

# Logging Methods Under Sustained Yield

By

FELIPE R. AMOS  
*Director of Forestry*

For almost half a century, power logging has been carried on in the Philippines with little or no interest in the production of future timber crops. This statement is not intended particularly as a reflection on those engaged in lumbering. Practically all our forests are owned by the Government and timber licensees are mere leasees of the Government, who quite naturally are interested primarily in logging methods as an economic measure. It is the policy, however, of the Government to protect and conserve our forests to insure a continuous supply of valuable timber for the future. This policy is expressly provided under Section 1817 of the Revised Administrative Code.

Continuity of production, or sustained yield, is the very essence of forestry. In order to attain this objective, however, logging methods must be determined not only on the basis of costs but also on the silvicultural requirements of the forest.

There are four main silvicultural systems or methods of harvesting timber designed to bring about the continuous production of future crops. These are briefly as follows:

1. *The clear-cutting system.*—In clear-cutting system, the whole area is cut clear in a single felling. The cleared area is then regenerated either naturally or artificially. This is a practical method to use where the trees in a stand are all of merchantable size. However, a disadvantage of this method is that the cleared area induces conditions which are often adverse to the growth of seedlings. Also, it offers poor protection

against soil erosion, landslides, and rapid run-off water.

2. *The seed tree system.*—Under this method, the area is cut clear in a single felling operation, but seed trees are left on the area either singly or in groups. The seed trees are to provide the seeds for the natural regeneration of the area. The operation and application of this method are the same as in the clear-cutting system, except that instead of cutting down and removing all the trees as in the clear-cutting system, trees are left to naturally regenerate the cleared area.

3. *The shelterwood method.*—This method "involves the removal of the stand by a series of partial cuttings, resembling thinnings, that remove the entire stand within a period of years which is a small fraction of the rotation age". The cleared area is regenerated naturally, with the surrounding shelter trees providing the seeds. Two or more partial cuttings may be needed to gradually free the reproduction. These partial cuttings are:

- (a) *Preparatory cuttings.*—As few of the matured trees, as are necessary, are cut merely to create favorable conditions for the seed germination.
- (b) *Seed cuttings or seed fellings.*—The canopy is carefully opened up so there is just sufficient light for the germination of seeds disseminated by the dominant trees. The cutting also ought to insure survival of the seedlings.

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\* Paper read in the first Phil. Forest Conservation and Reforestation Conference, Sept. 30-Oct. 1, 1954.

(c) *Removal cuttings.*—More of the trees are removed at intervals in order to admit more light to the seedlings. When reproduction is well established, the final felling is made by cutting down and removing all the shelter trees.

For the successful application of this method, it is necessary that there be a demand for small-size and low-grade timber.

4. *The selection system.*—Under this system only the oldest or largest trees in a stand are harvested. Hence, in one felling operation, harvesting could be done throughout the stand as the oldest and largest trees may be scattered singly or in groups all over the area. The almost continuous cover of trees in the area is maintained, the openings made being small and scattered. This affords the area a high degree of protection at all times.

From our limited experience in Basilan Forest Reserve, which is the only managed forest in the Philippines, and from indications shown in the operations of the Bislig forest under the Bislig Bay Lumber Company, which is the only lumber company so far voluntarily harvesting its timber on the basis of selection system, it appears that the selection system is highly suitable to most of our virgin forest areas which are covered by trees of all sizes and which must be under forest cover at all times for effective protection against soil erosion, landslides and rapid run-off.

It is, however, risky and dangerous to prescribe the use of any silvicultural system or system of harvesting the timber without first making the proper survey and study of the particular forest involved. The forest area that is contemplated to be managed under a sustained yield basis should first be surveyed, mapped and inventoried. Data on growth and yield are also very essential. These information form the basis in the formulation of a management plan which will prescribe, among other things, logging and silvicultural operations to be followed.

