Soil Piping

It's a Form of Subsoil Erosion

By Joel E. Fletcher and Karl Harris

▲ **Pipe entrances in an alfalfa field near Pomerene. The arrows point at the holes where the soil has caved into the underground tunnels. SCS Photo.**

The word "piping" has been used by engineers and soils men for many years to denote a type of erosion in which subsoils erode out from under the surface in channels (pipes), thus resulting in the final caving-in of the surface soil. Roughly 30 percent of the land in one of Arizona's narrow river valleys has been lost by this process since the early 1900's.

Five Causes of Piping

Piping may occur in any area where all of these 5 conditions are present.

1. The surface soil takes water faster than the subsoil, whether this be due to rodent burrows, cracking, permeability, or any other cause.

2. Immediately above the tighter layer of the subsoil there must be an easily erodible layer which may be quicksand, silt, highly dispersed material, or clods the size of buckshot.

3. The water that reaches the tighter layer must have a hydrostatic head. This may be caused by the tighter layer having a definite slope or by the water itself piling up to furnish the slope. The water must be subject to a force pushing it down the slope towards the outlet.

4. There must be an outlet for this water to escape into a channel or some other place.

5. There must be a source of water. This may be irrigation water. Or, as in the Picacho area, rainfall may collect from the slick areas to form the source.

Piping has been found in some form or degree of severity in the areas shown in black on the map above. In some of these areas, there is only a very occasional pipe, while in others the area may be completely destroyed by huge pipes and pits. These latter pipes may actually occupy several levels to considerable depths.

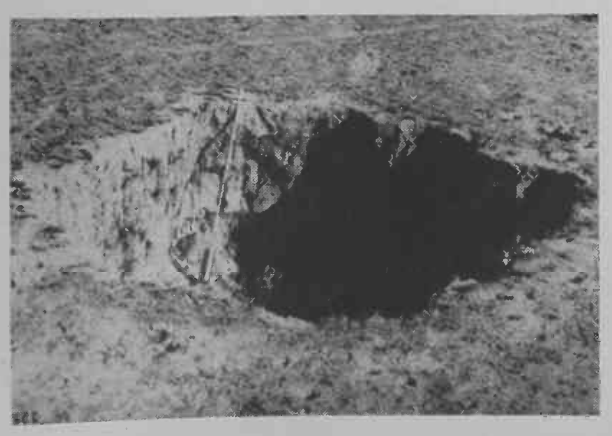
What Can Be Done

Piping may be prevented by eliminating any one or more of the five necessary conditions. Areas which are subject to piping should not be cropped to alfalfa, or other crops which completely dry out the subsoil. In addition, strict control should be maintained on water applications and flood waters.

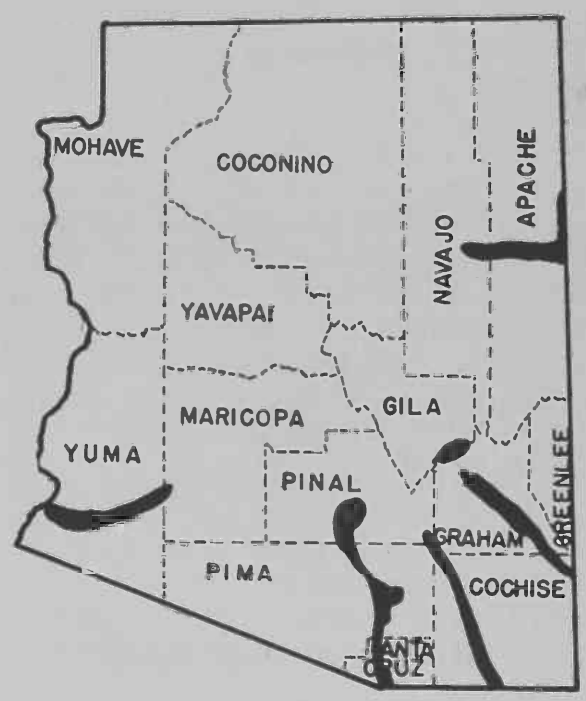
Also, strict control and eradication of all burrowing animals is imperative. It is advisable to prevent any water from leaving the field, whether as tailwater or otherwise.

Adequate remedies for this type of erosion are not known. Additional research is needed.

—Joel E. Fletcher is Soil Conservationist; Karl Harris is Irrigation Engineer, cooperating with the University of Arizona.



← **Large "soil pipe" near Benson. This hole was formed when a farm tractor caved into the arched tunnel of a pipe. SCS Photo.**



▲ **State of Arizona showing areas (in black) where soil piping has been observed to some degree.**

F. F. A. Field Day Well Attended

A total of 365 students and their teachers of vocational agriculture from 23 Arizona high schools attended the annual Future Farmers of America Field Day conducted by the College of Agriculture last April 10 on the U of A Campus at Tucson.

The program included contests and awards in eight departments of the college. Walter H. Cummins, past national F.F.A. president, from Oklahoma, was the annual banquet speaker.

The Arizona sweepstake award was won by the St. David F.F.A. Chapter.