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Fuelwood Outturn Study in Dryzone

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အပူပိုင်းဒေသများရှိ ထင်းစိုက်ခင်းများမှ ထင်းထွက်မှုကို လေ့လာခြင်း။

ဦးစိုးတင့်
သစ်တောသုတေသနဌာန၊ ရေဆင်း။

စာတမ်းအကျဉ်းချုပ်

အိမ်သုံးနှင့် အိမ်တွင်းစက်မှုအသေးစားများအတွက်ထင်းရရှိမှုမှာ မြန်မာပြည်အခြားဒေသများထက် အပူပိုင်းဒေသများတွင် ပိုမို၍ အရေးကြီးသော ကဏ္ဍမှ ပါဝင်နေပါသည်။ ထိုအပူပိုင်းဒေသများ၌ ထင်းစိုက်ခင်းများ တည်ထောင်ရာတွင် အထောက်အကူပြုနိုင်ခြင်းအလို့ငှာ အပူပိုင်းပေါက် သစ်မျိုးအချို့နှင့် ဘောစကိုင်းတို့၏ ထင်းထွက်နှုန်းကို လေ့လာထားပါသည်။ ရှား၊ မယ်ဇလီ၊ ယူကလစ်နှင့် ဘောစကိုင်းတို့၏ ထင်းထွက်နှုန်းကို (၀.၂) အချင်း အရွယ်ထိ ခုတ်လှဲတိုင်းထွာ၍ ကုဗထုထည်နှင့် လက်စီး ထင်းအရေအတွက် ရရှိနိုင်မှုကို တင်ပြထားပါသည်။

Fuelwood Outturn Study in Dryzone

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Abstract

Fuelwood for domestic and small cottage industrial use plays an important role in dry zone areas than other parts of the country. So as to help in forming fuelwood plantations in these arid regions, fuelwood production of some of the dry zone species and ipil (Bawzagaing) were studied. *Acacia catechu* (Eucalypts) and ipil-ipil (Bawzagaing) were felled and measured to a minimum diameter of (0.2"). Results are presented in terms of solid volume and numbers of fuelwood bundles.

Introduction

It is estimated that one third of the world's population depends on wood for cooking and heating. Eighty six percent of all the wood consumed in the developing countries is said to be used for fuel and out this at least half is used for cooking. It is also forecast that this situation will become desperate with the increase of population (Edwards Ayensu-Panel on Firewood Crops-National Academy of Science). In Burma, the firewood harvested is estimated about 45 times as large as the teak harvested and 17 times the volume of commercially extracted hardwoods. It is also true in Burma that with the annual increment of population by 2.2%, the supply of firewood situation become insufficient and consequently the soaring price of firewood is evident. Only small percentage of the urban population in the country use electricity as a source of energy for cooking. Majority of the urban population and cent per cent of the rural population have to rely on firewood for their daily cooking. Small local industries also consume firewood, such as for boiling local made condensed milk, sugar cane and grilling beans.

Owing to a relatively high cost of electricity and limited availability of gas fuel, firewood can be expected to play an important role for both domestic cooking and industrial use for some decades in Burma. Although the acquisition of firewood in other parts of the country is not very difficult, it is rather dreadful in the dryzone area where firewood is scarce and the climate and soil condition are severe. Therefore it seems appropriate to raise firewood plantations to ease the extreme shortage of firewood in the dryzone areas and hence promote the economy of the residence in these areas. Great care is needed to introduce potentially adaptable firewood species with satisfactory volume outturn in these areas of adverse conditions. Keeping this objective in mind, this study on the fuelwood outturn was carried out. It is hoped that the study will help in species selection in forming firewood plantations in arid areas of Burma.

Procedure

Dryzone species were selected for the investigation. They are (1) *Acacia catechu* (Sha), (2) *Cassia siamea* (Mezali) and *Eucalyptus camaldulensis* (Eucalypts). Although it is not a dryzone species, Ipil-ipil (Bawsagaing) was also included as it has a promising volume according to the literature. The plantations formed in the dryzone area for fuelwood production could not be obtained of same ages and therefore measurements were made of different ages as shown below.

	Species	Year of Planting	Age at the time of Measurement
1.	Sha	1970	12 years old and 3 year old
2.	Eucalyptus	1972	10 years old
3.	Bawsagaing	1980	2 years old
4.	Mezali	1979	4 years old

Apart from mezali. other species were in the form of plantation. Mezali trees were from Hlaingtat nursery area and they were planted in a single row. Spacing and locality were:-

1.	Sha	Mondaing Reserve	12' x 12' spacing
2.	Eucalyptus	Yupadaung	12' x 12' spacing
3.	Bawsagaing	FRI, Yezin	7' x 7' spacing
4.	Mezali	Hlaingtat	12' x 12' spacing

Bawsagaing spacing is pretty irregular and it was a rough spacing planted in Forest Research Institute, Yezin. Soil type is poor dryzone soil and rainfall is also very scare and is about 20"-30" annually.

