

CHAPTER 3. SEEDBED PREPARATION

3.4 TECHNIQUES OF REDUCED TILLAGE

3.4.1. USING THE SCARIFIER

INTRODUCTION

In the dryland, low rainfall areas of West Africa, it is common practice to use a scarifier for seedbed preparation. This replaces the plough and provides a quicker (reduced tillage) method for opening up the soil so as to allow infiltration of the early rains.

The soil is not inverted which means that the technique is not suitable in conditions of heavy weed growth and is rarely recommended for the preparation of fallow land. However where few weeds are present, scarifying will uproot them and leave them on the surface as a mulch. This provides protection from both wind and water erosion, at the same time as helping to maintain soil moisture near the surface between rains.

The scarifier is normally equipped with tines made from spring steel. These vibrate in work, loosening the soil and reduce the risk of damage when encountering obstacles (Fig.1).

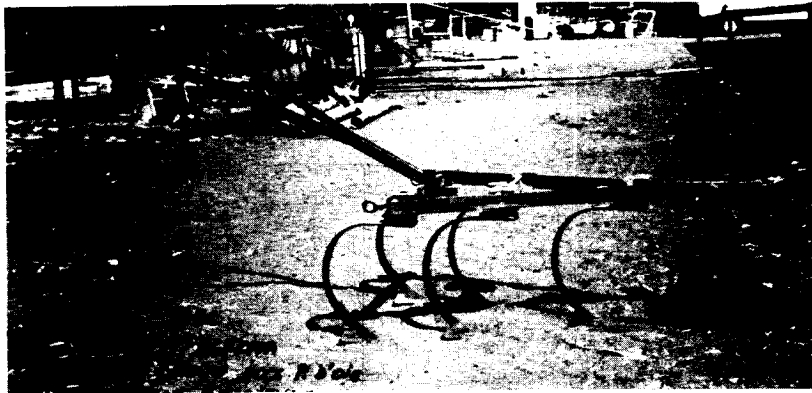


Fig. 1 A triangular toolbar frame equipped with 5 spring tines as commonly used in Burkina Faso for scarifying. Normally reversible points would be fitted.

Photo: Manuel Lecca

Some designs of scarifier are equipped with rigid tines (Fig.2). Although occasionally these may be bent during work when striking an obstacle, they can be easily reshaped by the local blacksmith. In contrast, the spring tine would be weakened if repaired by the blacksmith, as a special heat treatment is required to maintain its strength.



Fig. 2 The Rumpstad scarifier equipped with 3 tines.

Photo: Manuel Lecca

CHOOSING THE POINTS

Several types of point are normally available for the scarifier and the final choice will depend upon local conditions. A narrow reversible point (Fig.3a) or a rigid tine (Fig.3b) will penetrate better in hard soil but only part of the weeds will be uprooted in a single pass. A second crossing pass is important to ensure good seedbed preparation.

The duck-foot point is useful in lighter soil and where weed growth is more advanced. Penetration will be less than with a reversible point and so again a second transverse pass will normally be needed to prepare the seedbed to sufficient depth. The same duck-foot point can later be used for inter-row weeding (Fig.3c).

The sweep has a flatter form and is designed to undercut weeds but to provide little uplift (Fig.3d). It is not suitable for a scarifying action.

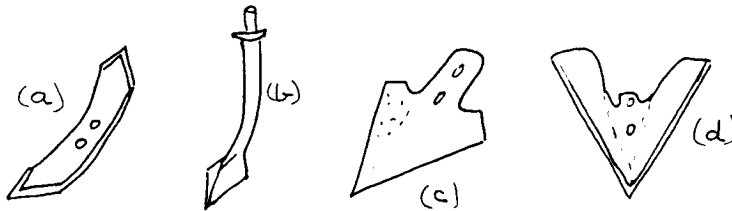


Fig. 3 The reversible point for scarifying harder soils (a); the rigid point (b); the duck-foot point for scarifying lighter soils and general weeding operations (c); the sweep used for weeding (d).

CHOOSING THE NUMBER OF TINES AND THEIR POSITIONS

Under normal conditions, a strong pair of oxen can pull 5 tines. These may be arranged so that 2 tines lead and 3 tines follow. Alternatively they may be in 3 gangs, one central tine leading and 2 pairs following (Fig.1). Lateral spacing between each tine must be equal and normally between 15 and 20 cm. It is particularly important on an expanding frame such as the Houe Manga, that each tine be aligned in the direction of advance (Fig.4).

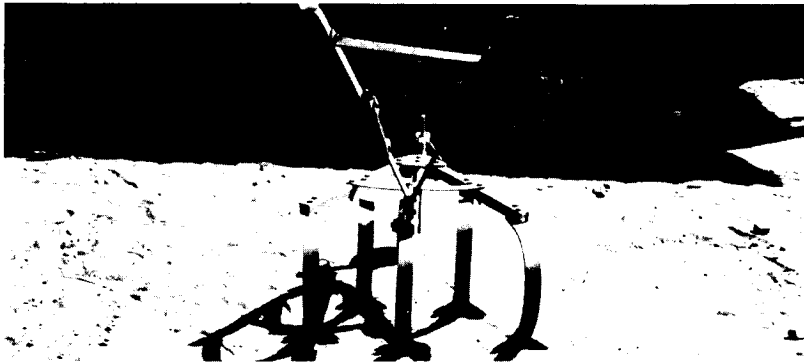


Fig. 4 This Houe Manga has the 4 left-hand tines correctly aligned. The right-hand tine however needs adjusting to point in the direction of advance.

Photo: Manuel Lecca

When using a lighter pair of oxen, a single strong ox or a pair of donkeys, only 3 tines should be attached. One is placed at the front and the other 2 at the rear of the implement (Fig.5). Spacing between tines should also normally be between 15 and 20 cm. The appropriate choice must be made according to local field conditions and it also depends upon the type of point fitted.



Fig. 5 Three spring tines attached to the Arara multi-purpose toolbar as used in Niger.

Photo: Manuel Lecca

PREPARATION OF THE SEEDBED WITH THE SCARIFIER

The field is normally prepared after the first rains and two passes are necessary when scarifying. The first pass should be made across the shorter side of the field or diagonally if the field is very narrow. A second cross is made along the length of the field, in the direction for subsequent seeding (Fig.6).

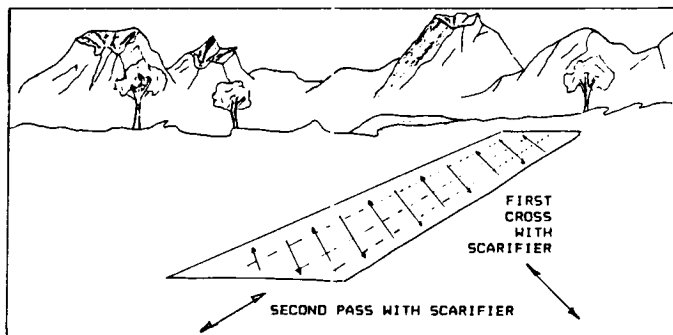


Fig. 6 Method for making 2 scarifying passes in a narrow field.