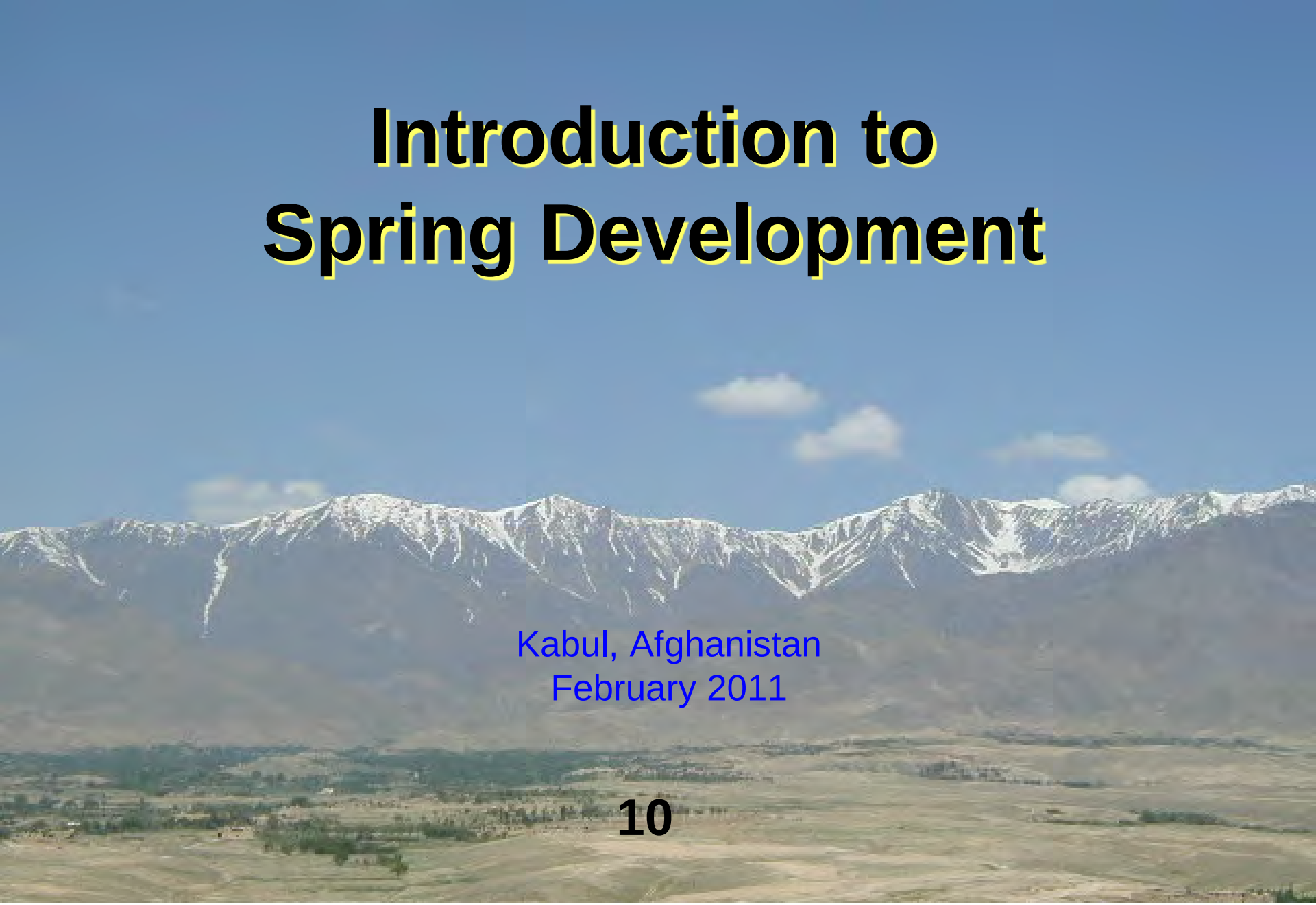
Introduction to Spring Development



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This watershed rehabilitation and restoration training was prepared by the U.S. Department of Agriculture (USDA) team of Jon Fripp (Civil Engineer – USDA/NRCS), Melvin Westbrook (Director USDA-NRCS/IPD), Otto Gonzalez (International Agricultural Development Specialist - USDA Foreign Agricultural Service), Clark Fleege, (Nursery Manager, USDA Forest Service, and George Hernandez (Forester - USDA Forest Service), in consultation with Lief Christenson, (USA CJTF101 Water Resources Coordinator, Afghanistan). Contact Jon Fripp at jon.fripp@ftw.usda.gov or Otto Gonzalez at Otto.Gonzalez@fas.usda.gov for more information on this workshop.

