KEFRI NEWSLETTER

KENYA FORESTRY RESEARCH INSTITUTE No. 20 June 1992

Give the people a say in Environmental Conservation, Says Minister

Urban Centres still depend on fuel wood despite lack of space to grow sufficient quantities.

The Minister for Research, Science and Technology, Hon. Kirugi L. M'Mukindia, has challenged forestry planners to give a say to the local people in the decisions which affect them. He said that local communities must be involved in whatever land use and conservation strategies being developed.

The Minister was opening the 4th Social Forestry Prize day at ICRAF auditorium in Gigiri, Nairobi on the 23rd of April.

He also paid tribute to the role played by women. "Women play a vital role in land use and they must be given recognition for that", he said. He added that although the organisers of the Social Forestry Event had recognised this concern, women's views must be considered when development programmes in Social forestry are being discussed, designed and implemented.
The Minister also thanked the Government and the people of Japan through her Excellency, the Ambassador, Madame Jinko Sato, for the Technical and Financial support that her country had extended to Kenya. He noted that to date, over

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KEFRI, the Kenya Forestry Research Institute is a National Forestry Research Institute mandated to undertake all aspects of forestry research and development within the context of formal and informal (industrial and farm) management.
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Dear Reader,

The Editor invites, views, comments and contributions. He, however, reserves the right to edit and change articles in accordance with the institute policy.

Editor

Dear Editor,

Are you a Scientist or a Technician?

Most people think that most scientists at present are actually undertaking simple routine technical work.

Apart from causing redundancy on the part of technicians and improper usage of meagre resources, this trend is leading to the inability of many scientists to solve basic problems. It is necessary that a balance is struck between the attractive short-term benefits of applied research and the degenerative consequences of ignoring the advantages of basic research.

A scientific researcher is a person learned in science, and devotes his time in research by application of specific methods. Methods are the principles and procedures employed in the systematic pursuit of knowledge, involving the recognition of the need to formulate a problem, collect data, formulate hypotheses, test and confirm or disapprove hypotheses.

On the other hand, a technician is a specialist in the technological details of a subject. In essence, technicians provide a service to the management side of an industry.

Currently, there is a conspiracy towards secrecy among many scientists which leads to duplication of work. Consquently, many questionable statements appear in several places leaving several people wondering where forestry research is headed for.

James Maina Were

KEFRI Operates under Five research programmes:
— Silviculture and Tree Improvement
— Forest Protection and Conservation
— Utilization and Forest Products
— Social Forestry Training and Research Development
— Research Support Unit

FOURTH SOCIAL FORESTRY PRIZE DAY

The Fourth Social Forestry Prize Day was held at the International Centre for Research Agroforestry (ICRAF) Auditorium, in Nairobi on 23rd April 1992.

This year's event drew participants from Machakos, Kitui, South Nyanza, Taita/Taveta and West Pokot. The aim of the one day event was to provide a forum for exchange of ideas between selected forestry farmers from the five districts on their objectives, experiences and problems. It was also hoped to promote National Awareness of Social Forestry and enhance tree planting in rural areas.

Social Forestry Prize Day is part of the wider Social Forestry Training Project which aims at promoting tree planting activities for the people and by the people. The project has its headquarters in Muguga at the National Social Forestry Training Centre under Kenya Forestry Research Institute. Its regional offices are in Kitui at the Regional Social Forestry Training Centre. The project is funded by the Japanese Government through the Japan International Cooperation Agency.

During the one day workshop, judges adjudicated over presentations made by the participants from the five districts. At the end of the day, prizes were awarded according to the scores received. The judges are drawn from leading forestry Research Scientists, Foresters and the Chief Advisor for the Social Forestry Training Project.

This year, the first prize consisting of a bicycle, two wheelbarrows, hoes, shovels and watering cans went to a Primary School from the West Pokot District. This was in recognition of the school's forestry club achievements. The school is Chelombai Primary School in a nomadic area. Through the efforts of the club, the school is influencing the otherwise nomadic tribe to settle and plant trees as a source of alternative income to their livestock. The club scored 31 points.

The second Prize went to an individual farmer from Taita/Taveta district, Mr. Mwamburi Mkambo. Mwamburi is a widower living all alone as his only children are daughters, married and living far away.