The present practices of logging are destructive to reproductions and young timber. Our regulatory measures, which are in the form of cutting rules, (copy attached) are primarily intended to ensure natural regeneration and for the protection of the cut-over areas. These rules are flexible enough in the sense that any part thereof could at any time be amended or entirely deleted to suit any particular condition. The result obtained from these rules are in general disappointing and these are due to two main reasons: (1) inadequate protection in cut-over areas from *kaiñgins* or squatters and fires; and (2) a seemingly lack of sympathy for and understanding of the policy of sustained yield. There is, therefore, the need of more forest guards, who may be paid from the reforestation fund.

I should like to point out also the need of strictly limiting the use of donkey engines to those with horse power not exceeding 150 for yarding purposes to rough and steep places only. Tractors, which are less destructive, should be assigned to level and rolling areas where they are adaptable.

The destruction to reproductions by *carabao* logging is practically insignificant. The danger, however, in this method from the forestry standpoint lies in the fact that very often only the smaller sizes of trees and those of high market value are utilized. Thus the forest tends to degenerate into a mere "culled" forest. There should therefore be a condition or rule in the license whereby this method of "high-grading" timber could be stopped by either closing the area or, at least, minimizing the amount to be cut.

Timber marking is rather a drastic measure but it should be resorted to when the need therefor arises.

All the foregoing rules, if strictly enforced, should result in the leaving of more residual timber and reproductions which would insure, at least, the natural regeneration of the cut-over areas. Of course, there would inevitably be small bare and open areas caused by donkey settings which could hardly be

expected to be regenerated naturally. These would simply be covered up by artificial planting.

The importance of the preparation of management plan for every forest cannot be over-emphasized. A management plan embodies the guiding principles and measures necessary for the development of any given forest area consistent with the government policy of sustained yield. As already mentioned, logging methods under sustained yield should take into account silvicultural requirements besides costs. For lack of funds and personnel, it is, however, impossible to prepare management plan for every forest area.

In order to enable us to manage all our forests, our field force of technical men (about 600) should be increased three-fold. Even if fund is available, the matter of getting the needed additional technical personnel would still offer a serious problem. The reason is that we have only the College of Forestry in Los Baños from which to draw the technical personnel. The College of Forestry is graduating annually only about 20 to 25 rangers and about 6 to 10 degree holders (B.S.F.). The best that could be done under present circumstances is to carry on the desired objective gradually. We have now in Mindanao timber inventory and land classification parties who will jointly establish the permanent forest line and collect detailed forest data necessary for the preparation of management plans. It is understood that areas to be managed are permanent forest areas previously classified as such.

To give an idea of the personnel and funds needed in the collection of data for a working plan for a forest area of about 90,000 hectares, the following estimate is given:

**Personnel:**

- 5 foresters
- 10 rangers
- 45 laborers

**Expenses:**

Salaries and wages . . . . .	₱18,400
Traveling expenses, etc. . . . .	11,400
<b>Total . . . . .</b>	<b>₱29,800</b>

Period to accomplish the field work . . . . .	2 months
Office work (mapping, computation of data, etc. and preparation of the working plan)	3 months

I should like to give below also an idea of the personnel and annual expenses needed for the same area to enforce the cutting rules necessary to insure natural regeneration and the leaving of more young timber in order to shorten the period of the second cut. These cutting rules, it must be remembered, are the only regulatory measures to control logging while the management plan is still pending preparation.

**Personnel:**

- 1 forester in charge
- 4 rangers

Salaries and Wages . . . . .	₱16,680
Traveling expenses . . . . .	3,300
<b>Total . . . . .</b>	<b>₱19,980</b>

Many lumber operators have invested in equipments and lumber plants with capacities well beyond the yield of their respective areas and as a result they have actually over-cut the forest. Some of them are already seeing the end of their supply of raw materials with no prospect for a second cut in many years to come, if at all. These operators have been operating for many years and around their operation communities have already grown up and developed; they and those dependent on their business for their livelihood will find themselves in a very difficult situation when and if drastic curtailment of their production is made in consonance with the policy of sustained yield. I feel that these operators should be given a reasonable period of readjustment.

