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EVALUATION OF THE YIELD PERFORMANCE OF SELECTED RUBBER PLANTING MATERIALS IN THE CONTEXT OF THE PLANTING POLICY

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The yield performance of selected planting materials over three time periods was assessed. Among the 32 planting materials for which data are available, 15 popular ones are selected for the purpose of analysis. The analysis of yield data shows that PB 28/59, RRIM 605, PB 5/51 and GT 1 are found to be superior compared to others in terms of yield (kg ha^{-1} y^{-1}) during the first ten years of tapping. During the fifteen year period of exploitation among the 8 planting materials, RRIM 605, PB 5/51 and RRIM 623 had relatively higher yield compared to others. Among the four planting materials for which data are available, during the twenty year period, GG 2 topped the list. A multiple regression analysis of the available data suggests that the variation in yield can be explained from 64 to 87 per cent (in 20 year period), 76 to 98 per cent (in 15 year period)and 74 to 100 per cent(in 10year period except in the case of PB 235)depending on the planting material. The observed and estimated yield are comparable except for the first year of tapping for the three time periods and for the twentieth year of tapping. The planting policy of the company (1970–1980) appears to be in tune with the yield performance of the selected planting materials during the ten year period. During the period 1960–1980 (except for the first sub-period) the clones such as GT 1, PB 28/59, PB 217 and PB 235 have received maximum attention.

Key words – Yield performance, Rubber planting materials, Planting policy, Year of tapping, Density, Multiple regression equation.

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INTRODUCTION

Natural rubber (NR) production in India is insufficient to meet the internal consumption and very often the country has to depend on imports which range from 15 to 20 per cent of the total requirement. Though the Government of India made earnest efforts to achieve self sufficiency in NR production the increase in production is nullified by a relatively faster rate of growth of consumption on account of a growing and diversifying domestic rubber goods manufacturing sector. Among the various schemes launched by the Government to achieve self sufficiency, the popularisation of High Yielding Varieties (HYV) of planting materials deserves special mention. Even though the response to the promotional efforts initiated by the Rubber Board was positive from both the estate and the small holding sectors, there exists considerable difference between the two with regard to the adoption of HYV materials. For instance, at present 99 per cent of the total area in the estate sector is under HYV compared to 88 per cent in the small holding sector.

Rubber plantation industry in India is characterised by the dominance of the small holding sector which accounts for more than 80 per cent of the total area under rubber cultivation. Though only 20 per cent is accounted by estate sector, the higher productivity achieved by it makes the contribution significant. An attempt is made in this paper to assess the yield performance of various planting materials over three time periods *vis-a-vis* the planting policy of a large company during 1960–1980. The company is one of the largest rubber planting companies in India having more than 8900 ha of planted area and about 7500 ha under tapping.

The main objectives of the study were:

* to assess the yield performance of selected planting materials;
* to estimate the extent of individual and combined influence of selected variables on yield rates;
* to determine the year of tapping which gives the maximum yield for each planting material and
* to assess the planting policy of the company.

MATERIALS AND METHODS

A large plantation company has furnished yield data along with details such as planting density and year of opening for 32 planting materials covering a period of 20 years. Among the 32 planting materials, 15 are selected on the basis of popularity, measured in terms of their relative shares in total area under tapping as on January, 1988. The combined share of these 15 planting materials is more than 94.5 per cent of the total area under rubber. Since the data pertaining to yield for the 20 years of tapping were not available for all the varieties, trends in yield rates were analysed separately for three time periods, *viz.*, ten, fifteen and twenty year periods to obtain maximum possible coverage of the planting materials.

The influences of year of tapping and density on the trends in yield rates of individual planting materials were estimated by employing multiple regression analysis (Steel and Torrie, 1960).

The regression equation takes the form:

$$y = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3,$$

where y = estimated yield

a_0, a_1, a_2 and a_3 are estimated constants.

x_1 = year of tapping

x_2 = density

x_3 = product of x_1 and x_2.

A quadratic function of year of tapping on yield has been worked out and the results were compared with the model mentioned above. Finally an attempt was made to assess the planting policy of the company by ranking the planting materials according to their relative shares in total area planted during ten year priod (1970–1980) *vis-a-vis* a ranking of the planting materials based on thier mean yield during the first ten years of tapping. The relationship of the respective ranks was examined by finding out the rank correlation.

