A Preliminary Report On The Tinua Watershed Project's Bamboo Propagation Trials at Tansen, Palpa, Nepal

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Summary

Bamboo Propagation in Nepal has been neglected for many years, Recently efforts have been made to remedy this situation. This paper documents one trial in Tansen, run jointly by the Tinua Watershed Project and the United Mission to Nepal's Horticulture/Agronomy Support Programme (H.A.S.P.).

Of the seven bamboo species tested, four of them, Dhanu bans, Tana kalo, Tama seto and Taru bans were found to grow successfully from culm cuttings - both one and two node. Taru bans was found to be particularly successful. Further trials on these species were started in February 1989. The other three species, two (Leiwa and Ghopi bans) gave poor results - possibly due to their small size - from both rhizomes and cuttings. Laurei bans, although it did not grow from cuttings, gave very promising results (80 percent success) from rhizomes. Being a spreading species Laurei bans is worthy of planting on a winder scale, particularly on sites suseptable to soil erosion. Rhizome cuttings with short culms were found to give better initial growth than those with long culms, providing grazing animals are excluded.

1. INTRODUCTION

. Bamboo has been propagated in Nepal for many centuries using rhizome cuttings, but because of their size (often about 10kg), the planting of extensive areas has been impractical. Since 1987 efforts have been made in the long neglected field of bamboo propagation by the Forest Section of the Tinua Watershed Project-Palpa, using culm cuttings instead of rhizomes. In February of that year a cutting preparation/propagation trial took place in Palpa in cooperation with the Soil & Water Conservation Section, under the leadership of Mr. Chris Stapleton of the Forest Research Project, Kathmandu.

The Forest Section has now established seven pilot nurseries and in February 1988 a training course on propagation techniques was held for 25 naikes, in preparation for the planting during the monsoon of 1989. In March-April 1988 a further experiment was started in cooperation with UMN-Tansen. Under the leadership of Mr. Peter Storey, cuttings of seven species were planted to test different propagation techniques. These techniques included: traditional rhizome cuttings; one and two node culm cuttings; layered rhizome cuttings and the 'Man Bahadur Method'. All techniques were tested udner both wet and dry conditions.

The trial was to be supervised for two vegetative periods and results evaluated and included in the plant production programmes of the Forest Section from Forest Year 1990/91. The results presented herein represent the progress of the bamboo halfway through the trial period.

2 METHOD

2.1 Description of the Study Area

The area chosen for the trials is located in Chirtungdhara Panchayat (PF "Humindegeihra"), near Tansen, Palpa District (see Table 1).

Table 1: Meteorological Data For Tansen, Palpa District, Nepal

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dev
Rainfall (mm)	18	15	26	42	103	355	621	273	355	49	10	46
Min Temp (C)	8	10	15	18	19	20	20	21	19	16	13	9
Mean Temp (C)	13	14	19	23	23	24	23	24	23	21	18	14
Max Temp (C)	18	19	24	27	28	27	26	27	26	25	22	18
No. of Years Observed	5	6	7	7	7	7	7	6	6	6	6	6

