



# Newsletter

Sawlog Production Grant Scheme (SPGS) III

Issue 3: July – December 2017



**Tree Nurseries:**  
A foundation for  
profitable  
commercial  
forestry



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**Cover photo:** A nursery worker waters tree seedlings

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# FOREWORD

I bring you warm greetings from FAO and thank you for your continued support to the successful implementation of the Sawlog Production Grant Scheme (SPGS) III Project. I congratulate the Project team for its hard work and commitment to uplifting commercial forestry in Uganda and on this important publication. I thank the European Union (EU) for funding SPGS III and the Government of Uganda for entrusting FAO to implement this important project on its behalf.

This issue of SPGS III Newsletter focuses on tree nurseries as an important link within the commercial forestry value chain. The quality of planting material is essential in establishing viable forest plantations because high quality and improved seed/ seedlings result in productive, healthy and profitable plantations. FAO, through SPGS III, is championing the nursery certification program through which nursery operators voluntarily apply for certification, commit to adhere to and implement acceptable quality standards for operating commercial tree nurseries. It is our hope that these standards will help to guide the development of national certification standards. Certification is carried out annually and upon completion of a successful audit, a nursery is given a star rating of one (lowest) to five (highest). All certified nurseries receive a certificate of compliance valid for one year, in addition to a chart-sized signage affixed to their location sign posts.

The exercise is carried out throughout the country. FAO believes that this is one way of building tree investors' confidence in the quality of seedlings that they buy, in anticipation of a good forest plantation.

In this issue of the newsletter, read more about certification of tree nurseries, the feasibility of operating a tree nursery as a business enterprise.

You will also read about the level of progress of the SPGS III Project, including support to maintenance of forest plantations through thinning and pruning grants, support to establishment of woodlots in communities, public and private institutions as well as FAO's affirmative action to promote commercial tree planting in semi-arid Karamoja region. This issue also carries

an article on processing and industrial utilization of wood; an aspect of commercial forestry which SPGS III will be promoting in Uganda. This is especially important, given the establishment of a critical mass of commercial forest plantations that will, in years to come, require expertise and resources to harvest and process timber to quality standards.

FAO will join the rest of the world to celebrate the International Day of Forests on 21 March 2018 under the theme: "Forests and sustainable cities". Recognizing that more people live in cities than ever before and that by 2050, six billion people or 70% of the global population is expected to live in urban areas, forests will become very critical in transforming by filtering out harmful pollutants and mitigating the effects of climate change. Cities will become greener, healthier and happier places to live. The International Day of Forests is a great opportunity to raise public awareness on forests and sustainable city ecosystems and enhance urban food security and resilience of cities to current and future climate hazards. Once again, FAO commends the EU, Government of Uganda, all individuals and private companies, communities and institutions that are working with SPGS III to plant more trees. Together we can restore Uganda's forest cover and reverse impacts of climate change while improving rural livelihoods.

Enjoy your reading!

**Alhaji M. Jallow | FAO Country Representative**

# Grantees hone skills in plantation establishment and maintenance during field tour and meeting



*Grantees get a feel of aqua soil, an absorbent gel used as a water reservoir during planting*



*A grantee uses a soil auger to determining soil depth*

Improved skills and raising awareness about commercial forestry are key outputs of the FAO/SPGS III Project. FAO recognizes that commercial forestry in Uganda is still a relatively new venture, and many tree farmers have limited skills in establishment and management of forest plantations. It is critical that grantees are aware of quality silvicultural standards since grant payment is premised on achieving minimum standards of plantation establishment. During the verification of plantations in August 2017, a number of grantees fell short of silvicultural standards; implying that many did not receive a grant. This was largely attributed to lack of technical know-how and highlighted need to train grantees in plantation establishment and maintenance operations. Consequently, in November 2017, the Project organized a series of field tours and meetings for grantees in the different clusters throughout the country. The objective was to create an opportunity for grantees or investors to learn about best practices in commercial forestry, through sharing experiences and knowledge with each other and through demonstrations. The FAO/SPGS III team demonstrated critical forest operations including: how to identify good tree seedlings, stressing the importance of sourcing seedlings from certified nurseries; correct planting of seedlings, chemical weed control and selection of the right soil for tree planting (including identifying wetlands or swampy soils that may not favour tree growing).

“Commercial forestry is a good business. If you focus on quality establishment of your plantation, you will enjoy massive returns in the future”, said David Alfred Esamich, a beneficiary of SPGS III from Karamoja. Esamich is a recipient of a grant to establish commercial forest plantations in Okore sub-county, Katakwi District and in Napak District of the semi-arid Karamoja region. For Julian Omalla, founder of Delight Uganda Limited and Delight Agribusiness, “even without a grant, training is very important if one is to benefit from commercial tree

planting”. She believes that many people plant trees with limited knowledge and so “they lose out”. Omalla, who received a grant to plant 120 hectares in Nwoya District, appealed to tree growers to always plan, ensure timely operations, check the soil type and texture in order to plant suitable trees and realize greater economic gains. The award-winning entrepreneur noted: “Northern Uganda has oil and other minerals and in the future there will be great demand for timber for construction; therefore people should plant trees to be able to supply timber”.

The meetings also enabled FAO to interact with grantees for feedback on their progress and to appraise the latter on relevant modalities for successful implementation of the grant. The field tours were held at: Global Woods Ag. Limited in Kyankwanzi District (Albertine cluster), Ferdsult Forest Plantation in Buikwe District (Central and Eastern clusters), Richard Bakojja’s forest plantation in Mubende District (Western and South Western clusters) and Kachung Plantation Project in Dokolo District (Northern, Karamoja, and West Nile clusters). Currently, there are 520 grantees (individuals and private companies) that have committed to promoting commercial forestry by establishing plantations that meet quality standards as advocated by SPGS III. They will establish plantations on a combined land area of 23 000 hectares.

On behalf of the European Union (EU) delegation in Uganda, the EU Operations Advisor for Sustainable Environment, Jalia Kobusinge thanked the grantees for investing in commercial forestry and urged them to maintain good standards and ably “demonstrate that commercial forestry is viable”.

Pioneer tree grower, SPGS III grantee and host of the field visit in Mubende District, Richard Bakojja, commended the Government of Uganda, FAO and the EU for championing commercial forestry in Uganda.

“When I started planting trees, I used such bad seed that instead of harvesting timber, all I got was firewood”, he said. “But commercial forestry is not about simply planting a tree. It must be a good tree from a good seed source” he added. Through SPGS, tree growers can now get expert advice to ensure quality plantations.

Also in attendance were certified contractors, tree nursery operators, District Forestry Officers (DFOs) and representatives from Uganda Timber Growers’ Association (UTGA).



**W**e believe that commercial forestry is an alternative avenue to help us ensure sustainability through income generation while protecting the environment. The field tour has enabled me to learn how to correctly use chemicals and plant seedlings.

*Sister Sylvia Akugizibwe  
Daughters of St. Theresa of the Child Jesus  
Kabare District*



**T**here is a lot of environmental degradation in Apac District and I believe that through commercial forestry, we can grow more trees and reverse this problem. With the skills I have learnt, I will help to sensitize my community not to cut down already existing trees.

*Obete Dennis  
Apac District*

*By Anita Tibasaaga- Communications Assistant, FAO/SPGS III*

## Curiosity, passion led her into commercial tree nursery business: The story of Annet Mubiru



*Annet Mubiru (right) watering clonal eucalyptus cuttings at her tree nursery*



*Annet Mubiru tends her eucalyptus mother garden*

**A**t 56 years of age, Annet Mubiru speaks with pride about her journey into business; taking on various investments and eventually becoming a reputed player in the commercial agriculture sector in Uganda. The mother of three is a graduate of Business

Administration from the then Uganda College of Commerce in Nakawa, Kampala and is the proprietor of Annema Eucalyptus Nursery in Mityana District. Her decision to engage in tree nursery business was driven by her passion for business and a curiosity about

commercial tree planting and managing seedling nursery. Mubiru launched her business career and farming enterprises over two decades ago when she started rearing chicken and animals for sale. With about 1000 birds, she was successful in bidding to become the Mityana District franchise holder for Ugachick Poultry Breeders Limited- a company specializing in breeding, chicken feeds and fish farming. She soon expanded her chicken business by growing, sourcing and supplying maize for use as chicken feed and food. She was able to open up two shops, one for agro (chemicals, fertilizer, fungicide and equipment) and another as an animal veterinary drugs shop, selling feeds and chicks. In 1992 she decided to join politics and served the people of Mityana District as the Secretary for Women in Mityana Town Council. She used this platform to empower other women in the District to start business and farming ventures. By 1998, she had become a household brand in Mityana District, securing big tenders to supply maize and had become a property owner in Mityana town.

### **Starting commercial forestry**

In 2013, one of Mubiru's clients, Mr Mwima needed fungicide for his tree nursery. Mubiru was intrigued that Mwima was operating a commercial tree nursery business, a business that was increasing in popularity in the country. Together with the Mityana District Forestry Officer, she visited Mwima's nursery in Kisaana, Mityana Road. At Kisaana, she was impressed by the scale of Mwima's nursery although he was struggling to find market for his plantlets. "Some plantlets were overgrown so I offered to help him boost his sales by displaying ten of them at my shop and directing interested growers to him", she says. The display worked and after a short period, Mwima got several orders. This sparked in Mubiru the conviction to operate a tree nursery as she moved closer to finding her pot of gold.