RESULTS AND DISCUSSION

Analysis of trends in mean yield

The planting materials chosen for the study and their relative shares in total area under tapping as on January, 1988 are shown in Table 1.

Table 1. Planting materials and their relative shares in total area under tapping.

Planting material	Type/Source	Relative share (%)
GG 1	Polyclonal seedlings, Malaysia	16.76
GT 1	Primary clone, Indonesia	15.35
RRIM 600	Hybrid clone, Malaysia	10.75
GG 2	Polyclonal seedlings, Malaysia	10.47
PB 28/59	Primary clone, Malaysia	9.32
PB 86	Primary clone, Malaysia	6.62
PB 217	Hybrid clone, Malaysia	4.79
PBIG	Polyclonal seedlings, Malaysia	3.29
GG 4	Polyclonal seedlings, Malaysia	3.23
Polyclonal seedling trees	(source not specified)	3.21
PB 5/51	Hybrid clone, Malaysia	3.18
PB 235	Hybrid clone, Malaysia	2.43
RRIM 623	Hybrid clone, Malaysia	2.20
RRIM 628	Hybrid clone, Malaysia	1.46
RRIM 605	Hybrid clone, Malaysia	1.42
Others		5.52
Total		100.00

The above data indicate that GG 1, GT 1, RRIM 600, GG 2 and PB 28/59 together account for 62.65 per cent of the total area under tapping. Another important point to be noted is that among the fifteen materials, five are polyclonal seedlings and ten are clones whose relative shares are 36.96 and 57.52 per cent, respectively.

Table 2 shows the results of the analysis of yield performance of the selected planting materials during the time periods mentioned above. The analysis of the data shows that the influence of the type of planting material on yield is significant. During the ten year period, PB 28/59, RRIM 605, PB 5/51 and GT1 have performed relatively well in terms of yield compared to the other planting materials. Among these materials, RRIM 605 had the lowest coefficient of variation suggesting a relatively higher stability. Among all the fifteen planting materials studied, PBIG, RRIM 628, PB 86 and GG 4 had the lowest yield during the ten year period.

During the 15 year period, RRIM 605, PB 5/51 and RRIM 623 were found to be superior in terms of yield. Interestingly, once again RRIM 605 recorded a relatively higher stability among the top performers. During this period also PBIG and PB 86 are ranked below all other varieties with respect to yield.

For the 20 year period, data are available only for four planting materials and among them, GG 2 tops the list followed by GG 1 in yield. However, PBIG with its lowest yield had the maximum stability compared to the other three materials.

Even with the limitations imposed by the available data, we find it difficult to withhold a tentative relationship observed between yield and variability in yield. For instance, during the ten year period PB 28/59 with its highest yield shows a relatively higher variability, whereas, PBIG had the lowest yield and the lowest variability. However, for the fifteen year period, though RRIM 605 had the highest yield, its variabitlity was lower compared to PB 5/51 which had the second best mean yield. During the twenty year period, GG 2 had both the highest yield and maximum variability compared to the other three planting materials for which data are available. In this connection, it is worth mentioning that during the three time periods analysed, PBIG is characterised by the unique feature of having the lowest yield and variability.

Table 2. Mean yield and coefficient of variation (c.v.) of selected planting materials during the three time periods.

PLANTING MATERIALS	TEN YEAR PHASE		FIFTEEN YEAR PHASE		TWENTY YEAR PHASE	
	Mean yield (kg ha^{-1})	c. v.	Mean yield (kg ha^{-1})	c. v.	Mean yeld (kg ha^{-1})	c. v.
GG 1	1040 (11)	35.70	1144 (5)	29.45	1179 (2)	25.88
GT 1	1154 (4)	46.58	NA	NA	NA	NA
RRIM 600	1116 (6)	40.19	NA	NA	NA	NA
GG 2	1056 (9)	36.48	1153 (4)	30.06	1230 (1)	27.49
PB 28/59	1293 (1)	42.11	NA	NA	NA	NA
PB 86	974 (13)	31.71	1063 (7)	26.53	1122 (3)	23.73
PB 217	1109 (7)	41.13	NA	NA	NA	NA
PBIG	919 (15)	30.96	982 (8)	25.25	1031 (4)	22.39
GG 4	998 (12)	39.35	NA	NA	NA	NA
Polyclonal seedling trees	1051 (10)	35.03	1105 (6)	28.45	NA	NA
PB 5/51	1164 (3)	43.69	1337 (2)	36.69	NA	NA
PB 235	1121 (5)	46.73	NA	NA	NA	NA
RRIM 623	1060 (8)	37.68	1226 (3)	33.37	NA	NA
RRIM 628	961 (14)	42.42	NA	NA	NA	NA
RRIM 605	1194 (2)	34.08	1365 (1)	30.63	NA	NA