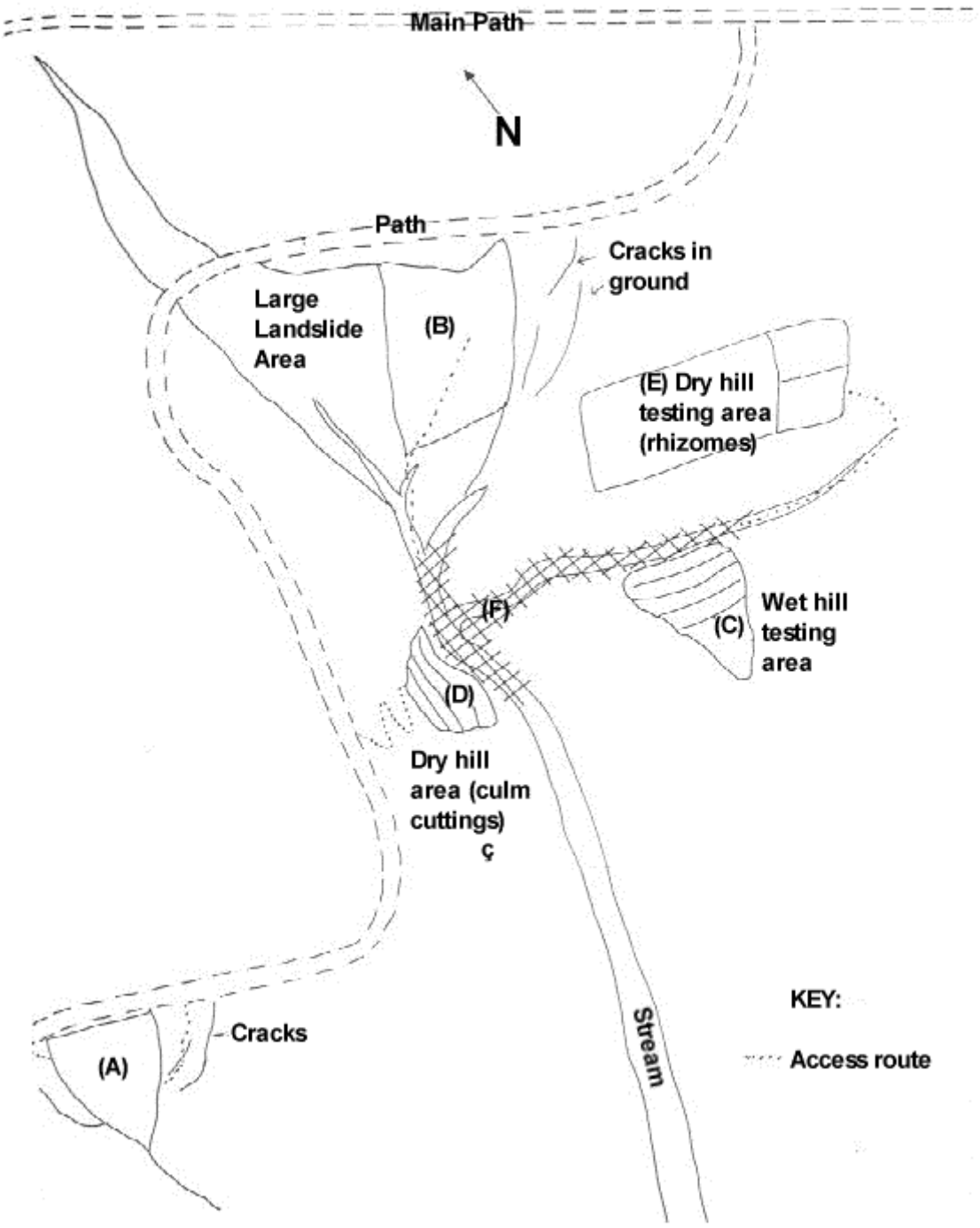
Latitude	27º 52'	**Altitude**	1 067m
Longitude	83º 32'	**Mean Daily Temp. Diff.**	8 ºC
Mean Annual Rainfall	1 914 mm	**Absolute Min Temp**	4 ºC
Mean Annual Temp	20 ºC	**Absolute Max. Temp.**	35 ºC

