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SUMMARY OF RICE YIELD REGRESSION:

1.) ORIGINAL DATA SET: 306 cases

2) CULLING THE DATA SET:

a) INVALID DATA:

- field areas less than 1 hectare
- questionable data due to noted contradictions or vagueness in colonist response
- estimated yields where colonist estimated yield of rice which had been harvested and piled but not yet threshed and sacked
- incomplete data for yield, areas, density, maize density, carbon, phosphorus or aluminum
- planting densities outside range of experiment station density studies

b) EXCLUDED CATEGORIES OF VALID DATA:

- fields interplanted with manioc
- fields interplanted with pasture (no actual cases in useable data categories)
- fields interplanted with "other crops" (other than maize, manioc or pasture)
- fields with toppling reported
- fields with germination problems reported (no actual cases in useable data categories)
- fields with planting dates other than in December, January or February
- varieties other than IAC-101, IAC-1246 or Canela de ferro

3) ADJUSTMENTS AND TRANSFORMATIONS OF THE DATA:

a) Yields are expressed as proportions of the predicted yield from interpolating from the results of agricultural experiment station studies done in the Altamira area testing the effects of variety and planting density.

b) Carbon is "adjusted to 2.0" meaning that values of percent carbon higher than 2.0 are assigned values of 2.0. This is in accord with the "linear response and plateau" model for predicting crop yields from soil nutrients.

4.) RICE YIELD REGRESSION:

$$\text{Rice yield (proportion of experiment station yield)} = 0.60 * \text{Carbon (\%)} - 1.52 * 10^{-5} * \text{Maize Density (plants/ha)} + 1.67 * 10^{-2} * \text{Phosphorus (ppm)} - 9.47 * 10^{-2} * \text{Aluminum (mE/100g)} - 6.03 * 10^{-3}$$