NA — Not available

Note: Figures in brackets refer to relative rankings of individual varieties based on yield performance

Another important observation emerging from Table 2 is that the rate of increase in yield between the ten year period and the fifteen year period is not maintained during the next sub-period in the case of all the planting materials for which data are available (Table 3). From Table 3, it is evident that between the ten year period and the fifteen year period, highest rate of increase in yield is recorded by RRIM 623, PB 5/51 and RRIM 605. Between the fifteen year and the twenty year periods and between the ten and the twenty year periods, GG 2 accounts for the highest rate of increase in yield.

Regression analysis

To understand and estimate the extent of influence of available variables, *viz.,* year of tapping, density and the product of these two, a multiple regression is fitted between yield and these variables. The regression equations for different planting materials for different time periods together with their values of R^2 are given in Tables 4, 5 and 6.

Table 4 furnishes the regression equations for the individual planting materials for the ten year period. The variation in yield can be explained to the extent of 74 to 100 per cent depending on the planting material

Table 3. Trends in the rate of increase in yield

Planting material	Rate of increase between 10 year period and 15 year period (%)	Rate of increase between 15 year period and 20 year period (%)	Rate of increase between 10 year period and 20 year period (%)
GG 1	9.95	3.07	13.32
GT 1	NA	NA	NA
RRIM 600	NA	NA	NA
GG 2	9.25	6.69	16.56
PB 28/59	NA	NA	NA
PB 86	9.29	5.46	15.24
PB 217	NA	NA	NA
PBIG	6.86	5.00	12.00
GG 4	NA	NA	NA
Polyclonal seedling trees	5.13	NA	NA
PB 5/51	14.89	NA	NA
PB 235	NA	NA	NA
RRIM 623	15.70	NA	NA
RRIM 628	NA	NA	NA
RRIM 605	14.26	NA	NA

NA = Not available

except for PB 235 where R^2 is not significant. During the ten year period, the yield pattern of PB 235 appears to be highly unstable. The quadratic function can also explain equally well the yield pattern for this period except in the cases of PB 86 and PB 217. In these two cases, there exists a positive relationship between density and yield as is evident from a declining trend in density followed by a declining yield.

Table 5 shows the regression equations for the fifteen year period. The variation in yield can be explained to the extent of 76 to 98 per cent depending on the planting materials. During this period also R^2 is highly significant in all cases. Here also the quadratic function is equally efficient in estimating the yield performance within the density range of 357 to 285 ha^{-1}. The estimated yield performance of individual planting materials during this period is given in Fig. 1.

Table 6 shows that variation in yield can be explained from 64 to 87 per cent by this function depending on the individual planting material. R^2 is highly significant in all the cases. It is also interesting to note that a quadratic function of year of tapping alone on yield could estimate equally well the variation in yield during the twenty year period. In other words, it indicates that the influence of density within the range of 355 to 261 ha^{-1} is negligible during the twenty year period for the four planting materials given in Table 6. The estimated yield performance of individual planting materials during this period is given in Fig. 2.

