Tillage Practice:
READING AND COMPREHENSION

Tillage began before the earliest written records of mankind. The first implements were hand tools to chop or dig the soil, usually made of wood, bone, or stone. They were used to subdue or destroy the native vegetation, make openings in the soil to receive seeds or plants, and reduce competition from native plants and weeds growing among the crops. The next stage of tillage, application of the power of domestic animals, occurred in parts of the world before the dawn of history. This made possible development of implements with a steady forward movement. Among these were the crooked-stick plow to stir the soil, and the brush drag to pulverize the surface. Little further progress was made for many centuries except that eventually some plows were fitted with iron shares despite a common misapprehension that iron poisoned the soil. The development of steel in the 19th century resulted, in 1833, in a plow with sharp edges that cut the soil layer and in a curved polished surface that permitted the plow to occur. That straight-line movement of the plow has since been supplemented with the rotary movement in such implements as disk plows, harrows, the rotary hoe, and various pulverizing and stirring tools.

Purposes of Tillage:
The fundamental purposes of tillage are (1) to prepare a suitable seedbed, (2) to eliminate competition from weed growth, and (3) to improve the physical condition of the soil. This may involve destruction of native vegetation, weeds, or the sod of another crop. It may further involve removal, burial, or incorporation in the soil of manures or crop residues. In other cases, the tillage operation may be solely to loosen, compact, or pulverize the soil. The best system of tillage is, then, the one that accomplishes these objectives with the least expenditure of labor and power.

The effect on soil erosion also must be considered in planning all tillage operations. The kind of tillage for seedbed preparation on dry lands is governed almost entirely by the effects of tillage upon the conservation of soil moisture and the prevention of surface runoff and wind erosion.

Seedbed preparation for grain sorghum under dry land conditions in Kansas, land cultivated with a disk harrow or duck foot cultivator to control spring weed growth gave an average yield of 18.5 bushels. Land
left uncultivated, with the weeds allowed to grow until it was listed at planting time, produced only 10.8 bushels per acre.

Under most conditions, a desirable seedbed is one that is mellow yet compact enough so that the soil particles are in close contact with the seed, but the seedbed must be free from trash and vegetation that would interfere with seeding, unless special planting equipment that cuts through the residues is used. The seedbed should contain sufficient moisture to germinate the seed when planted, and support subsequent growth. In irrigated regions, it is occasionally necessary to plant the crop and then irrigate the field in order to supply sufficient moisture for germination, but this practice is avoided whenever possible because of frequent irregular stands. Irrigation before planting is preferable.

**Intertillage or cultivation:**

The primitive husbandman hoed or pulled out the weeds that grew among his crops planted at random in his small clearings. In ancient and medieval field husbandry, field crops were planted at random or in close rows with the seed dropped in plow furrows. These crops were later weeded by hand or with crude hoes or knives. Jethro Tull introduced intertillage into English agriculture in 1731 when he applied it to crops like turnips planted in rows.

**Purposes of Intertillage:**

The primary purpose of intertillage is weed control. Intertillage also breaks a crust which otherwise might retard seedling development, and in some cases roughens the soil sufficiently to increase water infiltration. Some have claimed, without substantial proof, that intertillage brings about aeration of the soil, with the result that plant foods are more readily available because of increased bacterial and chemical action in the soil.

The crops that generally require planting in rows with sufficient space between them to permit cultivation during their growth include corn, cotton, grain sorghum, sugar beets, sugarcane, tobacco, potatoes, field beans, and broomcorn. Intertillage controls weeds that grow in the open spaces before the crop can shade the ground.

Crops with relatively slender stems, such as small grains, hay crops, and flax, that thrive under close plant spacing, cover the land rather uniformly. Without cultivation after they have been sown, they tend to suppress weeds by root competition and shading. Yields of these crops usually are low when they are planted in cultivated rows, because they do not utilize the land fully. Where condition are so severe that small-
grain and hay crops succeed only in cultivated rows they are generally unprofitable.