In the case of sha, eucalypts and bawsagaing, the trees were felled and measurements were taken down to .2 " in diameter. Mezali could not be felled as it was planted for shade and therefore the measurements were made with the help of a ladder. Firstly, the trees felled were cut into 1 ½', 2' and 3' length shorts according to the diameter of the twigs as follows:-

	Diameter	Length cut (feet)
1.	0.2"-1.0"	1½'
2.	1.0" - 1.5"	2'
3.	1.5 and above	3'

The mid diameter of every short was measured with calliper to the nearest. 1". Solid volumes were calculated from the diameter thus measured. The number of trees felled was represented below. In the case of Eucalyptus, plots 300' away were selected for measurement and in each plot, nine trees (3 x 3) were felled and measured.

	Species	No. of trees measured
1.	Sha	12 trees (Total)
2.	Eucalyptus	234 trees
3.	Bawsagaing	57 trees
4.	Mezali	18 trees

The fuelwood obtained by felling the trees were stacked and the stacked volume were also measured. Out of the stacked volume, the number of fuelwood bundles were calculated.

Results

Results are Presented in the table below:-

Particulars	Sha	Eucalyptus	Bawsagaing	Mezali	Sha.
1. Locality	Mondaing	Yupadaung	Yezin	Hlaingtat	Mondaing
2. Year of Planting	1970	1972	1980	1979	1980
3. Age at the time of measurement.	12 years	10 years	2 years	4 years	2 ½ years
4. Spacing	12' x 12'	12' x 12'	7' x 7'	12' x 12'	12' x 12'
5. Maximum diameter bh	6.0"	11.0"	3.5"	4.5"	1.2"
6. Minimum diameter bh	2.5"	1.0"	1.8"	.9"	0.7"
7. Average diameter bh	4.1"	4.95"	2.4"	2.6"	1.04"
8. Minimum height	19'	62'	26'	23'	8'
9. Minimum height	13' 9"	12' 10"	16' 6"	9' 7"	5' 6"
10. Average height	17'	38'	12'	17'	6'5"
11. Max. crown diameter	14' 6"	24' 6"	12' 0"	18' 0"	8'
12. Min. crown diameter	7' 8"	2'	4' 6"	7'	4' 3"
13. Average diameter	9'0"	12' 0"	6' 4"	12' 6"	5' 5"
14. Max. solid volume/ tree	1.8 c.ft	20.1 c.ft	1.26 c.ft	2.6 c.ft	0.13 c.ft
15. Min. solid volume/ tree	0.36 c.ft	0.056 c.ft	1.8 c.ft	0.1 c.ft	0.06 c.ft
16. Average solid volume/ tree	1.27 c.ft	3.79 c.ft	0.63 c.ft	0.9 c.ft	0.09 c.ft
17. Average stacked volume per tree	2.92 c.ft	8.71 c.ft	1.45 c.ft	2.1 c.ft	0.21 c.ft
18. No. of local size fuel bundles. (14 " length x 1' 9" girth) .2 c.ft	22 no	65 no	11 no	16 no	1.5 no
19. Outturn per acre (Stacked.)	17.7 tons	52.8 tons	25.7 tons	12.7 tons	1.27 tons
20. Outturn per acre (Bundles)	6665 no	19695 no	9768 no	4848 no	455 no

Conclusion

Observing the outturn of firewood from the given table indicates that among Bawsagaing 2 years old, Mezali 4 years old and Sha 2 ½ years old; Bawsagaing stands first, Mezali second and lastly Sha. In other words, Sha is seem to be a very slow grown species and so should not be considered as a good firewood plantation species. On the other hand, Bawsagaing being planted in Pyinmana, Yezin area, is seemed to get a favourable weather condition and so is higher in outturn. It is therefore, with the permission of men and time, some observations will be carried out in really dry area. At the moment, Mezali happened to be a promising species for dryzone fuelwood plantations.

Again, Eucalyptus of age 10 years, as compared to Sha of age 12 years, Eucalyptus outstands significantly and it is doing well in such arid region. It is therefore can be mentioned that Eucalyptus is the most suitable species in dryzone in term of fuelwood outturn and growth. Eucalyptus, obviously should not be substituted the indigenous species for Timber production, but with the result obtained in this study, it should be given much attention to this species in forming firewood plantations in dry area where the climate and soil conditions are harsh.

The results tabulated represents that in term of priority in selection of fuelwood species in arid region, Eucalyptus stands first, by Mezail, Bawsagaing and Sha. Bawsagaing as stated above is a very promising species in area of favourable conditions. Further study of this species in dryzone area of Burma will be followed up in near future. Studies on the fuelwood outturn of other dryzone species such as Kokko, Htanaung, Dahat, Than, Tama and Subyu will also be explored with the permission of staff and time.