (Mpera), *Drymaria cordata* (Ugwiashighi), *Senecio syringifolia* (Ulenge), *Trimeria grandfolia*, *Conyza newii* (Ikowe), *Clerodebdrum johnstonii* (Luli), *Clausena anisata*, and *Zanthoxylum chalybeum*. Some of these plant species have been approved by the Institute of Traditional Medicine (ITM) of Muhimbili University of Health and Allied Sciences (MUHAS) as well as the National Institute for Medical Research (NIMR) for steam therapy.

Threats to forests hosting plants used for steam therapy

Tanzania has over 10,000 plant species of which some are used as remedy for various diseases, including COVID - 19. Unfortunate, we have not given plants a due respect by investing significantly in forest protection. Every day, forests are degraded and deforested for various reasons, some of which are avoidable. For instance, some people are burning forests for hunting of small mammals (e.g. Giant rats - Ndezi) or determining a life span. For such reasons, about 150,000 Ha of forests are burnt every year. Other threats include wood fuel production, and shifting cultivation, to mention a few. Wood fuel production encompasses firewood and charcoal production, which altogether account for >85% of primary energy

supply. Charcoal production contributes to an average annual deforestation of about 100,000–125,000 hectares. It is estimated that annual wood needed for charcoal production is 30 million cubic meters, and more than 160,000 charcoal kilns are operated each year (equivalent to 438 per day). A demand of charcoal is very high in cities and towns. For instance, Dar es Salaam with population of more than 6 million people consumes about 985,585.5 bags of charcoal per month, which is more than 50% of all charcoal produced.

Firewood for tobacco curing has also detrimental effects; one hectare of Miombo woodlands is needed to obtain firewood to cure 0.45 tons of tobacco. Shifting cultivation contributes significantly to deforestation. It occupies 7.6% of the total country land area and 33% of area categorized as woodlands. Generally, deforestation (i.e. conversion of forest to other land uses) in Tanzania is increasing at an alarming rate. The annual rate of deforestation has been reported to increase annually. For instance, in 1998 annual rate of deforestation was reported to be 150,000 ha while in 2015 was 372,816 ha and in 2018 was 469,420 ha. Deforestation and forest degradation are posing threatens on availability of the plant species for remedy of various infectious diseases. Therefore, multiple uses of forests should be observed in a wider spectrum in order to ensure its sustainability, otherwise the country may fall in a short of a certain plant species for remedy of diseases like COVID-19 pandemic. Such a short fall may also affect communities who depend on forest resources for their livelihood as source of cash income and medicine.

Conclusion and way forward

Tanzania has over 10,000 different plant species found in forests and woodlands for various uses. Some of the plant species are those used in steam therapy against COVID-19. These forests we have inherited from our forefathers. But what if our forefathers could have decided to cut down all trees and leave us a desert? Could it be possible to import plants for steam therapy for everyone? How much could cost the Government to meet the demand? It is a right time to use the COVID-19 pandemic and other disasters to learn how to take care of plants and thus to protect forests. This is due to the fact that our actions have begun to cause the disappearance or decline of some plant species. Of all plant species we have, 305 are threatened as according to the IUCN Red List, with 276 species classified as Endangered. We call on foresters and conservationists to educate the community about the importance of forest conservation by citing examples of the use of plants as remedy for COVID-19.

"WHEN LOCAL DEMOCRACY MEETS WITH EXPERTISE": A CONTESTED ELECTION OF VILLAGE NATURAL RESOURCES COMMITTEE IN MACHEMBA VILLAGE, TUNDURU DISTRICT, TANZANIA

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Introduction

The year 1998 will remain in a history of forest management in Tanzania. It was the year when forest policy recognized the role and importance of forest adjacent communities in the forest management. The policy introduced a concept of Participatory Forest Management (PFM). The concept is a combination of two participatory approaches; Community-based Forest Management (CBFM) and Joint Forest Management (JFM). The CBFM refers to a forest management approach whereby village governments obtain tenure and management rights over forests on village land, which allows them to declare Village, Group (Community) or Private Forest Reserves. Its overarching goal is to secure unreserved forests on village lands through granting authority to village governments to establish forest reserves; it can be: 1) Village Land Forest Reserves (VLFRs), 2) Community Forest Reserves (CFRs), and 3) Private Forest Reserves (PFRs).

Although the CBFM is designed to be implemented at village level where there is relative higher number of people who are illiterate and innumerate, it is framed based on principles of scientific forestry. This is manifested in the preparation and implementation of a Forest Management Plan (FMP). Consequently, foresters have been using limited resources to train members of Village Natural Resources Committee (VNRC) on various aspects of forest management. Several scholars have shown how such framing potentially contradicts with PFM policy goal of improving forest governance (e.g. participation). This article discusses how a requirement of "expertise" is hindering local democracy, which resulting into conflicts. The article is using an example of contested VNRC election of 2017 in Machemba Village, Tunduru District, Southern Tanzania.