Module Topics:

- **Purpose of Spring Development**
- **Design and Construction Issues**
- **Examples**

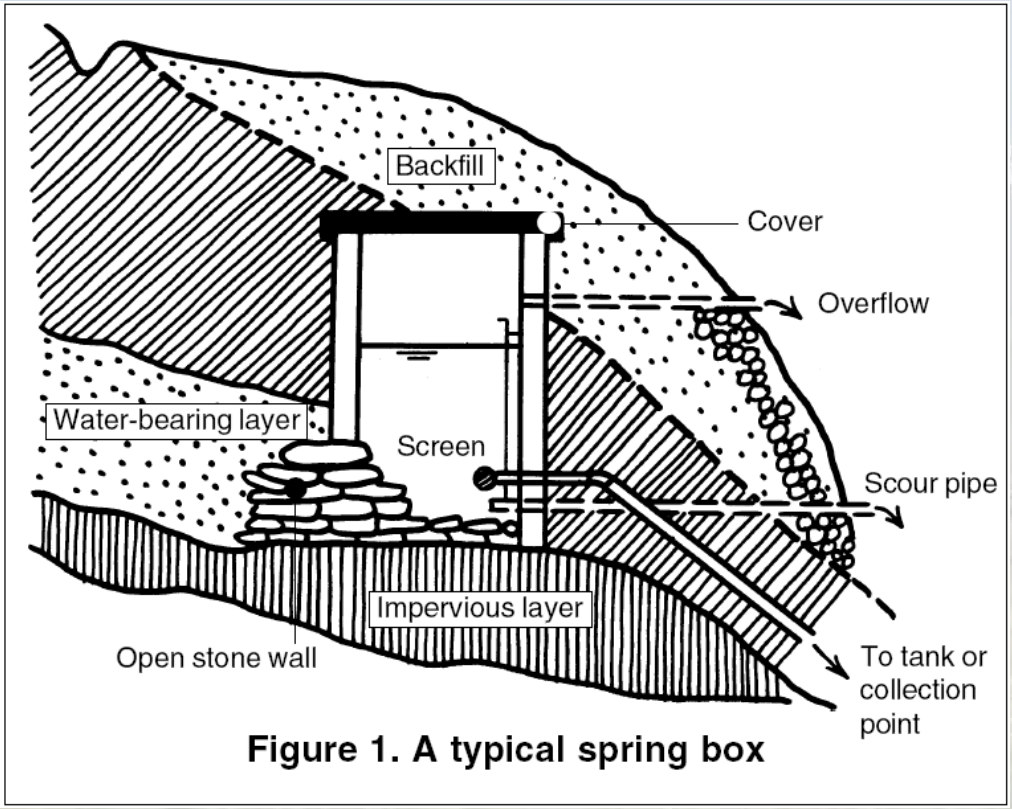


Figure 1. A typical spring box

Spring Developments Can Provide

- **Water for agriculture irrigation**
- **Water for livestock**
- **Water for people**

Spring Developments can be constructed in any zone but are typically installed in the collection zone