Table 4. Multiple regression equations for the ten year period

Planting material	Regression equations	R^2
GG1	$Y = 20356.4774 - 1511.8755 x_1 - 52.3664 x_2 + 4.0489 x_3$	0.94
GG2	$Y = 39719.2837 - 1907.3979 x_1 - 102.2800 x_2 + 4.5017 x_3$	0.89
PB 86	$Y = 27203.2541 - 728.1546 x_1 - 84.4139 x_2 + 1.7774 x_3$	0.99
PBIG	$Y = 8478.1667 - 1408.1659 x_1 - 24.9613 x_2 + 4.7326 x_3$	1.00
PB 5/51	$Y = 6126.9987 - 1273.0018 x_1 - 17.4481 x_2 + 4.4044 x_3$	0.95
Polyclonal seedling trees	$Y = 2971.6152 - 505.5746 x_1 - 8.0402 x_2 + 2.0334 x_3$	0.92
RRIM 605	$Y = -22667.5212 + 1385.5400 x_1 + 64.6376 x_2 - 3.2984 x_3$	0.74
RRIM 623	$Y = -4565.8900 - 702.9417 x_1 + 12.1242 x_2 + 2.9293 x_3$	0.92
GG 4	$Y = 6684.3810 - 980.2279 x_1 - 16.3608 x_2 + 2.9362 x_3$	0.92
GT 1	$Y = 16827.8990 - 1581.3644 x_1 - 44.9378 x_2 + 4.7167 x_3$	0.81
PB 217	$Y = -4634.8913 + 428.3630 x_1 + 15.1475 x_2 - 0.7799 x_3$	0.96
PB 235	$Y = 2921.5106 - 876.2153 x_1 - 7.5898 x_2 + 3.0237 x_3$	0.57
PB 28/59	$Y = -5899.6423 - 522.3392 x_1 + 15.4007 x_2 + 2.6010 x_3$	0.80
RRIM 600	$Y = 5940.7296 - 1329.0243 x_1 - 16.7984 x_2 + 4.5357 x_3$	0.92
RRIM 628	$Y = 6607.4773 - 400.5459 x_1 - 18.9863 x_2 + 1.5004 x_3$	0.83

Table 5. Multiple regression equations for the fifteen year period

Planting material	Regression Equations	R^2
GG 1	$Y = 8297.8638 - 580.4337 x_1 - 20.7147 x_2 + 1.7466 x_3$	0.82
GG 2	$Y = 2479.2445 - 535.5483 x_1 - 5.8085 x_2 + 1.8615 x_3$	0.81
PB 86	$Y = 21767.6051 - 715.4624 x_1 - 67.3754 x_2 + 1.9644 x_3$	0.98
PBIG	$Y = 14295.6170 - 711.5260 x_1 - 41.6968 x_2 + 2.1462 x_3$	0.86
PB 5/51	$Y = 6775.5380 - 640.4715 x_1 - 18.7635 x_2 + 2.2837 x_3$	0.90
Polyclonal seedling trees	$Y = 5433.9825 - 477.4289 x_1 - 14.6548 x_2 + 1.7145 x_3$	0.82
RRIM 605	$Y = -4122.9854 - 192.1860 x_1 + 12.9799 x_2 + 0.9821 x_3$	0.76
RRIM 623	$Y = 6549.1314 - 451.4619 x_1 - 16.8903 x_2 + 1.5153 x_3$	0.87

