



# What is Non-Cement Drinking Water ?



*Making an intake tank without cement, Jajarkot, Nepal*

It is so important to have clean drinking water for a healthy life. Because of modern development and population increase, forest is decreasing and water springs are drying up. Problems have been seen of cement-made drinking water tanks causing the springs below to dry up. Also, if the cement cracks, all the water in the tank leaks away, and this is too expensive to fix. So as an alternative to this, we describe in this chapter a way to build drinking water systems without using cement. Instead, they use local resources and skills to make systems which are safe, cheap to build, and long-lasting.

# Why **make Non-Cement Drinking Water ?**

Many people think that beneficial development can only come by importing and using resources from far-away foreign countries. Few people believe that it's possible to build a drinking water system for a village without using cement. But since 1991 in Jajarkot and Surkhet districts of Western Nepal, the Jajarkot Permaculture Programme (JPP) has made many such village systems to provide safe drinking water, and all are being maintained and still running to this day.

## Benefits of building drinking water systems without cement

- to build clean drinking water systems
- to do this without damaging other springs
- to build cheaper drinking water systems
- these use less time and labour resources to build
- local people can build and maintain these systems
- this means that everyone in the village can be involved in building and maintaining their own drinking water system
- this helps the local economy



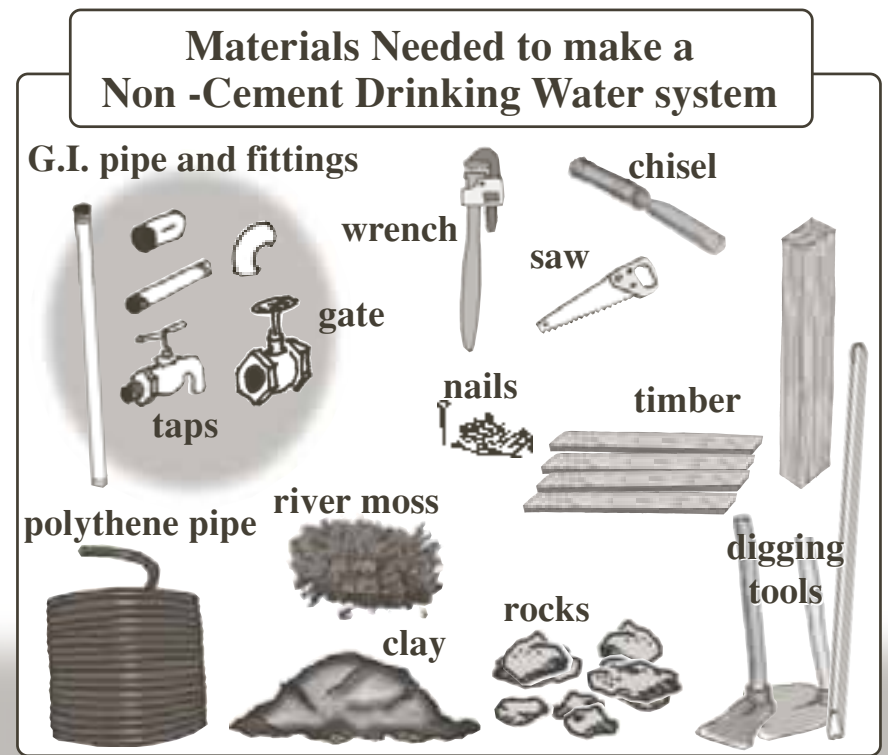
**This Chapter's Author:**  
**Mr Bhuvan Khadka**  
Himalayan Permaculture Group,  
Surkhet, Nepal



# How **to make Non-Cement Drinking Water ?**

Drinking water systems can be made from springs near to the villages without using cement. It's best to build these during the winter when farmers have more free time. At this time, springs are also low due to lack of rain, so it is easier to measure the flow. There are 3 steps to building the non-cement drinking water system :-