$p = 0.0165$

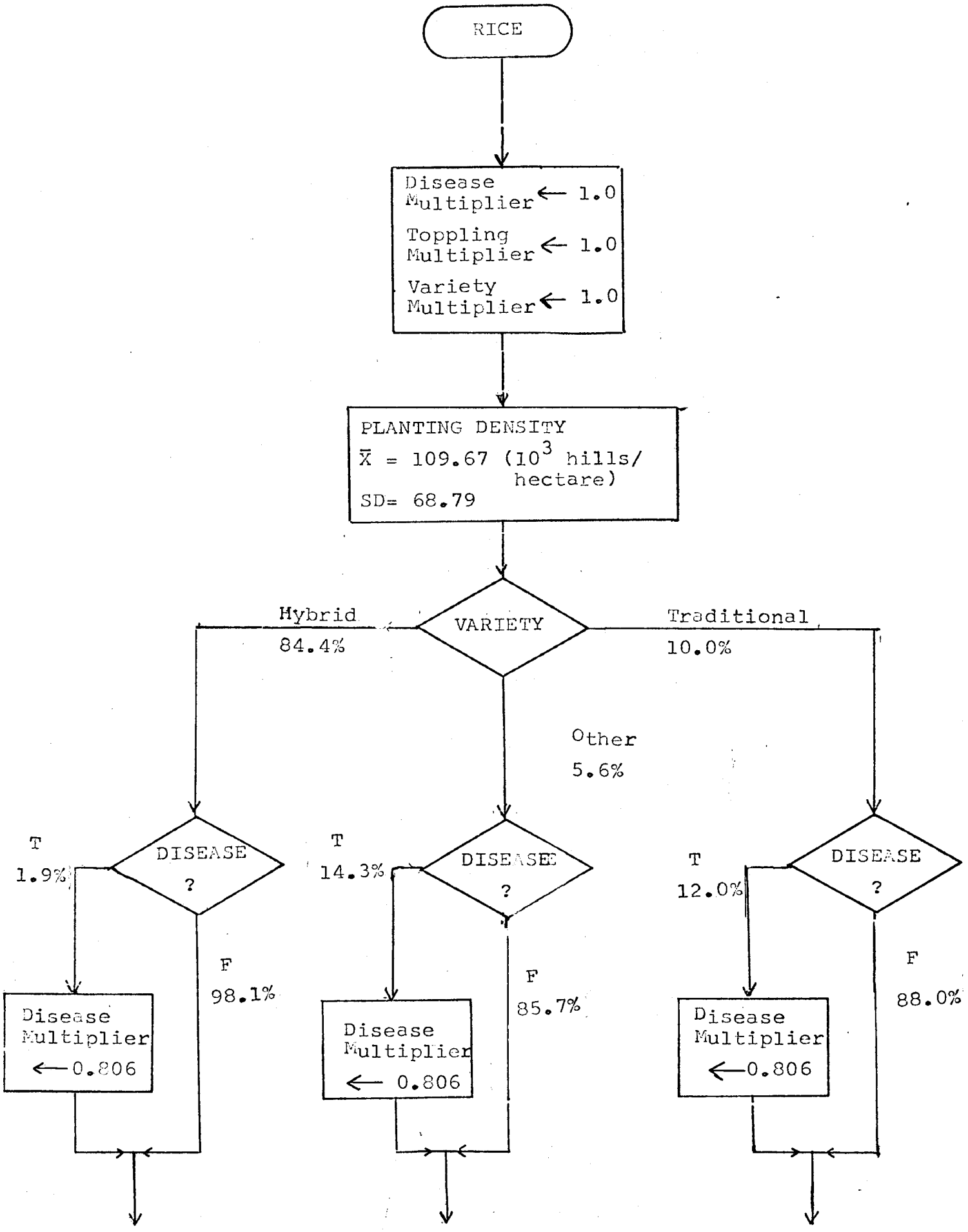
$r = 0.7808$

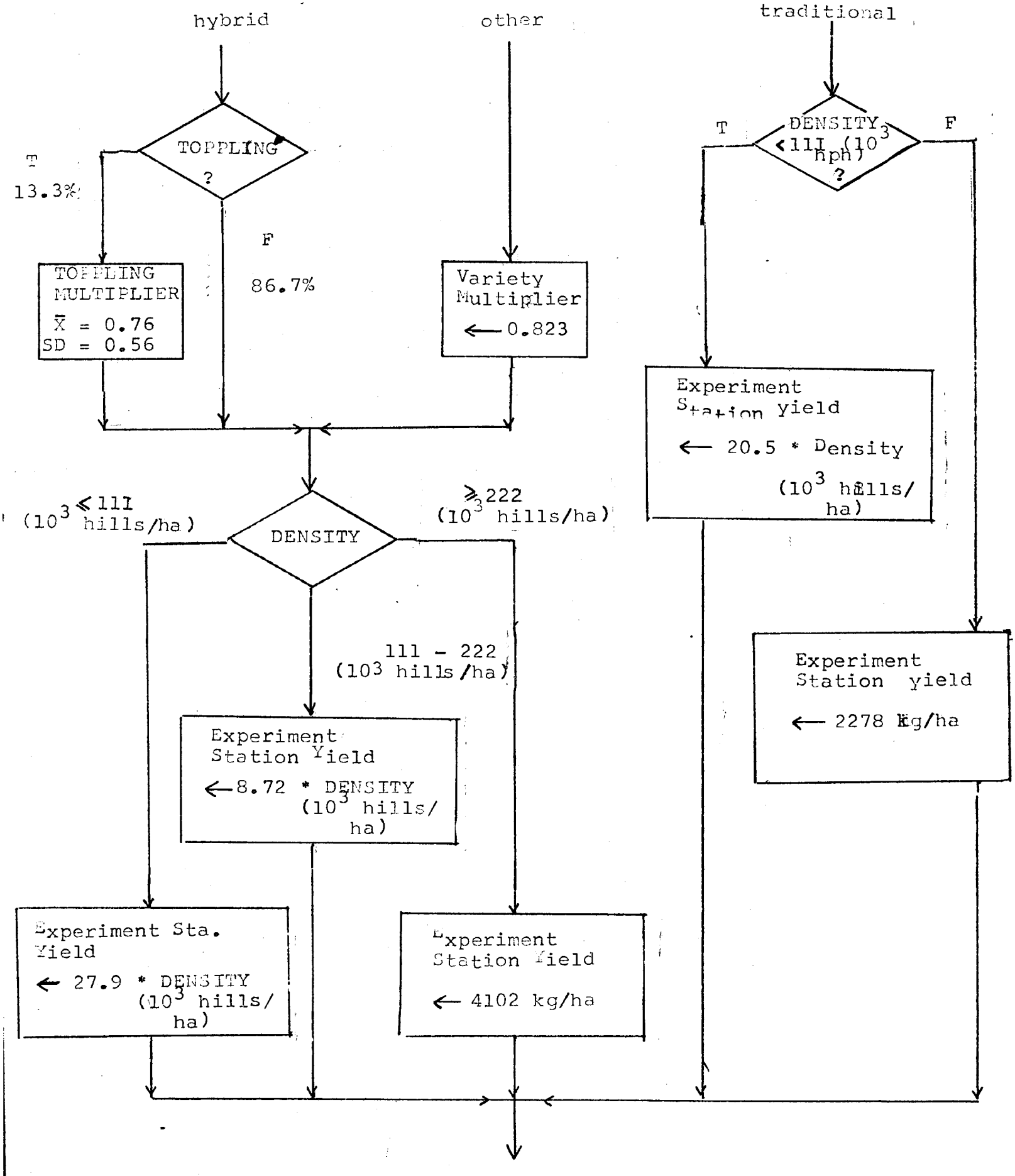
$r^2 = 0.6096$