Thus, I feel that with what logging had so far done all these years, it is inevitable to conclude that:

(1) Power logging practices in the Philippines have been destructive to reproductions and young timber;

(2) In harvesting, no one method of logging, neither of silvicultural system, should be prescribed uniformly for all our forests. Every particular forest must first be studied and

and based on the data and information gathered, a management plan should be formulated whereby the silvicultural systems and the method of logging should be prescribed with the end in view of insuring natural regeneration and, if possible, a continuous operation year after year. Continuity of production or sustained yield, has always been and must always be the essence of forestry;

(3) In the interest of sustained yield and the natural regeneration of logged-off areas, there is immediate need of:

(a) Strict enforcement of the present license cutting rules and others that may be prescribed by the Bureau of Forestry to insure natural regeneration and sustained yield;

(b) Considering and/or regarding all public lands as *forests* until released for agriculture. Our people consistently believe that all lands are potentially agricultural. To correct this wide-spread misconception which encourages squatters to occupy and clear forest lands, all areas that are to be permanent forests should be determined and declared as such within five years;

(c) Soliciting the cooperation of all law enforcement agencies of the Government;

(d) Employment of more forest guards and pay them well; and

(e) Formulating working (management) plans for big companies within one year and for all the smaller concessions.

(4) To operate on sustained yield basis, the concessionaire's license agreement should be extended to 25 years with option to renew for another 25 years; and

(5) Concessionaires should willingly and fully cooperate with any system of cutting prescribed by the Bureau of Forestry as necessary for forest conservation.

## CUTTING RULES

for

Timber License Agreement No. 46

of

### **FIRE**

1. Forest fires shall be kept out from your cutting areas within permanent timber-

lands. To this end all your donkey engines and locomotives shall be equipped with efficient spark arresters. A reasonable number of spark arresters shall be kept in stock in order to insure immediate replacement—especially important during the dry season—of any arrester that is broken or in any way rendered ineffective.

2. During the fire season, you shall, in addition to your regular guards or watchmen, maintain a special fire patrol along your railroad line, donkey set-ups and other places in and around your concession where the fire risk is great with the end in view to detecting and suppressing promptly any fire that may start from whatever cause.

3. The following acts are hereby prohibited and you shall therefore see to it that all your woods' force, including your contractors and their employees, are properly warned accordingly:

a. Setting fire in any portion of your logged-over areas for the purpose of raising some agricultural crops.

b. The practice of burning a donkey set-up for any purpose whatever after the operation thereof has been completed.

c. Clearing of the underbrush by fire to facilitate skidding.

d. Allowing fires, caused by sparks from locomotives, donkey engines or from any other source, to burn or smoulder without putting it out.

e. Throwing cigarette or cigar stub in a place where it is likely to start and develop into a forest fire due to the presence of a sufficient amount of inflammable material, such as dry underbrush and debris.

f. The leaving of unextinguished fire used in cooking or heating food in the woods.

g. Getting rid of slash and debris by fire to clean up a new donkey set-up.

4. If required, you shall place your men at the disposal of any authorized Forest Officer for the purpose of fighting a forest fire, unless prevented by circumstances beyond your control.

5. In short, you shall in accordance with Paragraph XIX—13 of your license agreement do all in your power to prevent and suppress forest fires within your cutting areas from any cause whatever and shall require your woods' force, including logging contractors and their men, to do likewise. Should fire occur in your concession, despite preventive measures taken, you will be held liable for the damages that may be sustained by the forest due to the above cause.

#### *DIAMETER LIMIT*

1. The cutting of Tindalo, Akle and Molave less than 60 centimeters in diameter, breast height, is prohibited. (Act 3572)

2. Unless so authorized under special license, the cutting of trees bearing edible fruits is prohibited. (Act 2812)

3. Diameter limit for First Group, 60 centimeters; for Second Group, 40 centimeters; Provided that no trees of Lauan, Apitong, Palosapis, Tangile and other dipterocarp species belonging to the Second or lower groups less than 50 centimeters in diameter, breast height, shall be cut, except in the rights-of-way and agricultural areas.

4. No tree of any diameter or species marked by an authorized forest officer for seeding or protection purposes shall be cut.