Establishment of Machemba Village Land Forest Reserve

On 5th March, 2014, Machemba village held its first democratic election to elect 12 VNRC members through Village Assembly. Each of nine sub villages was allowed to elect one representative with exception of three sub villages that elected two representatives; male and female. Election considered gender, age and education. On education, the emphasis was literacy and numeracy with assumption that they are trainable. VNRC members then elected Chairman, Secretary, Accountant and First-Aider among themselves. Thereafter, they were trained on demarcation and assessment of forest resources. They were also actively involved, together with professional foresters as facilitators, in demarcation of the VLFR, forest resources assessment, and preparation of provisional Forest Management Plan (FMP), which was presented and approved in the Village Assembly held on 6thMarch 2015. The VLFR was officially declared by Full Council of Tunduru District on 13th May 2015. The plan was for five years, i.e. from 2015 to 2019, and it contained general information on the forest, harvesting plan and forest bylaws. Declaration of VLFR paved the way for VNRC to start forest management activities as prescribed in the FMP.

Implementation of the Forest Management Plan

Implementation of the FMP was preceded by: Firstly, election of a patrol commander among ordinary villagers who has graduated "Mgambo" training for coordinating forest patrols. Secondly, election of three villagers with at least secondary education to form harvesting supervision committee that is responsible to supervise all harvesting operations of forest products (mainly timber) in the VLFR. Thirdly, election of a villager with at least secondary education to serve as statistician. All elected members were trained on respective responsibilities and became VNRC members.

The implementation of forest management activities effectively started in July 2016. By May 2017, the committee had carried out more than 70 forest patrols; both ordinary and bird patrols[1] (bird monitoring). On the same period, the committee supervised two timber harvesting operations.

[1]The bird patrol is carried out in the protection zone of the forest once per month to monitor the frequency of three bird species of particular interest namely Crested Guineafowl (*Guttera pucherani*), African Broadbill (*Smithornis capensis*), and the Dark-backed Weaver (*Ploceus bicolor*) perceived as indicator species for good forest quality. The patrol is carried out to fulfill the requirement of Forest Stewardship Council (FSC) certification.

Contested Village Natural Resources Committee election in 2017

Election of the VNRC in Machemba is guided by Forest bylaws, in particular, section 7 (Implementation procedure), sub section III, which states that: *"…..the Committee shall hold office for a period of three (3) years. The VNRC has come into effect on 13/04/2014. At least half of the members who have done well during the three-year period remain on the committee to give experience to the newly elected members*". To comply with the bylaws, the first week of May 2017, a Village Executive Officer (VEO) convened Village Assembly meeting to elect new members of the VNRC. In that assembly, VEO reminded villagers about requirement of the bylaw by reading sub section III of section 7 but villagers disagreed. Instead, they started shouting: "*We don't want them; we need to elect new ones*".

Villagers alleged VNRC members for mishandling their resources. They cited examples of fund, motorbikes and even uniforms (green combat and boot). For instance, one village was heard alleging top VNRC members to use a motorbike bought by VNRC for personal use. Although there was no concrete evidence provided at the assembly to prove such allegations, they still rejected to retain some members. Others brought an issue of local democracy by saying that they have democratic right to choose their leaders. And if new leaders must be trained, they are willing to contribute money to pay trainers, a proposal which was supported by the majority.

Realizing that the plan to retain some members based on their expertise was impossible, VEO allowed election to proceed for each sub village to elect representatives. New VNRC members were elected. VEO prepared an election report with a list of members and submitted to District Council.

A decision of the villagers to elect new members by 100% was not warmly welcomed by CBFM facilitators for the ground that it was against forest bylaws and CBFM best practices. They instructed VEO to convene special meeting to settle the matter, which was convened on 15th May 2017 (Plate 1). In the meeting, facilitators explained importance of retaining some VNRC members. Unfortunately, villagers replied by telling facilitators that: "*If you want them, find your forest that they will manage, but not ours*. The meeting was closed but a mission to reinstall some VNRC members failed over local democracy. When I last reached

out to the people in Machemba in early May 2020, I was told that the village used its own fund to train new members of VNRC.

Plate 1: Villagers in Machemba Village attended Special Meeting held on 15 May 2020

Concussion and way forward

It is not the intention of this article to criticize, rather to create awareness on how the need to maintain expertise at village level contradicts with efforts of improving local democracy (governance). The article indicates that justification of retaining some VNRC members is to maintain expertise. Such situation not only undermine local democracy; it is also promoting elite capture of which few villagers who were received training continuing to hold positions in VNRC. It is therefore recommended that while expertise is given an upper hand in CBFM, we should consider local democracy as pre-requisite for sustainability of CBFM forests. Therefore, it is high time now to re-think the best way of sustaining support to CBFM villages, especially on technical and financial aspects to capacitate local institutions.