In October 2013, Annet Mubiru bought 4 000 clonal eucalyptus cuttings from Mwima and planted 11 acres in Bulela sub-county, Kibaale village, Mityana District. She learnt everything she needed to start commercial tree planting and nursery operations through Mwima who introduced her to SPGS. "He was very generous with his knowledge and even invited me to Kabanyolo to take part in training on forest plantation establishment by SPGS. At this point, she had already determined to set up a nursery in order to tap into the growing demand for quality seedlings and cuttings. To start her mother garden, she bought 3000 plantlets and was told to ensure adequate water supply and to set the nursery in an accessible area. Mubiru's plan was to establish the nursery at her home on Buye Hill, where she has easy access to water and the mother garden in a different location. But she soon learnt that the nursery and mother garden should be in the same vicinity.

In 2014, Mubiru had completed planting her mother garden and was invited to attend her first SPGS training. By the end of the training, she was more convinced that her passion for commercial forestry was sufficient to help her manage a successful nursery. During the training which had both theory and practical sessions, Mubiru emerged as the best participant in nursery management and was awarded a pair of lopping shears, (a tool used for cutting back during the process of establishing a mother garden for clonal eucalyptus).

Mubiru notes that through her short experience in managing a clonal tree nursery, the venture is no walk in park but is profitable if one is committed. One should be able to ably manage the workers. She has 10 workers, supervised by a manager who stays at the nursery site. She further advises intending nursery operators to consider establishing mother gardens as opposed to planting seed every season as this guarantees constant supply of planting material and investors are better able to predict the financial returns from sale of cuttings. She notes that the supply of good seed can become erratic when seed is out of stock and this can jeopardize one's ability to maintain constant supply. A clonal nursery mother garden on the other hand is always in place and can produce for up to ten years depending on how it is managed.

According to Mubiru, the demand for eucalyptus clone cuttings is often higher than supply. To match customer preferences for Grandis Urophylla (GU) clones, expanded her mother garden in 2017 and planted more GU8 and GU7 clones. Other varieties in her nursery are eucalyptus Grandis cameldulensis (GC) 540, GC789 and GC 550 eucalyptus clones. She sells each GC seeding at UGX 600 and each GU seedling at UGX 700. Annema nursery currently produces 15 000 seedlings per season but Mubiru target increasing this to 20-30 000 seedlings per season in the coming few years.

It's now about five years since Mubiru started the tree seedling business and she has no regrets. "This was my passion and I am happy; I think I have a good nursery", she says. Out of proceeds from sale of plantlets, she has been able to acquire land and planted 50 acres of eucalyptus trees from which she wants to supply timber. She has sold many clonal eucalyptus cuttings to friends and people in the area and has encouraged many to engage in tree nursery and tree planting business. Through SPGS III, Mubiru says she has also been able to interact with large scale tree farmers and benefited from their experience and knowledge in order to advance her enterprise.

### On nursery certification

Annema Eucalyptus Nursery received certification from FAO/SPGS III for the first time in 2017. According to Mubiru, it was critical to get certification as a quality mark to guarantee customers' confidence in the quality of planting material she produces. Additionally, certification creates awareness among those intending to operate commercial nurseries, about the existence and relevance of recommended standards to be followed. Mubiru appreciates FAO for the certification program through which her nursery has been marketed through the published lists of SPGS III and during meetings of grantees and other stakeholders. The proprietor of the four-star nursery and one of the only certified nurseries in Mityana District, Mubiru is committed to addressing all the critical challenges at the nursery and aspires to get the five star grade. One of the nursery's biggest challenges is accessing a constant supply of water. In the meantime, she has dug a shallow pond and acquired a small truck which she uses to ferry water from town, in containers. In July 2017, the national water body connected her to the national water grip but the water supply in Mityana District is so low that it does not go as far as her nursery. Mubiru advises tree growers to always buy seedlings from certified nurseries as opposed to road-side nurseries whose source of seed cannot be authenticated.

### Going forward

"I believe that I have made my mark on greening Uganda", says Annet Mubiru. She believes that because her nursery is clean and neat, tree growers are assured of clean and disease-free planting material. Mubiru thanks the Government of Uganda and the European Union for supporting commercial tree growing through FAO/SPGS III. She calls upon the Project to support unique needs of nursery operators, such as training and accessing constant water supply, in order to sustain production and supply of quality seedlings. She looks forward to attending more training courses by SPGS III so that she can improve operations in her nursery.

She advises youth in Uganda not to shy away from investing in tree nursery business as there is great demand for quality planting material. However, she notes that it is important to secure sizeable land of at least five acres on which to establish a mother garden, space to display the plantlets, land to grow food for the workers and establish permanent structures such as housing. She therefore advises young people not to rent land for nursery operations but to acquire permanent land. When establishing a clonal nursery, it takes about eight months from the time of planting a mother garden to hardening and actually starting to sell plantlets. As such youth need to be patient enough before they can start earning from the investment.

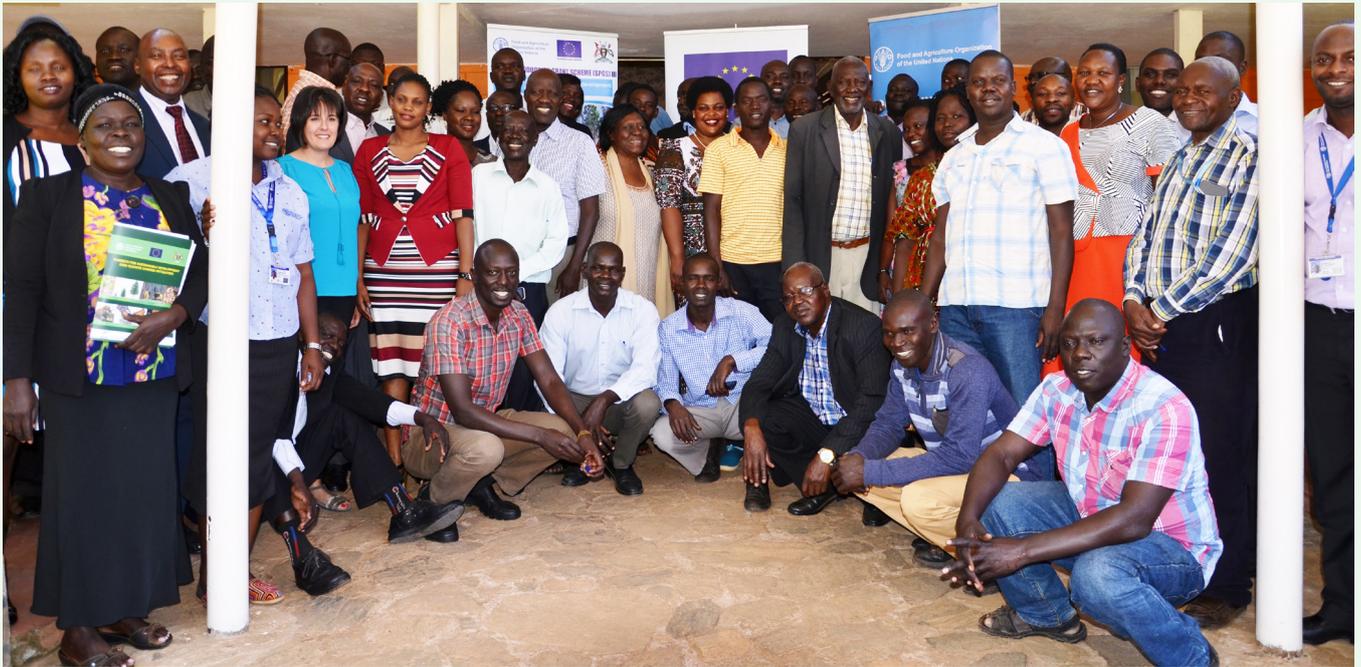
*By Anita Tibasaaga- Communications Assistant, FAO/SPGS III*

## Tree farmers in Karamoja embrace tree planting; sign up for FAO financial support

In 2016, FAO made a call for expression of interest for commercial tree plantation grant support and received many applications from all over Uganda; but only two from Karamoja region. A second call was made, exclusively for Karamoja, as part of an affirmative action to attract more tree planters in the region, which receives relatively low rainfall; an average annual rainfall ranging from 350-1000mm per year. Although semi-arid, Karamoja has immense potential for dryland forestry. As such, FAO/SPGSIII targets supporting establishment of over 1 000 hectares (ha) in the region by 2020. After the second call, 36 individuals and private companies were identified, making a total of now 38 successful grantees in the region. Like all commercial plantation establishment grantees, they will receive on-site technical advice and conditional grants paid upon satisfactorily meeting set quality standards. The expected planting season in Karamoja is from May to August 2018.

To commence their journey into commercial tree planting, the successful applicants attended a meeting on 4 October 2017 in Moroto District, where they were informed of the key requirements, terms, procedures and timelines for accessing and utilizing the grants. They were introduced to FAO/SPGS III quality establishment and maintenance standards and recommended tree species for Karamoja. They were required to submit planting plans after which they were expected to sign Grant Support Agreements (GSAs) as a commitment to the co-financing arrangement between the grantee and FAO.

The meeting was also attended by: District Forestry Officers from Karamoja, officials from the United Nations Office for Project Services (UNOPS), National Forestry Authority, Ministry of Water and Environment (MWE) and the District Chairman and Resident District Commissioner for Moroto District. UNOPS is the grant manager for the FAO/SPGS III Project.