5. The cutting of undersized trees valuable for seeding purposes, left standing in logged-over areas within permanent timberlands for firewood, ties, or other purposes, unless specially authorized by the Director of Forestry, is prohibited.

6. Likewise, no undersized trees shall be cut in areas that are still being logged-over or are to be logged-over for railroad ties, skids, telephone poles and for building and other construction purposes, except in the rights-of-way, or agricultural areas. "Right-of-way", in this connection, is understood to mean either railroad right-of-way or runway for yarding cable.

7. Firewood for donkeys and locomotives may be taken, free of charge, areas and right-of-way, or downed unavoidably in the process

of felling. Firewood obtained from merchantable logs or trees, however, will be paid for at the regular rate, whether in timberland or agricultural areas.

8. Trees cut in violation of the above requirements under 3, 4, 5, and 6 shall be paid for at four times the regular rate.

#### *FELLING AND YARDING*

1. The felling of trees shall be done insofar as practicable in the direction where it could cause minimum damage to valuable poles, saplings and seedlings.

2. All felling and bucking shall be done with saws.

3. All guy lines for spar trees and gin poles, and cable riggings shall be slung from stumps of trees, which are to be felled.

4. Insofar as practicable, the choker will be placed around the end of the log to be yarded, nearest to the runway for the main cable. This is to minimize destruction of young reproduction as much as possible.

5. In yarding, care shall be taken so that saplings and poles are not unnecessarily destroyed. Not infrequently many a valuable tree is sacrificed for the sake of speed when all that is to be done when a log being yarded is hung up to stop the engine, replace the choker so that the log is pulled around the obstacle, thus preventing the uprooting of or serious injury to the tree.

6. Trees unnecessarily damaged or destroyed in logging shall be paid for at the regular rate, provided that if they are undersized they shall be paid for at four times the regular rate.

7. The foregoing requirements under this paragraph apply only to permanent timberlands:

#### *HIGH STUMPS, MERCHANTABLE TOPS, SNAGS, ETC.*

It will be of distinct advantage to you to observe the following practices since any merchantable portion of a tree cut and abandoned, whether in permanent timberlands or agricultural areas, shall invariably be paid for:

1. To cut the tree at a height from the ground not exceeding its diameter. In case of a buttressed tree, it should be cut not higher than the top of the main buttress.

2. The following should be cut, or removed, and utilized:

(a) Merchantable tops to a diameter of 30 centimeters (12 inches, approx.)

(b) All merchantable trees cut in the rights-of-way.

(c) Merchantable trees, each containing at least two 5-meter logs, still standing but so seriously injured in logging as to make them useless for protection or seed trees.

(d) All merchantable snags if found profitable to remove after felling.

3. No tree shall be left lodged in the process of felling.

4. To cut the logs into proper lengths so as to avoid waste of merchantable tops.

5. Insofar as practicable to buck logs so as to avoid serious splits, which may not be allowed for in scaling.

6. Logs less than 33-1/3% of their gross volume sound in the case of First Group and less than 50% sound in the case of Second Group and lower Groups may, however, be left in the woods as they are not to be charged for.

#### AGRICULTURAL AREAS

1. In agricultural areas, all merchantable timber, regardless of size or species, shall be cut and utilized. "Merchantable" in this sense is understood to mean all timber which can be logged with profit.

2. As far as practicable, logging shall first be confined to agricultural areas before operation in absolute forest lands is begun.

#### TRAILS

All permanent trails, rights-of-way, or other easements which pass thru or adjoin the logging areas shall be kept from obstructions of any kind of public use.

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*Director of Forestry*

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# **MINDANAO LUMBER DEVELOPMENT CO., INC.**

## **G. E. ANTONINO, INC:**

**HEAD OFFICE:**  
884 Florida St.,  
Malate, Manila  
Telephone:  
5-63-94

**GAUDENCIO E. ANTONINO**  
*President and General Manager*

**MAGNOLIO W. ANTONINO**  
*Asst. Gen. Mgr. & Secretary-Treasurer*