PINE WOODCHIPS: AN EMERGING BUSINESS VENTURE IN URBAN AREAS

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Introduction

The ban on the use of plastic carrier bags, popular known as "*Mifuko ya Rambo*" that was effected from 1st June 2019, has brought great sadness to many low-income Tanzanians. The ban has undoubtedly improved the general cleanliness of many towns and cities and is expected to reduce harzards caused by plastic load in the environment. The bags were used for various purposes including carrying in of groceries and other items from stores, markets and hardwares. Shopkeepers used the bags to store goods for their customers. Traders selling cereals, vegetables and fruits in the market used the bags for keeping purchased goods. Food vendors for making takeaway for their customers even though it was against health regulations also used the bags. Some households used the plastic bags for igniting charcoal as an alternative to kerosene. So, it was more than just bags, but igniters. This was due to high price of kerosene of which most people could not afford. Therefore, the ban not only affected its intended use, but also the alternative use. It also affected a large group of young people who had been engaged in selling the bags in markets for a long time.

While alternative for plastic carrier bags has been made available for carrying items, the same is true for the igniters. The advent of woodchips has brought great relief for majority of communities for igniting wood fuel like charcoal and firewood. Woodchips are most popular in the Southern highlands (i.e. in Mbeya, Iringa, Njombe and Rukwa regions) whereby women are seen in local markets selling them. However, it has rapidly become a popular venture in the urban of Dar es Salaam, Morogoro, Pwani, Iringa, Mwanza and Tanga. The price of well packaged woodchips is around TZS 500 - 1,000 per bunch of 150 grams. Woodchips, "*viwashia moto*" in Swahili, are indeed among the wood products, usually small to medium sized pieces formed by cutting or chipping wood tree stems, branches, logging

residues, stumps, roots, and wood waste. Woodchips are normally produced from trees with high resin level, mostly preferred are the Pinus species.

This article presents findings of which authors took opportunity to study about the woodchips. Discussion in this article is based on the following aspects: tree species mostly preferred for production of wood chips; places where raw materials are collected; how woodchips are processed and marketed; legality of the business.

Tree species used to produce wood chips

From the horse mouth of some vendors at Kibaha Town revealed that pine species are used for production of woodchips. After investigation, it was found that, *Pinus caribaea* is the one mostly used at Kibaha since the species in mostly found in lowlands. This pine species has gained popularity in production of woodchips apart from other well known uses as windbreaks, land rehabilitation, pulpwood, wood fuel and timber. The previously thought hindering factors for charcoal production has become advantageous since the high amount of resin as combustible liquid and its tendency to produce sparks makes the species good fire igniter. Other Pinus species suitable for woodchips production for fire ignition include *Pinus patula,* and *P. elliotii.*

Sources of raw materials

The raw materials for production of woodchips are collected from government plantations and individual woodlots as leftovers such as stumps, branches and roots. At Kibaha, they are mainly collected from old TAFORI research trial plots, which were previously within the North Ruvu Forest Plantation and individual woodlots out of the forest. It was also noticed that, some woodchips are obtained in the Southern highlands particularly in the following areas Mafinga, Njombe, Mbeya and Rukwa.

Processing and marketing of woodchips

After collection, the stumps, branches or roots are processed to woodchips (Plate 1) by collectors and packed in bags of 25 or 50 kilogrammes ready for transportation to the market. Vendors at the market repack the woodchips into small quantity of 10 – 25 pieces of woodchips equivalent to 150 grams per package and sell at TZS 500 – 1000 (Plate 2). The sale of woodchips in urban markets has blossomed and received well by majority of users;

vendors have stated that the venture serves as source of income thus improving their livelihoods.

Plate 1: Woodchips in processing

Plate 2: Woodchips arranged in bunches ready for sale

Legality of the business

Interviews with staff working in forest plantations considered harvesting of stumps for production of woodchips as illegal because during the cause of collection, one may illegally harvest live trees for production of woodchips or other products. The interview further revealed that woodchips are not mentioned in the National Forest Regulations of 2004 as among the forest products or part of the forest products like value added firewood, therefore, are not taxed, thus calling for inclusion in the regulation. However, demand of the product is relatively high at the market in such a way that numbers of processors is increasing day to day. This indicates that the product has reliable market and the business could be profitable.

Conclusion and way forward

Although woodchips from *P. caribaea* and other pine species have been potential for production of '*viwashia moto'*, the trade has left government officials in puzzle on how to quantify and include it to the government revenue. This article has unmasked the true potential of woodchip by addressing its demand and market value. Woodchips are recommended to be categorised as among the value added wood products that could be another source of revenue to the government in order to maximize utilization of the tree and thus the government revenues. Despite of its potential, there is a need to create awareness on conservation principles to communities engaged on collection of woodchips materials to avoid harvesting live trees.

