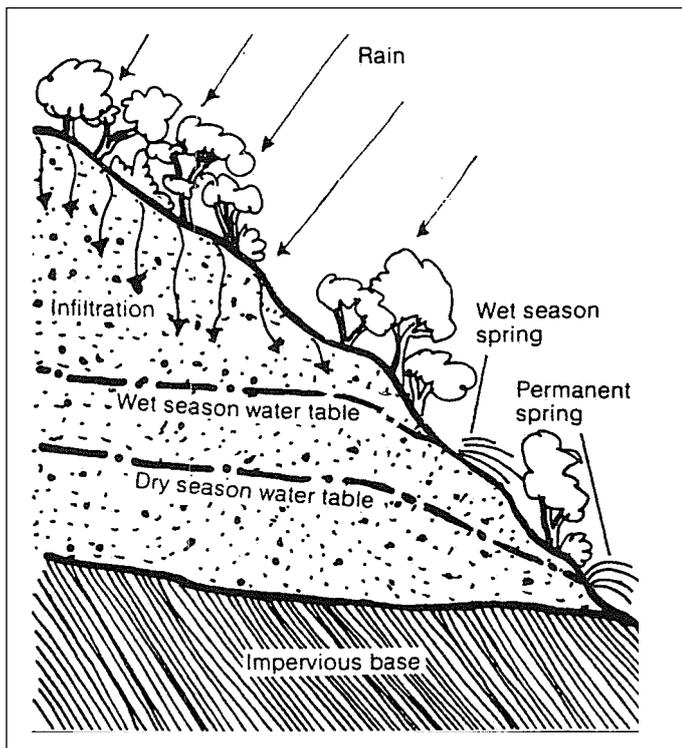


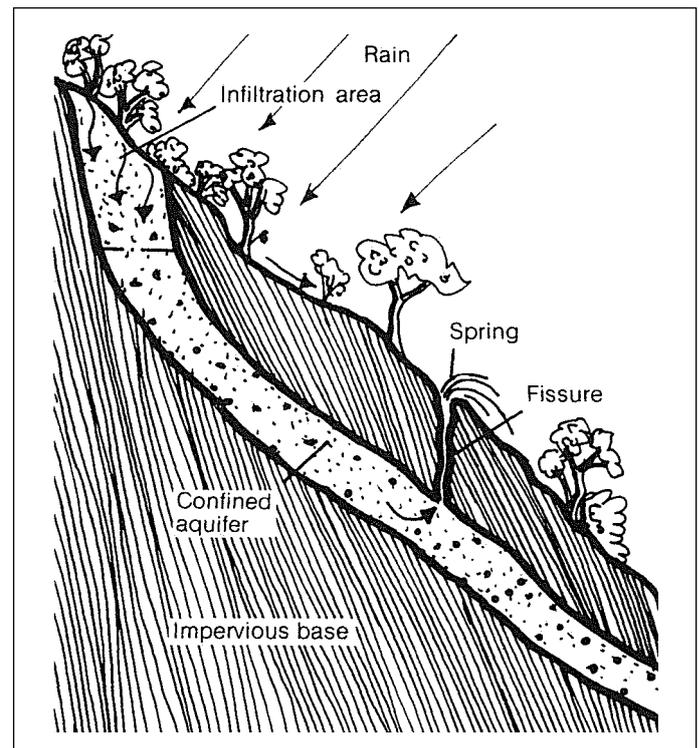
3. Protecting a spring

There are two main types of springs

Gravity springs occur where groundwater emerges at the surface because an impervious layer prevents it seeping downwards. This type usually occurs on sloping ground and its flow changes with variations in the height of the water table.



Artesian springs occur where groundwater emerges at the surface after confinement between two impervious layers of rock. The flow is very nearly constant.



Selecting a spring

- Consult local people, who will know where the springs are in the area. They will also be able to tell you which ones stop flowing during the dry season. The best time to measure the flow is in the dry season.
- Ask the villagers if the flow is ever greater than when you measure it. If the maximum flow is greater than 10 litres/second, a simple spring box will not be strong enough.
- Investigate around the source to make sure the 'spring' is not really a stream which has gone underground and is re-emerging.
- If the spring is to be connected to a piped water system, it should be well above the village and as inaccessible as possible to minimize pollution by children and livestock.
- If people are to collect water directly from the spring it should still be on higher ground than the village it serves, but as nearby as possible.
- Intakes should not be built on swampy ground.
- Intakes should be located where they will not be threatened by land erosion or flood waters or where the water will cause erosion.
- Try to incorporate other facilities requested by villagers, eg. for washing clothes or watering animals.