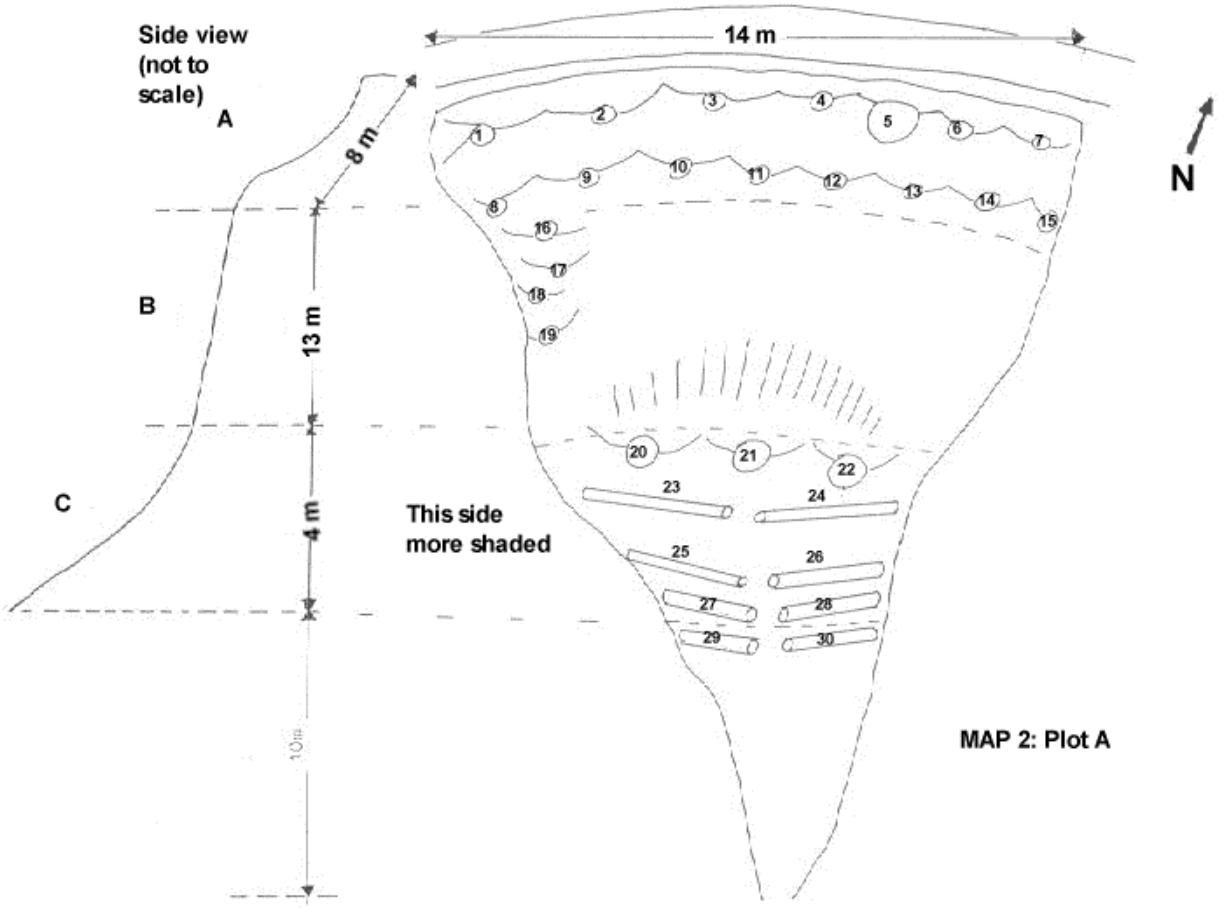
Source: Tinua Watershd Project, Palpa (quoted in Kasojoo, 1988 and Jackso, 1987. All values rounded to nearst integer.

Several plots were selected in narrow valley (Map 1) in order to test planting techniques under different growing conditions. Plots A (Map 2) and B (Map 3) are new landslide areas of differing soil qualities. Plots C (Map 4) and D (Map 5) are terraced slopes, wet and dry respectively. Plot

E (Map 6) is a dry hill slope and Plot F (Map 7) is located on the banks of the streams at the bottom of the valley.