COMMUNITY INVOLVEMENT IN ON-FARM TREE PLANTING FOR SUSTAINABLE FOREST RESERVES ENHANCEMENT IN HANDENI DISTRICT, TANZANIA

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Introduction

Tanzania is among the countries with forests and woodlands cover in the world. It is estimated that more than 55 % of the total land of the United Republic of Tanzania has about 48.1 hectares millions of forests. About 16 million hectares of forested areas have been gazetted as forest reserves. Tanzania is facing unprecedented deforestation of about 469,000 hectares per year. The total loss is estimated to be 19.4% of the forest cover and the extent of deforestation differs from one ecosystem or forest type to another. The current rate of deforestation and degradation shows higher number of distorted forests.

On the other hand, Tanzania forests are at risk due to the highly dependence of community on wood products. For example, wood remains are the main source of fuel for Tanzanians in rural and urban areas. Trees are felled for firewood or turned into charcoal. Subsequently, there is use of forests for other social-economic purposes including timber and Non-Timber Forest Products such as medicine, tannins, vegetable, oils, ect. Several measures have been taken in order to conserve forests in Tanzania. One among the measures on restoring Tanzania forests is to involve local community in on-farm tree planting so as to decrease the forest wood resources dependence. The government and other stakeholders have put efforts to embolden the local people expecting to cater their need for wood resources from forests to engage effectively on protecting and preserving the nature forest reserves. Therefore, this article concentrates on involvement of community in on-farm forestry for enhancing sustainable forest reserves in Handeni District, Tanzania.

Community involvement in on-farm forestry

Community participation in forest management has been perceived as a crucial tool to enforce reciprocal-based knowledge on empowering local people to have alternative ways for the source of energy and align on community-based effort to protect and preserve the forests. Local people in Handeni District were trained on tree nursery establishment and tree planting techniques as among the measures to combat forest degradation in Tanzania. Tree planting and nursery establishment trainings were conducted in Muungano village where 60 participants were involved in this training for Kwamatuku and Muungano villages. In each village, local communities were trained on the recommended soil mixture, potting and seed sowing. Local communities were also trained on routine tree nursery care (Plate 1).

Plate 1: Project team leader teaching participants daily tree nursery care in Muungano B village

The training was tailored based on community needs to the surrounding forests in Handeni District. A total of 1070 tree seedlings were raised and distributed to local community and schools for planting. The tree seedlings were planted to surrounding compounds. The seedlings were of five different tree species namely; *Kaya anthotheka*, *Cedrela odorata*, Senna *siamea, Azadirachta indica and Tectona grandis* (Table 1)

Table 1: Seedlings raised in Handeni District

SN	Scientific name	Vernacular name	Number of seedlings raised
1	*Kaya anthotheka*	Mkangazi	2000
2	*Cedrela odorata*		2500
3	*Senna siamea*	Mjohoro	2400
4	*Azadirachta indica*	Muarobaini	2300
5	*Tectona grandis*	Mtiki	1500
Total number of seedlings			**1070**

Conclusion and way forward

Thirty local communities in Handeni District were trained on tree nursery establishment and tree planting techniques as one among the measures to combat forest degradation in Tanzania. The involvement of community in tree planting initiatives is crucial since it is an acceleration towards sustainable development of forests. Also, the enacted strictly laws holdback forests detrimental which is a causal-effect of communities' intervention as a turning point to cover their needs. We recommend setting strategies which abide forests remaining in the centrepiece management to ensure an evolutionary process from conventional to participatory approaches that comprises community-based forest management and joint forest management for enforcement of sustainable protection and preservation of forest reserves.

CAN IRON FRAMES BE AN ALTERNATIVE MATERIAL TO MAKE FRAMES OF BEEHIVES IN TANZANIA?

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Introduction

The story of this article dates way back in 2011 while Mr. Elia was working on water meter. In those days water meters were protected with cement chamber and iron cover. As he was trying to open the meter chamber, he found that honeybee colony had built on iron cover and putting honeycombs on the meter cover without any problem (Photo 1). This phenomenon was strange for Mr. Elia who leaves in Himo, Kilimanjaro. At that time the quest for studying beekeeping poped up.

Photo 1: The place where bees were found to build honey combs in 2011

In 2017, Elia decided to join the Beekeeping Training Institute-Tabora to pursue the Basic Technician Certificate in Beekeeping. While studying the module of Beehive Construction, he found that about 100% of the frames of beehives in Tanzania use timber. Also, during the training, it was found that the cost of construction of frames of beehives using timber is high to be met by local beekeepers. It was further noted that, carpenters run into challenges of maintaining precise measurements of frames using their current tools and equipment. Based on different publications on wooden frames, it shows that wooden frames can be used in two honey harvesting seasons, few beekeepers can cope with the cost of changing frames once they are damaged. Beekeepers must have stock-piles of replacement frames once the frames within the hive are broken during inspection or harvesting. Further, frames of beehives can rot when exposed to constant moisture and cause additional cost of changing the frames of beehives from time to time.