To understand Spring Development, you need to understand soil attributes

- Gravel
- Clay

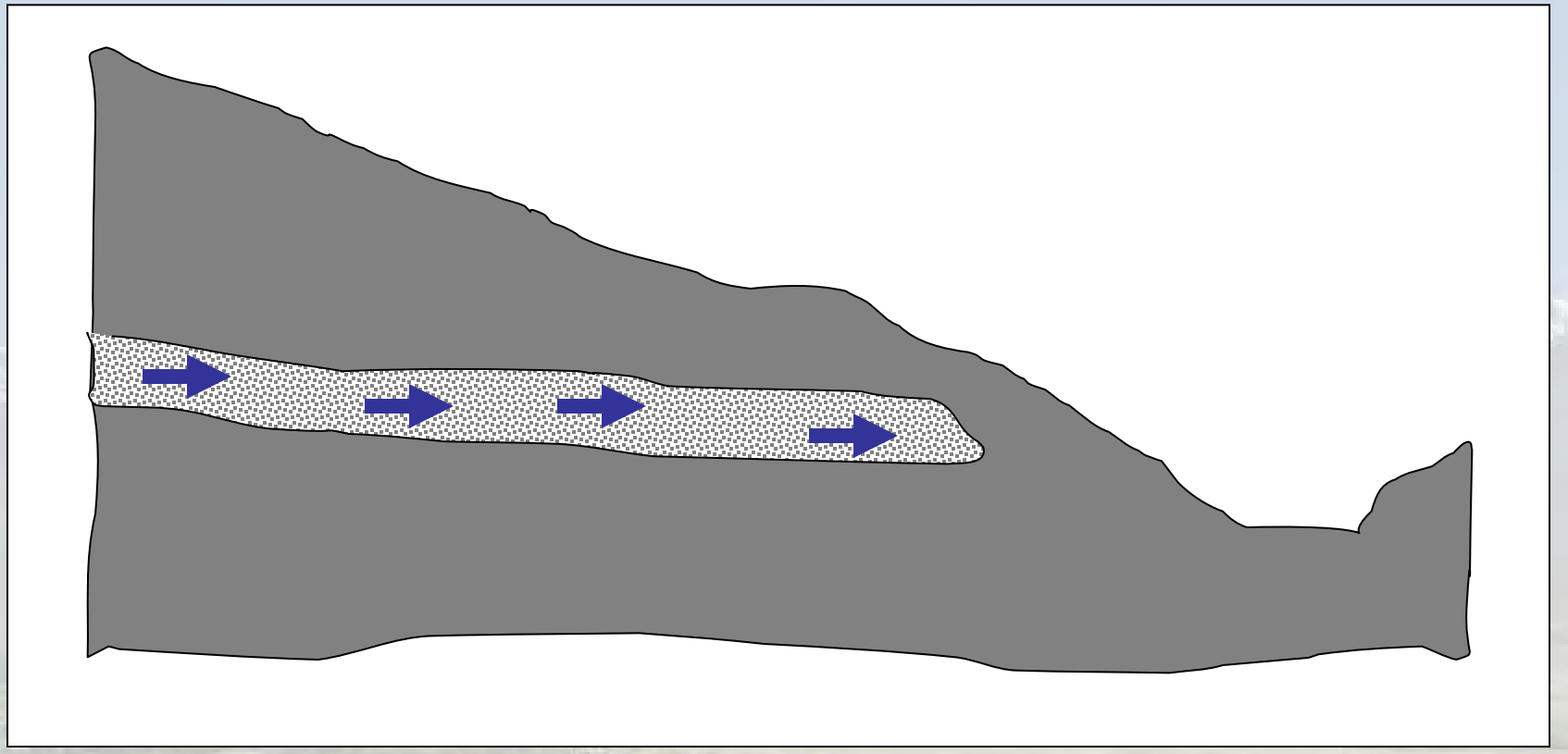
Gravel

Water <u>can</u> easily flow through gravel

Clay