**Successful applicants of tree planting grants from Karamoja sub-region, with staff of FAO and UNOPS.**

While closing the meeting, Andrew Napaja, the District Chairman of Moroto District commended FAO, the European Union and Government of Uganda for implementing SPGS III and for promoting commercial forestry in Karamoja. He called for more awareness creation among the people of Karamoja, urging them “not to cut down trees and to support commercial forestry investments”

### **Training**

Once successful applicants had signed the Grant Support Agreements (GSA), FAO/SPGS III organised a four-day training in forest plantation establishment in November 2017 in Lira District. Through the training, grantees enhanced their knowledge and skills in good commercial forestry practices. Participants included: grantees, plantation managers, supervisors, contractors, as well as District Forestry Officers (DFOs) from Abim, Kaabong, Nakapiripirit and Napak Districts. Training topics included: planning and budgeting for plantation establishment, principles of silviculture in site selection and species matching, forest surveys and compartmentation, site preparation and establishment, quality planting materials and plantation record keeping. Practical sessions were on: site selection, land clearing, lining out, pitting, wetland delineation using a soil auger, glyphosate (herbicide) calibration and application, termicide application, fertilizer application, planting using aqua soil (absorbent gel) and how to plant assorted tree species such as Teak stumps, *Grevillea robusta*, *Gmelina arborea*, and *Melia volkensii*. They were held at Kachung Plantation Project in Kachung Central Forest Reserve, Dokolo District (Northern Cluster). The training was conducted in the Karamoja cluster because Karamoja region does not yet have appropriate commercial plantations, with the relevant standards,

which could be used for field demonstrations. Kachung Plantation Project has a diversity of species, most of which are recommended for the semi-arid Karamoja region, including: *Grevillea robusta*, *Gmelina arborea*, and *Melia volkensii*.

They were assessed through group work, presentations and field work. Gilbert Emugenyait of Yara Yara Forest Group emerged the best and was awarded three electronic copies of training manuals on: weed control, pruning and thinning. All participants received certificates of completion of the plantation establishment course.

Ongoing and upcoming developments in Karamoja cluster:

1. Verification of woodlot beneficiaries is ongoing at various institutions in Karamoja region. Upon verification, beneficiaries will receive seedlings for the next planting season in May to August 2018
2. Working together with DFOs with in Karamoja region, 30 nurseries have been identified and will receive training in January 2018, on appropriate practices in raising *Melia Volkensii*, *Gmelina arborea* , *Grevillea robusta* and *Bathdavia* seedlings. Upon satisfying SPGS III requirements, they will receive certification in 2018.
3. FAO/SPGS III is working with the National Tree Seed Center and UTGA to source high quality seed for the nurseries in Karamoja.

**By Peter Ssekiranda and Vallence Turyamureba, Programme Assistants, FAO/SPGS III**

## Rwanda delegation gets tips on tree nursery business and management



*Members of the Rwanda delegation tour a Eucalyptus grandis plantation owned by Isaac Kapalaga in Kifu. The plantation is almost four years old.*

**T**ree nurseries play a central role in the forestry value chain, especially since production and use of high-quality nursery stock is the first step in establishing a good commercial forestry. Consequently, the International Union of Conservation of Nature (IUCN) Rwanda, through the Forest and Landscape Restoration Project organized a learning visit to Uganda and interacted with the FAO/SPGS III team in September 2017.

The delegation was led by Mr Patrick Hardcastle, a Forestry Development Specialist. The visit aimed at reinforcing IUCN's commitment to enhancing skills and capacity of farmers, cooperatives, youth groups, and District Forest Officers to stimulate investment in forestry by exploring opportunities in plantation establishment, nursery business and adopting good nursery establishment and management practices.

According to the IUCN team, Uganda was selected for this exchange visit because of its advancement and modern capabilities in seedling production, made possible with continued support from FAO, the European Union and Government of Uganda through SPGS III.

The 10-person delegation included members of associations and cooperatives involved in forestry, District Forest Officers, and facilitators of Farmer Field Schools. They also visited different plantations established with support from SPGS.

During the meeting held in Kampala, the FAO/SPGS III Project Coordinator, Leonidas Hitimana, told the Rwanda delegation about advantages and benefits so far realized through FAO's voluntary private nursery certification program in which participating nurseries are audited and certified based on compliance with set quality standards. He also talked about the Project's collaboration with private sector players such as the Uganda Timber Growers' Association, through which nursery operators can access high-quality seed.

Following their visit, the Rwanda delegation learned that a good forest results from good seedlings from a good tree nursery. They realized the need to create more awareness about forest investment, train staff at the Rwanda tree seed center in modern seed technology, importing good quality seed, and establish demonstration sites in Rwanda, with good seed of *Eucalyptus grandis*, Pines (*Pinus caribaea*) and *Maesopsis eminii*. The group also noted the value of hybrid *Eucalyptus* even for small farmers, who will probably be the main tree planters in Rwanda. The importance of high standards of practice, which FAO/SPGS III has promoted and achieved was also lauded and recognized.

The delegation applauded FAO/SPGS III for promoting commercial forestry and urged for the strengthening of the wood processing industry so as to expand the market and attract more investment in commercial forestry.

## Institutions benefit from FAO/SPGS III woodlot establishment support



*One of the participants of the training in woodlot establishment held in Luwero District in October 2017 shows the difference between a good seedling (left) and a poor one (right)*

**F**irewood and charcoal are the main sources of energy for cooking for the majority (about 96 percent) of Ugandans. According to the Ministry of Water and Environment in its State of Uganda's Forestry 2016, the over reliance of much of the population on biomass and the reluctance of many households to adopt energy saving technologies has raised the demand for fuelwood and fuelled deforestation.

Cognizant of this ever-increasing need for wood fuel consumption, FAO, through SPGS III supports public and private institutions such as schools, hospitals, religious institutions, prisons, community based organizations and district local governments to establish high quality forest plantations. FAO recognizes that these institutions heavily rely on woodfuel for energy and is therefore committed to supporting the establishment of 2 500

hectares (ha) by 2020.

Through the woodlot support initiative of SPGS III, FAO procures quality seedlings and distributes them to contracted institutions at no cost. The Project also conducts field-based practical trainings in plantation establishment for the institutions' woodlot managers. This ensures deployment of the right skills and knowledge for woodlot establishment and management. The beneficiary institution is expected to clear the land in preparation for planting, transport the seedlings to the planting site as well as carry out the planting and subsequent maintenance operations.

To kick start the initiative, SPGS III supported 46 institutions to establish 452ha of woodlot plantations countrywide in the following clusters: Albertine, Central, Eastern, Karamoja, Northern, South Western and West



Nile. Managers of woodlots in the various institutions took part in a four-day field-based plantation establishment training in Luwero district in October 2017 to equip them with relevant technical knowledge and skills to ensure that seedlings are planted correctly and woodlots maintained to recommended standards. “Our school was spending at least three million Uganda Shillings on firewood every term”, says Father Gonzza Kajubi from St. Charles Lwanga Ssala Primary School in Masaka District. But through FAO’s support, the school of 800 students has established a 10-acre woodlot of Eucalyptus trees, primarily to ensure self-sufficiency in woodfuel supply and to be able to prepare meals at “zero cost” on energy. Fr. Kajubi adds that the school is committed to maintaining the woodlot; having two teachers now equipped with skills plantation establishment and maintenance. The school has also interested its students to engage in tree planting and management of the woodlot. He notes that woodlot establishment has helped the school to safeguard against land encroachers and to reduce land wrangles. In August 2017, FAO/SPGS III made a second call to institutions with interest in establishing woodlots. Subsequently, 58 institutions were selected and will receive support to establish 600ha in the March/April 2018 planting season. Also in preparation for the next planting season, the Project will conduct a plantation

establishment training for these institutions’ woodlot managers, before seedlings are delivered. So far, the SPGS III technical team has already carried out technical verification of their sites.

Since the overall target of establishing 2 500ha of woodlots is yet to be achieved, SPGS III will continue to call upon the public to apply for support to establish woodlots. Below are requirements for support for establishment of woodlots, for institutions:

1. The applicant should be a public or private institution dependent on wood fuel
2. The applicant must have land size ranging from 5-15ha, suitable for tree planting
3. Copies of proof of land ownership or any user rights should be attached
4. Signed minutes of meetings of the institution’s governing body, agreeing on the action, should be attached
5. The institution should have the willingness and ability to plant and maintain the established woodlot beyond SPGS III’s support

***NB: Plantations developed under this support are strictly for wood fuel***

***By Josephat Kawooya- Programme Associate, FAO/SPGS III***

## FAO supports establishment of demonstration woodlot at Gayaza High School



FAO through the SPGS III Project, has supported the establishment of a one-acre eucalyptus woodlot plantation at Gayaza High School in Wakiso District, Central Uganda. This was during the Annual School Farm Camp that is hosted at the School in 2017 and was this year attended by over 250 students and 50 teachers from all over the country. The woodlot was planted as a demonstration plot to help students and teachers attending the Camp, to appreciate the benefit of planting trees and conserving forests and to acquire practical skills in tree planting and management. FAO also committed to helping Gayaza High School to maintain the woodlot for a period of one year by providing relevant technical support.

FAO staff also conducted field and lecture sessions on tree nursery management and taught students and teachers the benefits of buying tree seedlings from certified nurseries and engaging in seedling production as a business. The lecture presentation was made by Zainabu Kakungulu- Program Officer, Training and Research at FAO, during the teachers' pre-Camp Conference organized by FAO. Kakungulu noted that forestry is an economically and socially viable investment option given that the market for forest products is steadily increasing.

“According to forecasts by FAO, annual growth rates in demand for timber products will rise by up to 2.5% in the coming years”, she said. In Uganda, the market size for sawn wood is 369 000 cubic metres or 1 440 000



**FAO staff- Francis Ssali (left) and Edith Nakayiza (in reflector jacket) pose with students of Gayaza High School and the Deputy Headteacher, Mr. Ddungu, after a training session on woodlot establishment and maintenance held at the school's newly-established woodlot**

cubic metres of round wood per year worth UGX 101 billion (or \$43 million)". "The market for wood products in Uganda and within the region is almost certain," she added.