Based on this information, Mr. Elia conducted an investigation study on the phenomena witnessed in 2011. The study included two questions: (i) Is it true that honeybees build combs on iron frames? (ii) Does the quality of honey and beeswax from iron frames meet the standards set in the country? To answer these questions, Elia applied the principles he had learned in his research class and he shared with Dr. Devolent Mtui and Mr. Stanslauss Lukiko.

Experimenting with iron frames

The experiment started by acquiring a good quality apiary site. Purchasing of two frame beehives and the welding of iron frames of the same size as the wood frames, these iron frames were then fitted into a beehive. The beehives fitted with iron frames were sited (Figure 2) in an area with *Mangifera indica* trees. During the inspection on 29/9/2020 all the hives were found occupied by honeybees. After the hives have been occupied by honeybees, the inspection started twice a month.

Experince with iron frames

A total of six iron frames with ripen honey were ready for harvesting on 28/2/2021. On examining the iron frames, it was found that the honey was fine and the combs were neatly arranged without cross combing (Photo No. 2). It was easier to undertake colony inspection

and honey harvesting. Furthermore, iron frames cemented with propolis to brood and supper boxes were removed by hive tool without any sort of damage as in wooden frames.

Photo 2: Beehives sited on trees

Photo 3: Honeycombs on iron frames trees

Next steps

The next steps are to determine the quality of honey from iron frames with the focus on the percentage of lead. The quality response of honey from iron frames is very important in order to compare the level of lead with what is acceptable for human consumption i.e not to exceed 0.5 mg / kg. Additionally, the usage of iron stin steel in constructing iron frames and cost benefit analysis of iron frame will also be included in the next steps.

Conclusions

In terms of workability and durability, iron frames have proved to be more effective. It is true that honeybees build honey combs on iron frames as do in other cavities. Also, iron frames can be alternatives to timber frame and thus reduce the use of timber in the construction of frames for beehives.

TAFORI HOSTS A SUCCESSFUL INTERNATIONAL CONFERENCE ON FOREST AND HONEYBEE PRODUCTS VALUE CHAINS FOR DEVELOPMENT OF SUSTAINABLE LIVELIHOODS AND INDUSTRIAL ECONOMY

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1.0 Introduction

The International Scientific Conference (ISC) on Forest and Honeybee Products Value Chains for Development of Sustainable Livelihoods and Industrial Economy was a 3 days' conference that was held at Mlimani City Conference Centre, Dar es Salaam, Tanzania from 23 – 25 February 2021. The conference was organized by Tanzania Forestry Research Institute (TAFORI) and financially supported by the Ministry of Natural Resources and Tourism (MNRT) and the Ministry of Foreign Affairs of Finland through the Value Chains Development Programme (FORVAC).

The objective of the conference was to unlock the potential of forest and beekeeping sector by providing platform for sharing knowledge and promote discussions on how to develop forest and honeybee products value chains for transforming the nation into middle income country. That in mind, the conference specifically aimed at:

(i) Collating existing state-of-the art knowledge on different forest value chains in order to deploy this knowledge to support value chains development;
(ii) Generating practical information to inform policy making process;
(iii) Creating awareness on opportunities and constraints or challenges in Tanzania's forest and beekeeping value chains; and
(iv) Elevating the role of the forest and beekeeping sectors in contributing to industrialization and country's economic growth.

2.0 Introductions and remarks from selected dignitaries

The opening session of the conference was facilitated by Ms. Mindi Kasiga and attended by high profile government officials led by Hon. Dr. Damas D. Ndumbaro (MP) the Minister for Natural Resources and Tourism who officiated the opening ceremony on behalf of her Excellency Hon. Samia Suluhu Hassan, the Vice President of the United Republic of Tanzania. The other dignitaries (Photo 2) who accompanied the Guest of Honor were: Hon. Kisare Magore, District Commissioner, Ubungo, Hon. Mary Masanja (MP), Deputy Minister of Natural Resources and Tourism, Dr. Aloyce Nzuki, Permanent Secretary (PS) MNRT, Dr. Felician Kilahama, Chairman TAFORI Board of Directors, Dr. Ezekiel Mwakalukwa, Director of Forestry and Beekeeping Division – MNRT, Dr. Revocatus Mushumbusi, Acting Director General of TAFORI, Mr. Jackson Msome, Chairman of National Beekeeping Advisory Development Committee (NABAC) and Ms. Gladness Mkamba, representative of National Forestry Advisory Committee (NaFAC) Chairman. The opening ceremony was entertained by the Tanzania Prison's Brass Band (Photo 3) and it started with the official inauguration of the ISC Exhibition by the Chief Guest of Hon. Dr. Damas Ndumbaro (MP).

