INTERCROPPING
in semi-arid areas

Report of a symposium held at the
Faculty of Agriculture, Forestry
and Veterinary Science,
University of Dar es Salaam,
Morogoro, Tanzania,
10-12 May 1976

Editors:
J.H. Monyo, A.D.R. Ker,
and Marilyn Campbell

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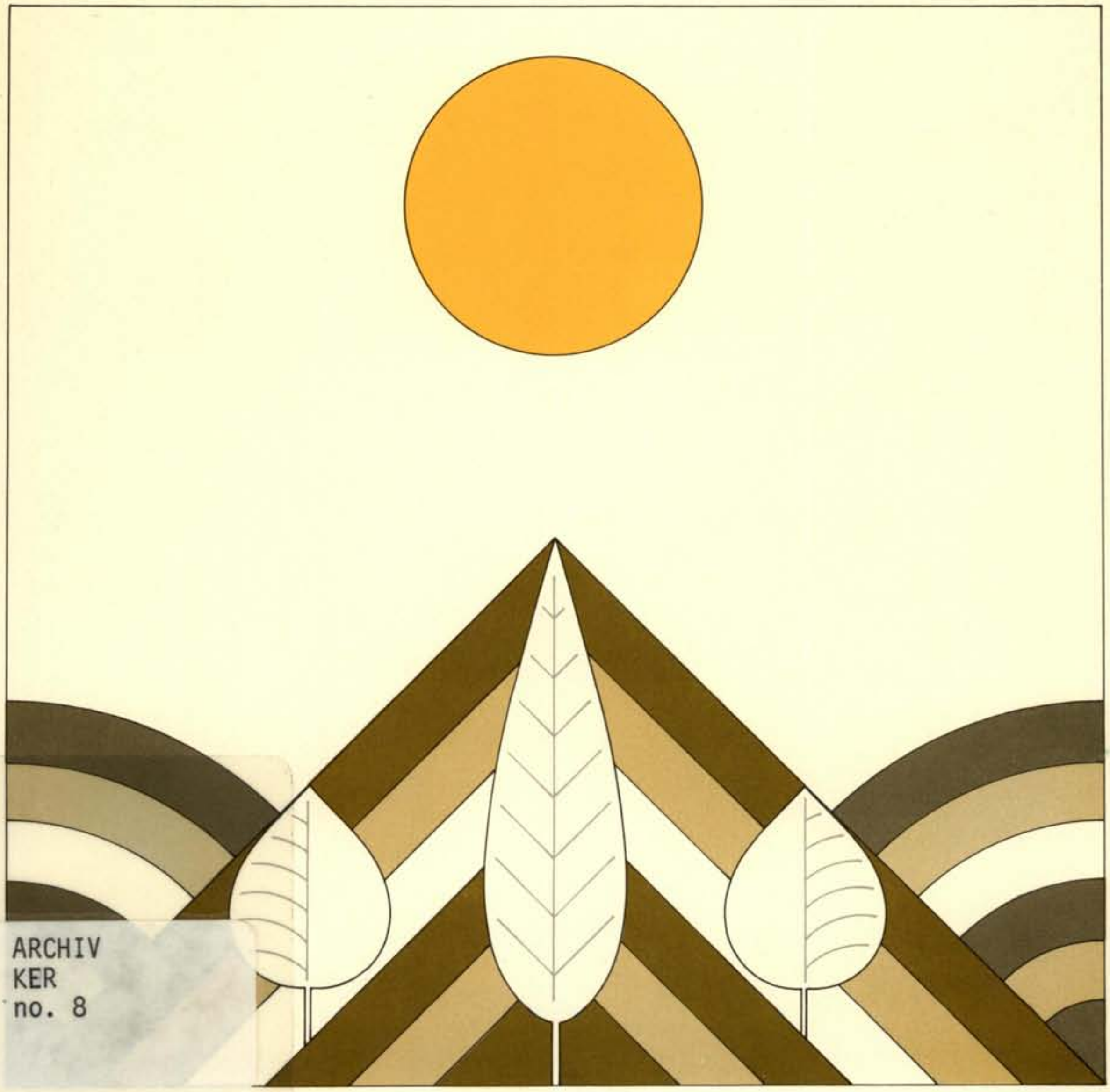

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Farmer's field near Ibadan, Nigeria, showing intercrop of cowpea under maiz

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Systematic Spacing Designs as an Aid to the Study of Intercropping

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Although intercropping and relay cropping are widely practiced in the tropics, particular systems are usually highly location-specific (64). As compared with sole cropping, socioeconomic benefits are often better established than are ecological or technical ones (44) and this is sometimes due to comparisons being made at different total plant populations (21). Indeed, the exploitation of environmental resources will be highly dependent not only on crop combination but also on plant population. Furthermore, the interaction between these two factors may well vary depending on the time and magnitude of the particular environmental components involved and the stages of plant development achieved, so that ecological benefits are apparent in some instances from intercropping (21) but not in others (43, 44). A more fundamental approach is likely to sharpen our understanding of the value of intercropping more rapidly than just a proliferation of empirical trials, particularly as the number of variables involved is so large and their interactions so complex. Experiments involving systematic spacing designs could well assist here (58).

Both the extent of between-component competition and within-component interference can be tested by using a replacement crop series within a systematic spacing design (e.g., a "fan"). The theoretical results of such a trial were discussed by comparing the *actual* yields of the individual crop components used in such a design with their *predicted* yields, the latter based on the sole crops grown over a wide range of plant populations using the same design.

Thus, for a mixture, both the best crop ratio and spacing to optimize yield per unit area of harvested parts, calories, protein, or cash, can be predicted from the results of a few preliminary experiments that provide the yield/plant population response curves of the components, and the extent to which these are altered in mixtures. It is then possible to compare this with the maximum sole crop returns for each component grown at its optimum plant population. The results of combining crops with different types of sole-crop yield/plant population response curves were then outlined.