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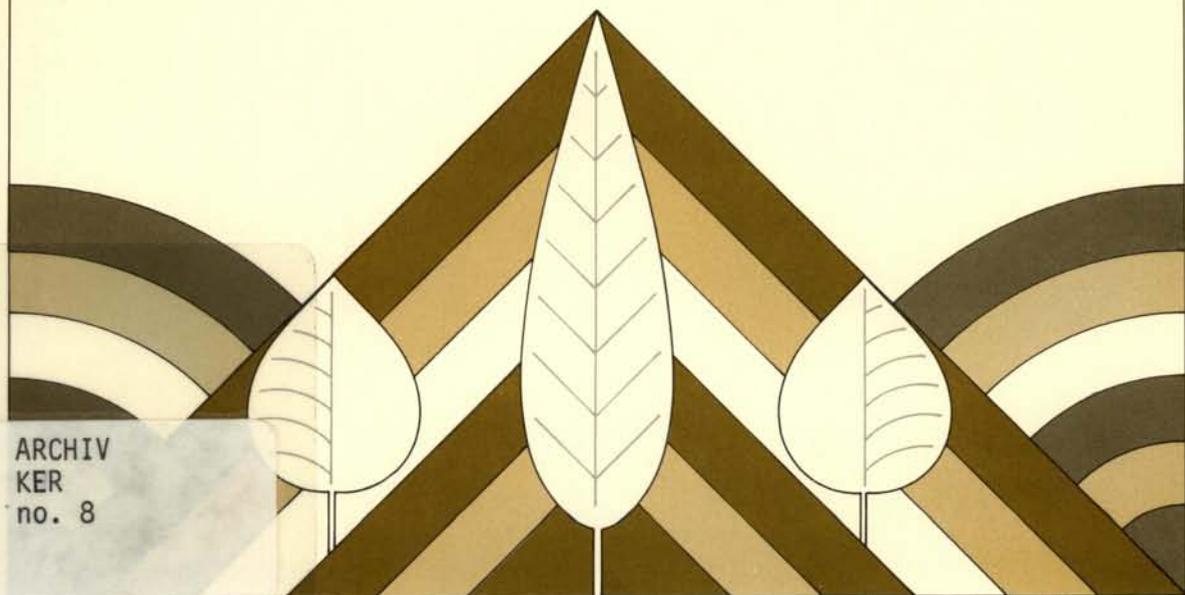
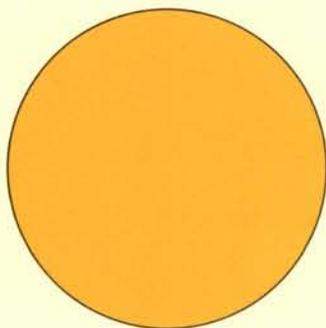
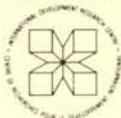
INTERCROPPING

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

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Studies on Mixtures of Maize and Beans with Particular Emphasis on the Time of Planting Beans

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Recent comprehensive studies have shown considerably higher yield advantages from mixtures as compared to pure stands. For instance, Andrews (20) reported large advantages from mixtures of late-maturing sorghum with finger millet and cowpea, which were attributed to the long growing season that allowed the interplanting of crops of very different maturity periods. At Makerere, mixtures that involved short-term annual crops (maize and beans, sorghum and beans) have outyielded their pure stands by up to 38 and 55% respectively (21, 22). A major conclusion that emerged from the Makerere experiments was that mixtures probably gave higher yields because they were able to utilize the environmental resources much more efficiently than pure stands.

The real physiological mechanism by which the physical environment may be better exploited by mixed crops is not well understood. There are basically two possibilities: firstly, mixtures may achieve better spatial use of resources because of more efficient canopy structure or rooting pattern. Secondly, they may achieve better temporal use of resources because different growth cycles of the component crops combine to give an extended period of efficient resource use.

So far little research attention has been directed to determining the relative importance of these two effects. A number of experiments were therefore carried out at Makerere, the main objective of which was to examine the importance of different growth cycles in the productivity of mixtures.

Like the maize and beans experiment reported earlier (21), a "replacement series" of pure maize, two-thirds maize/one-third beans, one-third maize/two-thirds beans, and pure beans was used at three plant populations and at three dates of planting beans. The maturity periods of the maize and beans were 120 and 85 days, respectively. A high level of nitrogen was again applied to eliminate the effect of nitrogen transfer from the beans.

Yields of the mixtures were up to 25% higher than could be achieved by growing the two crops separately. These advantages of the mixture decreased markedly with delayed planting of the beans. For instance, at population 3 for the mixtures, which consisted of two-thirds maize/one-third beans, the yield advantages decreased from 20% when beans were planted the same time as maize to only 2% when the beans were planted 4 weeks after.

It is concluded that differences in maturity periods of the component crops were probably the major factors contributing to the yield advantages in these mixtures.

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