IDRC-186e

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Second Symposium on
Intercropping in Semi-Arid Areas,
held at Morogoro, Tanzania,
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Editors: C.L. Keswani
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International Development Research Centre

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Intercropping : proceedings of the Second Symposium on Intercropping in Semi-Arid Areas, held at Morogoro, Tanzania, 4-7 August, 1980. Ottawa, Ont., IDRC, 1982. 168 p. : ill.

/Intercropping/, /semi-arid zone/ — /agricultural research/, /Africa/, /cultivation practices/, /plant breeding/, /plant protection/, /crop yield/, /research results/, /research methods/.

UDC: 631.584(213) ISBN: 0-88936-318-8

Microfiche edition available

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similarities, and differences.

In view of these facts, a farming systems research program is being proposed. The basic aims of the program will be: (1) to develop more relevant and effective research methods and understanding of indigenous farming systems; (2) to evolve and develop improved or new technical components for alternative farming systems; and (3) to aid small farmers, who have, so far, been ignored by new technological developments in agriculture.

The farming systems research will be based in the Faculty of Agriculture and Forestry, Makerere University. The university farm at Kabanyolo, about 16 km away, will serve as the locus of the project. Cooperative farmers will be selected from within a radius of 80 km from Kabanyolo for logistical reasons. The project area will be extended to other parts of the country as and when resources permit.

The first step in the proposed FSR will be to establish the nature and magnitude of the various problems confronting small farmers. Most of the research will be conducted in farmers' fields because "on-farm" research enables farmers to be involved in formulating and testing farming system technologies under natural conditions and at many locations simultaneously. As well, it enables researchers to make recommendations that are directly relevant to local conditions, thereby allowing farmers to be grouped into recommendation domains based on the identification of similar circumstances.

The farming systems research will be multidisciplinary in approach and will consist of agronomic, soil management, pest and disease management, integrated crop and animal management, and socioeconomic studies. The ultimate goal of the research is to generate technological components that the farmer would be willing and able to adapt.

Discussion

Mukiibi (comment): There was a suggestion from one of the participants that the agricultural systems in Uganda are robust enough not to require much improvement. I think this is incorrect. At the moment, there is famine in Uganda, which indicates that there is a delicate balance between production and consumption. Actual production is at least four times less than potential production, so there is a great deal of room for improving the farming systems in Uganda.

Brain (question): Is not the real problem in Uganda an absence of marketing and buying systems rather than farming systems per se, which were very effective in the past?

Fendru (answer): The farmer is faced with a whole array of problems. Our aim is to find out what farmers are doing now. There is a shift from cash crops to food crops due to the risk of not selling, which can be counteracted by their consumption.

Mixed Cropping in Tabora Region — Summary

J. E. Mansfield

TRIDEP, Tabora, Tanzania

Tabora region is located in west-central Tanzania. It occupies an area of approximately 73 500 m^2 and is of relatively low relief, ranging from 1050 m above sea level in the northeast and northwest to 1500 m in the southeast. The climate is warm, with mean maximum temperature of around 30°C. Rainfall is markedly seasonal, occurring between November and May, the mean rainfall ranging from 1000 mm in the west to 700 mm in the northeast.

The climate is unsuitable for perennial crops; therefore, this paper dealt mainly with upland annual rain-fed crops grown within the region. The important upland cash crops are tobacco and cotton. In addition, other commonly grown crops in the area include: rice, maize, sorghum, and millet. Legumes such as groundnuts, French beans, cowpeas, bambarra nuts, green-grams, and pigeon peas are found in mixed cropping. Cassava and sweet potatoes are grown as root crops. Sunflower also finds a place in mixed crop fields. Maize is the preferred cereal staple throughout most of the region, even in the areas of low rainfall.

The important environmental factors of the region may be said to be the dominance of coarse- or medium-textured soils of low fertility. Rainfall is

variable from year to year and is suitable only for growing rain-fed annual arable crops. Two-thirds of the region is in a relatively high rainfall area (800-1000 mm), with the remainder of the region receiving less than 800 mm of rainfall. This mean rainfall difference gives rise to a drier type of vegetation and higher risk of long dry spells. Within the two rainfall areas, one finds the relatively small amount of highly fertile, dark brown to black, cracking clays on which most of the cotton is grown.

Spacing of the maize component of mixtures appeared to increase with increasing complexity of the mixtures and there appeared to be an awareness to vary spacing according to the crop components and the complexity of the mixtures. Root-crop mixtures usually occupy the smallest plots (<0.1 ha) and are concentrated near the homestead. The complexity of the mixture tended to decrease with distance from the homestead and few farmers appear to cultivate at distances greater than 2.5 km from the homestead.

Mixture combinations vary from year to year. It is a highly flexible system that has developed over the years and it is highly resistant to changing to monocropping as far as family food crop production is concerned.

Early maturing varieties of maize are favoured in the low rainfall areas, except where soils are fertile and have a high water-holding capacity. Yields from accurately measured plots, based on farmer recall, showed a trend toward higher yields being associated with small areas (<0.1 ha). This was considered to be partly due to "greater exaggeration" and also because of receiving increased attention as a result of the plot being located close to the home and improved land fertility provided by small stock, refuse, and kraal manure. Yields show a high coefficient of variation and mean yield figures, therefore, are of limited value as a guide to the actual levels that can be expected.

Simple plot trials involving maize/groundnut and maize/sorghum mixtures showed that maize grown alone or in a mixture gave significantly higher yields in high rainfall districts than in lower rainfall areas, whether fertilized or not. Groundnuts in a mixture gave significantly higher yields with fertilizer in low rainfall districts. There was no significant yield difference between maize grown alone or in a mixture in the high rainfall district. The maize component seemed to benefit most from the application of fertilizers. Coarse-textured soils gave higher mean yields of maize in the higher rainfall areas regardless of whether fertilizer was applied or not. Yields from medium- to fine-textured soils, without fertilizer, did not vary significantly with rainfall but the response to fertilizer was significantly higher in the high rainfall district. It is suggested that this may be partly due to the higher water-holding capacity of these soils counteracting the adverse effect of lower rainfall.

Discussion

Scott (question): Based on the information that has been gathered and analyzed by Dr Mansfield for the Tabora area, it would be useful if he could comment on his recommendation for research, which could lead to increased and more stable production for farmers.

Mansfield (answer): Regarding whether or not interrow mixtures are the same as alternate-row combinations has been partly answered in papers already presented. Alternate-row combinations lend themselves to mechanizing mixed cropping for use in commercial production, should this prove the most economic form of production. This should be investigated. Due to the multiple choice element in plant populations it would seem questionable how much research effort should be put on this aspect of cultivation.

Monyo (question): Could you comment on the concept of a two-season pattern in a trimodal rainfall regime.

Mansfield (answer): I don't know the significance of this pattern, which is based on rain pattern and distribution as compared with monthly distribution. I may show a transition from a distinct bimodal pattern in the north to a nonmodal pattern in the south. It does indicate that, in practice, there are two rainfall troughs rather than one in January, the locally accepted "dry months."