You will also need the following information:

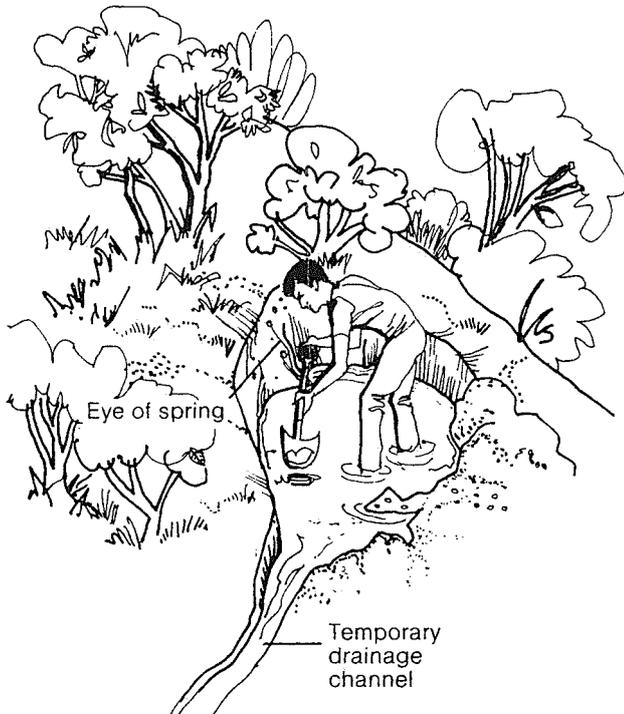
- Check whether the water looks clear
- The flow of the spring (litres/second)
- Possible sources of contamination
- Details of water rights in the area

Protecting a spring

Each spring is, of course, a special case, but building an intake box is one method of protecting a spring from contamination.

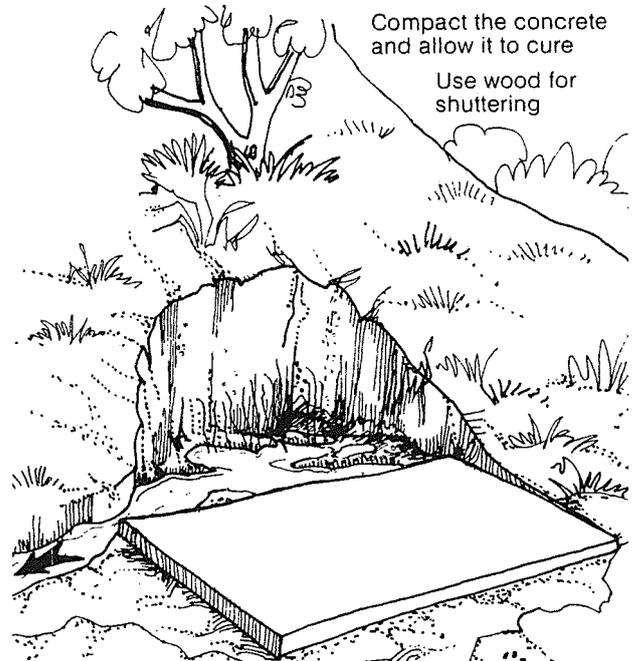
1

Dig round the eye of the spring to the impervious layer. This often increases the flow



2

Pour a concrete 'floor' for the spring intake box across its full width
Mix 1:4:8 cement:sand:gravel

