The Role Of Water, Management And Variety In Determining The Yield of Sawah Rice

Sempor Project Area

An analysis had been made to reveal the role of water, management, and variety in determining the yield of sawah rice. For this purpose the many yield data from sample plots available in the Agriculture Extension Service in Kebumen had been used. They were obtained from the wet season crop of 1968/1969 and from the dry season crop of 1969. They included yields of local as well as improved varieties under ordinary management practices and Bimas.

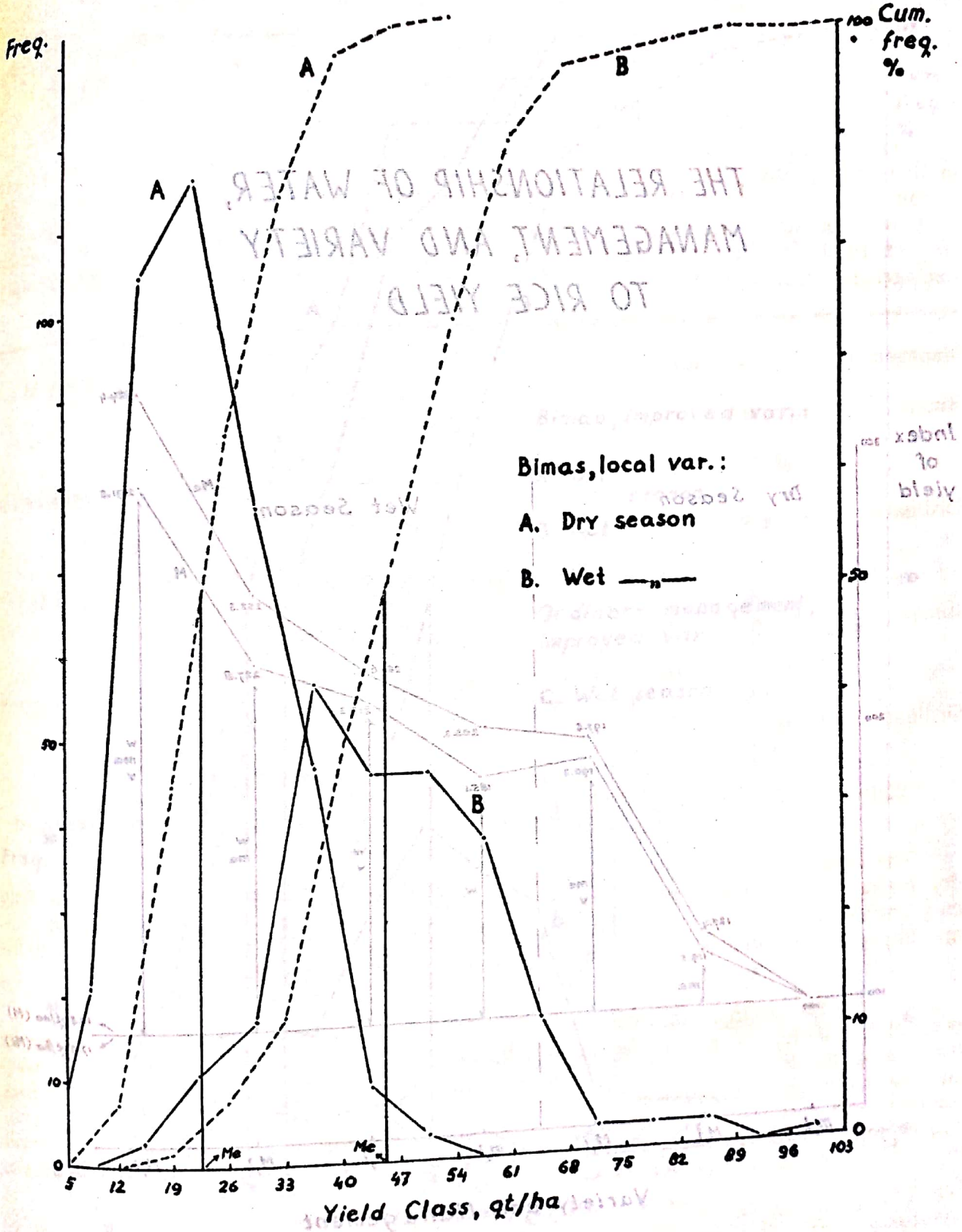
Management	Variety	Season	M ± s.e. and n	Me.	Mo. empiric	Difference between M
Bimas	improved	wet	57.77 ± 1.64 (105)	58.03	58.55	
						>12.67***
	local	wet	45.10 ± 1.39 (240)	45.13	45.19	>15.54***
						> 2.87
Ordinary	improved	wet	42.23 ± 3.50 (22)	40.00	35.54	>8.46***
						> 5.59
	local	wet	36.64 ± 0.88 (147)	36.36	35.80	> 4.56
						> 1.03
Bimas	improved	dry	37.67 ± 4.35 (12)	35.33	30.65	
						>14.01**
	local	dry	23.66 ± 0.45 (375)	22.80	21.08	>17.87***
						> 3.86**
Ordinary	local	dry	19.80 ± 1.33 (44)	17.89	14.07	