The old man Mr. Mwamburi Mkambo from Taita Taveta practices some form of agroforestry, but of especial importance is the fact that trees represent his source of cash. He lives all alone and does all his work all by himself. As for the school from West Pokot, Chelombai Primary School, their aim is to influence the local community to practice tree farming. Through planting certain types of trees that can be used as fodder during the dry season, it is possible to persuade some nomads to establish permanent settlements. Most nomads in West Pokot do not see the need to plant trees as they are not sure of staying in any particular place for more than eight months. However, because the school has some water and trees, signs of more permanent settlements were beginning to emerge in the neighbourhood. Some parents were even beginning to show interest in the trees planted by their children and were helping in looking after the young trees by watering and protecting them from livestock attacks.

The climax of the Prize Day was the issuing of individual prizes by the Minister for Research, Science and Technology, Hon. Kirugi M'Mukindia.
In his remarks, the Minister stressed the need for tree planting as most of Kenya is semi arid. The Minister was happy to note that tree planting was beginning to bear fruit even within the nomadic areas of Kenya.

The occasion was also attended by the Ambassador of Japan to Kenya, Her Excellency Jinko Sato. She said that she was happy to be associated with the Prize Day and that her country was determined to support Kenya in Social Forestry.

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1300 farmers and local leaders had been trained by the project since it started. The Minister also thanked ICRAF for availing their facilities to the project to hold its one day workshop.

Turning to the participants, the Minister congratulated them for their self motivated initiatives that had led to their selection to the competition.

Paul Barasa

THINNING AND PRUNING OPERATIONS IN FOREST MANAGEMENT

Introduction

Among the various silvicultural operations undertaken in plantations, thinning and pruning are the most crucial in that they, to some extent, determine the value of the wood products obtained. Silviculture has been defined as: the art of producing and tending of forests. The subject matter of silvicultural practices consists of the various treatments of forest stands that may be applied to maintain and enhance their productivity. The silvicultural operations are normally directed at the creation and maintenance of the kind of forest that will best fulfil the objectives of the owner. In managed forests, the rate at which value is produced, and not the final value is the important factor.

A managed forest is more productive than one that is unmanaged or mismanaged. Management of a tree crop ensures:

— Control of composition,
— Control of stand density,
— Restocking of unproductive areas,
— Control of length of rotation,
— Facilitating the harvesting, management and use of the forest land, and
— Protection of site and indirect benefits.

Silvculture is usually a combination of improvement upon and limitation of natural processes of forest growth. In this report, two silvicultural operations, thinning and pruning are reviewed. Details include an assessment of the suitability of the schedule employed and also their economic soundness.

THINNING

Thinning is fundamentally a technique of controlling the density of the stands. It is the designed removal made in immature stands in order to stimulate the growth of trees that remain and to increase the total yield of useful material from the stand. Surplus trees are removed for the purpose of concentrating the potential wood production of the stand on a limited number of selected trees. The primary objectives of thinning is to keep the more promising trees growing steadily by removing less desirable neighbouring trees before competition becomes injurious. Thus the most common policy followed in thinning is to encourage the growth of the leading trees rather than to resuscitate those that have fallen behind.

The total production of cubic volume by a stand of given a age and a given site is for all practical purposes constant and optimum for a wide range of densities of stocking. It can be decreased but not increased by altering the amount of growing stock to levels outside this range. On the other hand, the total yield of a stand is augmented largely by virtue of the utilization of trees that would ultimately die of suppression. Therefore, the fundamental objectives of thinning are;

(a) to redistribute the growth potential of the stand to optimum advantage,

(b) to utilize all merchantable material produced by the stand during the rotation, and

(c) to regulate the distribution of growing space for the advantage of the existing crop

Trees to be Thinned

At any time thinning is carried out, a choice has to be made as to which trees are to be retained for either subsequent removal or retention as the final crop. The selection of the trees to be favoured and of those to be cut in thinning is based on relative position and condition of the crown, the health of the tree, and the condition and quality of the tree bole.

Thinning Schedules

A thinning schedule is essentially a series of temporary reductions made in stand density (measured in terms of basal area of some similar parameter) to maximize the net value of products removed during the whole rotation. Three main considerations enter into the development of an effective thinning schedule. It is first necessary to decide which method(s) of thinning should be employed at each state of the rotation. Second consideration is the timing of the first and subsequent thinning. Finally, it is necessary to determine approximately how much growing stock will be left after each thinning.

Four thinning methods or approaches include:

— Low crown thinning,
— Crown thinning,
— Selection thinning, and
— Mechanical thinning.

Of these, low crown thinning is the most commonly used in our forest management practices. In theory, the first thinning can be carried out just as soon as the crowns or the root systems of individual trees close together and start to interfere with one another. The best single criterion for determining when to apply the first thinning is the live crown rotation, i.e., percentage of length of stem clothed with living branches of the potential crop tree. It is also worthwhile to note that as long as a satisfactory ratio is maintained, a stand need not be thinned unless the thinning will pay an immediate profit.