Photo 2: The Guest of Honor and the dignitaries at the high table from the opening ceremony

Photo 3: Prison's Brass Band entertaining the official opening and the Guest of Honour visiting two of the exhibition booths

1.1 Planning process

This conference had an organizing committee that comprised of 16 forestry and honeybee stakeholders from different organizations including government institutions and private sector as shown in (Photo 1).

Photo 1: The Conference Organizing Committee members

The Organizing committee was well structured, with a Secretariat within TAFORI and working committees. Dr. Siima Bakengesa was the Chairperson of the Organizing Committee while Dr. Chelestino Balama being the Secretary.

The conference was attended by various stakeholders and Figure 1 gives a pictorial overview of stakeholder representation.

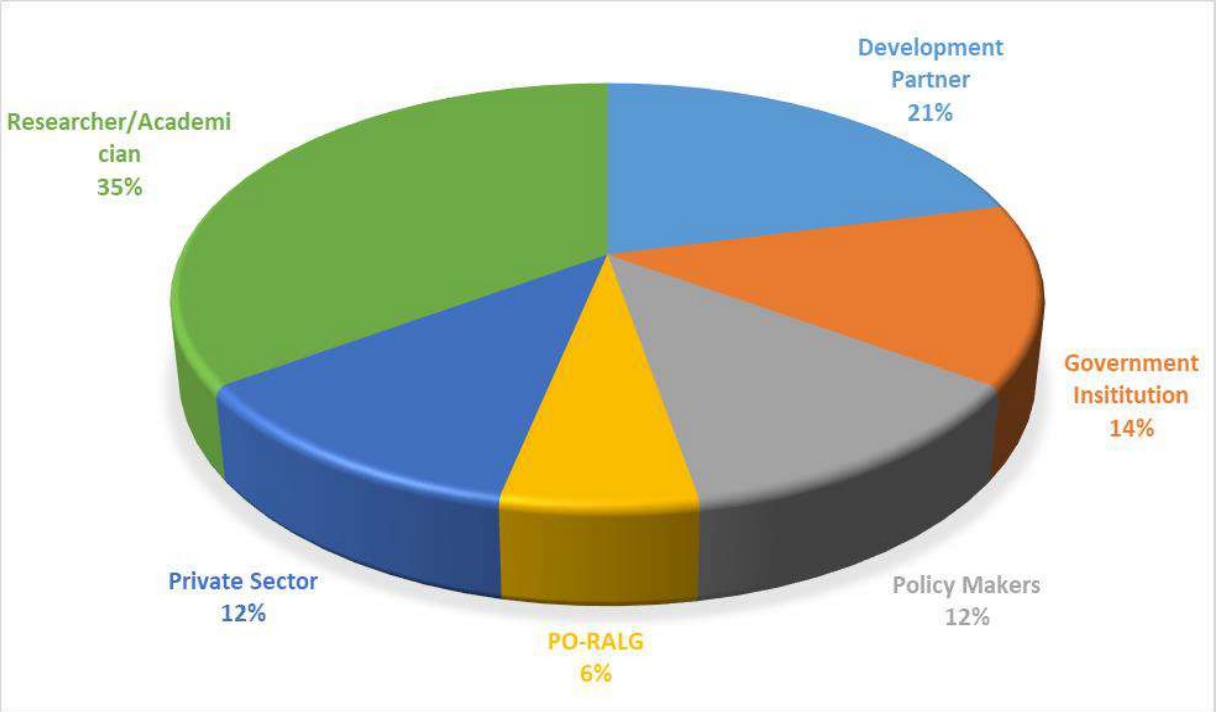

Figure 1: TAFORI International Scientific Conference stakeholder representation

1.1.2 Highlights from the official opening address

Hon. Dr. Damas D. Ndumbaro (MP) the Minister of Natural Resources and Tourism delivered the official opening address on behalf of Hon. Samia Suluhu Hassan, the Vice President of the United Republic of Tanzania (Photo 4). The Vice President expressed her appreciation of the forestry and honeybee sectoral programs and specifically their alignment with the ruling party i.e. Chama Cha Mapinduzi 2020 - 2025 Election Manifesto Articles 46, 67-71 and 264-235. The Guest of Honour address highlights included;

- Emphasis on unexploited potential of the forestry and beekeeping sectors, which can increase contribution of the two sectors in the national foreign trade from the current levels of 3.5 and 5.9 percent through products quality improvement programs and efficient marketing strategies;
- Call for review of His Excellency President Dr. John Pombe Magufuli's inaugural speech to the 12th Parliament of the United Republic of Tanzania, which has directives for ensuring sustainable management and use of the national natural resources;

- Directive to stakeholders and specifically the District Councils to implement national tree planting program which aiming for at least 1.5 million trees per year;
- Need for increased investment in industries to reduce importation of forestry and honeybee products;
- Conference participants to actively contribute to conference deliberations and suggest how best to address the challenges in forestry and honeybees' products value chains development and identification of niche markets;
- The conference should come up with a plan for promoting forest and beekeeping products; improve production quality and quantity; and identification of market needs and behaviors. Also, the existing gaps in forest and honeybee products value chains should be identified;
- There are a good number of researches that have been done. However, many research findings are kept in cabinets. There should be a plan to make sure these research findings reach the intended stakeholders;
- Provide solutions to various challenges in the forestry sector like invasion of forests that is being caused by husbandry, agriculture, mining and cutting of trees for poles;
- Make sure you supervise fully the environmental protection and conservation. Also, you should supervise the implementation of environment act of 2004; and
- Special thanks should go to collaborative partners especially the Government of Finland.