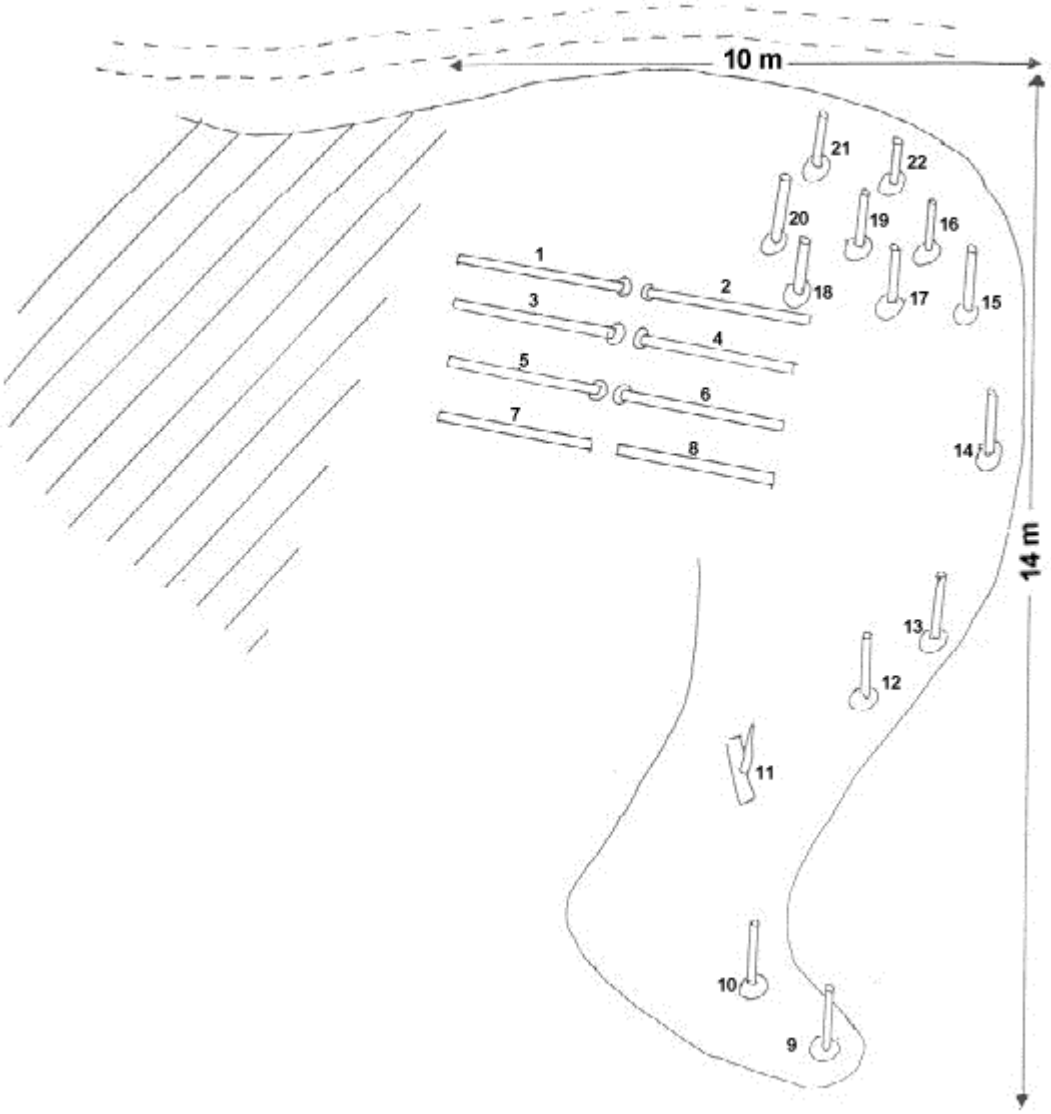
Map 1: Bamboo Trial Area in Panchayat Chirtungahara "Humindegeihra", W. No. 4.