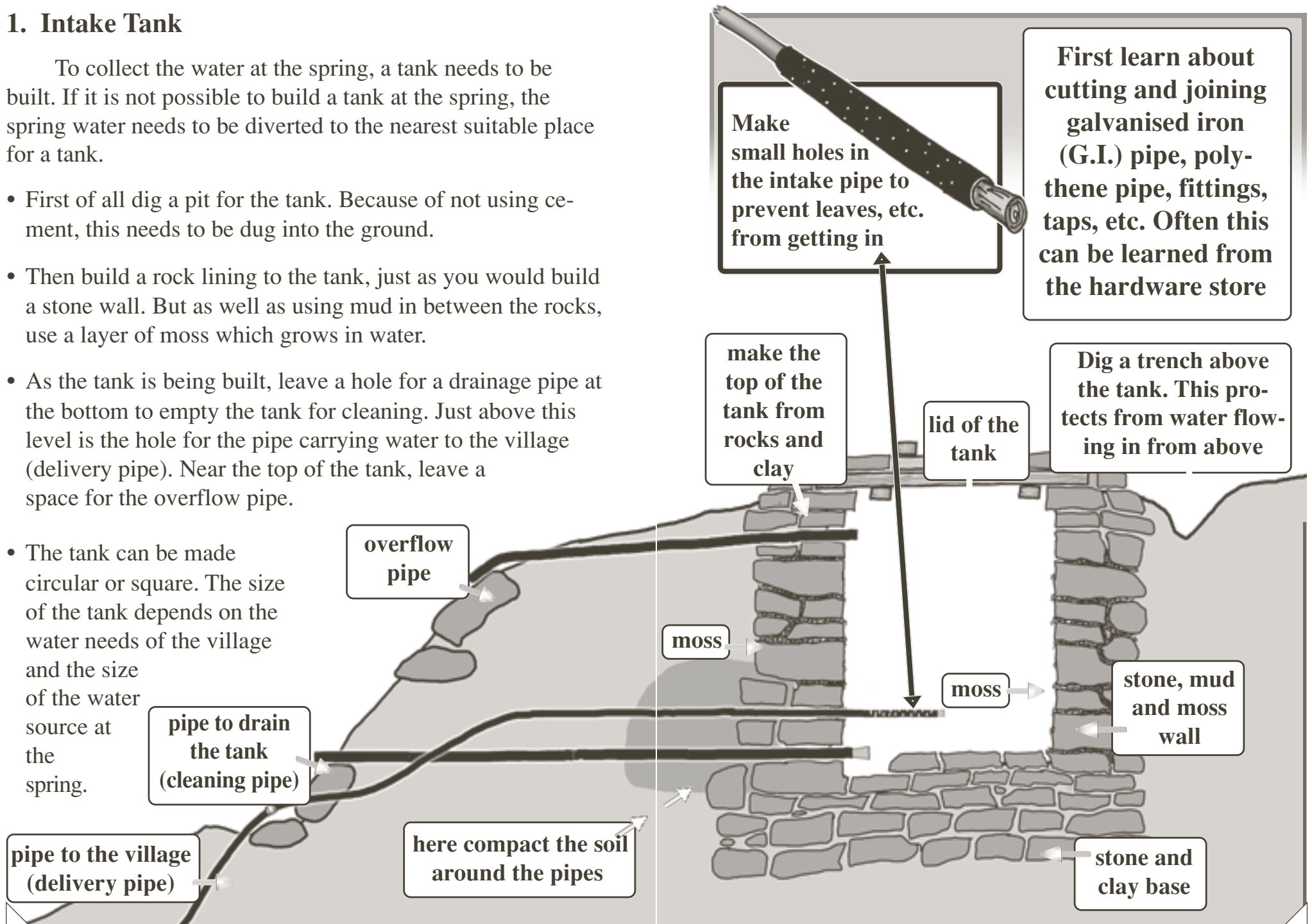
1. Building and managing the spring intake tank;
2. Laying the pipe to the village, and tanks in between, if any;
3. Building the tapstands in the village.