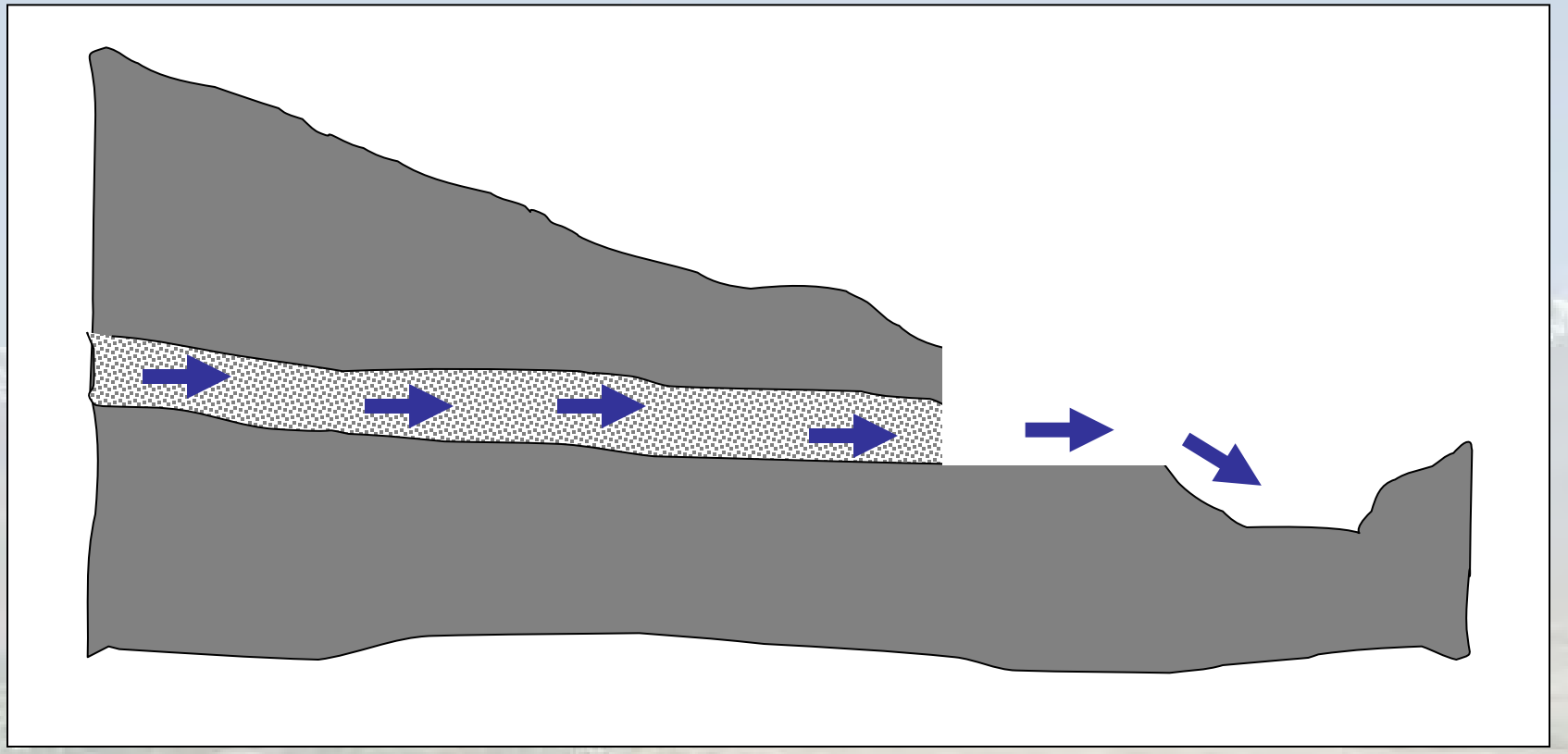
Water <u>can not</u> easily flow through clay

- **Water can be contained in a gravel layer**
- **The clay may keep it from coming out very fast or at all**