The first thinning is usually referred to as pre-commercial or non-commercial thinning. First thinning differs from commercial thinning in that it will not contribute to the future increase in value of the stand. If an investment is required to carry out the first thinning, it is desirable to make it heavy enough to ensure that no further treatment will be required before the stand reaches the stage where a profitable cutting can be made.

The longer the first thinning is postponed, the grater is the risk that it will be followed by wholesale losses. The immediate financial advantages of postponing the first thinning should be carefully weighed against the danger of being trapped in a vicious circle in which treatment become ever more necessary and ever more dangerous. There are several considerations that affect the timing of the first thinning in different situations. Some of these include;

— the extent the natural pruning has proceeded depending on the species.

— the taper of the stems,

— the width of the crown, and

— a stand in which the trees have ben artificially pruned should be thinned immediately to ensure that the pruned trees survive and grow rapidly.

Timing of Subsequent Thinning

As crowns expand, the number of trees that can occupy a given area to the best advantage decreases and the surplus volume available for removal in the next thinning accumulates. The heavier the thinning in general, the longer is the interval between them. However, heavy, infrequent thinning tends to reduce the total yield of a stand, because of the long periods during which parts of the growing space remain unoccupied. In the forest plantation management, subsequent thinning are undertaken at equal intervals, usually five years. The practice of repeating thinning at equal intervals simplifies administration but has no other virtues. In reality, young stands should be thinned more frequently than old ones because they close up more rapidly.

The Need to Thin

It has been observed that thinning can only manipulate the final wood product, but cannot increase the productivity of a given site. This then raises the question of whether to thin or not. Several factors come into play in determining the necessity of thinning. First is the initial espacement used in establishing a plantation.

The closer the spacement used in establishing a plantation, the higher the need to thin out some to encourage vigorous growth in the final crop trees.

Second, is the rotation, the longer it is, the greater the growing space an individual tree will require and consequently the accelerated demand to thin. The end product envisaged from a given plantation also determines the treatment of a given stand. With pulpwood, the tree sizes need not be huge and thus a shorter rotation is possible as opposed to peeler logs which for the same species and site will take longer rotations. As pointed out above, this will have a direct bearing on the need to carry out thinning to attain our specific objectives.

Pruning

Trees must have branches and branches form knots which are the most common defects of wood grown in managed forests. Branches do not necessarily fall off when they cease to function as their continued presence is not a crucial handicap to the survival of the tree. Knots formed by living branches are far less damaging than those left by dead branches, but it is nevertheless desirable to to control their size. The elimination of branches by physical and biotic agencies of the environment is called natural or self pruning and takes place slowly. However, in forest plantation management, artificial pruning is carried out. This is the removal of branches from a chosen portion of a stem which is accomplished swiftly to increase the quality and value of the crop ultimately harvested. In the foregoing discussion, only artificial pruning will be considered.

Objectives of Pruning

The most common and traditional purpose of artificial pruning is the production of clear material on rotations shorter than would be required with natural pruning. The necessary period of growth after treatment is rather long. So the practice ordinarily must be coupled with thinning to stimulate diameter growth.

Pruning is mandatory for production of clear timber on acceptable rotations from such species as the cypress, pines and araucarias which characteristically retain their dead branches for years.

Pruning improves access to stands during thinning operations and allows decomposition of slash to commence before the start of clear felling. However, all imagined advantages of this operation are subsidiary to the principal aim of improving timber quality.

Effect of Pruning on Growth

If too many living branches are removed at once, the crown surface may be so reduced as to cause serious retardation of growth in height and diameter. Although the reductions in height growth caused by excessive green pruning are invariably small, their cumulative effect may be great enough to lead to the suppression of pruned trees by adjacent unpruned trees. A number of early investigations have found that 25 to 30 per cent of the live crowns of a variety of conifers can be removed without reduction in height growth or serious decline in diameter growth.

In a detailed study, on growth of loblolly pine, it was demonstrated that very little growth in total volume resulted from leaving a live crown ratio of more than 50 per cent. It was also shown that the growth in volume of clear wood was maximized by reducing the live crown ratio to about 40 per cent because the additional clear length compensated for the slight reduction in diameter growth.

Pruning is more costly per tree than almost any other kind of silvicultural operation. It should therefore be undertaken only on those species that do not prune well naturally and produce timber of reasonable value. Pruning intended for production of clear timber should be limited to trees that are already growing rapidly in diameter or can be made to do so promptly by thinning. This usually means pruning young small trees, not necessarily because they are young and small but because such trees are most likely to be growing rapidly.