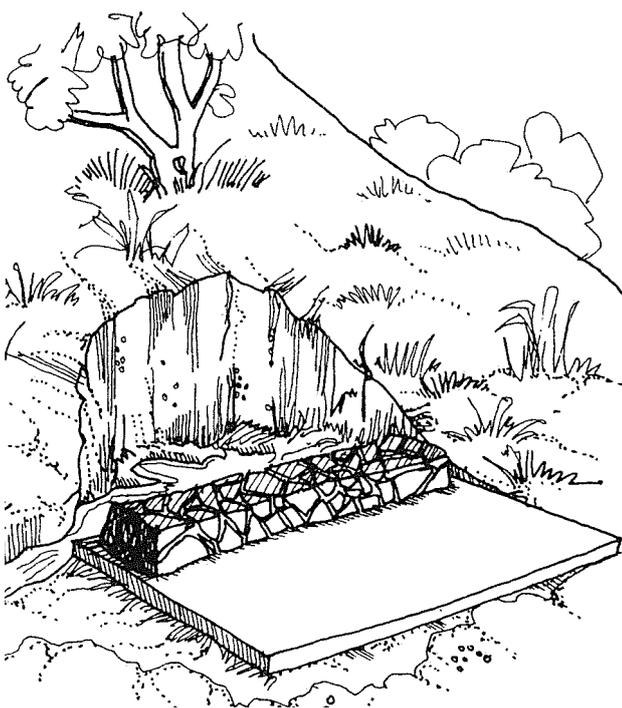


Floor extends at least 1m forward from eye of spring across its full width

Cover the floor with a thin layer of cement mortar 1:4 cement:sand

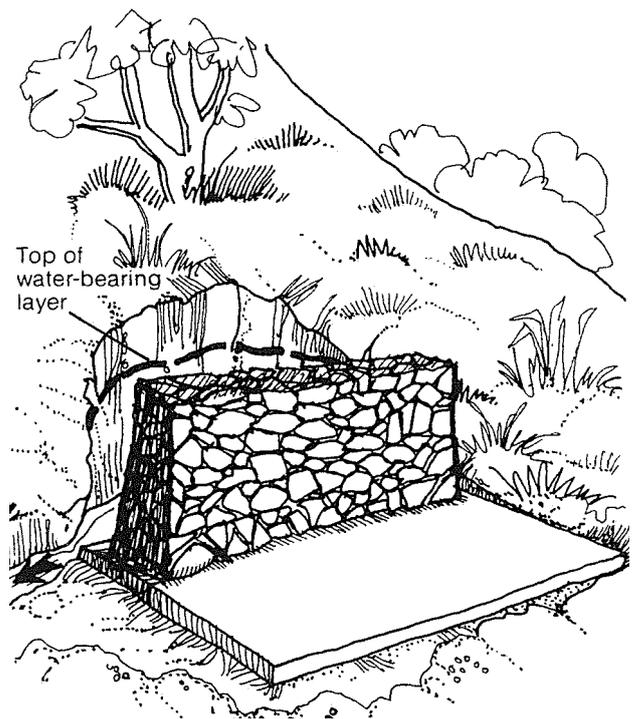
3

Make a masonry footing for the back wall



4

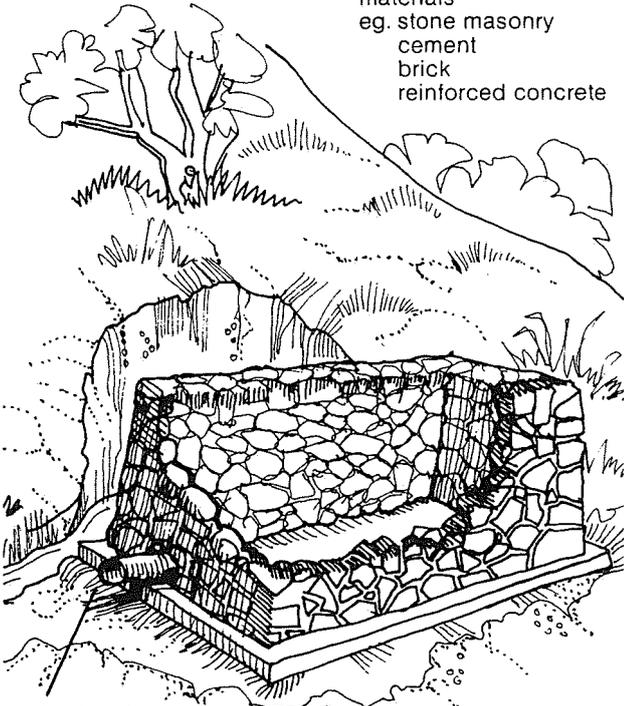
Dry stone masonry back wall



Protecting a spring

5

Front and side walls
from locally available
materials
eg. stone masonry
cement
brick
reinforced concrete