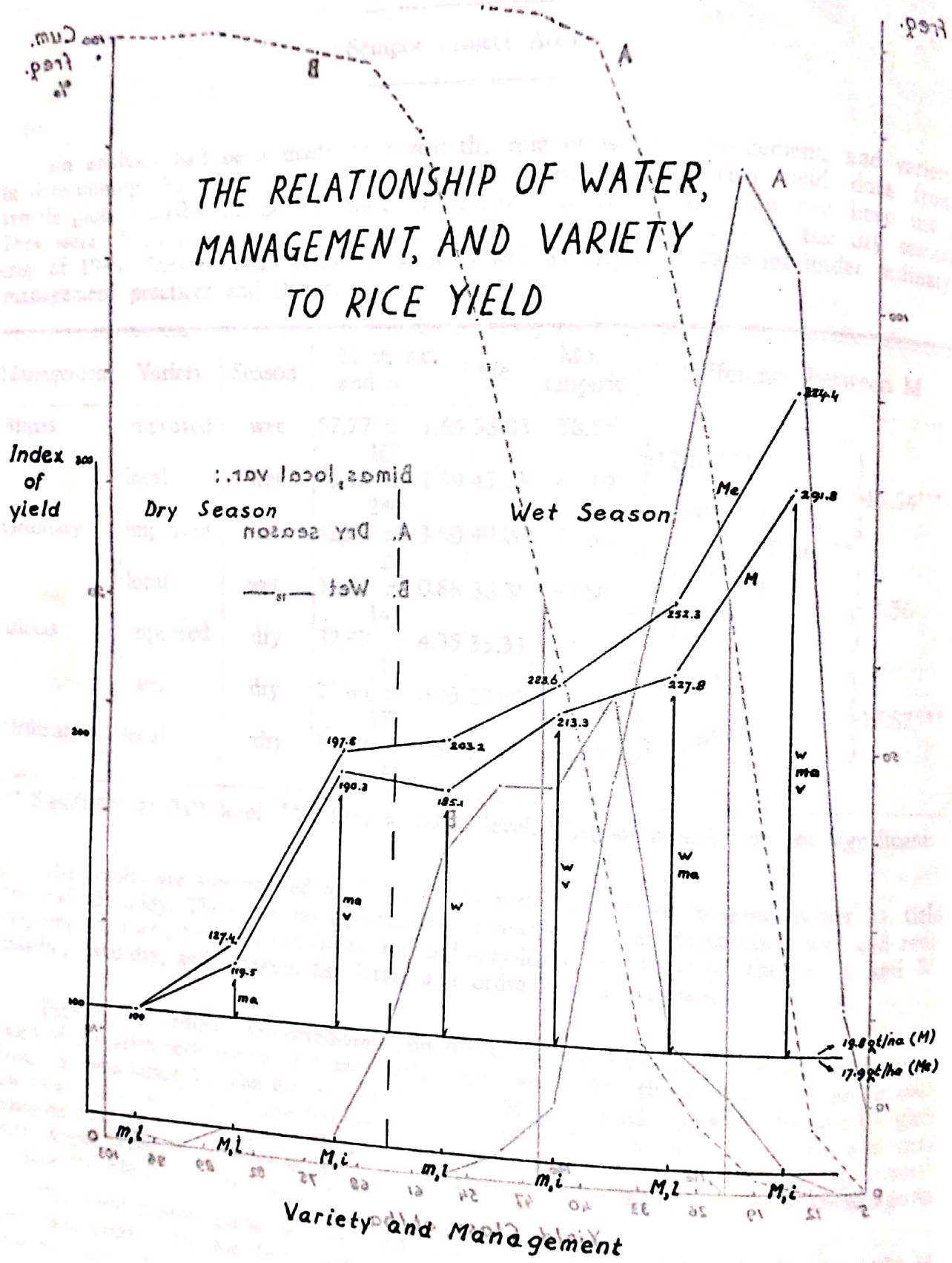
** Significant at 0.01 level. *** ditto at 0.001 level. Without asterisk = not significant.