According to Richard Mugweri- a teacher from Luigi Guissani High School in Kireka, "the session on forest and nursery management as a business and initiative in schools was very enriching and an eye opener to the opportunities that forestry offers". Mugweri urged fellow teachers to support their students' learning about trees and to respond to FAO's calls for support to establish forest plantations in their schools and communities. One of the targets of the SPGS III Project is to provide grants and technical support towards establishment of 4 000 Hectares (ha) of trees planted by institutions such as schools and 2 500ha of trees for fuel wood planted by communities.

The FAO team also exposed students to tree nursery management and the opportunities it offers if done as a business. They visited Uganda Tree Resources Limited, a certified tree nursery with four star accreditation

by FAO. Here, they learnt how to transplant cuttings from a mother garden to the field, field preparation for planting, importance of buying tree seedlings from certified sources, and good management practices for tree growth and maturity. Phiona Aket, a student from Tororo Girls' School in Eastern Uganda, who attended the Camp said: "I have always been interested in forestry because my father is a tree grower in Tororo District. I will use the knowledge I have gained today to buy seedlings and plant some trees at home and at school, and also teach my fellow students about tree planting".

FAO has supported the Annual Farm Camp at Gayaza High School since its inception in 2014 as part of efforts to enhance agricultural and entrepreneurial skills of young people. The theme for the 2017 Camp was: Skilling Youth in Agri-business in Tune with Wildlife Conservation. The Camp was a unique opportunity for FAO, through the SPGS III Project, to popularize the importance of forestry in the agriculture sector and to motivate and empower students to engage in commercial and community forestry.

# SPGS III Project certifies commercial tree nurseries for the period 2017/2018



*Sylvia Ayebare (left) from Ferdsult Engineering Services Limited in Buikwe District receives a certificate from Charles Byaruhanga (center)- FAO/SPGS Focal Person at the Ministry and Leonidas Hitimana (right)- FAO/SPGS Project Coordinator.*

Commercial tree nursery operators who met the minimum standards for certification were recognized and awarded certificates of compliance for the year 2017/2018. This was during the first Annual Commercial Tree Nursery Operators' meeting held in July 2017 at Silver Springs Hotel in Bugolobi, Kampala. The meeting brought together over 100 nursery operators from different parts of the country, who had participated in the nursery certification exercise. It was an opportunity for the project to give participants feedback on the certification exercise while pointing out areas for among those whose nurseries failed to meet requirements for certification. A total of 66 nurseries met the minimum score during the audits and received certification. Participants shared experiences, highlights, and lessons learnt from the certification audits. Operators of certified nurseries were informed about the opportunity to supply over seven million seedlings (SPGS III target) to community groups and woodlot beneficiaries supported under SPGS III. Other issues discussed at the meeting included: the importance of raising seedlings sourced from approved sources as well as prevention, identification and control of different pests and diseases that affect seedlings.

In attendance were officials from: National Forestry Authority (NFA), Uganda Timber Growers' Association (UTGA), National Forestry Resources Research Institute (NaFORRI), the Forest Sector Support Division (FSSD) of

the Ministry of Water and Environment and suppliers of tree nursery chemicals and equipment.

UTGA General Manager- Denis Kavuma, urged the nursery operators to coalesce into an organization through which they can benefit from collective bargaining, collective marketing, and synchronized pricing for stronger synergies. Charles Byaruhanga from FSSD noted that Government, through the Uganda National Bureau of Standards, plans to include nursery certification guidelines in the national standards for nursery and forest operations. FAO/SPGS III Project Coordinator- Leonidas Hitimana-, who also represented the FAO Country Representative- Alhaji Jallow, noted that the project targets establishment of 30,000 hectares of trees by 2020 by supporting commercial forest tree planters, woodlots for institutions, and community groups. Nursery operators are therefore key players in commercial forestry as they ensure supply of high quality seedlings.

FAO, through SPGS III emphasizes that seedlings planted by contracted grantees are sourced from certified nurseries. As such, the Project will continue carrying out spot checks on some nurseries as way of maintaining standards and ensuring that quality is not compromised. The project also continues to provide technical advice and assistance to nursery operators, whether certified or not.

Certification for 2018/2019 will be held in 2018 and a call for expression of interest will be made.. Among the key requirements for certification is the capacity to raise at least 100 000 high quality seedlings in one season and raising from seed obtained from an SPGS III recommended sources.

### Nursery training in Karamoja

The project plans to carry out the first nursery training course in the Karamoja region on 8-11 January 2018 in Moroto District. The objective of the course is to improve skills of nursery operators in the region, to enable them produce quality seedlings for use by contracted grantees in the next rain season. Nurseries within the Karamoja region, with capacity and in need of technical support will be targeted to benefit from the training.

Focus will be placed on raising species that have been selected specifically for commercial timber purposes in the region. These include: *Melia volkensii*, *Casaurina*

*equistifolia*, *Pinus Oorcapa* (improved sources) *Gmelina arborea*, *Tectona grandis*, *Grevelia robusta* and *Bathedevia* (improved *Mvule*).

### Seed availability

Uganda Timber Growers' Association (UTGA) has imported 2000gm of improved, clean seed of *Eucalyptus grandis* from NCT (South Africa) and is selling to its members at 20 000 Uganda Shillings per gram. Many nursery operators have been shying away from stocking *Pinus Caribaea* (Australia) due to its apparently high cost per kilogramme compared with that from Brazil. By April 2018 (next planting season), UTGA will import PCH Australia on order and at an affordable price. For details, contact Peter or Carol on 0785 343 564/0703 343565 or visit their offices at Plot 116 Bukoto Street, Kamwokya. Nursery operators are reminded to make timely bookings to avoid disappointment.

*By Francis Ssali- Programme Assistant-Plantations Development, FAO/SPGS III*

## Public- private partnership model boosting commercial forestry in Uganda



**Commercial tree investors admire high quality *Eucalyptus* tree seedlings at a certified nursery in Mubende District during a tour**



**A beneficiary of the plantation establishment grant poses among her trees in Central Uganda**

**F**orests are very important because they provide wood for construction, energy, food security, a natural habitat for animals, and help to reduce the effects of climate change. Between 1990 and 2015, Uganda lost an average of 90 000 hectares of forests annually, shrinking the forest cover from 24 to 10 percent. According to the Ministry of Water and Environment, only about 7 000 hectares of planted forests have been established yearly in the last 15 years.

This imbalance threatens Uganda's ability to achieve the Sustainable Development Goals (SDGs), especially on sustainably managing forests to mitigate climate change, transformation of Uganda into a green and modern economy, and the contribution of forests to livelihoods of current generations and those of posterity.

FAO applauds the Government of Uganda and the European Union for supporting commercial forestry

through innovative approaches such as SPGS III, while at the same time creating jobs and increasing household incomes of those involved in commercial tree planting. SPGS III seeks to encourage private sector investment in commercial timber plantations by providing grants and forestry technical advice to private sector investors involved in tree planting for production of timber and electricity transmission poles. Through this model and recognizing favorable government policies such as Build Uganda, Buy Uganda that promotes local consumption of domestic products, FAO- supported by the UN Office for Project Service (UNOPS), offers the investor a conditional grant of about 30 percent of the estimated total investment.

The retrospective disbursement is made after a field inspection to verify that the investor has carried out critical forest operations and has complied with the FAO/SPGS III recommended standards for quality forest plantations. This model helps to guarantee that the investor will have sufficient funds to effectively establish and manage the forest plantations while also ensuring that the plantations benefit from the recommended silvicultural operations that will favour high quality timber and transmission poles. Neglecting key operations results in poor forest plantations and poor return on investment.

So far, 520 small, medium and large scale tree growers have been selected throughout Uganda, and these will receive grants to plant a total area of about 23 000 hectares.

In order to guarantee quality service delivery by tree nursery operators and forest contractors, SPGS III conducts voluntary certification for these service providers. Certification of tree nurseries is important because tree farmers are assured of quality planting material. Certification of forest contractors on the other hand is vital because many investors in commercial forestry in Uganda have limited skills in operations related to forest plantation establishment and maintenance. Many therefore require services of experienced service providers to establish and maintain plantations on their behalf. FAO/SPGS III offers training to these service providers, who receive a one-year rating-based certification. Currently, FAO has certified 66 tree nurseries and 40 contractors. Lists of certified nursery operators and contractors can be obtained from the SPGSIII project office. The increasing demand for certification is a positive indicator of the relevance that private sector players attribute to providing quality

planting material and forestry services to support a vibrant sector.

As plantations planted during phase I and II of the project fast approach maturity, FAO/SPGS III Project will support downstream processing to ensure optimum utilisation of timber emerging from expanding plantations. The State of Uganda's Forestry 2016 reports that the estimated sawnwood market in Uganda is 369 000 cubic meters with an estimated value of 101 billion Uganda Shillings. FAO forecasts consumption of industrial wood at 1.7 million cubic meters by 2030. Investment in processing and value addition is therefore important. There are a number of processing and utilisation bottlenecks including the limited application of appropriate harvesting and processing technologies due to the high costs of machinery, operational inefficiencies, waste and low recovery rates. The project will support investment in processing technology and skills development to help match Uganda's wood processing capacity to the local demand for wood products.

Local communities and institutions that are highly dependent of wood for energy are also benefitting from the SPGS III Project which targets establishment of 4 000 and 2 500 hectares by communities and institutions respectively, majorly for provision of wood fuel or bioenergy. So far, FAO, through the SPGS III Project has distributed about two million seedlings to communities and institutions in the country.