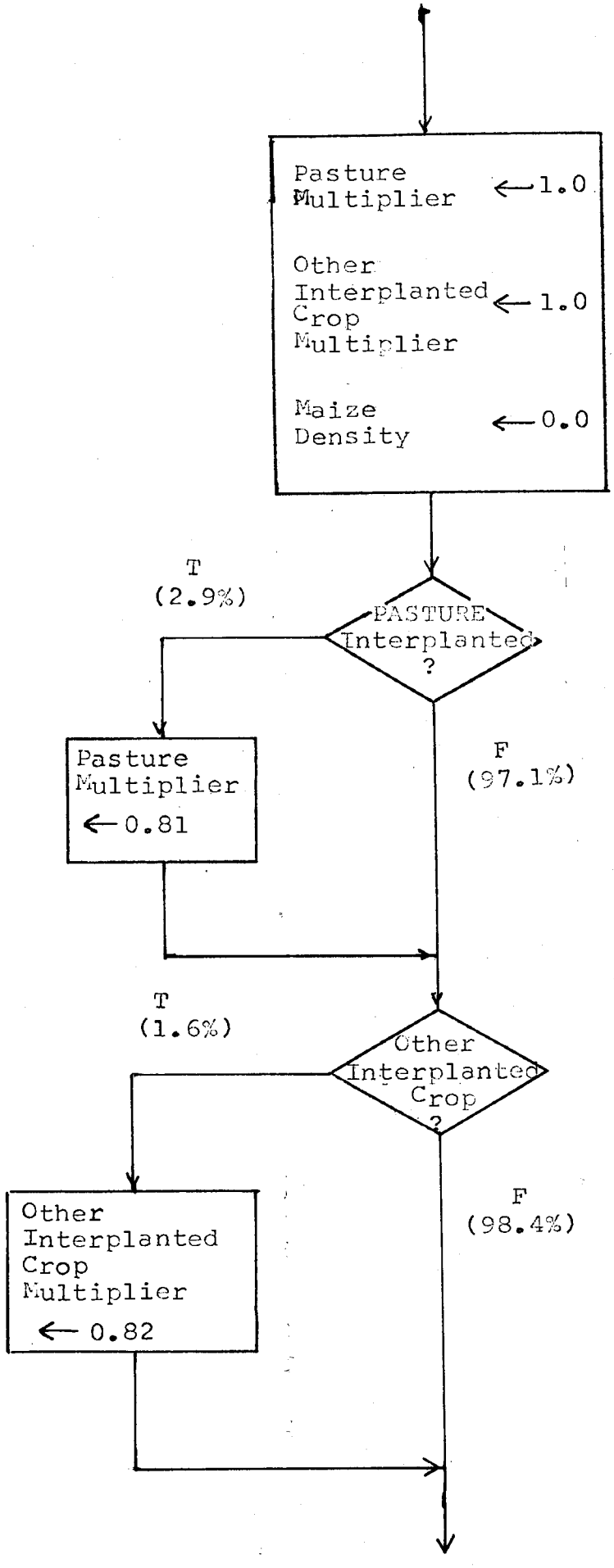
$SE = 0.2029$

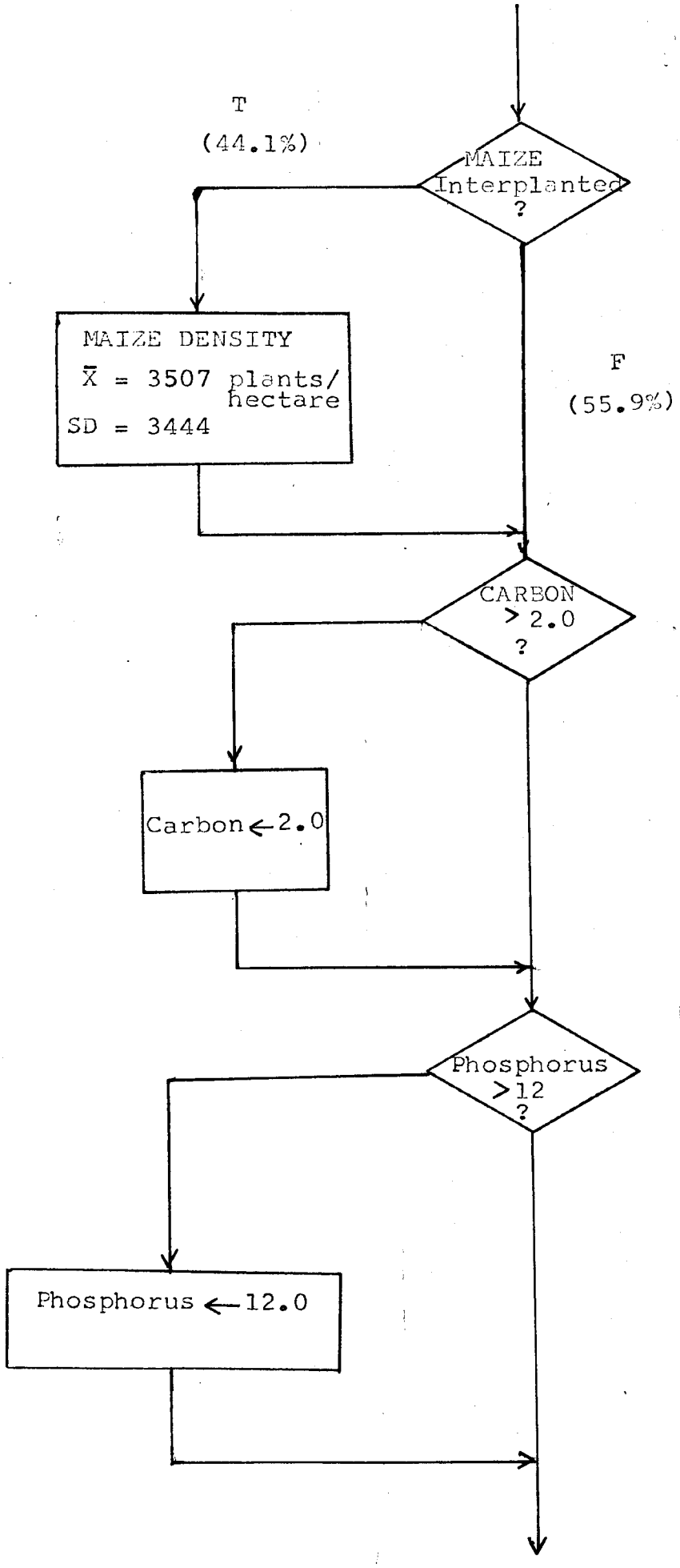
$N = 17$

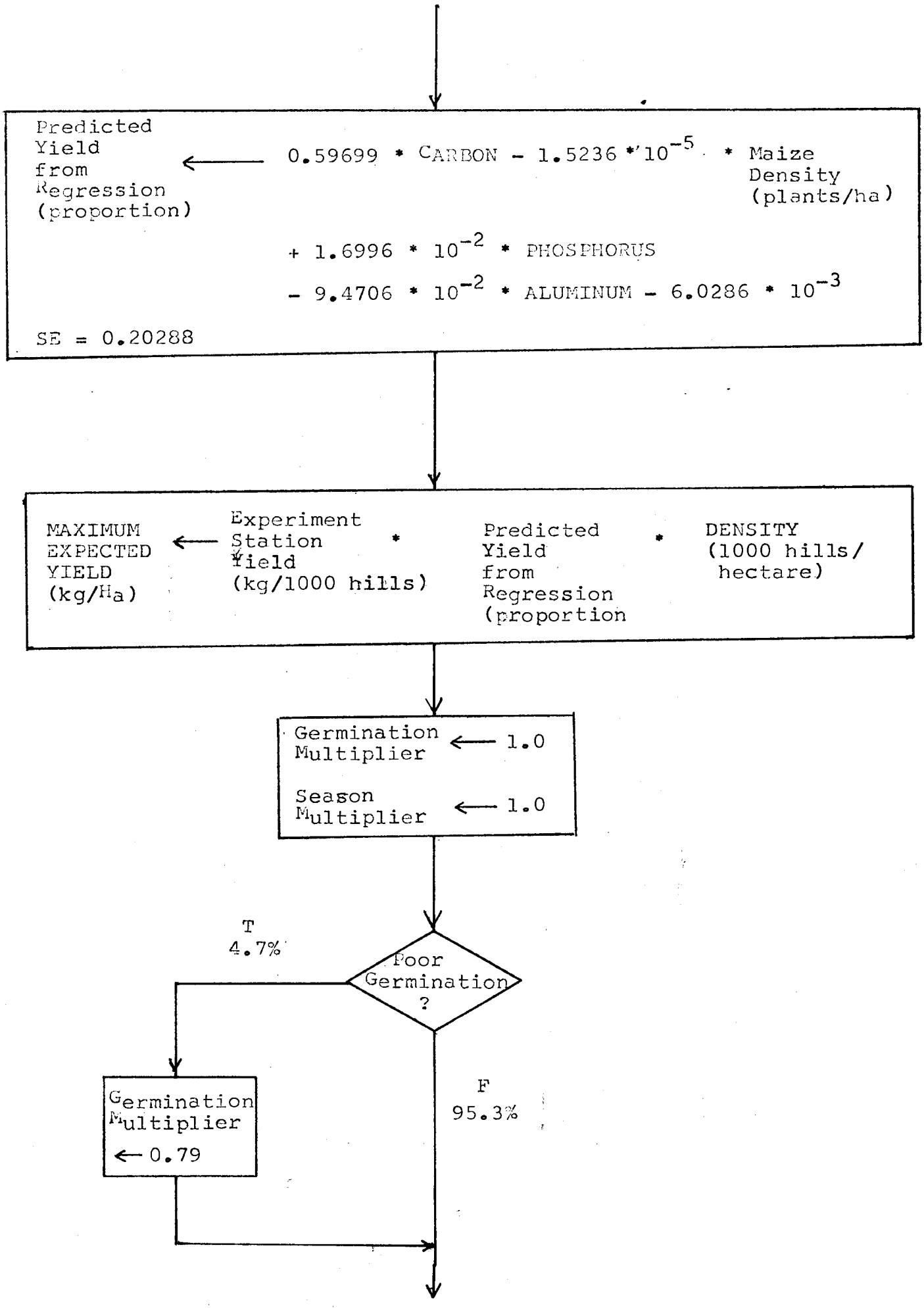
RICE ACTUAL YIELDS VS YIELDS PREDICTED FROM REGRESSION
1.5143
1.2786
1.0429
.80714
.57143
.33571
.10000
ACTUAL YIELD (proportion of experiment sta. yield)
.10000
.33571
.57143
.80714
1.0429
1.2786
1.5143
PR.01U
1.7500
Yield predicted from regression (proportion of experiment sta. Yield)