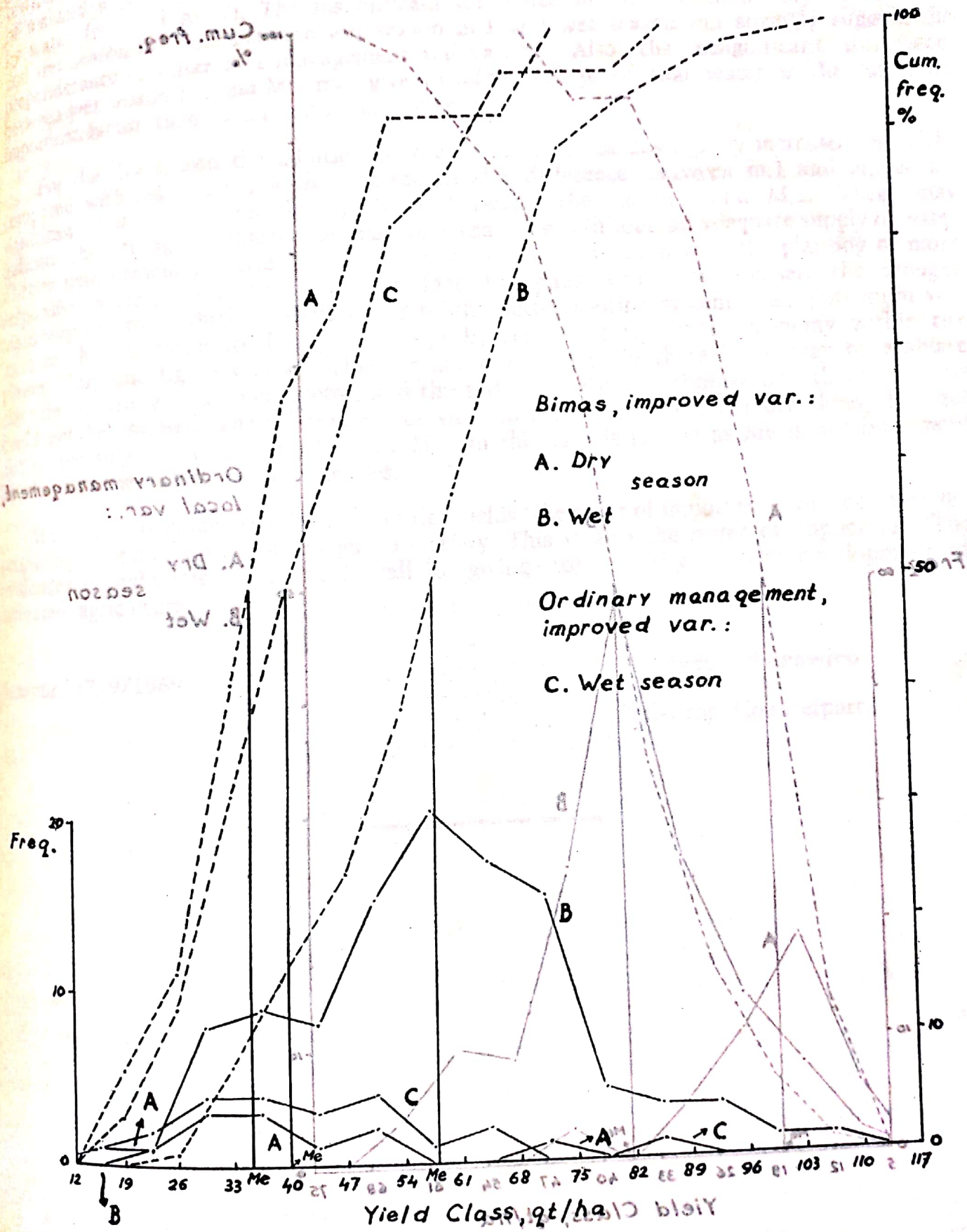
The results are summarized as follows. The yields are stated in quintals per ha. field dry stalked paddy. There are no significant differences between Bimas-local-wet and ordinary-improved-wet, between the latter and ordinary-local-wet, between the latter and Bimas-improved-dry, and between the latter and ordinary-improved-wet.