For ownership and sustainability, FAO is implementing SPGS III together with public and private sector implementing partners, including: Uganda Timber Growers' Association (UTGA), Forestry Sector Support Department (FSSD) of the Ministry of Water and Environment, Nyabyeya Forestry College, Makerere University, National Forestry Resources Research Institute (NaFORRI) and the National Forestry Authority (NFA).

Finally, SPGS III Project has demonstrated that a model of co-investment (Public Private Partnership) and retrospective payment of grants for commercial tree planting can greatly incentivize private sector players to invest in commercial forestry and contribute to a critical mass of high quality plantations. The latter are envisaged to result in high quality forest products such as timber and create jobs along the commercial forestry continuum.

***By Leonidas Hitimana, Project Coordinator, FAO/SPGS III***

# Successful applicants for pruning and thinning support to receive financial grants

In addition to supporting plantation establishment, FAO/SPGS III offers financial support to tree farmers to prune and thin their plantations. Pruning involves the removal of dead and live branches, in stages (starting at the lower part of the crown of a tree), at predetermined times during its growth, with the aim of ensuring knot-

free timber. Thinning on the other hand is an operation aimed at minimising competition and involves the removal of a proportion of living trees from a stand at the onset of competition. Thinning can be carried out once or several times during the rotation of the crop. Below are benefits of the two operations:

PRUNING	THINNING
<ul style="list-style-type: none"> <li>• Improve timber quality, i.e. prevent the formation of dead knots, produce clear timber and reduce the size of live knots</li> <li>• Facilitate movement within stands to enable other operations, e.g. marking for thinning and wood extraction</li> <li>• Reduce fire hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Provide remaining trees with more space for crown and root development to encourage stem diameter increment</li> <li>• Remove suppressed, poorly formed, diseased, dying and dead trees</li> <li>• Provide an intermediate financial return from sale of thinnings</li> </ul>

To promote quality tree plantations, FAO/SPGS III provides a financial subsidy of 150 000 Uganda Shillings, paid per hectare, for each of the two operation. During its implementation period, the Project will support a total of 5 000 hectares of plantations, ready for pruning and/or thinning. In addition to this grant, tree farmers access technical assistance from FAO staff who ensure that the operations are carried out to acceptable quality standards.

In July 2017, the SPGS III Project made a call for expression of interest for pruning and thinning grants. After a thorough and transparent evaluation process, 244 of the 270 applicants were successful. Subsequently, the project organized a sensitisation meeting with the successful applicants, in November 2017. The meeting aimed at informing successful applicants of the terms and conditions of the grant support agreement and also to sensitise them about the expected quality standards for pruning and thinning operations.

Speaking at the meeting, FAO/SPGS III Project Coordinator, Leonidas Hitimana noted that FAO,

through SPGS III is keen on ensuring adherence to set standards in order to advance the commercial forestry sector, facilitate a higher competitive advantage for Uganda and increase incomes from sale of good timber. He also informed the meeting that FAO will work with the Ministry of Water and Environment (MWE) to establish a commercial forestry forum where private sector players can discuss issues pertinent to the sector and share good practices and experiences.

Representing the Permanent Secretary of the Ministry of Water and Environment, Charles Byaruhanga, the Principal Forest Officer, Forestry Sector Support Department, commended FAO staff for exhibiting a high level of technical competence and thanked the European Union for funding commercial forestry to improve livelihoods and incomes in Uganda. Byaruhanga encouraged tree plantation investors to consider carrying out essential operations such as pruning and thinning, that not only add value to their plantations but also create numerous jobs in the sector.

**By Andrew Namanya Akasiibayo- Programme Assistant, FAO/SPGS III**

# How to operate a commercial tree nursery as a business enterprise



*If carefully planned and managed, tree nurseries are a viable income-generating enterprise*

Over the last couple of years, there has been an increasing trend in establishment of commercial tree plantations in Uganda. During the first and second phases of the SPGS Project (2004 to 2015), 47 000 hectares of commercial forest plantations were established by private small, medium and large scale tree farmers. An additional 31 000 hectares will be planted by 2020 during the current phase - SPGS III.

The development of forest plantations has triggered growth of other forestry related income generating enterprises. One such enterprise is commercial tree nurseries, fast growing, to meet the increasing demand for tree seedlings. Tree nursery business is seen as an enterprise with quicker financial returns from the sale of planting material compared to tree planting. It is therefore an appropriate income generating enterprise for small land holders and community groups.

**Below are key technical and financial considerations for managing a tree nursery business:**

**Quality of seed:** Use of genetically improved seed is a critical aspect in growing commercially viable forest plantations. Many tree farmers are now aware of the

importance of using improved seed. Nursery operators should therefore use improved seed if they're to meet customers' demands. The main sources of improved seed are imports from Brazil, Australia and South Africa. Uganda does not at the moment have a tree breeding programme and for now, these are the recommended sources of seed for commercial forestry, until such a time when we develop our own seed orchards. The introduction of clonal Eucalyptus has to a great extent reduced the dependency on Eucalyptus seed.

**Quality and quantity of planting material (seedlings and cuttings):** Using improved seed is not an end in

itself to ensuring a good plantation. Germinating the seed and raising it into the right quality of planting material is equally vital. Through the project's voluntary annual nursery certification programme, nurseries are audited annually based on a set of established quality standards. Successful nurseries are subsequently awarded a certificate of compliance. The purpose of the nursery certification is to promote the production of quality tree seedlings from private nurseries in the right quantities and at the right time, while ensuring

customer confidence in the product. Private nursery operators also receive training and are equipped with skills to help them better manage to become more financially sustainable.

**Location of the nursery:** Careful site selection, planning and proper management are essential for sustainable production of high quality nursery stock. An unsuitable site will sooner or later increase the cost of operations and could lead to unnecessarily high seedling losses and poor stock production. Some key considerations in choosing a location for a tree nursery include:

**Topography:** The area for nursery beds should be gently sloping (two percent maximum) for better surface drainage. Standing water, no matter how little, may result in undesired unhygienic conditions that may cause diseases. Slopes greater than two percent can cause erosion. It is therefore important to choose a site with an appropriate drainage.

**Availability of water:** Securing an adequate and reliable supply of clean water is a prerequisite for starting a tree nursery. Water needs and timing of those needs must be carefully considered. For example, in eucalyptus mother gardens, irrigation may be necessary during the dry season. The key questions to

answer should therefore be: is the water source reliable during the dry season? Are backup sources available in emergency situations? Is it feasible to develop an on-site water source? Is water quality satisfactory?

**Proximity to customers, labor, and transport services:** A tree nursery should be located in proximity to seedling customers, work force and in an area with a good transport network. It is not advisable to transport seedlings to planting sites within a distance more than 100 km. Locating the site geographically close to seedling customers is most prudent. In terms of labour supply, the nursery should be within easy commuting distance.

**Site production potential:** Many nursery sites have been selected and developed with little or no allowance for future expansion. Regardless of how remote it may seem, expansion should be considered to allow room for future growth.

**Budgeting and Costing:** Budgeting is critical and must have highest priority in the development process. Budgets should be planned in advance to ensure that funding, people, and facilities will be available when needed. The budget and the action plan must be developed together.

#### An example of a budget for raising 100 000 seedlings of *Pinus Caribaea*

Item	Description	Quantity	Units	Estimated Unit Cost (UGX)	Estimated Total cost (UGX)
Purchase of seed	<i>Pinus caribaea</i> - Brazil	5	Kg	3 500 000	17 000 000
Nursery bed construction	Assorted materials	1	Lumpsum	4 900 000	4 900 000
Consumables	Assorted	1	Lumpsum	11 550 000	11 550 000
Labour	Casual workers and 1 permanent supervisor	1	Lumpsum	5 000 000	5 000 000
Tools and equipment	Assorted		Lumpsum		500 000
<b>Estimated total cost</b>					<b>33 950 000</b>

**Budget analysis and interpretation:** From the above example, the estimated unit cost of production for a seedling is about UGX 340. Going by UGX 500 as the minimum selling price of a pine seedling (could go as high as UGX 700), with a production capacity of 100 000 seedlings annually, one is able to earn up to UGX 16 000 000 annually. It is important to note that increasing the

quantity produced would significantly lower the unit cost of production while lowering production would increase it. This therefore implies a minimum number of seedlings to produce for one to have a viable enterprise.

**By Zainabu Kakungulu, Programme Officer- Training, FAO/SPGS III**

# Growth in commercial forest plantations presents opportunity for wood processing industry in Uganda



*A semi-permanent sawmill*

Over the past decade, the forest sector in Uganda has registered tremendous growth in area of commercial forest plantations established particularly for timber and poles. During the last first two phases of the SPGS project (2004 – 2015), over 45 000ha were planted by small and medium private tree farmers. Other entities such as the National Forestry Authority (NFA) and large private companies such as New Forests Company, Green Resources AS and Global Woods, also established about 15 000ha of commercial forests. SPGS III has a target to support establishment of an additional 31 000ha. Unquestionably, there great increase in the forest plantation resource base in Uganda. In order to ensure optimum future processing and utilisation of wood emerging from expanding plantations, there's need to start focusing on establishment of efficient processing and facilities. To ensure sustainability of Uganda's forestry sector and to realize benefits from such a huge forest resource base, plantations must be felled at maturity, logs processed, residue wood products efficiently utilised and then replanting conducted immediately after. This calls for good milling facilities to process wood, while ensuring waste minimization, increased energy efficiency as well as improving operator safety.

However, Uganda still has inadequate and poor milling facilities, forcing many tree growers to unsatisfactorily carry out the recommended three levels of thinning, fearing to lose value on their trees. Many communities

and small and large scale tree growers are grouped into clusters based on regional representation, but have no access to modern downstream processing facilities. As such, tree growers are forced to rely on the wide-spread mobile milling facilities which are inherently inefficient, have low utilisation of wood waste and offer a low price for raw timber. This is reducing tree growers' return on investment.

