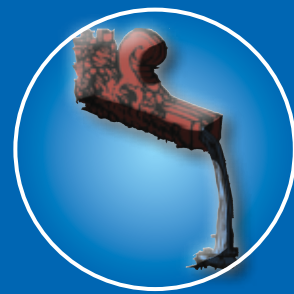


ICIMOD Manual 2016

# Community Training Manual



Springshed Management in the Hindu Kush Himalayas  
**Aspects of Groundwater and Hydrogeology**

ICIMOD

FOR MOUNTAINS AND PEOPLE



# About ICIMOD

The International Centre for Integrated Mountain Development (ICIMOD) is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush Himalayas (HKH) – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – based in Kathmandu, Nepal. Globalization and climate change are having an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream and downstream issues. ICIMOD supports regional transboundary programmes through partnerships with regional partner institutions, facilitates the exchange of experiences, and serves as a regional knowledge hub. It strengthens networking among regional and global centres of excellence. Overall, ICIMOD is working to develop economically- and environmentally-sound mountain ecosystems to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now and in the future.

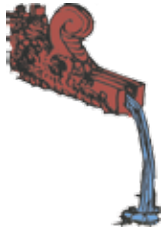


ICIMOD gratefully acknowledges the support of its core donors:

The Governments of Afghanistan, Australia, Austria, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Norway, Pakistan, Switzerland, and the United Kingdom.

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# About Transboundary Landscape Initiatives in the Hindu Kush Himalayan Region



The Hindu Kush Himalayan region is extremely varied, yet there are many interlinkages between biomes and habitats as well as strong upstream-downstream linkages related to the provisioning of ecosystem services. The Convention on Biological Diversity advocates for the use of landscape and ecosystem approaches for managing biodiversity in the region, recognizing the need for increased regional cooperation. ICIMOD and its partners have identified seven transboundary landscapes for programmatic cooperation. From west to east, these are: Hindu Kush Pamir, Karakoram-Pamir, Kailash, Everest, Kangchenjunga, Far Eastern Himalayas, and Cherrapunjee-Chittagong. The transboundary landscape concept makes it possible to address the conservation and sustainable use of natural resources (biodiversity, rangelands, farming systems, forests, wetlands, and watersheds) in landscapes defined by ecosystems rather than administrative boundaries. The approach is people-centred and includes cultural conservation, which is an essential first step to resource conservation efforts in the region and helps translate collaborative action into sustainable and equitable development.

## About the Kailash Sacred Landscape

Located within the remote southwestern portion of the Tibet Autonomous Region of China, adjacent districts in the Far-Western region of Nepal, and the northeastern flank of Uttarakhand State in northern India, the Kailash Sacred Landscape (KSL) is spread over an area of about 31,000 km<sup>2</sup> and represents a diverse, multi-cultural, and fragile landscape.

The Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) is a transboundary collaborative programme between China, India, and Nepal that has evolved through a participatory, iterative process among various local and national research and development institutions within these countries. The programme aims to achieve long-term conservation of ecosystems, habitats, and biodiversity while encouraging sustainable development, enhancing the resilience of communities in the landscape, and safeguarding the cultural linkages between local populations.



### **Contributors**

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### **Special acknowledgment**

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<sup>3</sup> Freelance Illustrator



# Picture Series: A methodology for inclusive adult education

Picture Series is a participatory, inclusive adult education training method for communities and other local level stakeholders in development programmes.

This method:

- Simplifies difficult technical subjects into the language and messages that resonate with the local communities, NGO staff, and other stakeholders in the field.
- Allows participants to be actively involved in discussions.
- Provokes and steers the participants' thought processes.
- Is an intensive process for participants, as well as trainers, that results in new insights on the topic of the training.

The material can be used by local authorities or field staff of governmental or non-governmental organizations working in an area related to the respective topic and who have adequate knowledge.



# How to Use This Manual

**Target group:** Community members, barefoot hydrogeologists, womens' water user groups, and local authorities in and around springshed areas. The ideal number of participants is 20 to 30, but can reach up to 60 (which would require twice the time).

**Aim:** Participants understand the connection between groundwater, rainfall, infiltration, hydrogeology and good governance in springshed management.

**Duration:** Approximately 2 – 2.5 hours

**Note:** *In addition to using the picture series as a whole during a well-organized training session, trainers can also use individual pictures to conduct short, flexible, ad hoc awareness-building activities for a specific purpose.*

*This is the first of two manuals presently existing on springshed management. The second manual is about 'Springshed Management - Governance'*

## General rules for the training

1. Give everyone a chance to express his/her point of view freely and without interruption.
2. Actively involve women and quieter participants in the discussion, as they may remain quiet while more active participants express their opinion more emphatically.
3. Listen to each participant attentively, and give her/him the feeling that every answer is important.
4. There are no wrong answers.