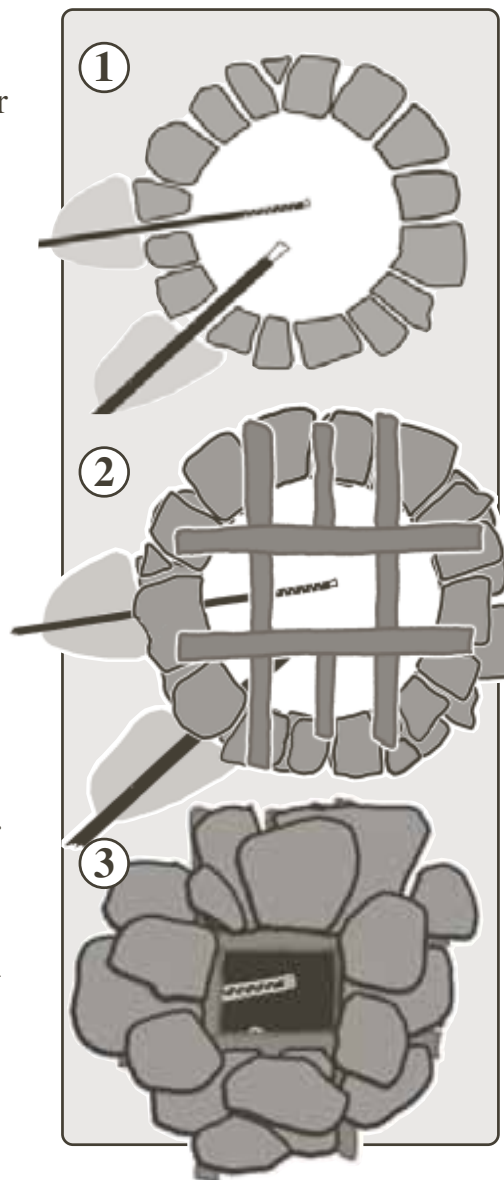
# 1. Intake Tank

To collect the water at the spring, a tank needs to be built. If it is not possible to build a tank at the spring, the spring water needs to be diverted to the nearest suitable place for a tank.

- First of all dig a pit for the tank. Because of not using cement, this needs to be dug into the ground.
- Then build a rock lining to the tank, just as you would build a stone wall. But as well as using mud in between the rocks, use a layer of moss which grows in water.
- As the tank is being built, leave a hole for a drainage pipe at the bottom to empty the tank for cleaning. Just above this level is the hole for the pipe carrying water to the village (delivery pipe). Near the top of the tank, leave a space for the overflow pipe.
- The tank can be made circular or square. The size of the tank depends on the water needs of the village and the size of the water source at the spring.



- When the wall is built up, leave a hole big enough for a person to get into the tank. If the pipes become blocked, it may be needed to clean the tank.
- Make a strong frame to cover and close the tank with timber or rocks.
- When the tank is finished join a gate valve to the pipe taking water to the village (delivery pipe) and to the cleaning pipe at a suitable place outside the tank. This means the water supply can be cut off if the pipeline needs maintenance at any place. Instead of a gate valve, a wooden bung can be used to block the pipe from the inside of the tank



After this work is finished, the area around the tank needs protection. If possible, prevent livestock from walking in the area, and prevent people from cutting trees there. If the area is bare, a tree plantation should be made.

## *Let's See* How to make Non-Cement Drinking Water



In Dharnasi village, Jajarkot, an intake tank is being built.



Between the rocks in the wall the moss can be seen.



3

Starting to make the top after the tank has been built.



4

Leaving a hole big enough for a person to fit in, the lid is made.



5

Showing the position of a tank in the forest.



6

An intake tank with a stone lid.



7

For protection and maintenance, a well fitting wooden door is made.



8



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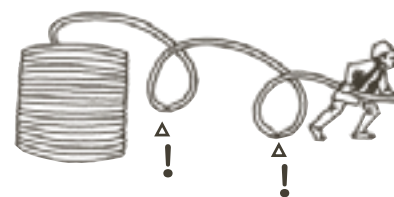


Overflow pipe

- 1 intake tank
- 2 overflow pipe
- 3 cleaning pipe
- 4 delivery pipe

**Making a drinking water tap in the village**

**10**

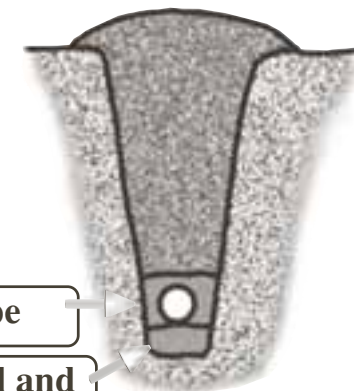


**don't uncoil pipe like this, it will develop kinks and may split**



**uncoil pipe like this**

Dig a trench to bury the pipe from the tank to the taps in the village. The pipe should be buried 3 feet deep. In the bottom of the trench first put loose soil and stones. Use G.I. pipe where there are rocks and so a trench cannot be dug.



