

Effect of tillage methods and mulches on crop production in heavy-textured soils in Zanzibar. In collaboration with the University of Morogoro, Tanzania, tillage studies were conducted in Zanzibar to investigate the effects of methods of seedbed preparation and mulching on crop growth. Different treatments investigated were black and white polythene mulch, no tillage, ridges and bare flat surface. Differences in plant growth among different treatments were attributed to differences in soil temperature and moisture regimes. These soils have high clay content and low permeability. High soil moisture content and poor aeration were more serious in no-tillage and mulched plots during periods of frequent and heavy rains; consequently, crops were more chlorotic than in conventional-tillage plots. Effects of different treatments on crop yield indicate that the highest maize yield was obtained under white polythene mulch treatments and the lowest under no-tillage treatments (Table 13). These differences in grain yield were attributed to the number of grains per row and the unit grain weight. The yields of cowpea and soybean also observed a similar trend.

Table 13. Effects of seedbed preparation on soybean grain yields in Zanzibar.

Treatment	Grain yield t/ha	
	1979	1980
Black polythene	0.8	1.1
White polythene	1.5	1.0
No-tillage	0.5	0.4
Ridges	0.6	0.5
Bare	0.8	0.6
LSD (5%)	0.4	0.2

Effect of tillage on paddy rice production. In 1976, grain yields of rice were similar in conventional and non-tillage methods. Yields were significantly affected only by the level of N application. The yields were not affected by the tillage treatments for about 3 years. Since 1979, the plant height, tillers and grain and straw yield have been less in conventional-tillage than no-tillage for sandy soils (Table 14). In clayey soil, the differences due to tillage treatments were not pronounced (Table 15). Comparisons of rice yield in Tables 14 and 15 indicate that an optimum level of N for rice for a clayey soil is about 60 kg N/ha; whereas, the effect of N on rice yield in a sandy soil was not significant. The adverse effect of no-tillage on rice may be due to many factors, including nutrient imbalance. In a sandy soil, leaching losses of applied fertilizer on an untilled paddy may be more than in a puddled soil.

Table 14. Effects of tillage methods and N on rice grain yield (IITA, 1980 First season).

Fertilizer	Grain yield t/ha	
	No Tillage	Conventional Tillage
With	2.50	3.82
Without	1.98	3.13
LSD (5%)	1.00	

Table 15. Effects of tillage methods and N on rice grain yield (IITA, 1980 Second season).

N rate kg/ha	Grain yield t/ha	
	No Tillage	Conventional Tillage
0	1.99	3.75
30	2.94	4.79
60	3.59	4.54
90	4.02	5.05
LSD (5%)	0.82	

Effects of tillage methods and mulches on yam production. An experiment was initiated at Onne to investigate the effects of tillage methods and mulches on yam production. Treatments consisted of planting on either the flat or ridge with and without residue mulch. Observations were made for soil temperature, moisture and bulk density and root and shoot growth and tuber yield. Leaf area was generally more in mulched than unmulched plots with the least leaf area measured in the unmulched



No-till rice (top) had a poor stand and low yield after 6 consecutive crops compared to good stand and high yield in conventionally puddled paddy (below).