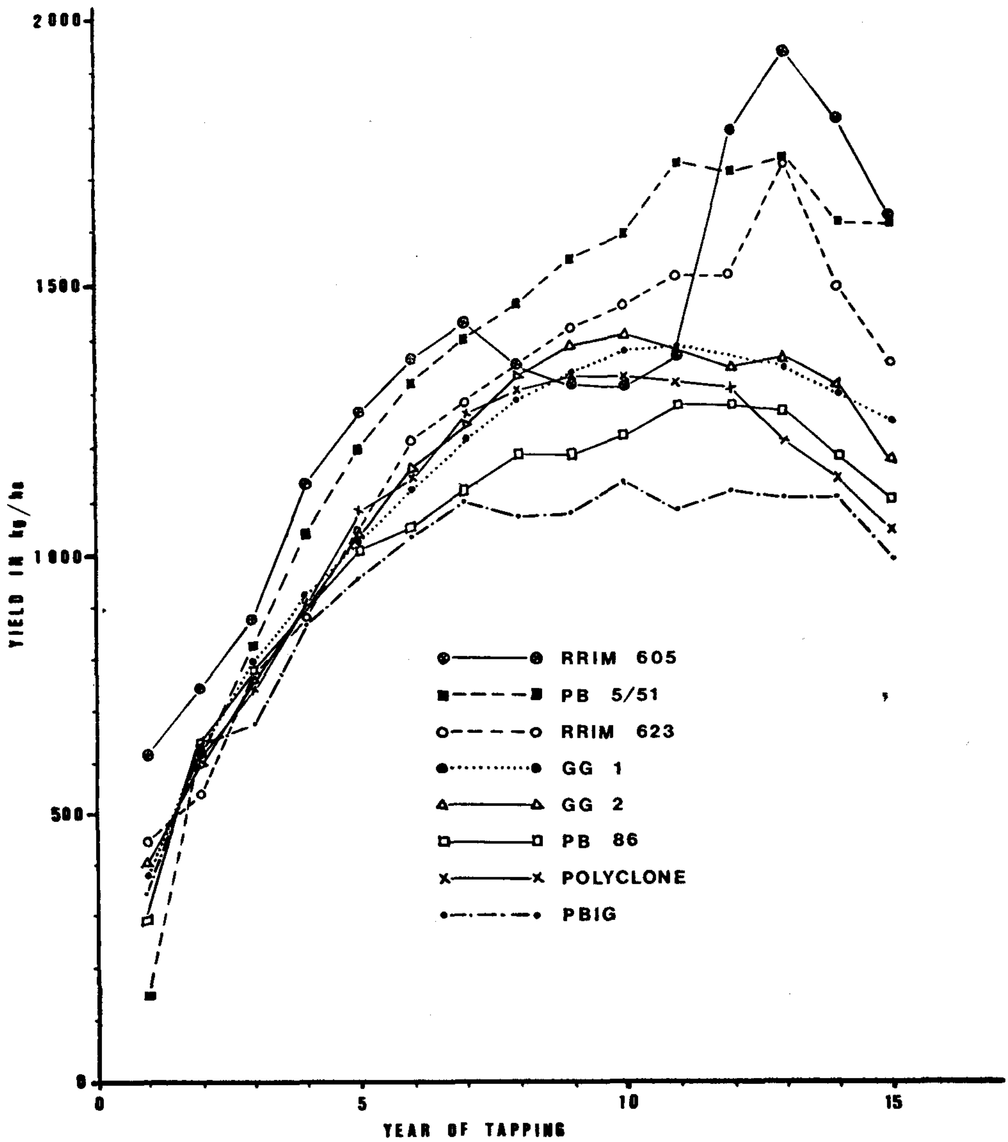

Fig. 1. Estimated yield performance during the 15 year period

Table 6. Multiple regression equations for the twenty year period

Planting material	Regression equations	R^2
GG 1	$Y = 4122.9692 - 359.6009\ x_1 - 9.7646\ x_2 + 1.2353\ x_3$	0.78
GG 2	$Y = 10814.7928 - 346.3413\ x_1 - 26.5879\ x_2 + 0.8731\ x_3$	0.64
PB 86	$Y = 23031.9880 - 414.6990\ x_1 - 70.8200\ x_2 + 0.7634\ x_3$	0.87
PBIG	$Y = 9138.0722 - 325.7214\ x_1 - 25.8257\ x_2 + 0.9790\ x_3$	0.72