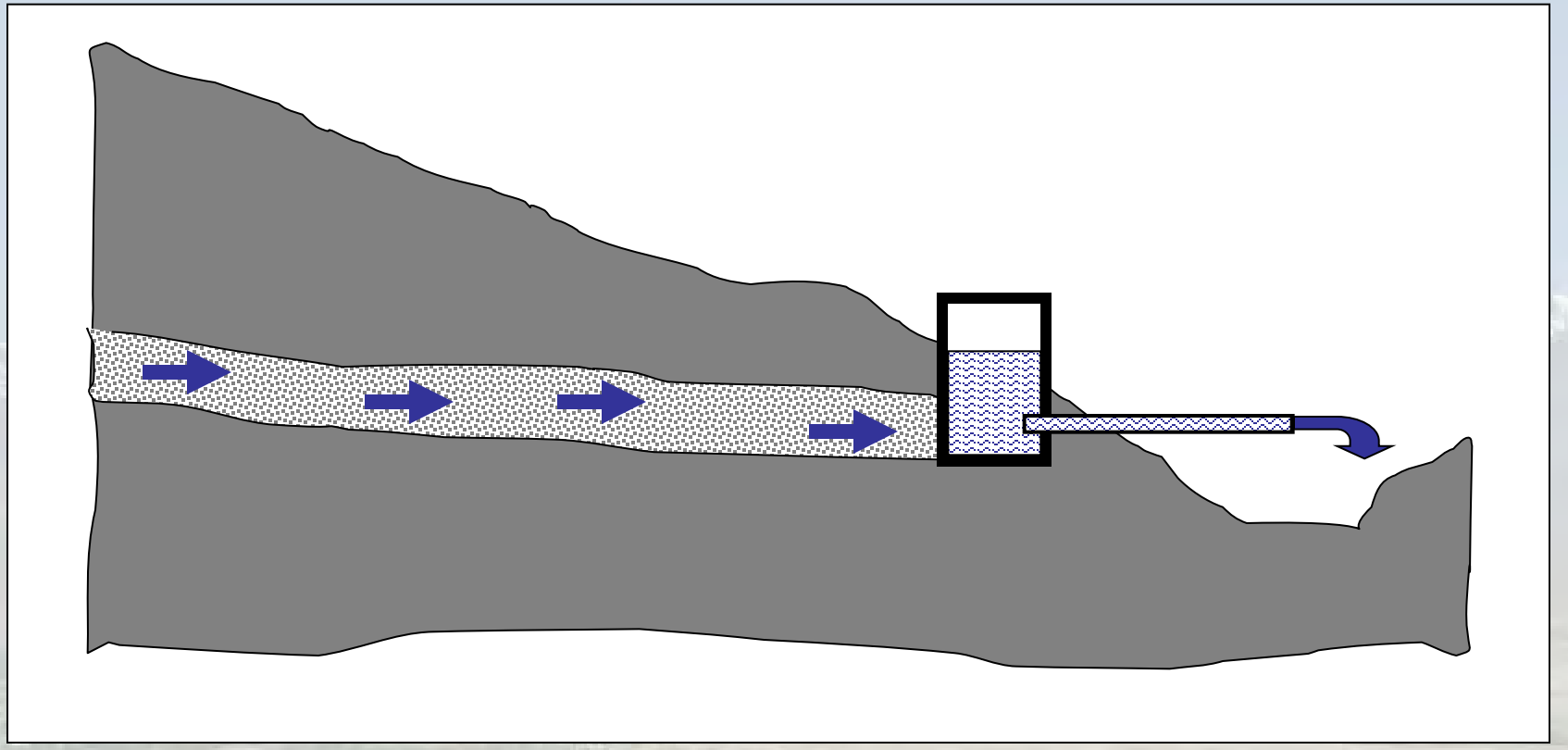
Section

- **If you dig out the clay, the water will not be trapped in the gravel**
- **It will come out**
- **But it will be uncontrolled**



Section

- **If we use a spring box, we can control the water as it comes out of the gravel layer**
- **We can use it as a well**
- **We can put it in a pipe and send the water to another location**



Section

Locate a suitable area

- Look for low point in slopes
- Look for green, water loving vegetation
- This type of project captures water lost to this vegetation and evaporation