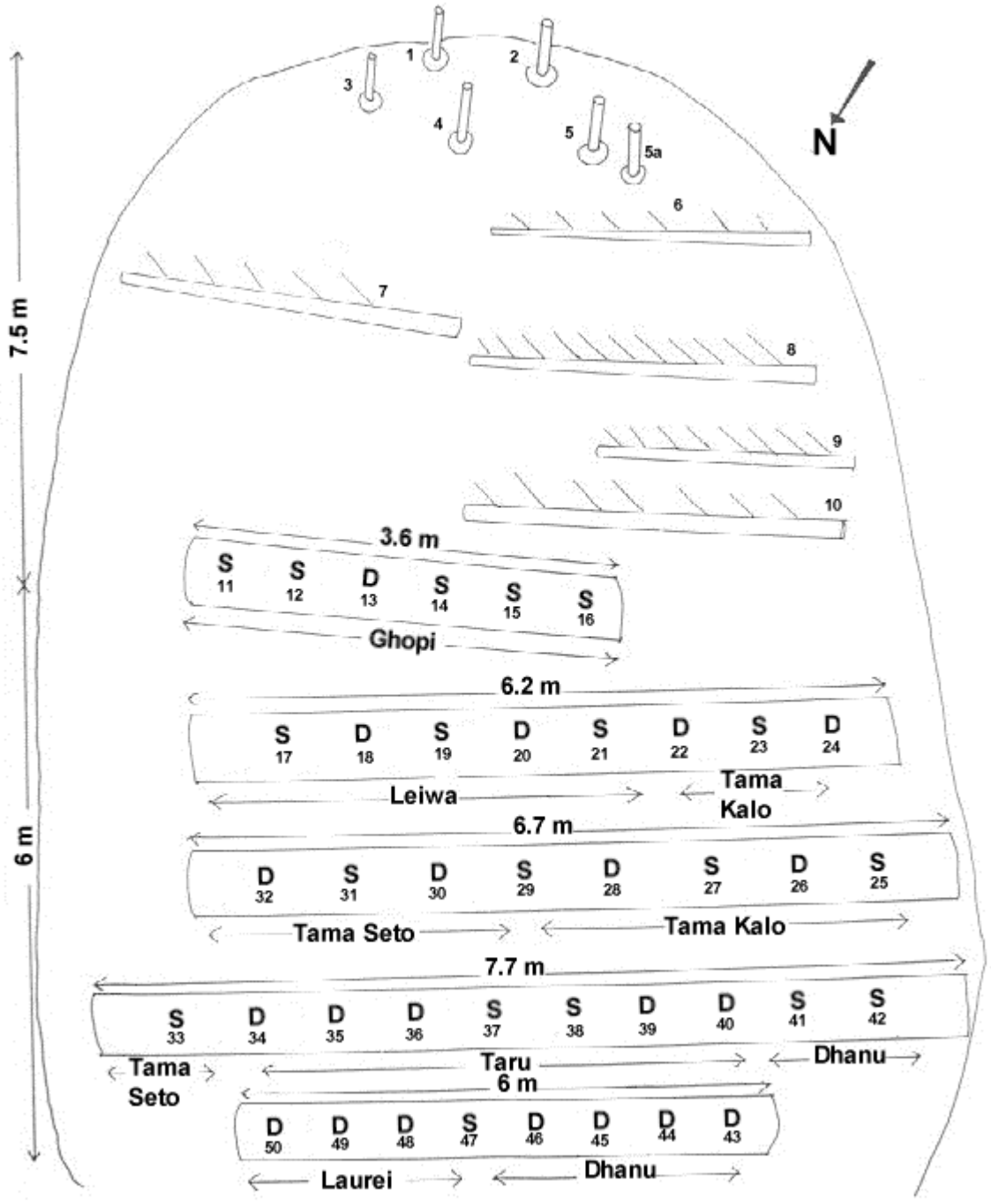

Side view
(not to
scale)
A
B
C
8 m
13 m
4 m
14 m
N
This side
more shaded
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