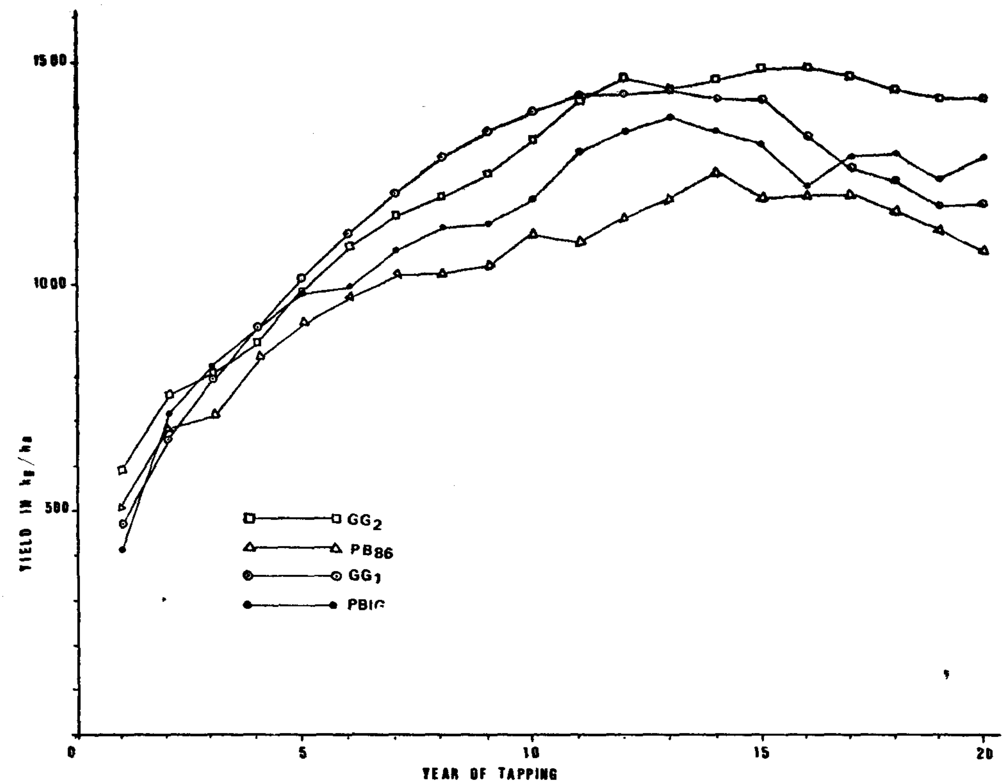

Fig. 2. Estimated yield performance during the 20 year period

The regression equations (Tables 4, 5 and 6) for the selected planting materials explain almost equally the variation in yield. However, in practice, tapped area for individual planting materials may not be available. Therefore, a pooled estimate of the yield relation has been worked out for the three time periods using both the quadratic function and the function including density (Wonnacott and Wonnacott, 1970). The relevant equations are given in Table 7.

During the three time periods for which data were analysed, both the equations are more or less equally efficient in explaining the variations in yield. But it also becomes obvious that the inclusion of density and the product of year of tapping and density do not contribute much in explaining the trends in yield. In other words, the quadratic function of the year of tapping on yield alone can be used without loss of any accuracy in estimating the yield performance, provided the density is in the ranges mentioned earlier. A comparison of the observed yield and the estimated yield based on the two equations is given in Table 8. It can be seen that there exists a relatively higher difference between the observed yield and the estimated yield during the first year of tapping for the three time periods as well as for the twentieth year of tapping. Even though we do not have concrete evidence to explain the factors contributing to this disparity, the following may be two of the main factors behind such a divergence:

(a) during the first year of tapping the actual number of trees tapped is much less than the density given and

(b) the number of tapping days during the first year is also comparatively less.

One of the possible reasons for a relatively higher yield for the four planting materials during the twentieth year of tapping may be the use of stimulants. The dependability of the model in predicting/estimating the trends in yield could have been improved had there been more variables such as number of tapping days, tapping system, cultural practices, etc.

Assessment of the planting policy of the company

For the purpose of understanding the planting policy of the company (new-planting/replanting) in relation to the yield performance of different planting materials, we have analysed the pattern of planting during the twenty year period (1960–1980) and the results are summarised in Table 9.

Table 9 is illustrative of the fact that the company did not follow a uniform planting policy from 1960 to 1980 period as is evident from the trends in the pattern of planting during the sub-periods listed in the table. During 1960–1965 three seedling varieties accounted for 92.2 per cent of the total area planted. But in the next sub-period (1965–1970) there was a remarkable change in the pattern of planting as is evident from a substantial reduction in the share of seedlings (44.8 per cent) and an increased attention given to the clonal varieties. The share of

Table 7. Pooled multiple regression equation for three time periods.