An efficient and successful training session on Springshed Management in the Hindu Kush Himalayas has three parts:

- Preparation
- Conducting the training
- Assessment

Making the training a success is a difficult task and depends on the way you, as the trainer, address the community members.



## Preparation

Choose the place for the training. Inform the participants about the place, date, and time well in advance. Gather all the materials and familiarize yourself with them. Arrange the pictures in order. Seats should be arranged in a semi-circle. Ensure there is enough light to see the pictures during the training. Encourage women to participate.

## Conducting the training session

**Step 1** Get introduced by the local leaders and/or the partner. Create a warm and positive atmosphere by telling a story about yourself, the topic, the area, and your visit.

**Step 2** Select one volunteer and ask her/him to come to the front. Ask her/him to take the first picture and to show it to the audience. She/he can move around if necessary to ensure that everyone sees the picture properly. Take your time to ensure that everyone has seen the picture. Do not rush.

**Remember:** It is best if you show the picture yourself, as you can guide the direction, speed, and level of discussion, for example by requesting the participants to only look at the picture and to speak later.

**Step 3** Ask the question: What do you see on the picture? Encourage the participants to describe and discuss the contents of the picture, but not the meanings or stories behind the picture. There are no wrong answers, as people are interpreting the pictures. Make sure they do not feel like they are making any mistakes. If they are not giving the desired answers, ask other questions to steer the discussion and to encourage people to consider other points of view. Do not describe or explain the picture to the participants at any time.

**Step 4** If the participants (and you) are satisfied with the description of the picture, take the next one according to the order suggested in the manual.

**Step 5** After all, or a few connected pictures from the first topic are shown, ask the participants to create stories using the pictures. Ensure that everyone understands the objective and messages of the topic. Only then move on to the next topic. Please leave only pictures relevant for the discussion visible to not disturb the through processes.

**Step 6** Please note that you can be flexible regarding the order of the pictures. You can always go back to already used pictures, ask people to make the right order of a series of pictures, or ask them to set priorities. Adapt to the situation. Play with the pictures, and let others also play with them as well. For example, let sequences change, use volunteers to stand in different sequences with pictures, request new or better drawings, etc.

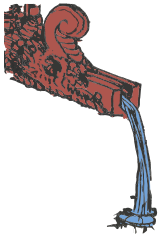
## Assessment

At the end of the session, ask questions to find out if the participants understand the topic. Gather feedback on the material used and the training session. Make notes of the collected feedback after the training session and try to incorporate the feedback into your next training session.



# Contents

1.	Uses and services of mountain springs	10
2.	What are springs?	12
3.	Groundwater and hydrogeological cycle	14
4.	Hydrogeology	16
5.	Identifying the recharge area	18
6.	Water conflicts	20



# 1. Uses and services of mountain springs

## Aim of the topic

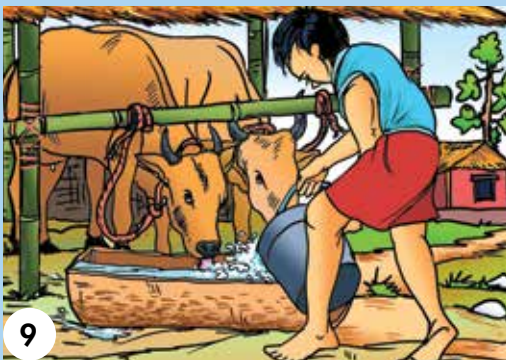
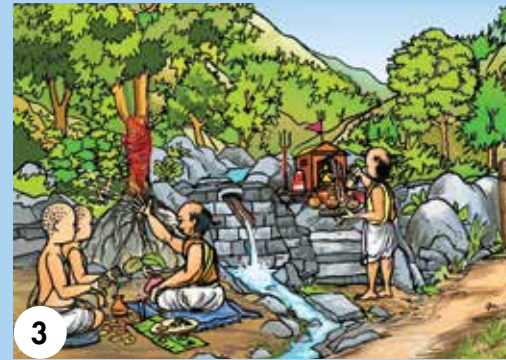
Participants understand the importance of springs in the mountains and midhills as a major source of water for drinking, domestic use, and irrigation, as well as for cattle.