A 2013 study by Mike Howard of Fractal Forest predicted that yield for first, second and third thinning from existing plantations would be 175 000m<sup>3</sup>. Howard extrapolated age class distribution data for SPGS supported plantations and applied expected yields from recommended thinning and harvesting regimes to the data to predict wood flow for Uganda. By the end of 2013, Uganda had an estimated sawmilling capacity of about only 30 000 m<sup>3</sup> per year. Today, Uganda needs six times the sawmilling capacity it had in 2013 to process the estimated volumes from thinning.

Plantation development in Uganda has fluctuated with availability of investment funding. This means that the plantation yield will not be regular. When clear-felling commences around 2022, yield from thinning and harvesting can be regulated to 700 000 m<sup>3</sup> per year up to 2030 by levelling out peaks and troughs in the various age classes (Mike Howard, 2013). Going by 2013 processing capacity, it is reasonable to conclude that investment in modern and efficient processing facilities

should start now. New processing facilities will need to concentrate on high productivity, light to medium equipment, high recovery percentage and product yields, low maintenance costs and superior accuracy.

Wood processing is the production of forest products, such as pulp and paper and construction materials. Utilisation means to use or convert wood into any usable form. Wood processing and utilisation includes: harvesting, sawmilling, wood drying, wood preservation, board making, timber engineering, marketing and disposal and use of forest produce. Investing in downstream processing and utilisation reduces the importation of expensive timber and timber products from overseas and can help to improve Uganda's wood processing competitive advantage. Moreover, importing timber from sources such as the Congo basin is not sustainable because of slow growth rates- 1m<sup>3</sup>/ha/year of natural forests compared with plantation forestry with growth rates greater than 10 m<sup>3</sup>/ha/year. Investing in downstream processing and utilisation creates jobs in Uganda and develops the local forestry sector. Plantations developed with SPGS support are grouped into clusters and so cluster-based processing facilities are ideal.

In SPGS III, downstream processing and utilisation will focus on sawmilling, taking into consideration the entire forest plantation resource base in Uganda. The Project will promote horizontal value addition (value addition at the saw mill) more than vertical value addition (further processing of a product). SPGS III seeks to support private sector to develop a model for investing in downstream processing and utilisation. Methods and machinery to conduct processing and utilisation in the saw mill will consider the following criteria:

- Recovery- percentage of output from input



*Josephat Kawooya, Programme Associate at FAO/SPGS III measures basal area for calculation of volume*

- Productivity
- Yield
- Investment and operational costs

Downstream processing and utilisation will commence with an evaluation of the following five pre-requisites for wood processing:

### **Mapping of biological asset**

Mapping of existing compartments helps planners to visualise the spatial distribution of the plantations, including boundary coordinates, effective area, distances from settlements and rivers and road network.

#### **Inventory**

An operational inventory will inform the saw millers of the product mix needed to meet the customer expectations. The type of sawmill and equipment required must be proportional to the resource base. There is also a need to generate an industry-consolidated forest management information system (FMIS).

### **Markets for both mainstream products and wood waste**

All steps in the forest value-added production chain aim at generating sustainable economic outcomes. One critical step is to identify suitable markets, even before cutting the logs. Mills must be designed to produce particular products for specific markets; for instance sawing pallets for framing market; structural timber for construction industry and select timber for furniture manufacturing. Currently, buyers of wood products in Uganda are more demanding and assertive; asking for improved timber grading, specific lengths, smaller volumes, shorter delivery times and specific species among others. Tree growers and sawmill investors in Uganda must therefore take these preferences into consideration as they plan for downstream processing.

Besides marketing timber as the mainstream product, wood processors can also market the wood waste as it is a valuable resource for the other industries.

### **Wood properties**

Information on wood properties for example radial and tangential shrinkage of timber to be converted into saw mills is required before cutting patterns and kiln drying schedules are determined. Other properties such as calorific values and ash content of waste from the saw mill must be determined for recommending appropriate energy production uses.

### **Logging systems**

Poor felling and bucking techniques reduce the value of logs and so investors ought to ensure use of efficient logging systems to maximise log recovery at harvesting. Logging systems must maximise utilisation of each

tree, plan the length of each log, optimise on terrain transport, produce customer preferred products, use efficient logging machinery and design an optimal road density.

### Capacity building

To supplement their knowledge and skills in downstream processing, tree growers and forest managers also need skills in various aspects, such as: harvesting, sawmilling,

timber drying, timber grading, saw doctoring and marketing.

Finally, SPGS III will help to address the prerequisites for downstream processing so as to help tree growers to benefit more from their investments.

*By Walter Mapanda- Forest Plantation Technical Advisor, FAO/ SPGS III*

## Pests and diseases of tree nurseries in Uganda

### Introduction

Pests and diseases are important limiting factors in the production of forest seedlings within nurseries. Environmental conditions within nurseries are

often ideal for proliferation of pests and diseases. Growing seedlings usually in extensive monoculture systems provides unlimited food for the pests and diseases when they infest. This document provides common pests and diseases in tree nurseries of Uganda.

### Common diseases in tree nurseries

Disease	Symptoms	Common host (s)	Management options
 <p>Mycosphaerella leaf spot</p>	<p>Small blackish spots on the underside of leaves and purplish or brown spots on the upper side that may result in early leaf drop</p>	<p>Hard woods such as <i>Eucalyptus</i></p>	<p>Preventive treatment is recommended as use of chemicals (fungicides) is not quite useful after attack. Plant disease-tolerant material</p>
 <p>Damping off</p>	<p>Disease of emerging seedlings resulting in rotting of seedlings from the stem tissue, just above the root collar, making the seedlings to topple over. The disease begins in patches and finally spreads to the entire bed. Pre-emergence damping-off occurs when fungi infect developing radicals and kill seedlings while shoot tissues are still below ground. Post-emergence damping-off occurs when fungi infect the succulent tissue of germinant above ground, causing decay, wilting, and death. <i>Rhizoctonia</i>, <i>Fusarium</i> and <i>Pythium</i> spp are the most common pathogens responsible for damping off.</p>	<p>Hard woods particularly <i>Eucalypts</i> seedlings</p>	<p>Optimum sowing density, Appropriate quantity of water, avoid damaging the bark of seedlings, application of chemicals, such as copper oxide and Benlate (Benomyl 50%) on onset of disease.</p>

	Mycelium and spores of the fungus are seen as a whitish growth on the host surface of affected seedlings.	Most Eucalypts spp and conifers.	Avoid overcrowding of seedlings to reduce humidity. Remove and destroy infected seedlings. Spray with appropriate fungicides
Cylindrocladium leaf spot	Grayish brown leaf spots on leaf surfaces. Whitish masses of fungal spores on older lesions. Can form on old lesions and shoot. Blight, cutting rots	Hard woods especially Eucalypts. GC Eucalyptus cuttings and other <i>Eucalyptus spp.</i>	Increase plant spacing to reduce humidity. Ensure good sanitation practices to reduce inoculum. Minimize wounding of the seedlings and segregate severely diseased plants. Apply Mancozeb (Dithane) to infected seedlings

### Common insect pests in tree nurseries

Insect pest	Symptoms	Common host(s)	Management options
Blue gum chalcid ( <i>Leptocybe invasa</i> ) 	 Minute black insect (<1.5 mm long) Forms galls on foliage and twigs	Eucalypts	Biological control using parasitoid <i>Selitrichodes neseri</i> . Systemic pesticide such as dimethothate used at nursery level
Aphids (Affects many species such as <i>Cinara</i> spp) 	Aphids feed on plant sap, causing yellowing of foliage, curling of leaves, branch deformities and in extensive attacks, death of seedlings. Aphids excrete a sugary substance called honeydew on foliage which can progress into black sooty mold.	Most susceptible tree seedling species are Grevillea and Eucalyptus.	Maintain seedling vigor through appropriate fertilizer application and watering to reduce stress to seedlings. Apply systemic insecticides, e.g. Dimethothate. Follow directions given by manufacturer.
Mole crickets ( <i>Gryllotalpidae</i> ) 	Pest tunnels nursery soil, uprooting some seedlings in the process. Some feed on roots and can cause serious damage.	Pines but also different types of seedlings	Primary option is chemical control using chemicals such as: Dursban, fipronil and imidacloprid. Biological control using parasitic wasps and nematodes also appropriate.

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Cutworms (noctuidae)



Larvae feed on newly emerged seedlings. Symptoms include cut or chewed seedlings, occasionally clipped on the ground line as shown below



Figure 49-1—Curworm damage on young conifer seedlings. Note clipped needles.

Attack a wide variety of both conifer and hardwood seedlings; damage is generally more severe among conifers.

Maintain nursery beds and keep surrounding areas neat. Apply chemicals such as diazinon, chlorpyrifos, or trichlorfon at the earliest sign of damage.

White grubs (*Phyllophaga spp*) and adult (beetle)



Japanese beetle larva



James L. Castner, U. Fla. Ent. Dep.

C-shaped white grub larvae (see fig on left) feed on primary roots of seedlings. Roots appear sparse or chewed. Seedling foliage wilts or gets discolored. Girdling or removal of entire tap roots. Severed or missing lateral roots.



All coniferous and hardwood seedlings are susceptible to attack.

Remove sod from nursery environment. Fumigate seedbeds with methyl bromide before seeding to eliminate white grubs. Apply granular insecticides to beds of established seedlings.

Red gum lerp psyllid (*Glycaspis brimblecombei*)



Production of large amounts of honeydew on which sooty mold develops. White conical waxy covers called lerp (see image below) on foliage. High populations lead to withering of leaves, severe defoliation, dieback and eventually tree death.