The natty cores will also be small and there will be ample time, even on a relatively short rotation, to develop boles of clear wood.

Only the best trees should be pruned and the work should ordinarily be confined to those destined to form the crop. However, just before the first thinning, it may occasionally be worthwhile to prune all trees to a height which can be reached conveniently from the ground. The main advantage of such pruning treatment is that it facilitates thinning by improving access to stands with few low branches. Pruning becomes increasingly expensive as it is extended up the tree. The pruning operation should ordinarily be avoided during the time of maximum growth activities. At such times the bark easily slips from the wood leaving serious wounds and the risk of fungal infection.

A thinning schedule must be closely linked with pruning policy. Heavy thinning is usually necessary to make a financial success of pruning. Conversely, pruning will make possible heavier thinning than would be justified if reliance were placed on natural pruning.

The comparison of ultimate values and present costs of pruning involves factors such as:

— Initial cost,
— Mortality,
— Number of years remaining before harvest,
— Interest rate at which pruning cost is compounded, and
— Increase in value of product attributable exclusively to pruning.

At the time of pruning trees should be growing much faster than the desired rate because of the inevitable deceleration of diameter growth. It is, therefore, advantageous to prune young and vigorous growing trees. Failure to follow pruning schedules strictly results in poor quality logs which earn less revenue. Also on the other hand, as the Kenyan market is undifferentiated in sawn wood quality, it is questionable in most cases if high pruning is necessary under the current market conditions.

The Current Practices

Based on Forest Department Technical Order No. 53 of 1991, there are several management categories for *Pinus patula* and each of these receive different treatments from the other.

Thinning and pruning treatment schedules are based on age of crop, top height or intervals since the last treatment. For each of these treatments, four operations will be carried out for production of sawn timber. First pruning at age 3 years and the others at 8m, 12m and 16m top height. Pruning is undertaken on selected trees. In each case, individual trees are pruned to half height plus one whole. In the production of pulpwood only one pruning is carried out. Concerning thingings, 4 thinning are undertaken in sawn timber plantations, the first at 16m top height and the rest take place at intervals of five years. With pulpwood plantation, only one thinning is carried out at 12 years.

EXTRACTS FROM MR OMONDI'S TOUR OF AUSTRALIA AND SOUTH EAST ASIA

Mr. Omondi is a Research Scientist and Head of the Kenya Forest Seed Centre (KFSC), He visited Australia and South East Asia between March and June 1990. At the end of his study tour he wrote a long report from which KEFRI Newsletter has selected some extracts for publication.

Observations in Australia

The Australia Tree Seed Centre (ATSC) has over the last 25 years accumulated considerable knowledge on the collection and science of Australian native trees, Prominent on this list are the *Eucalyptus* and *Acacia* species. The seed Centre has contributed significantly to promoting the use of Australian tree seeds abroad.

The ATSC differs slightly with the KFSC in its mandate and operation. While the Kenyan centre has the obligation of providing the foret department with seed for planting programmes, the Australian Centre collects only research quantities and leaves the bulk collections to the respective state forest departments and interested private entrepreneurs. In addition, while the KFSC strives to collect and generate handling information of almost all tree seeds within the country, the ATSC concentrates only on a few species for which there is demand for seed; mostly overseas. Out of a total weight.

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(401 Kg) of seed dispatched in 1989, Eucalyptus spp accounted for 66.6%.

OBSERVATIUONS IN MALAYSIA

Due to its geographical position, Malaysia is mostly covered with tropical rainforests which cover 60% (20.4 million ha.) of the total land area. Although the forest is a biodiversity in terms of flora, the *Diptercarps* comprise about 84% of the trees with the *genera shorea, Hopea* and *Diptero carpus* being the most common.

In the past, it has been a policy in many states in Malaysia to replace cleared forested areas with high value tree crops like rubber, oil palm and cocoa.

Although plantation forestry has become increasingly important, natural regeneration is encouraged in areas where selection logging is done. In the last few years, plantations of *Pinus, Araucaria, Acacia mangium, Eucalyptus* and *Gmemina arborea* have been established. In addition, urban forestry in parks and cities is an active programme especially in and around Kuala Lumpur.

Both the Forest Research Institute of Malaysia (FRIM) and the Kenya Forestry Research Institute (KEFRI) have the same overall objectgives, i.e. to undertake research and development of appropriate technologies for efficient management and utilization of forests and forest products.

The seed research laboratory has accumulated information regarding the handling of seeds of rainforest species. The section is not involved in any bulk seed collection apart from research quantities for germination and pretreatment and storage projects.

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