## Messages

- Springs are the most important source of drinking water.
- Spring water is important for domestic uses such as washing, cleaning, and cooking.
- Springs have economic value, as they can be used for the production of energy, agriculture, and grain.
- Well-managed springs provide good quality water.
- Good quality water means better health for all living organisms and the entire ecosystem.
- Springs have cultural, religious, and aesthetic values.
- Spring provide base flow (dry season flow) for rivers.

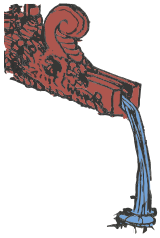
Remember

## Describe the pictures and tell stories



## Indicators of the pictures

- |  |  |   |
|--|--|---|
| <b>1</b> Springwater flows throughout the year       | <b>6</b> Woman washing clothes using spring water    | <b>11</b> Micro-hydro electricity generation from springs |
| <b>2</b> Springs contributing to a river             | <b>7</b> Man taking a bath using spring water        | <b>12</b> Agricultural system dependent on spring water   |
| <b>3</b> Religious and cultural services of a spring | <b>8</b> Washing dishes using spring water           |   |
| <b>4</b> Woman drinking spring water                 | <b>9</b> Man giving spring water to livestock        |   |
| <b>5</b> Woman cooking using spring water            | <b>10</b> Man watering vegetables using spring water |   |



## 2. What are springs?

### Aim of the topic

Participants understand what a spring is and that there are different types of springs.

### Messages

- Springs can be found everywhere, from high mountains to the midhills, to the plains.
- Groundwater is the source of springs.
- A spring is a point where groundwater comes out to the surface.
- Springs are living resources that are sensitive to climate, changes in the environment, and human actions.
- Springs can be seasonal or can be active throughout the year.

Remember



## Describe the pictures and tell stories



13



14



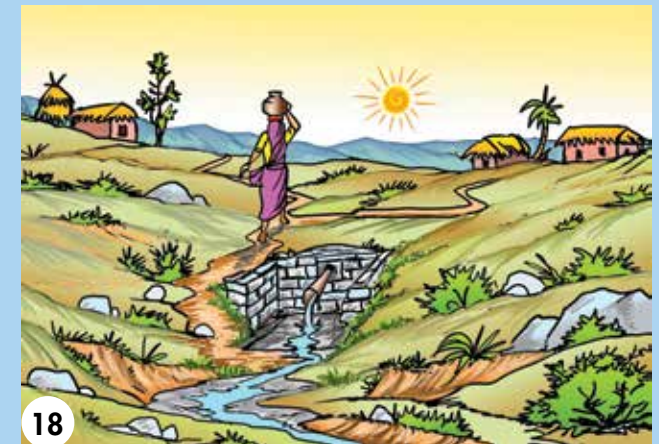
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16



17

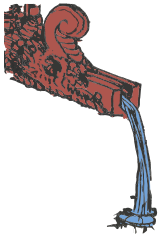


18

## Indicators of the pictures

- 13** Intact ecosystem and sufficient spring water
- 14** Managed land with sufficient springwater
- 15** Plentiful spring water during the rainy season

- 16** Limited spring water during the dry season
- 17** Spring in high altitude mountains
- 18** Spring in the plains



### 3. Groundwater and hydrogeological cycle

#### Aim of the topic

Participants understand that springs get water from aquifers, which store groundwater in cracks and spaces between rocks and in soil.