	R^2
Ten year period:	
Equation I (a)	
$Y = 13371.3276 - 1351.3687\,x_1 - 36.7866\,x_2 + 4.1666\,x_3$	0.89
Equation II (a')	
$Y = -42.01 + 354.5047\,x_1 - 21.4856\,x_1^2$	0.93
Fifteen year period:	
Equation I	
$Y = 9340.8787 - 615.5858\,x_1 - 25.2824\,x_2 + 1.9670\,x_3$	0.90
Equation II	
$Y = 224.5097 + 219.6590\,x_1 - 9.7960\,x_1^2$	0.90
Twenty year period:	
Equation I	
$Y = 9041.5160 - 341.6653\,x_1 - 24.0448\,x_2 + 1.0082\,x_3$	0.77
Equation II	
$Y = 422.6089 + 131.1371\,x_1 - 4.5931\,x_1^2$	0.78

(a) Equation I refers to yield function influenced by year of tapping, density and the product of these two.

(a') Equation II refers to yield function represented by year of tapping and its square.

Table 8. Comparison of observed yield/ha and estimated yield (kg ha^{-1}).

Year of tapping	Ten Year Period			Fifteen Year Period			Twenty Year Period		
	Observed Yield	Estimated Yield Equation I	Estimated Yield Equation II	Observed Yield	Estimated Yield Equation I	Estimated Yield Equation II	Observed Yield	Estimated Yield Equation I	Estimated Yield Equation II
1.	137.1	315.9	291.0	189.8	406.3	434.4	221.3	515.0	549.2
2.	701.7	650.2	581.1	712.9	652.7	624.6	679.3	703.3	666.5
3.	936.5	756.2	828.1	909.5	790.1	795.3	858.9	785.6	774.7
4.	1074.0	982.2	1032.2	1045.0	938.5	946.4	947.5	880.8	873.7
5.	1204.6	1180.8	1193.4	1178.4	1083.4	1077.9	1179.0	967.0	963.5
6.	1217.8	1314.6	1331.5	1198.4	1197.4	1189.8	1165.3	1044.0	1044.1
7.	1280.1	1391.0	1386.7	1312.1	1294.5	1282.1	1192.5	1112.0	1115.5
8.	1449.6	1437.7	1418.9	1335.8	1347.9	1354.8	1215.0	1163.0	1177.8
9.	1396.5	1435.7	1408.2	1283.0	1409.3	1408.0	1223.5	1201.3	1230.8
10.	1407.8	1341.6	1354.5	1406.9	1447.9	1441.5	1287.3	1268.5	1274.7
11.				1391.3	1451.7	1455.4	1294.8	1302.3	1309.4
12.				1344.0	1440.4	1449.8	1175.8	1348.1	1334.9
13.				1490.0	1427.5	1424.6	1299.8	1356.7	1351.2
14.				1378.8	1381.2	1379.7	1281.5	1375.6	1358.3
15.				1403.8	1310.9	1315.3	1262.3	1356.0	1356.2
16.							1331.8	1352.8	1345.0
17.							1256.8	1337.7	1324.5
18.							1225.5	1294.6	1294.9
19.							1306.5	1249.4	1256.1
20.							1404.5	1195.4	1208.1

clonal varieties has increased considerably, from 79.1 per cent during 1970–1975 to 95 per cent during the last sub-period, 1975-1980. However, during the twenty year period (1960–1980), the relative share of seedlings works out to 37.1 per cent owing to a remarkably high relative share during the initial period. An important conclusion emerging from Table 9 is that since 1975 the company has given maximum preference to certain selected clones, *viz.*, GT 1, PB 28/59, PB 217 and PB 235 whose combined share works out to 81.7 per cent of the total planted area between 1975–1980. Conversely, GG 1 and GG 2 were not planted since 1975.

Table 9. New planting /replanting by the company during 1960–80 (relative shares expressed in percentages)

Planting material	1960–65	1965–70	1970–75	1975–80	1960–80
GG 1	40.8	28.9	6.0	—	17.3
GT 1	—	4.8	25.5	37.7	18.3
RRIM 600	3.4	12.8	25.8	5.9	12.7
GG 2	44.0	12.4	1.3	—	12.4
PB 28/59	—	6.8	10.9	22.5	10.7
PB 86	—	—	—	0.3	0.1
PB 217	—	0.3	7.8	11.7	5.3
PBIG	—	—	—	—	—
GG 4	—	—	11.4	2.5	3.8
Polyclonal seedling trees	7.4	3.5	2.2	2.5	3.6
PB 5/51	1.3	8.4	4.8	—	3.8
PB 235	—	—	1.1	9.8	2.9
RRIM 623	2.4	5.2	1.1	—	2.1
RRIM 628	—	6.7	—	—	1.7
RRIM 605	—	5.3	—	—	1.4
Others	0.7	4.9	2.1	7.1	3.9
Total	100.00	100.00	100.00	100.00	100.00

To evaluate the planting policy of the company *vis-a-vis* the yield performance of the selected planting materials, the fifteen selected varieties were ranked on the basis of yield during the first ten years of tapping on the one side and on the basis of their relative shares in the total area planted during 1970–1980 (the latest ten year period for which data are available) on the other side. The results are summarised in Table 10.