**pipe**

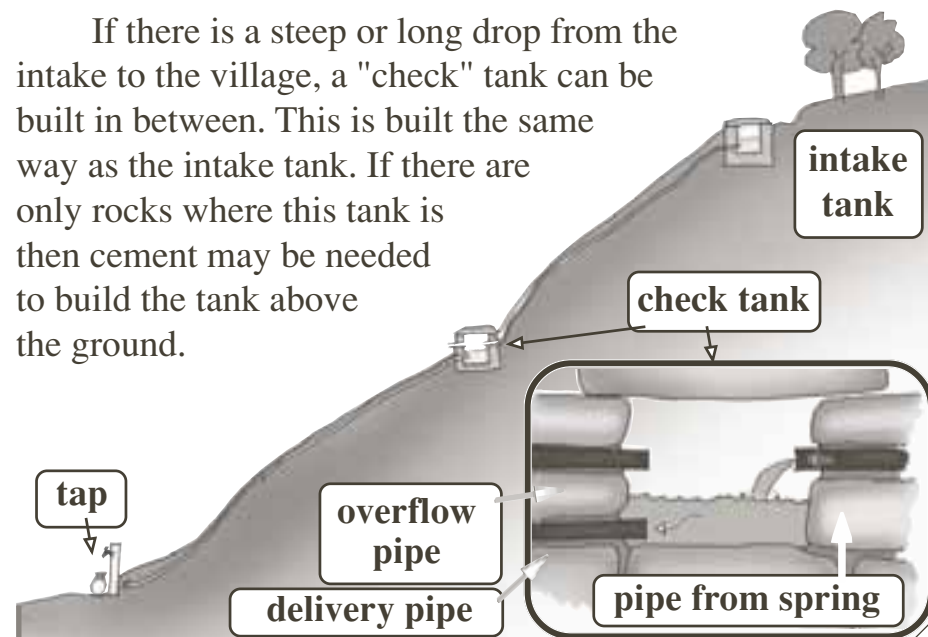
**soil and stones**

**11**

**Waste water from the tap used to irrigate kitchen gardens. It can also be used for nurseries and orchards**



If there is a steep or long drop from the intake to the village, a "check" tank can be built in between. This is built the same way as the intake tank. If there are only rocks where this tank is then cement may be needed to build the tank above the ground.

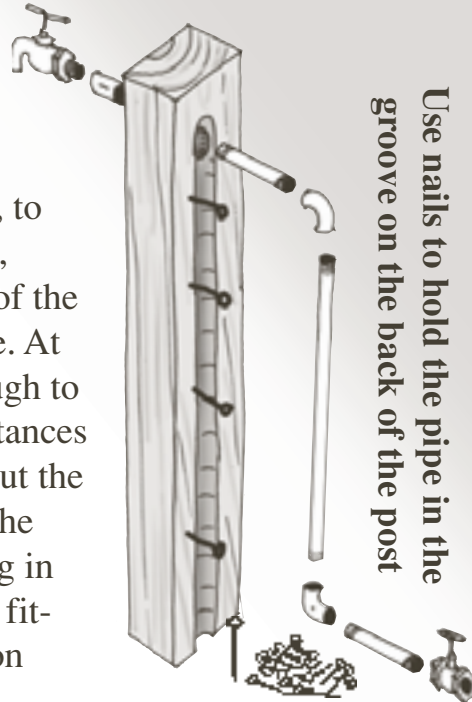


## Making the Tapstand

After the site for the tapstand has been prepared, make a smooth wooden post.

On the back of this post, to the height that the tap will be, chisel a groove in the centre of the post in which to hold the pipe. At the top, make a hole big enough to hold the tap. Measure the distances cut in the wooden post, and cut the pipe according to this. Bury the post so it is upright and strong in the ground. Join the pipe and fittings and fit into the groove on the back of the post, with the tap coming out of the hole.