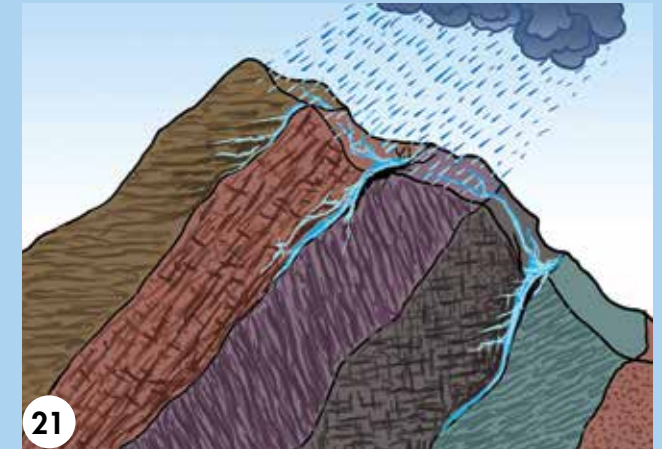
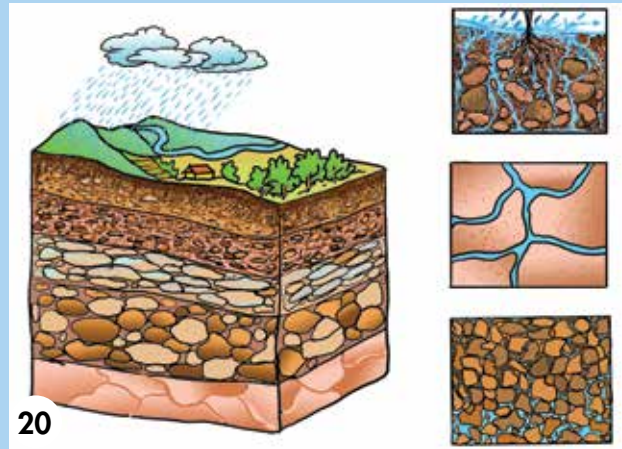
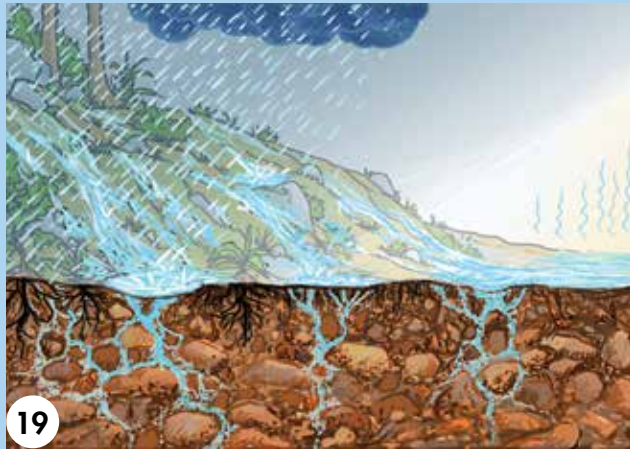
#### Messages

- During rainfall, three things can happen to the water: it flows as surface runoff, it infiltrates, or evaporates into the atmosphere through vegetation.
- A certain portion of rainwater enters the ground and is stored in the spaces and cracks in rocks, rock materials, or soil. This storage space is called aquifer.
- The movement of water inside rocks depends on the dip/inclination, structure, and properties of the rock.
- Spring water comes out where the surface of the earth cuts across the water table, or upper groundwater level.
- Springwater is groundwater.
- Groundwater quality depends on the types of rock and land management practices.

Remember



## Describe the pictures and tell stories



## Indicators of the pictures

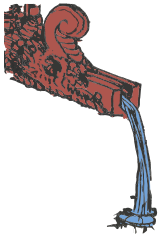
**19** Water cycle

**20** Water stored in the ground

**21** Groundwater movement inside rocks

**22** Groundwater coming to the surface

**23** Good quality spring water as a result of good land management



## 4. Hydrogeology

### Aim of the topic

Participants understand that the capacity for storing and transmitting water depends on the rock structure.