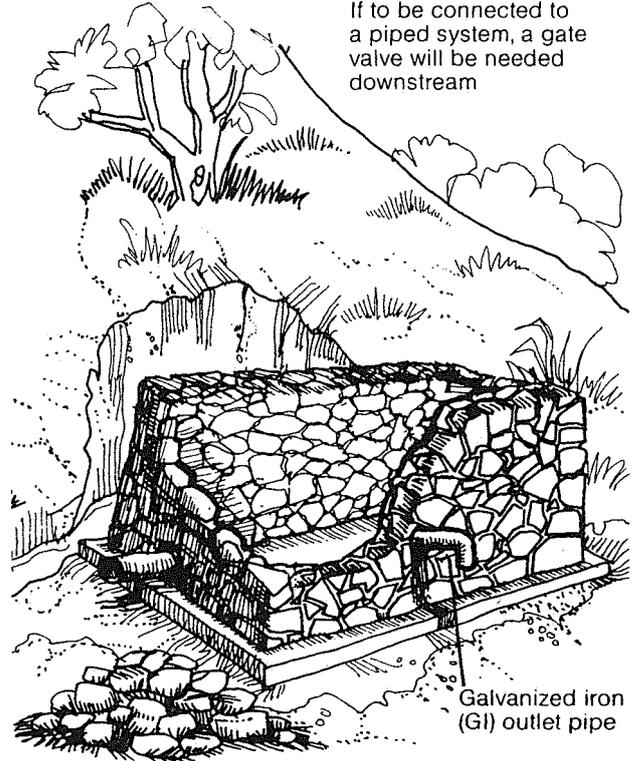


Wash-out pipe
2in or 3in diameter GI pipe
Clean spring box
at least annually

6

Outlet pipe

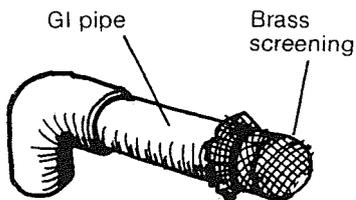
If to be connected to
a piped system, a gate
valve will be needed
downstream



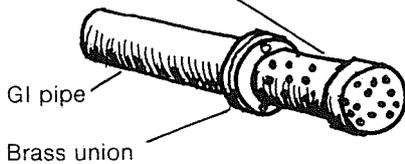
Galvanized iron (GI) outlet pipe
If people will collect water direct from the source, use 2½-3in pipe for flows of 1-2 litres/sec. If piped system, size of pipe is determined by designed pipe line. See reference 1