MAP 2: Plot A

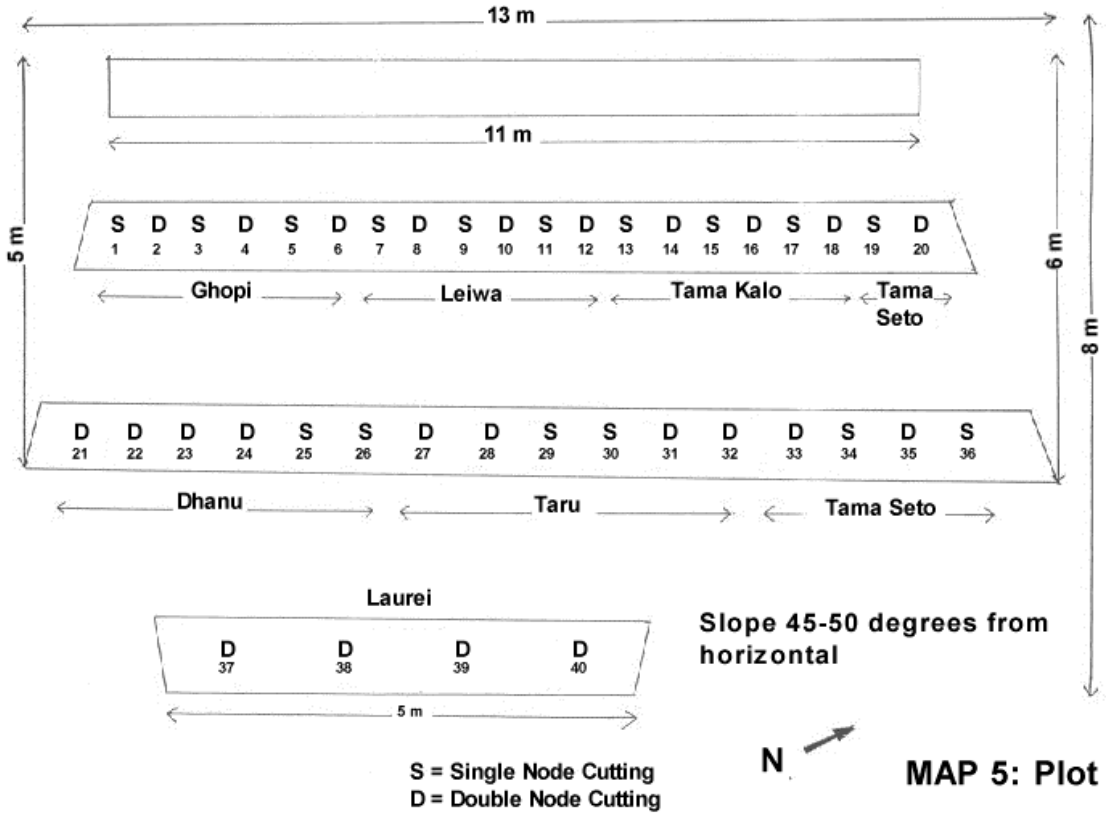
MAP 3: Plot B



MAP 4: Plot C

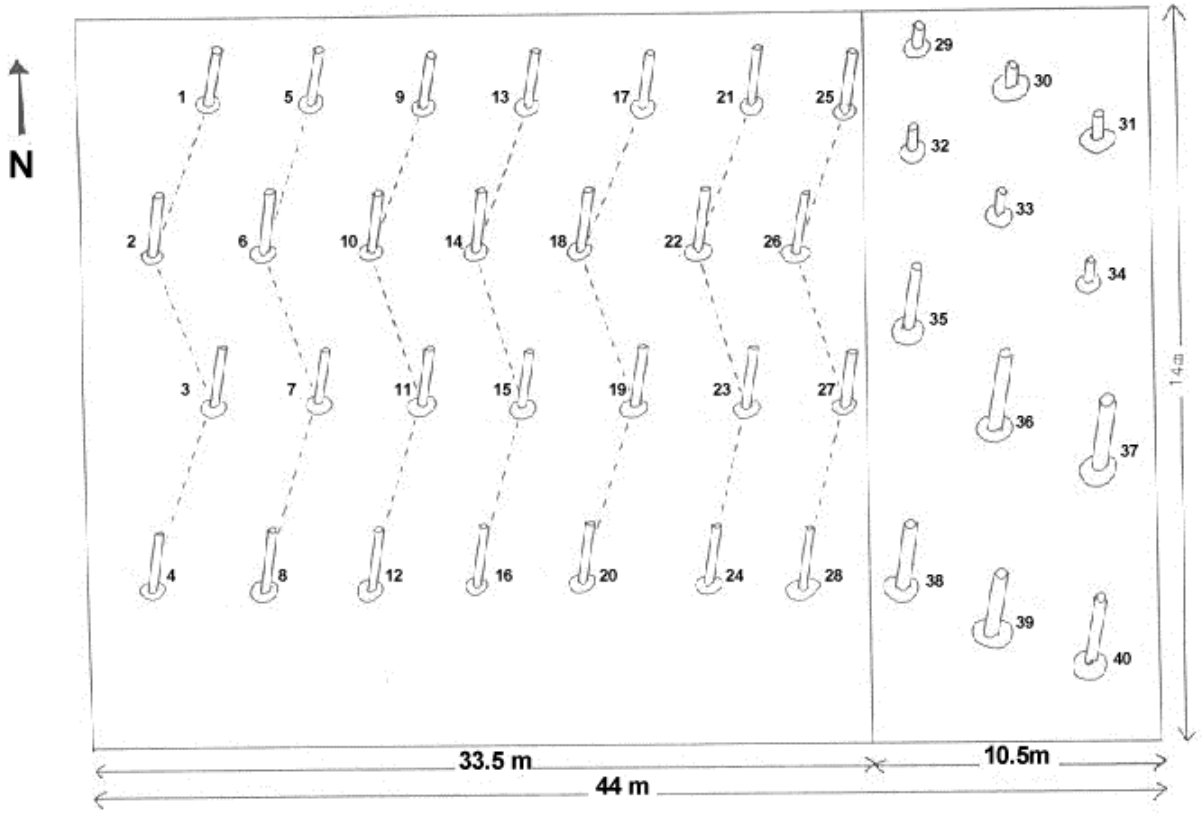


S = Single Node Cutting
D = Double Node Cutting

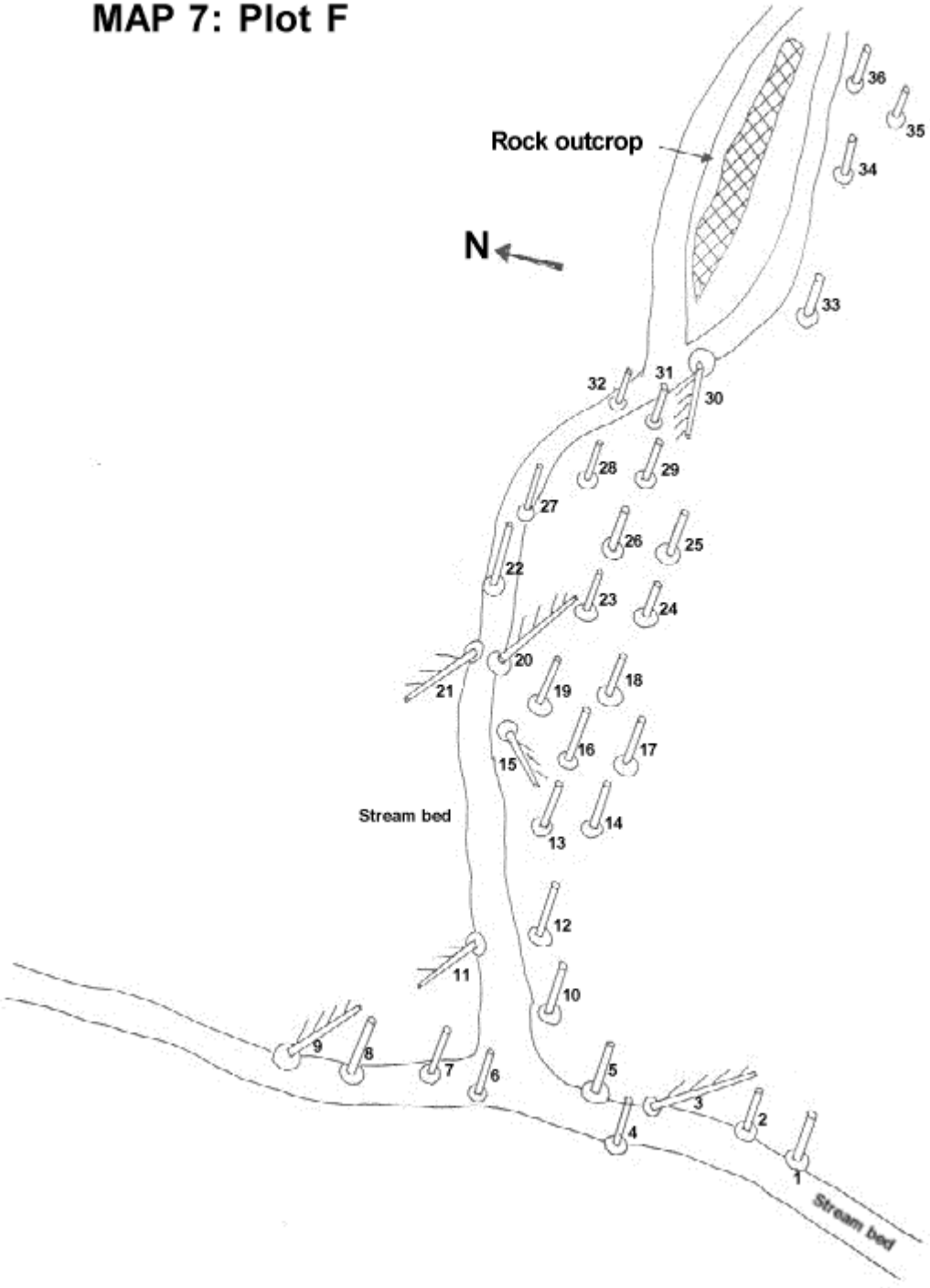

13 m
11 m
5 m
6 m
8 m
S D S D S D S D S D S D S D S D S D S D
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Ghopi
Leiwa
Tama Kalo
Tama Seto
D D D D S S D D S S D D D S D S
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
Dhanu
Taru
Tama Seto
Laurei
D D D D
37 38 39 40
5 m
Slope 45-50 degrees from horizontal
N
S = Single Node Cutting
D = Double Node Cutting

MAP 5: Plot D

MAP 6: Plot E


N
1
5
9
13
17
21
25
29
30
31
32
2
6
10
14
18
22
26
33
34
35
3
7
11
15
19
23
27
36
37
4
8
12
16
20
24
28
38
39
40
14m
33.5 m
10.5m
44 m

MAP 7: Plot F


Rock outcrop
N
Stream bed
Stream bed
1
2
3
4
5
6
7
8
9
10
11
12
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14
15
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36

The following species were tested: Dhanu; Ghopi; Laurei; Leiwai; Tama Kalo; Tama Seto and Taru.