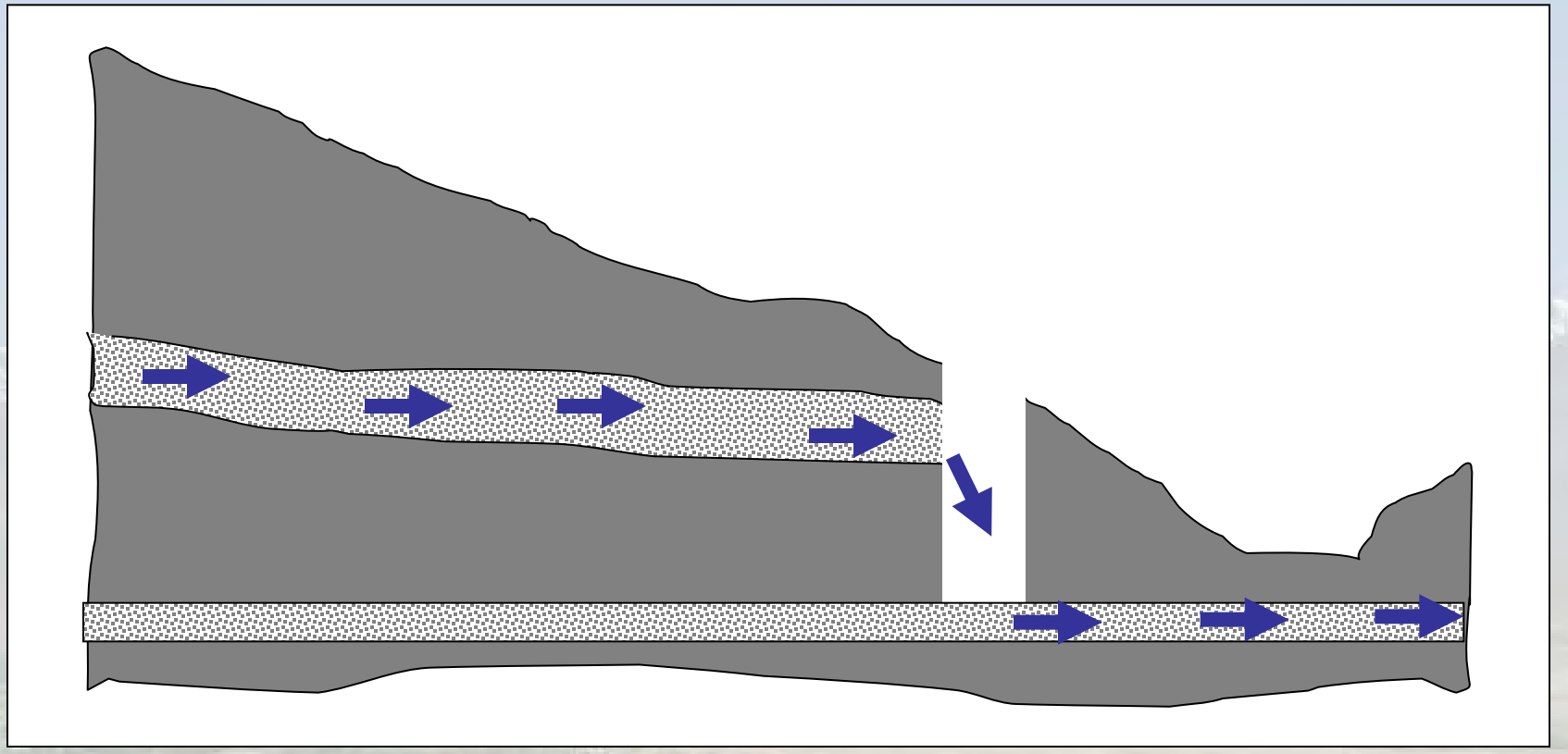
Dig a little to see if it will provide water

- Look at soils
- Assess how fast water fills hole

If so, excavate a larger hole.

The hole should be larger than the size of the spring box

- **Do NOT dig to another gravel layer or you might drain the water away.**
- **Stop digging if you feel gravel**
- **If you do dig into another gravel, place 15 cm of clay on bottom and compress it down**



Section

Excavate a trench from the hole to a lower elevation.