7

Outlet pipes
Screen end goes
inside chamber



OR Plastic pipe

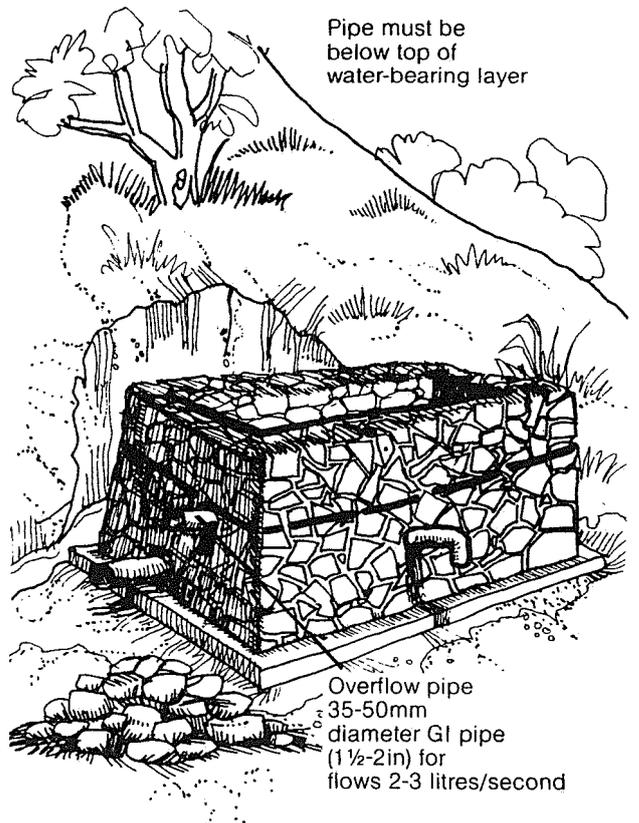


Make holes in the
end-cap with a
hot nail

8

Overflow pipe

Pipe must be
below top of
water-bearing layer

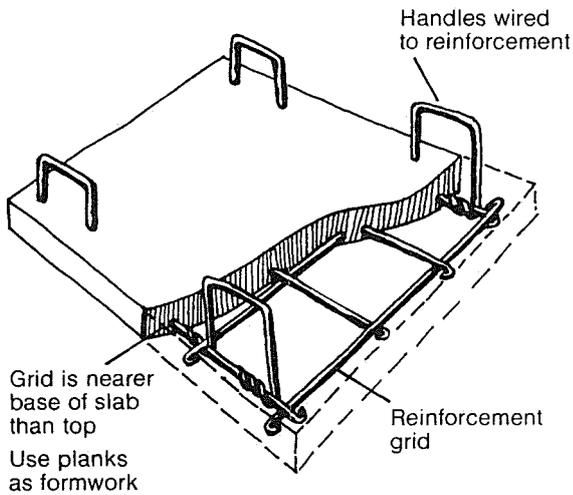


Overflow pipe
35-50mm
diameter GI pipe
(1½-2in) for
flows 2-3 litres/second

Protecting a spring

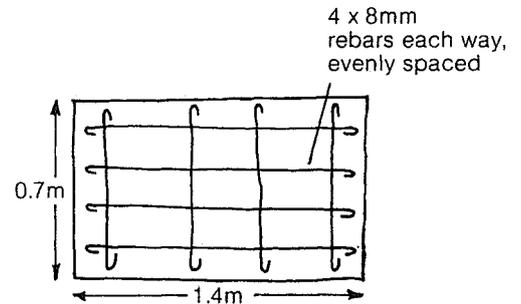
9

Reinforced concrete cover slab



10

Diagram of reinforcement for cover



OR use corrugated galvanized steel (CGS) roofing sheets

Tie rebar with wire at crossing points

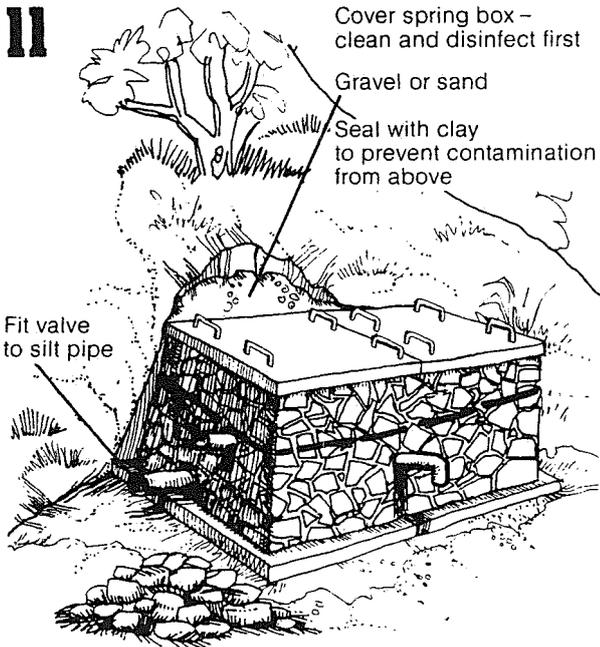
11

Cover spring box – clean and disinfect first

Gravel or sand

Seal with clay to prevent contamination from above

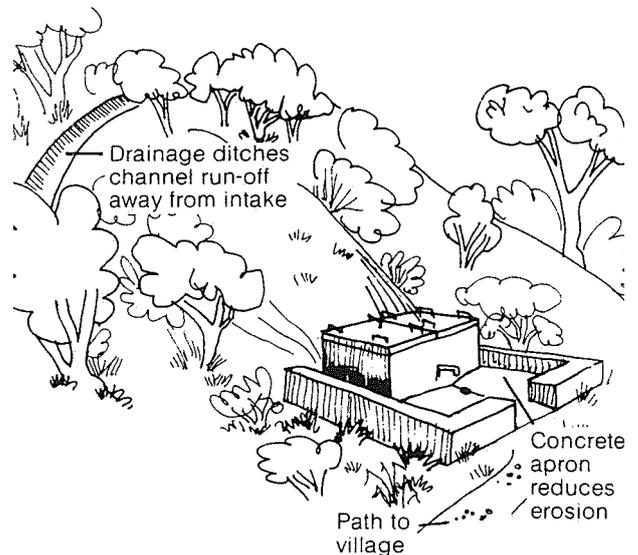
Fit valve to silt pipe



12

Finished spring box

Not to scale



For more information:

1. Jordan, T. D. Jr. *A handbook of gravity-flow water systems*, Intermediate Technology Publications, London, UK, 1984.
2. Cairncross, Sandy, and Feachem, Richard. *Small water supplies*, Ross Bulletin No10. The Ross Institute, London, UK, January 1978.
3. Wagner, E. G. and Lanoix, J. N. *Water supply for rural areas and small communities*, Monograph No42, WHO, Geneva, 1959.

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