2.2 Field Study Method

Surveys of the experiment were carried out after six months and one year. The growth of every plant was measured and a distinction drawn between the growth of 'shoots' (arising from new underground rhizomes) and 'nodes' (which grow from the stems of the original cuttings). The number of shoots and nodes was recorded, together with their maximum and minimum lengths, rounded up to the nearest 5 cm. In the second survey only a record of survival was made.

2.3 Data Analysis Method

The results were entered into a computer and general trends noted. No statistical analysis of the results was carried out because there were too few replications of each experiment for this to be possible.

3. RESULTS AND DISCUSSION

Table 2 (below) shows the results obtained from the trials. Appendix 2 lists the processed data for each species.

Table 2: Summarisesd Results

	Average Survival (percent)		
Species	**Rhizomes**	**Wet Cuttings**	**Dry Cuttings**
Dhanu	63	100	83
Ghopi	38	0	0
Laurei	80	0	0
Leiwa	25	0	33
Tama K.	50	50	83
Tama S.	38	100	50
Taru	35	100	100

From Tables 10, 11 & 14: Appendix 2.

Due to the lack of sufficient replications it was decided to present results by species rather than

for each trial plot. Greater than 50 percent survival was considered a "success", less than 50 percent a "failure". Of the seven species tested Dhanu bans, Tam a Kalo, Tama Seto and Taru bans were found to grow successfully from stem cuttings. At present it appears that double node cuttings are more viable than sigle node, Further trials were started in February 1989 to determine if there is a significant difference between the two methods. Taru bans proved to be the most successful species tested, consistently giving 100 percent success from cuttings, but propagated poorly from rhizomes.

Of the other three species tested Ghopi and Leiwa are of small diameter and therefore probably do not have sufficient food reserves to be grown efficiently from cuttings. They also grew poorly from rhizomes. Their future usefulness is therefore doubtful. Laurei bans does not produce large side branches and is also of small diameter (less than 3 cm). As it is also a speading species it is worthy of being planted on a wider scale because speading species are more effective at soil stabilisation when compared to species that form a dense clump.

Plot B was altered between the two surveys and so no data from this site was considered in the results and conclusions.

The results for Plot E were interesting (see Table 13, Appendix 2). Five 'short' Dhanu bans rhizomes (with a culm of less than 30 cm) produced a total of 14 new shoots in the first six months of growth, while 6 'long' Dhanu bans rhizomes only produced 4 shoots between them. (The fact that one of the short rhizomes died is probably not significant). From the success of Dhanu bans in this trial we can infere that:

1) Short rhizomes produce new culms more rapidly than long culm rhizomes, possibly because the proliferation of 'nodal' growth from the nodes on the upright stem suppress the production of new shoots from the underground rhizomes.

2) It is not necessary to purchase a complete culm to produce a successful rhizome cutting - only the roots are required. This means that the roots of harvested culms can be used.

3) 'Humindegheira' is protected from grazing, but on unprotected sites short rhizomes have little chance of survival. This is probably the main reason why long-culmed rhizomes have always been used in Nepal.

4. CONCLUSIONS

Dhanu bans is best grown from cuttings [Rhizomes are also successful].

Ghopi bans propagates poorly by any method.

Laurei bans is very successful from rhizomes and is worthy of use on a wider scale.

Leiwa bans propagates poorly by any method.

Tama Kalo can be grown from cuttings [rhizomes less successful].

Tama Seto can be grown from cuttings [rhizomes less successful].

Taru bans cuttings are far superior to rhizomes [usually the most successful species from cuttings].

Rhizomes with short culm will be more successful on sites where grazing is prohibited.

REFERENCES

Jackson, J.K. (1987). *Manual of Afforestation in Nepal*. Kathmandu, Nepal: U.K. Forestry Project, Forest Survey and Research Office, Dept. of Forest, 59.

Kasojoo, V.K. (1988). *Palpa As You Like It*. Nepal: Kumar Press