Table 10 enables us to evaluate the planting policy of the company in relation to the yield performance of different planting materails. In general, the planting policy of the company during 1970–1980 appears to be in tune with the yield performance during the ten year period as is evident from the rank correlation 0.54 which is significant at 5 per cent level (Fisher and Yates, 1963). But there are two individual cases which deserve attention. For instance, RRIM 605 had the second best yield during the ten year period and a relatively higher stability among the top performers. During the fifteen year period RRIM 605 had the highest yield coupled with a comparative stability. However, RRIM 605 has not been planted since 1970 and we are not in a position to offer any plausible explanation for the same. Another striking case is that of PB 5/51 which had the third best yield during the ten year period and the second best yield during the fifteen year period. Compared with RRIM 605 its stability in yield is not satisfactory. Here also we are left with no clues to the specific reasons for discouraging its planting since 1975.

Table 10. Ranking of selected planting materials based on mean yield and planted area.

Planting material	Ranking based on yield	Ranking based on planted area between 1970–1980
GG 1	11	7
GT 1	4	1
RRIM 600	6	3
GG 2	9	10
PB 28/59	1	2
PB 86	13	12
PB 217	7	4
PBIG	15	13
GG 4	12	5
Polyclonal seedling trees	10	9
PB 5/51	3	8
PB 235	5	6
RRIM 623	8	11
RRIM 628	14	13
RRIM 605	2	13

CONCLUSION

The analysis of yield data shows that PB 28/59, RRIM 605, PB 5/51 and GT 1 are found to be superior compared to others in terms of yield during the ten year period. Among the four, RRIM 605 had the lowest coefficient of variation. During the fifteen year period RRIM 605, PB 5/51 and RRIM 623 had a relatively higher yield and once again RRIM 605 recorded the lowest coefficient of variation among the top performers. For the twenty year period, among the four planting materials, GG 2 topped the list. During the three periods mentioned above, PBIG had the distinction of having the lowest yield and the lowest coefficient of variation. A tentative observation which emerges from the analysis is a positive relationship between yield and instability. This phenomenon demands a clinical-scrutiny of the variables affecting trends in yield and stability. Another interesting observation emerging from the anlysis of yield data is that the rate of increase in yield has declined during the last sub-period in the case of the planting materials for which data are available.

The relevant multiple regression equations and the values of R^2 for the three periods suggest that variation in yield can be explained from 64 to 87 per cent (in the 20 year period), 76 to 98 per cent (in the 15 year period) and 74 to 100 per cent (in the 10 year period except in the case of PB 235) depending on the planting material. It also becomes evident that a quadratic function of year of tapping alone on yield could estimate equally well the variation in yield provided the density is in the studied range for the three time periods. The model enables us to make an assessment of the relative performance of different planting materials year-wise.

Pooled multiple regression equations for the three time periods show that the observed and estimated yield are comparable except for the first year of tapping and the twentieth year of tapping. For paucity of data on relevant variables, it becomes difficult to offer a convincing explanation.

The analysis of the planting policy of the company during the four sub-periods between 1960–1980 suggests that except during the first sub-period, the clonal varieties such as GT 1, PB 28/59, PB 217 and PB 235 have received maximum attention.

An evaluation of the planting policy of the company (1970–1980) in relation to the yield performance of the selected planting materials during the ten year period justifies its policy as is evident from the rank correlation (0.54) which is significant at 5 per cent level. However, two individual varieties, *viz.*, RRIM 605 and PB 5/51 with their higher yield and better stability were not planted since 1970 and 1975, respectively. This divergence from the general pattern of planting of the company offers scope for further enquiry.

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