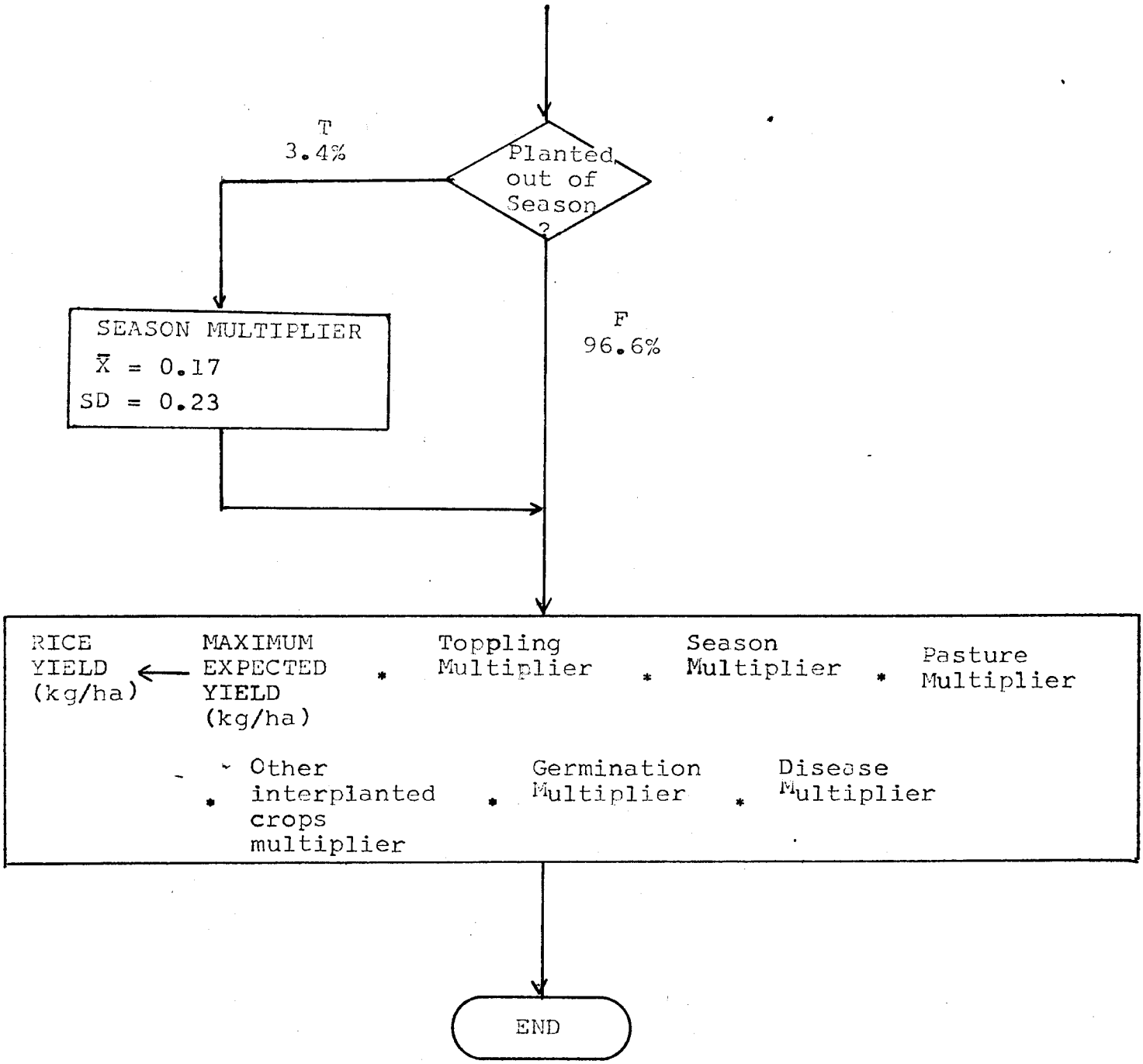

RICE
Disease Multiplier ← 1.0
Toppling Multiplier ← 1.0
Variety Multiplier ← 1.0
PLANTING DENSITY
$\bar{X}$ = 109.67 (10^3 hills/ hectare)
SD= 68.79
VARIETY
Hybrid
84.4%
Other
5.6%
Traditional
10.0%
T
1.9%
DISEASE ?
F
98.1%
Disease Multiplier ←0.806
T
14.3%
DISEASE ?
F
85.7%
Disease Multiplier ← 0.806
T
12.0%
DISEASE ?
F
88.0%
Disease Multiplier ←0.806


hybrid
other
traditional
TOPPLING ?
T
13.3%
F
86.7%
TOPPLING MULTIPLIER
$\bar{X}$ = 0.76
SD = 0.56
Variety Multiplier
← 0.823
DENSITY ?
T
F
< 111 (10^3 hph)
Experiment Station yield
← 20.5 * Density
(10^3 hills/ha)
DENSITY
< 111 (10^3 hills/ha)
≥ 222 (10^3 hills/ha)
111 - 222 (10^3 hills/ha)
Experiment Station Yield
← 8.72 * DENSITY
(10^3 hills/ha)
Experiment Station yield
← 2278 kg/ha
Experiment Sta. Yield
← 27.9 * DENSITY
(10^3 hills/ha)
Experiment Station Yield
← 4102 kg/ha


Pasture Multiplier ← 1.0
Other Interplanted Crop Multiplier ← 1.0
Maize Density ← 0.0
T (2.9%)
PASTURE Interplanted ?
F (97.1%)