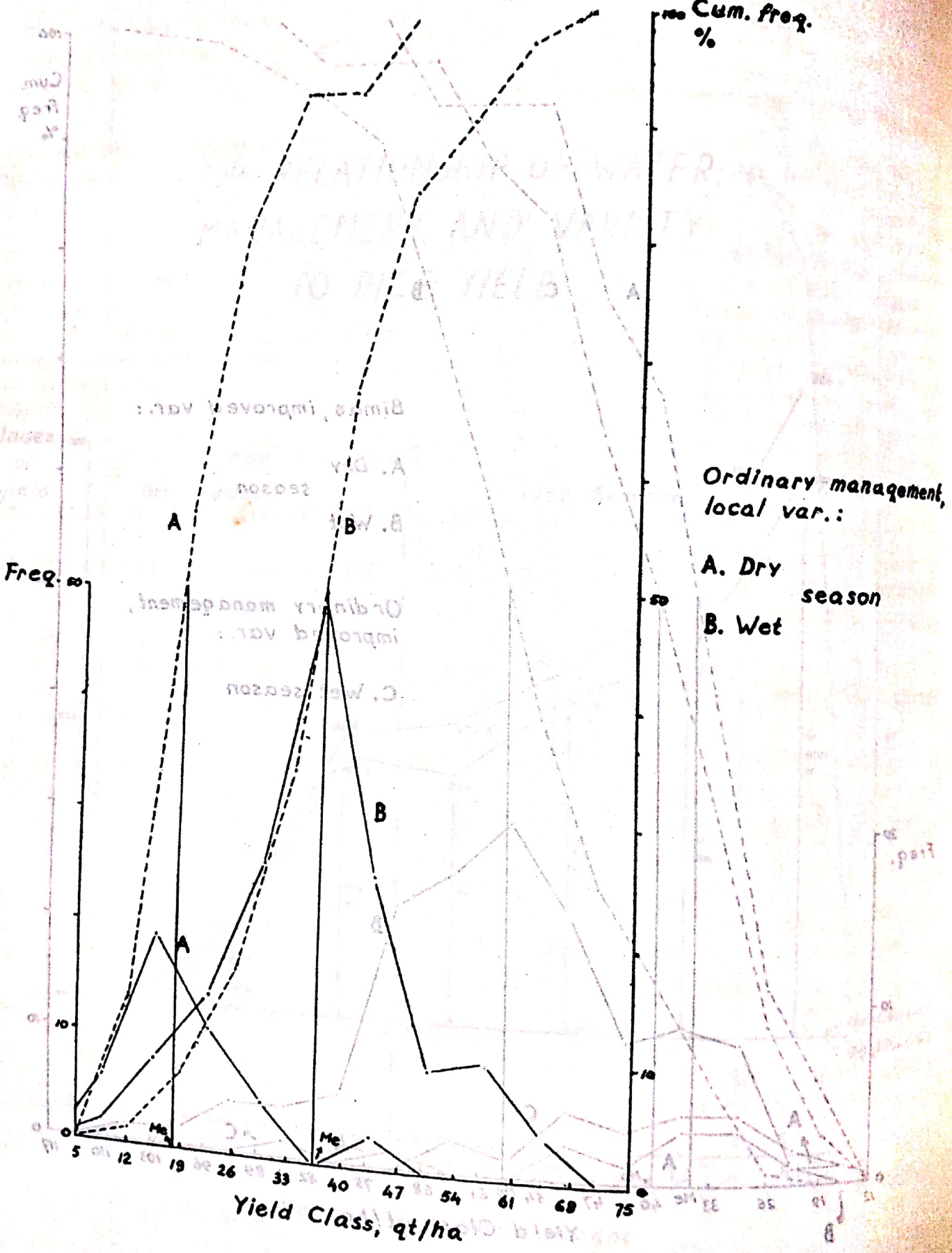
Except for ordinary-improved-wet and Bimas-improved-dry, all the standard errors (s.e.) of the arithmetic means (M) are small. That means that the sample M is no far away from the population M. The distance between the M, Me (median), and Mo (mode) gives an idea about the form of the frequency distribution. The first, second, fourth, and sixth samples have curves that are close to symmetrical. Asymmetry is connected with a small size sample. Where the curve is too far from symmetrical it may prove to be advantageous to take the Me as the central tendency of the variates.