Construct a Spring Box

A spring box is a hollow box or barrel with holes along one side. It can be a:

- Plastic Barrel
- Metal Barrel
- Concrete Pipe
- Plastic Box
- Stone
- etc

- **Install a pipe 15 cm from the bottom of the spring box.**

Seal around the edge

Place the spring box in the hole and the pipe in the trench

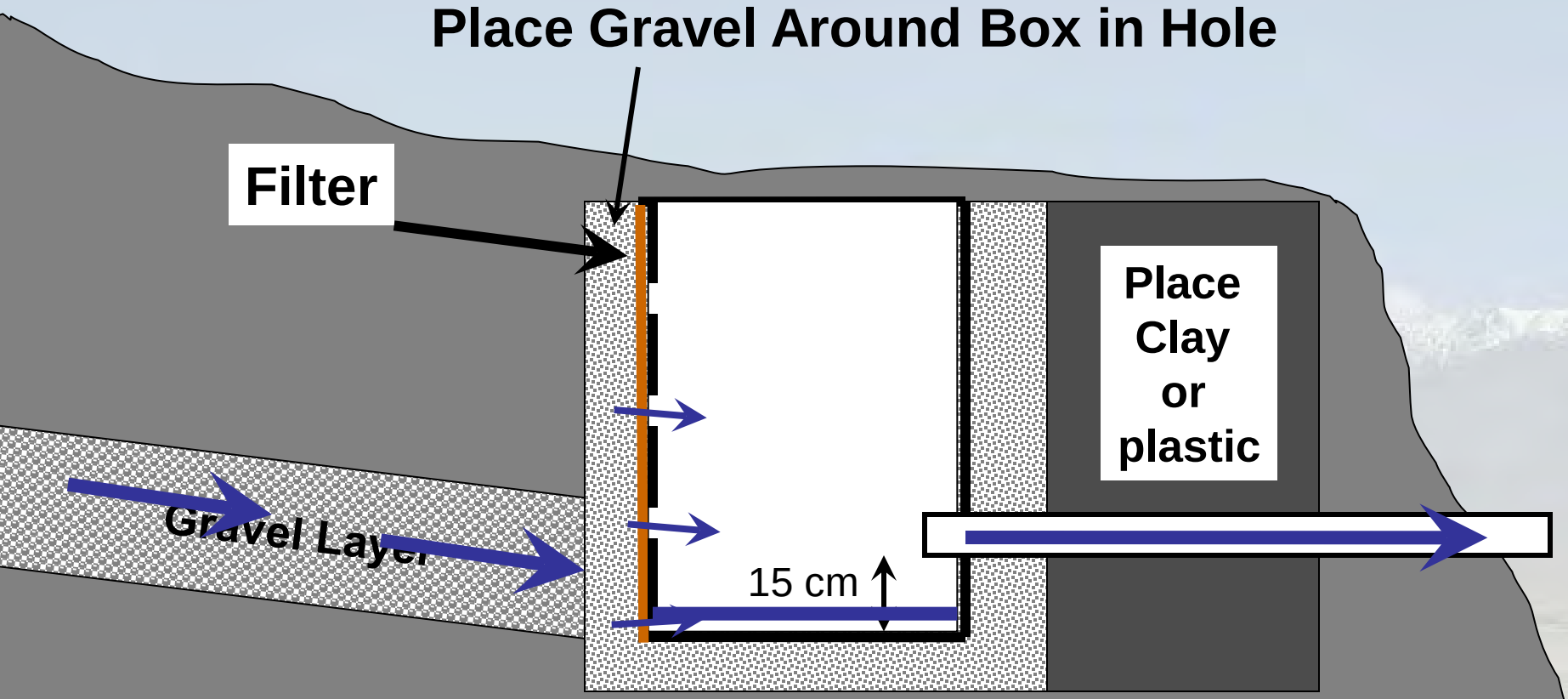
- Place a clay plug or plastic sheet in the trench below the spring box

Place a filter fabric around the spring box that covers the holes but still lets the water through

