

Groundnut Digger (ICRISAT Design) for Hard Soils

N.K. Awadhwal and T. Takenaga (ICRISAT Center)

Groundnut is grown primarily in rainfed dryland conditions and about 67% of the total world production comes from areas of the semi-arid tropics (SAT). It is important to harvest the crop at the optimum time, so that maximum yield of best quality pods with high shelling percentage, oil content, and high seed weight are obtained. The moisture content of the soil influences the ease of harvesting groundnut and in the SAT regions drought stress during the late stage of pod development is a common occurrence. Under such drought conditions most soils, except sandy soils, become hard and lead to harvesting problems. Under hard-soil conditions lifting of plants with pods cannot be done manually and the existing groundnut-lifting implements, mainly blade types, fail to penetrate to a desired depth and are not satisfactory. As a result, harvesting of the rainfed crop has to be postponed until the soil is moist from subsequent rainfall. Delay in harvesting leads to increased invasion by pod-rotting fungi, resulting in deterioration of the quality of the produce and the pod detachability increases, leading to increased harvest losses.

To overcome this problem, a groundnut digger for digging bunch type groundnut in dry and hard soils has been designed and developed at ICRISAT Center. It consists of a digger-bottom and a standard.

Based on functional requirements, the digger-bottom has two shares that are inclined at 120° with each other and contain chisel points for increased penetration into hard soils. A single digger-bottom attached to a toolbar can be pulled by a pair of oxen and two or more digger-bottoms can be pulled behind a tractor (Fig. 1).

A tractor-drawn unit consisting of two digger-bottoms attached to a toolbar was tested in the field, for digging groundnut (bunch type) from an Alfisol. The soil was dry (moisture content=4%) and hard (Cone index = 18 kg cm^{-1}). It covered a 1-m wide strip and performed quite satisfactorily, whereas a blade-type digger failed to penetrate to the desired depth. The groundnut digger penetrated into the hard soil and undercut the main roots of plants leaving them upright. The plants were then lifted manually, without any problem of pod-soil separation as the digger had loosened the soil. The harvesting losses were less than 2.5%. A single digger-bottom was pulled by a pair of bullocks and covered a 40-cm strip or one row of the crop.

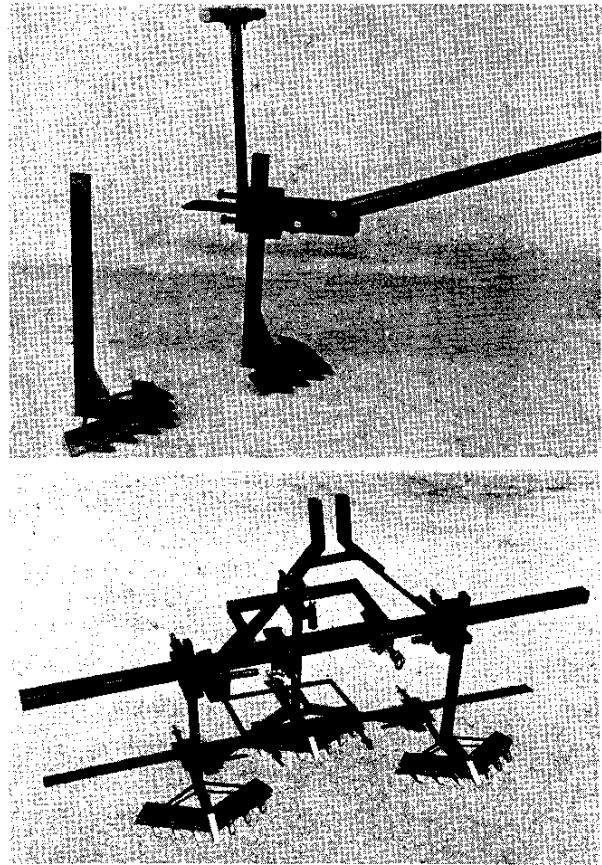


Figure 1. Groundnut diggers (ICRISAT design) for dry and hard soils.