Eucalypts seedlings/trees

Biological control using a parasitoid-*Psyllaephagus bliteus* Application of systemic insecticides such as dimethoate

<p><b><i>Thaumasticoris perigrinus</i> (Bronze bug)</b></p>  <p><small><i>Thaumasticoris perigrinus</i> Photo: Samantha Bush, FABI</small></p>	<p>Bronze bug is a light brown insect with darker areas on the upper side and has a flattened body of about 3mm in length. Normally found on older parts of foliage. The young bugs look like lice in size, colour and shape. Feeding causes affected leaves to change to bronze-metallic like colour, branch dieback and mortality.</p>	<p><b>Eucalypts</b></p>	<p>Biological control using a parasitoid wasp- <i>Cleruchoides noackae</i> Application of systemic insecticides such as dimethoate</p>
<p><b>Mealybugs (Coccoidae)</b></p> 	<p>Pest normally covered in a waxy secretion making it look cottony. Pest feeds on the soft tissues of plants and injects toxic saliva that causes yellowing, curling and distortion of leaves. Seedling shoot tips can develop a bushy appearance. The mealy bug excretes honeydew, the basis for symbiotic relationships with ants. Honey encourages the development of black sooty mold. High populations can kill seedlings.</p>	<p>Infests all types of seedlings particularly citrus seedlings</p>	<p>A healthy tree or plant is the best defense against mealybug and other pests. Start by planting a healthy seedling. In case of infestation, apply systemic insecticides such as dimethoate</p>
<p><b>Mvule gall fly</b> (<i>Phytolyma lata</i>)</p>		<p>Muvule (<i>Milicia excelsa</i>)</p>	<p>No control yet. Timely management in nursery to avoid stress factors.</p>

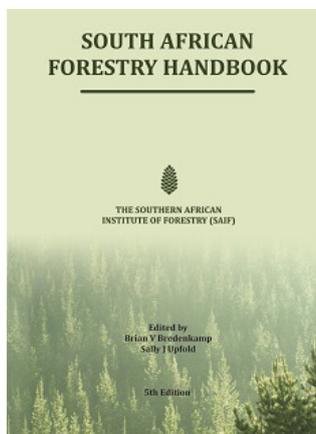
### Conclusion

Insect pests and diseases in forest nurseries should be prevented because infestation can spread very fast and cause extensive damage in a relatively short time. It is therefore important to promote conditions which are non-conducive for pathogen or pest development and spread. Use healthy seed to produce healthy seedlings within nurseries. Treat infected seed with appropriate chemicals if pathogens or pests are suspected. All seeds should be routinely treated with running-water rinses to help reduce pathogen surface contamination of seed coats.

Nursery sanitation is important because it reduces conducive conditions for pests and diseases. It is also important to carry out extensive and effective monitoring within nurseries to identify infestations early and deal with them timely. Applying chemical is often the least desirable option; although, sometimes this is the only way to prevent extensive loss. Should chemical spraying be necessary, none persistent chemicals should be used to avoid resistance and resurgence.

By Peter Kiwuso, National Forestry Resources Research Institute (NaFORRI)

# BOOK CHAPTER REVIEW: Wood quality of eucalyptus sawn timber: Effects of site and silviculture



In this chapter, Malan presents excellent summaries of scientific research regarding the effect of silviculture on the wood quality of eucalyptus sawn timber, conducted by different institutions in South Africa and other countries. Tree farmers in Uganda who are increasingly investing in establishment of eucalyptus plantations, particularly *E. grandis* as a preferred species for production of sawn timber and transmission poles will find this publication insightful.

The introduction points to the remarkable success of tree breeding programmes started in the 1960s that led to increased growth rate, improved stem form, improved adaptability and reduced levels of growth stress in eucalyptus trees. The latter is of great significance since it greatly affects the conversion efficiency and quality of wood.

Readers are made to understand that whereas the quality of sawn timber produced by *E. grandis* is not yet ideal due to its tendency to split and the variability within the tree, its wood is increasingly becoming popular because of its availability and pleasing appearance; plus the fact that the wood is open-textured, straight-grained and fairly strong. This chapter analyses the effect of different silvicultural practices, including spacing, pruning and thinning on the wood quality of sawn timber from eucalyptus.

**Spacing:** Quoting results of the research conducted by Malan and Hood (1992) on the Nyalazi CCT spacing trials, the chapter examines the effect of planting density on wood density, growth stress related defects and anatomical wood properties. Results indicate that freely growing trees (final stand 124 trees/ha) tend to attain mature wood density quicker while exhibiting a higher degree of uniformity than suppressed trees (final stand of 741/ha). Fast growing trees had significantly higher proportions of relatively homogenous wood compared to the slow growing trees

and were thus capable of yielding timber products with more reliable performance characteristics. There was a strong inverse relationship between planting density and average wood density. Contrary to the commonly held view that high growth rates tend to increase growth stress splitting, no effect of growth rate on growth stress splitting was observed.

**Pruning:** Malan notes that despite the good pruning qualities of *E. grandis*, its boards tend to exhibit knots with deep checks. These are normally associated with timber defects such as: cross fractures, excessive grain distortion, seasoning checks and compression failures. From a synthesis of studies conducted to determine the effects of pruning eucalyptus on wood quality of sawn timber, this chapter reveals that artificially pruning eucalyptus was found to promote clear wood formation.

**Thinning:** While analyzing the effect of thinning regimes on the quality of wood, Malan notes that there is evidence that severity of growth stress expression can be controlled by ensuring appropriate thinning to provide optimum rate of

diameter increment and improved radial uniformity and wood stability. Planting and thinning regimes designed to ensure rapid and free growth tend to promote within-tree uniformity in wood density while ensuring that growth stress is kept at a minimum.

Finally, the author stresses that practices aimed at maximizing individual tree volume growth (spacing, thinning and fertilization) in *E. grandis* have practically no adverse effects on the quality of wood produced by the remaining trees and the level of growth stress generated in individual trees. "In fact, results suggest that fast uniform growth results in improved wood quality as logs in the final harvest are less variable across the radius of the log".

"Malan, F. 2012. Wood quality of eucalyptus sawn timber; Effects of site and silviculture. In B.V. Bredenkamp and S. J. Upfold, eds. The South African forestry handbook 2012, 5th Edition, pp.667-672. South Africa, Southern African Institute for Forestry".

*Reviewed by Henry Ahimbisibwe-  
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# Timber Market Survey- Quarter Four, 2017

**Table 1: Current retail prices for selected timber species and sizes**

Specie	Size (inch x inch x foot )	Average Price (UGX)
Eucalyptus	Poles 4-6 inches	3,000
Eucalyptus	4X3X14	18,000
Pine	12X1X14	50,000
	6X2X14	18,000
	4X2X14	12,000
Mahogany	12X2X14	115,000
	8x2x14	85,000
Mahogany(Congo)	12X1X14	110,000
Mahogany(Uganda)	12X1X14	75,000
Mvule	12X2X18	170,000
	12X2X14	125,000
	8x2x14	110,000
	12X2X18	160,000
Nkalati	12x2x14	85,000
	12x1x14	55,000
Kirundu	12X1X14	7,000

Table 1 above shows the average timber prices as reported by timber dealers around Kampala in the last quarter (October – December) of 2017. Generally, the prices for locally sourced and imported boards (hardwoods) remained constant.

Figures 1-3 show the price trends of major species traded in Uganda in recent years, based on dealers’ retail prices in Kampala. Generally, the timber prices for both locally sourced and imported boards remained constant.

The prices of pine wood remained constant; attributed to the increasing supply of thinned wood from plantations. Some traders argued that efficiency in wood conversion had considerably reduced production costs, as a number of small mobile mills had been fabricated or imported.

Other traders attributed the stagnation in prices, despite the continued demand, to distance from the source of the timber.

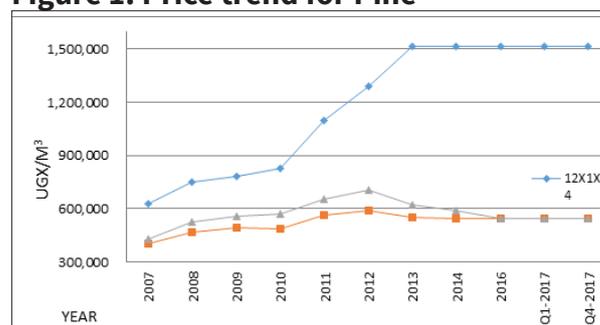
Most of the wood was from nearby plantations in the central region, and the transport costs from the said areas were considerably low.

The constant price was also due to change in preference by contractors who argued that eucalyptus prices were lower, the supply was sufficient and that eucalyptus was a harder wood. The price of the eucalyptus species remained constant, this was attributed to the increased supply.

Most of the eucalyptus logs were sourced from nearby thinned plantations which were being converted using fabricated sawmills in Bwaise and Ndeeba suburbs of Kampala. With the introduction of these fabricated machines which can convert the thinned logs, it’s anticipated that prices of both pine s and eucalyptus species might remain unchanged.

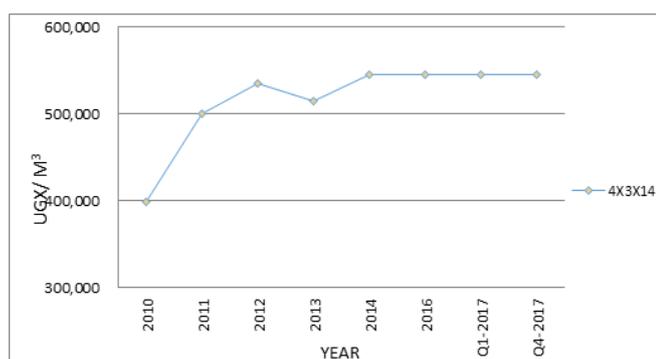
The prices of most of the hard woods remained constant; this was attributed to the stable supply and low demand. In addition, a variety of the hardwoods were available in the market; Mahogany (*Khaya* spp.), mvule (*Milicia excelsa*) and Nkalati (*Afrosesalicia cerasifera*), which acted as a substitute in case of scarcity of one of the species.