Fill the hole around the spring box with gravel

Place a lid on the spring box to keep dirty water and animals out

This is a cross section of an installed spring box



The box allows for some storage and a place for some sediments to settle out

Seal and slope ground above box and lines to drain to prevent contamination

Installed Spring Boxes 2004

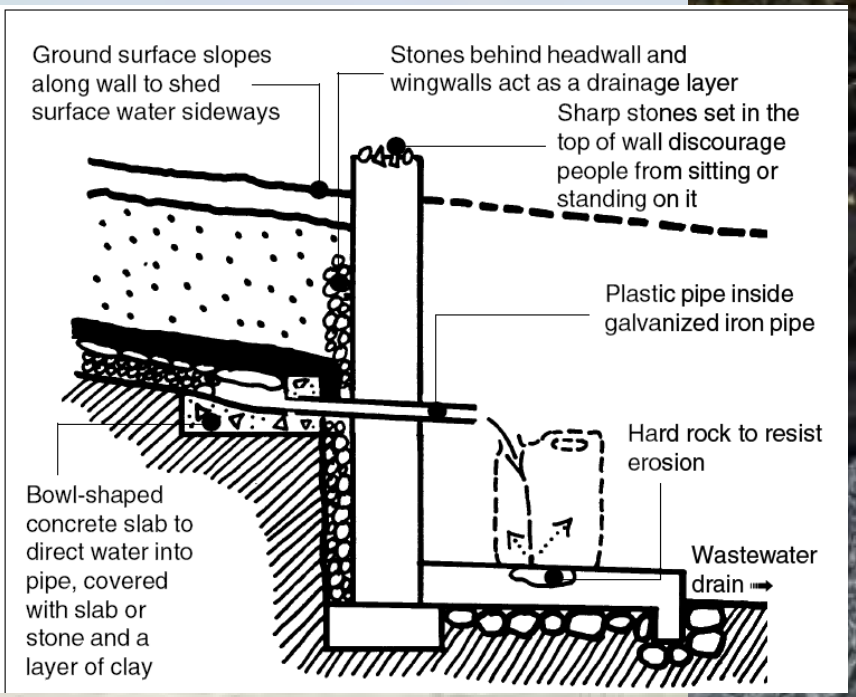
Still working …

Photos 2006

Other approaches are often used.

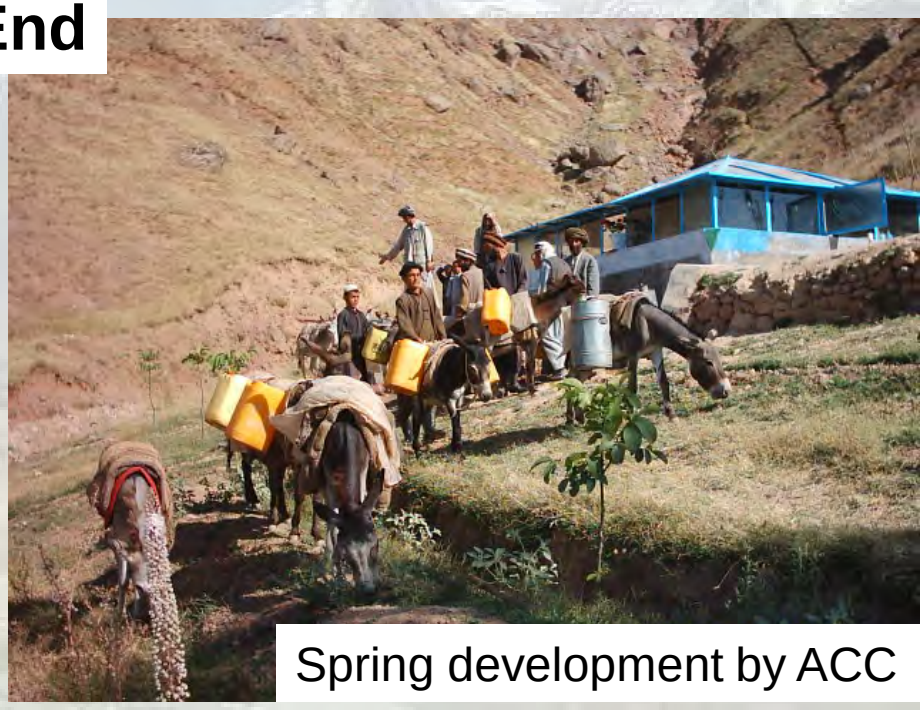
A box may not be needed if the water carries only a low level of sediments and if no storage is needed because the water flows at a rate sufficient to meet the peak demand.

Or if the spring has a defined point (spring eye)



Infiltration gallery with perforated pipe

The End



Spring development by ACC