Pasture Multiplier ← 0.81
T (1.6%)
Other Interplanted Crop ?
F (98.4%)
Other Interplanted Crop Multiplier ← 0.82


T
(44.1%)
MAIZE Interplanted ?
F
(55.9%)
MAIZE DENSITY
$\bar{X}$ = 3507 plants/ hectare
SD = 3444
CARBON > 2.0 ?
Carbon ← 2.0
Phosphorus > 12 ?
Phosphorus ← 12.0


Predicted Yield from Regression (proportion)
0.59699 * CARBON - 1.5236 * 10^-5 * Maize Density (plants/ha)
+ 1.6996 * 10^-2 * PHOSPHORUS
- 9.4706 * 10^-2 * ALUMINUM - 6.0286 * 10^-3
SE = 0.20288
MAXIMUM EXPECTED YIELD (kg/Ha)
Experiment Station Yield (kg/1000 hills)
Predicted Yield from Regression (proportion
DENSITY (1000 hills/ hectare)
Germination Multiplier
1.0
Season Multiplier
1.0
T
4.7%
Poor Germination ?
F
95.3%
Germination Multiplier
0.79


T
3.4%
Planted out of Season ?
F
96.6%
SEASON MULTIPLIER
$\bar{X}$ = 0.17
SD = 0.23
RICE YIELD (kg/ha)
MAXIMUM EXPECTED YIELD (kg/ha)
Toppling Multiplier
Season Multiplier
Pasture Multiplier
Other interplanted crops multiplier
Germination Multiplier
Disease Multiplier
END