**Figure 1: Price trend for Pine**



(Source: FAO/SPGSIII)

**Figure 2: Price trend for Eucalyptus**



(Source: FAO/SPGSIII)

**Figure 3: Price trend for Mahogany**



(Source: FAO/SPGSIII)

**Eucalyptus Poles Market**

**Table 2: Current retail prices for treated and untreated Eucalyptus poles for different sizes**

Size (Metres)	Price(Seasoned ) (UGX)	Price(Treated ) (\$)
10	172,500	163
12	282,500	234
14	302,500	274

(Source: FAO/SPGSIII)

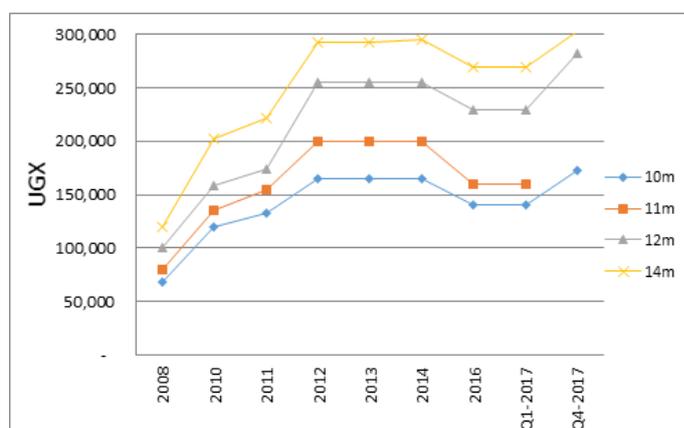
\*\$ =UGX 3,640 @ 05/01/2018

Table 2 shows the current average prices for seasoned poles and the selling prices for treated poles as reported by different pole treatment plant operators.

Figure 4 shows the price trends for eucalyptus poles in Uganda over the past few years as reported by different pole treatment plant operators. The figures indicate an increase in the prices of poles of sizes 10, 12 and 14 metres. This was attributed to general inflation in the last quarter of 2017 which led to the increase in transportation costs, consequently reflecting on the pole price.

Note the absence of the price for poles of size 11 metres. Poles of this size have been phased out in Uganda by the Electricity Regulatory Authority (ERA) and so were not being purchased by the different pole treatment plants. Most of the pole treatment plants reported an increase in the supply of poles but at the same time decreased high levels of splitting which they said was mainly observed in clonal eucalyptus.

**Figure 4: Price trend for Eucalyptus poles**



(Source: FAO/SPGSIII)

**Timber news from around the world**

**Increased demand for certified timber could be a major challenge**

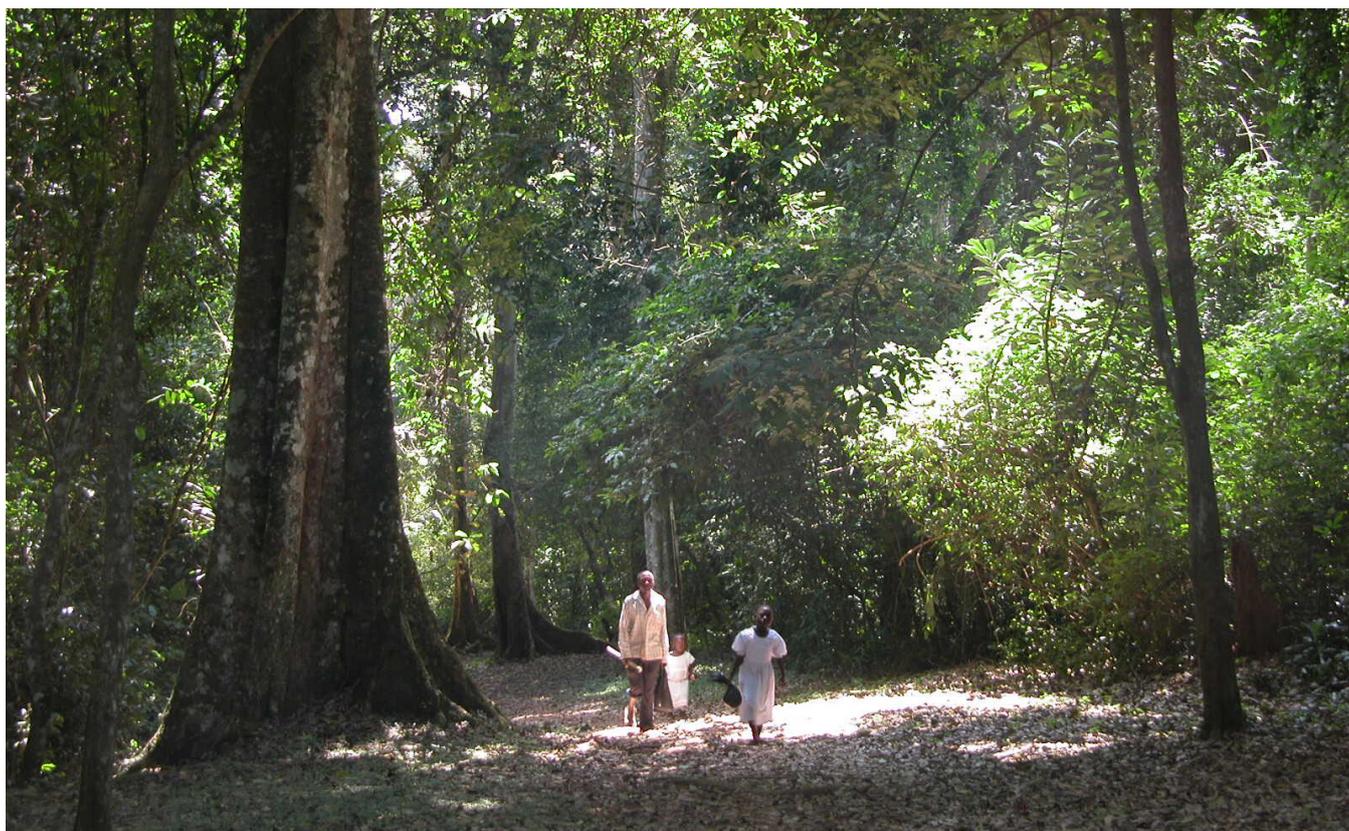
In terms of markets, the main focus of producers is China. While there was some uncertainty early in the year on which way demand in China would go, producers are now reassured that demand in this market has stabilised and that there are good prospects for West and Central African suppliers. Manufacturers in China are very mindful of the European Union and U.S. regulations aimed at eliminating illegal timber from the trade. There is some concern amongst West and Central African producers that buyers for the Chinese market will eventually demand, not only verified legal, but also ‘certified’ logs and sawn wood. Analysts proffer that this would be a huge challenge for many producers given the complexity of their businesses and the costs involved.

**Reconstruction in Middle East could pave the way for export growth**

For African producers, market prospects in the Middle East could improve as the various conflicts in the region come to an end and reconstruction of infrastructure and housing begins. This market is unique in that it absorbs the most diverse variety of wood products anywhere in the world, often of the lowest quality and grades and at the lowest prices. (Source: www.itto.int)

By Peter Bahizi- Programme Associate, FAO/SPGS III

# Forestry Quick Facts



- 1** Forests cover one-third of the world's land area and host more than half of the world's land-based plant and animal species.
- 2** Trees are a great carbon sink, with the world's forests removing an estimated 2.1 Gigatonnes of carbon dioxide annually – that's 2.1 billion tonnes! This plays a fundamental role in balancing the world's carbon cycle and helping to combat climate change.
- 3** Almost 900 million people, mostly in developing countries, are involved in woodfuel and charcoal production. About 2.4 billion people worldwide, or one in three, use woodfuel to cook meals, making wood energy a major contributor to food security and nutrition. Woodfuel provides 40 percent of today's global renewable energy supply – as much as solar, hydroelectric and wind power combined – and demand for bioenergy is soaring.
- 4** The world is witnessing a net loss of 3.3 million hectares of forest area a year - an area the size of Moldova. However, more than 20 developing countries have improved food security while maintaining or increasing forest cover. This shows that it is not necessary to cut down forests for agriculture in order to reduce hunger – quite the opposite! We need to manage forests sustainably so that they can remain healthy, provide a variety of goods and services and even support agriculture, livestock and fishery production.
- 5** Sustainably managed forests provide the primary raw material for paper, which is renewable and one of the most recycled materials in the world – around 55 percent or 225 million tonnes of all fibre used for paper production nowadays comes from recovered paper.
- 6** Food security can be achieved through agricultural intensification and other measures such as social protection, rather than through expansion of agricultural areas at the expense of forests.  
**Food and Agriculture Organization of the United Nations (FAO)** <http://www.fao.org/zhc/detail-events/en/c/1033884/>
- 7** The combined contribution of forests to soil and water management, carbon sequestration and future uses for Uganda's biodiversity is valued at US\$ 130.7million.  
**The State of Uganda's Forestry 2016, Ministry of Water and Environment**





SPGS III is a project of the Government of Uganda, funded by the European Union and implemented by the Food and Agriculture Organization of the United Nations (FAO)

21 March International Day of Forests



[www.fao.org/forestry](http://www.fao.org/forestry)



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