Photo 4: Hon. Dr. Damas D. Ndumbaro (MP) Minister for MNRT delivering the Official Opening address

1.2 Technical Presentations

1.2.1 Conference program and process

Dr. Aichi Kitalyi the Lead Facilitator of the conference presented a brief reflection of the opening ceremony. Technical presentations were delivered in six sessions. The sessions were moderated by senior scientists/experts highly conversant with the subject matter (Table 1). Participants recap of Day One and Day Two, contributed to development of key policy and technical emerging issues, which were discussed and presented in the Closing session.

Table 1: Technical presentations: number of sessions, papers presented and Session moderators

Thematic Area	Number of Papers	Moderators
Forest Products Value Chains	3 Keynote 16 Research papers	Prof. Fortunatas Makonda Dr. Leopold Lusambo
Honeybee Products Value Chains	2 Keynote 11 Research Papers	Mr. Seif Salum Mr. Daniel Pancras
Policies and Legislations	2 Keynote 3 Papers	Dr. Joel Mmasa

1.2.2 Presentation on forest products value chain thematic area

The Forest Products Value Chains (FPVC) thematic area had three keynote papers and 16 research papers which were presented in three sessions. The keynote papers addressed: forest products supply trends based on resource assessment data; forest value chain development drawing from experiences in Community Based Forest Management (CBFM) and importance of value chain information in international investment in forest production. The research papers covered different aspects of forest health and its effect on production, estimation of stocking rates from village land forest reserves, characteristics and properties of wood species, potential of dry forests and woodlands, value chain analysis of sawn wood, market systems analysis of Non-Wood Forest Products (NTFPs) and collective entrepreneurship in operating small and medium forest enterprises.

1.2.3 Presentation on honeybee products value chain thematic area

The Honeybee Products Value Chains (HBVC) thematic area had two keynote papers and eleven research papers which were presented in two sessions. The keynote papers focused on: Analysis of the honey products value chain in Tanzania and beekeeping practices and value chain development. The research papers were drawn from different aspects of honeybee value chains including; distribution map of pollen and honey types in Tanzania, beekeeping productivity aspects, ecosystem dynamics in the Eastern Arc Mountain forests of Tanzania based on fossils and modern pollen flora, climate smart apiculture technologies addressing productivity and food security in Arid and Semi-Arid lands in Kenya, beekeeping cluster initiatives, pot-honey value chain and beekeeping value chain management, commercialization of beekeeping industry in Tanzania. At the end of the Honeybee products value chains thematic area presentation, one paper cutting across the two sectors was presented. This was on the opportunities and challenges facing dissemination of forestry and beekeeping research results, drawing from experiences of TAFORI.

1.2.4 Presentation on policies and legislation

The Policies and legislation thematic area had two keynote papers and three presentations. The two keynote papers covered policies and legislations government the forest and bee products development and trade in Tanzania and forest-based enterprises value chain – linking practice and policy in Tanzania. The research papers addressed the role of national

forest policy and legislation in creating business enabling environment of sawn wood value chain from government and private plantations in Tanzania; Strengthening Tanzania's competitiveness to trade in forest and honeybee products from policy and regulatory perspective; and consumer country enforcement in combating illegal trade in forestry. Photo 5 shows conference participants following technical presentations with COVID-19 measures being well observed.

Photo 5: Conference participants following technical presentations with COVID-19 measures being well observed

1.3 Poster Presentations

Posters were displayed in front of the conference room in the three days and presenters were there to interact with participants. There were six posters in total. The posters focused on innovations. From the FPVC, there was a presentation on pine resins tapping in Tanzania, a potential high value product providing an option for early income from Pinus plantations. A presentation on Traditional medicine trees called for formalization of Traditional Medicine Trees industry within the forest sector. Another research from the FPVC recommended Baobab oil refinery process to use high temperatures from 250^0C to reduce health risk attributed to Cyclopropenoid Fatty Acids (CFPAs).

Posters from the HBPVC thematic areas introduced advanced technology to improve quality and quantity of natural bee products while maintaining the native vegetation. The second poster in this thematic area addressed the nicotine contents in honey, which is of major concern in the country. The study recommended establishment of national standards factoring allowable levels of nicotine in honey products.