The yield figures could be converted into index numbers using the lowest yield as the basis (100). This has been carried out with the M's as well as with the Me's. In this way the relative merit of each factor could more easily be shown, as could be seen on the accompanying graph. The difference between m,l (ordinary management and local varieties) and M,l (Bimas, local varieties) in the dry season is attributed to management


Freq.
Cum. freq. %
A
B
A
B
Bimas, local var.:
A. Dry season
B. Wet —"—
100
50
10
0
Me
Me
5
12
19
26
33
40
47
54
61
68
75
82
89
96
103
Yield Class, qt/ha







(ma), the difference between m,l and M,i (i = improved varieties) is due to the interaction of ma and v (variety), that between m,1 dry season and m,1 wet season is brought about by water (w), and so on. The insignificant difference in yield between dry season M,i and wet season m,1 and between wet season m,1 and wet season m,i strongly suggest the preponderance of water over management and variety. Also the insignificant difference between wet season m,i and M,1 may give an additional proof that water is the far more important factor than variety and management.

For the dry season the addition of the factor v to ma has rapidly increased the yield compared with ma alone. For the wet season the difference between m,1 and m,i is not significant, but it is extremely significant between the former and M,1. These may indicate the stronger influence of ma than that of v. Without an adequate supply of water a better management practice should be carried out in conjunction with the planting of more responsive variety. It is an established fact that phosphorus could lessen the drought sensitivity of crops which is attributable to the better rooting system. Also potassium will increase the resistance to drought of crops by regulating the water economy within the plants. Only one figure was available for m,i dry season. So there is no way to evaluate the role of variety as a single factor, and the relative merit of v compared with that of ma could not be assessed. The relationship of yield to the three factors is more clearly brought out by plotting the Me's instead of the M's. In this case it is true as Me is not influenced by the extreme values in the samples.

It may be concluded that to increase rice yields the order of importance of the three determining factors is water-management-variety. This is also the order of application. The evidences brought out in this study call for giving top priority to the development of irrigated agriculture.

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Soil-Crop Counterpart.