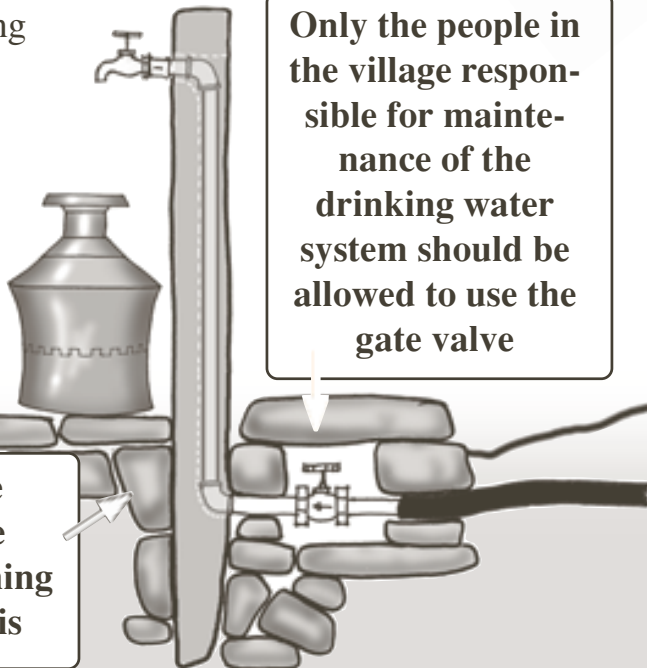
Then build up a strong wall any shape you like around the tap stand.



Use nails to hold the pipe in the groove on the back of the post

Only the people in the village responsible for maintenance of the drinking water system should be allowed to use the gate valve

Take advice from those skilled in joining pipe like this



Making a tapstand in the villages



The oldest non-cement drinking water system still working in Jajarkot, Sirpachaur village (built 1991)

Make a design to use the waste water from a tap stand for kitchen gardens or a community nursery

# Maintenance

## How to maintain Non-Cement Drinking Water

The tanks may leak a little but as the moss grows it will block all the holes. The older the system is, the stronger it gets and the less it leaks. The tanks should be cleaned if leaves or mud get in. Any leaking or split pipes should be repaired and re-sealed immediately.

To help to maintain and run the drinking water system in a sustainable way the village committee should set up a fund according to the number of households. If a community nursery is made, this can generate income from seedlings distributed which can go into the fund. The fund can be used to replace any fittings which may break, such as a tap, gate valve, pipe, etc.

If the forest is protected around and above the spring, the flow of water will increase. This is because the forest catches the rain and allows it to soak into the soil instead of running off the land.

Protect the forests  
Protect the springs !



# Farmers' Experience

## Mr Bir Bahadur Khatri



From Nepal, Surkhet district, Gumi - 9, Ghuyalpani village, Mr Bir Bahadur Khatri is a member of "Shiva Shakti" group. His village has made a non-cement drinking water system. Now let's hear about their experience.

“ Our village is on a high ridge. Though there are water resources it was very difficult to get them to the village. With the help of the Homestead Programme (JPP) we made an intake tank. This uses moss instead of cement. With cement, the tank will crack and water will leak out, but with moss this covers all the cracks. Because the system's made out of local resources we could build it ourselves, and up until now we haven't had to repair it. But if this is needed, we can do it ourselves. There are 5 small springs feeding 7 taps, and they're all working very well. ”

*Bir Bahadur Khatri*



JPP's Drinking Water Engineers:- Janga B. Gharti (left) and Ammar B. Nepal (right) have made more than 20 non-cement systems in Nepal's villages since 1991.





# Read On !



## Subjects Related to Non-Cement Drinking Water

This book provides enough information to be able to build your own drinking water system. However, this information is also linked to other methods. For extra benefits let's read, learn and practice from other related chapters.

### **Waste Water Chapter**

Information in this chapter about how to make use of household and tapstand waste water for irrigation.



### **House Hygiene Chapter**

Don't think that health improvement comes only from drinking clean water. If the house and kitchen are dirty, even more diseases can spread. Information about easy methods to keep the house clean are given in this chapter



### **Kitchen Garden and Mixed Vegetable Growing Chapters**

How to make and manage a home vegetable garden for permanence, ease and simplicity ? Information on doing less work for more production while also being able to produce a wide range of fresh vegetables is given in these chapters.