1.4 Exhibitions

There were 25 exhibitors drawn from public institutions and private sector. They all exhibited different forest and honeybee products, which demonstrate contribution of the sector to building industrial economy. There were also honeybee products value addition machine showed in the exhibition (Photo 6).

Photo 6: Prof Dos Santos and his team looking at the Honeybee products value addition machine

1.5 Closing Ceremony

The closing ceremony was facilitated by Ms. Mindi Kasiga who informed participants that both Kiswahili and English languages will be used in the closing ceremony. The Guest of Honour was Dr. Aloyce Nzuki the Permanent Secretary of the MNRT with his closing speech delivered by Dr. Ezekiel Mwakalukwa (Director of Forestry and Beekeeping Division) on his behalf. Dignitaries (Photo 7) at the high table in the closing sessions included Mr. Jackson Msome (Chairperson of the National Beekeeping Advisory Development Committee (NABAC)), Ms. Gladness Mkamba (Vice Chairperson of the National Forestry Advisory Committee), Dr. Felician Kilahama (Chairman of the TAFORI Board of Directors), Dr. Revocatus Mushumbusi (the Acting Director General TAFORI).

Photo 7: The Guest of Honor and the dignitaries at the high table from the closing ceremony

Highlights from the Guest of Honor (Photo 8) closing address: -

- Some of the policy and technical issues raised in the conference the Ministry has started working on them such as: Engineered wood products framework, National charcoal strategies, Forestry and beekeeping information system;
- TAFORI was advised to put more concerted efforts in dissemination of research findings, which is one of the measures of work performance of the organization;
- TFS was advised to use the available information on Illegal timber trade to put an end to such acts in the country and;
- Dr. Mwakalukwa noted that he had the privilege of following the conference from Day One. He noted that most of the presentations had potential contribution to the sector, but time allocate was not adequate Presenters did not have time to describe their work and results, but also plenary discussions had time limitation. He promised to take this up with TAFORI to work out another forum to discuss some of the papers for a better understanding of problems facing the sector and potential solutions.

Photo 8: Dr. Ezekiel Mwakalukwa Director of Forestry and Beekeeping, MNRT officiating the closing ceremony

In conclusion the Guest of Honor thanked all participants, presenters and exhibitors for active participation and contributions on different matters concerning forest and beekeeping products value chain. Guest of Honor appreciated diversity of the conference engaging more than 100 participants from different stakeholders in the sector. Finally, the Guest of Honor wished farewell to participants and wished them a safe journey back home.

1.6 Conclusion

The conference was highly rated by the participants in terms of organization, achievement of objectives, quality of oral and poster presentations as well as facilitation process. Further, from the conference it was observed that forest and beekeeping sector should be considered as priority sectors in the country and lobby for increasing investment in the sectors;

- Strengthen technical and business capacity of the primary producers (Tree growers and beekeepers) to increase competitiveness of the sectors;
- Research findings are put into practice and monitored for change; and
- Stakeholder commitment is required to strengthen PPP in the sector.

NEWS IN PICTURES

By. Geofrey G. Njovangwa

A group photo of Tanzania Forestry Research Institute (TAFORI) staff with the appointed Director General, Dr. Revocatus Mushumbusi (first row, second from right) that was taken on 21 April 2021 at TAFORI HQ, Morogoro

Tanzania Forestry Research Institute (TAFORI) staff at Headquartes on International Workers Day that was taken on 1st May 2021 at the Jamhuri Stadium, Morogoro

Stakeholders' workshop for a project on "Market Analysis for Products Derived from EAMCEF" Supported Products in Eastern Arc Mountains (EAMs) of Tanzania" that was held on 18th May 2021 at TAFORI HQ, Morogoro

Stakeholders' workshop for gathering requirements for a project titled "Developing online journal and research clearance system" that was held on 21st May 2021 at TAFORI HQ, Morogoro

Stakeholders who visited Tanzania Forestry Research Institute (TAFORI) Booth are seen to be keen on listerning to Principle research from TAFORI, Dr. Pilly Kagosi (with eye sight glasses) at the 17th Sokoine Memorial week that was held from 24th – 27th May 2021 at the Sokoine University of Agriculture grounds in Morogoro.

ANNOUNCEMENTS

i)TAFORI HQ Conference Halls

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

TAFORI has two (Sabas Hall na Nshubemuki Hall), one board room (Murira Board Room) na one special room in the library (Library Special Room). The charges for these services are listed below:

Table 1: TAFORI halls services information

Name	Number of people	Price per day (Tshs)
Sabas	150	600,000
Nshubemuki	15	200,000
Murira	30	500,000
Maktaba	8	100,000

These price packages cover 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.

Other services

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) TAFORI Lushoto Conference Hall

Taasisi ya Utafiti wa Misitu Tanzania (TAFORI) Lushoto centre is offering conference halls services at an affordable price as seen on the flyer below.