**Note: Optional chapter.**

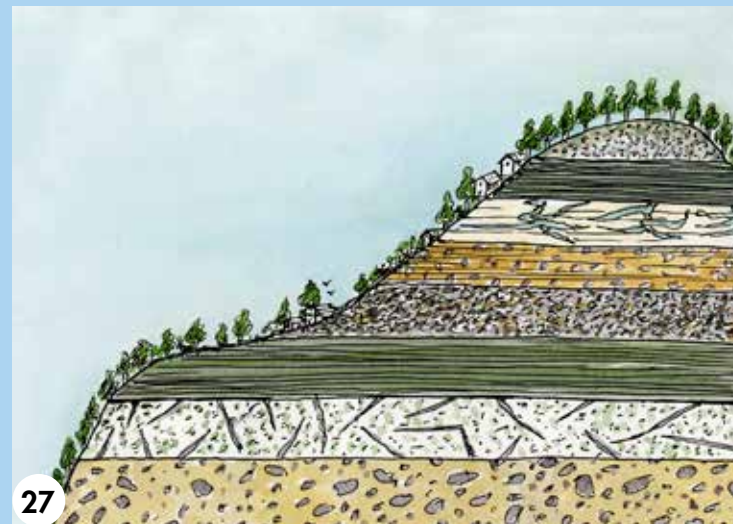
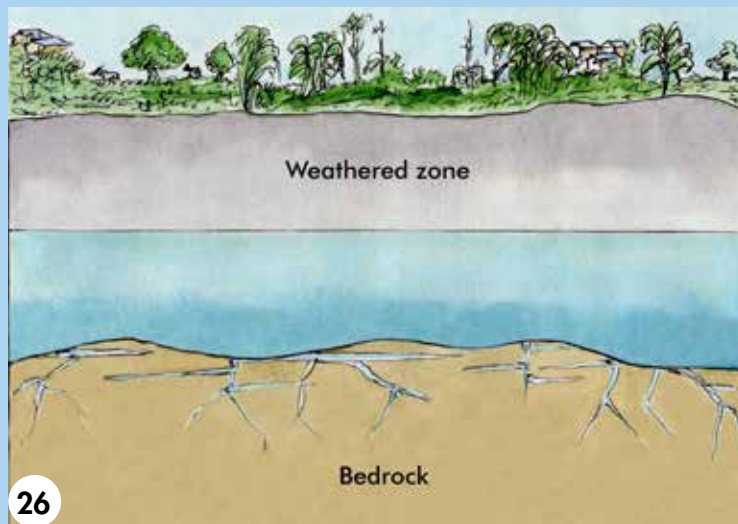
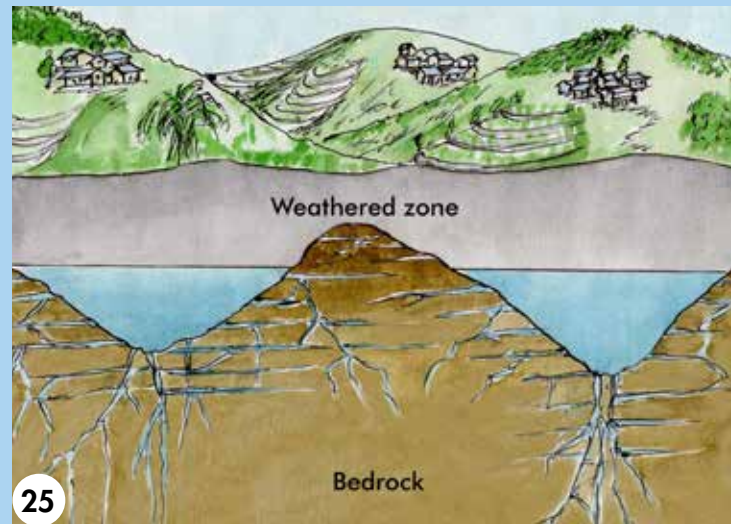
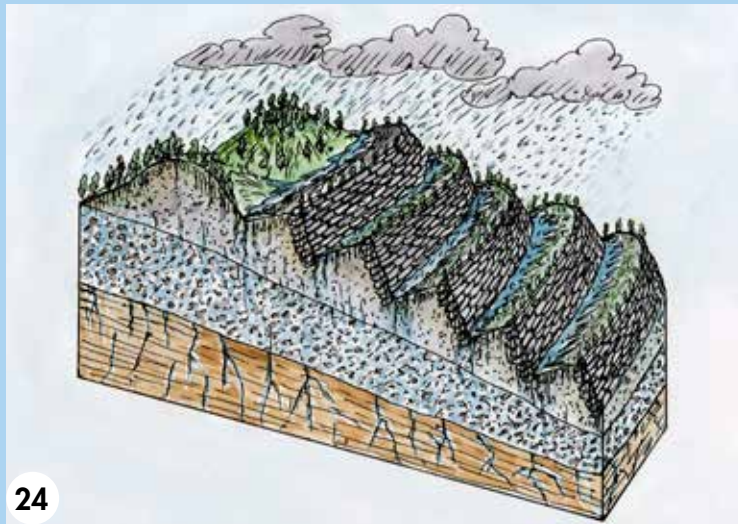
### Messages

- There are three types of rocks: hard (igneous), metamorphic, and soft rocks (sedimentary).  
**Note: Show real rocks.**
- There can be layers of different types of rocks in the ground
- Because of the space between the grains, the soft rocks can transmit and store water more easily than hard rocks.
- If hard rocks have fractures, these can also store and transmit water.

Remember

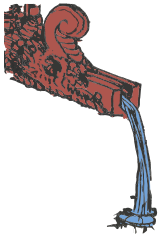


## Describe the pictures and tell stories



### Indicators of the pictures

- 24** Soil ecosystem storing water
- 25** Soft rocks storing and transmitting a large amount of water
- 26** Hard rocks storing limited water, but not transmitting water
- 27** Soil layers



## 5. Identifying the recharge area

### Aim of the topic

Participants are able to identify the recharge area of a spring using their knowledge of hydrogeology.

### Messages

- The extent of the recharge area depends on the dip/inclination of the rocks and its' fractures.
- The recharge area can be a catchment right above the spring or far away.
- The recharge area could include farmland, forest, or a combination of different land use types.
- The right treatment of the recharge area of a spring can improve water quantity and quality of the spring.
- The community should visit the recharge area with technicians to find the best solutions.
- The identified recharge area should be marked in order to provide better protection and maintenance.

Remember



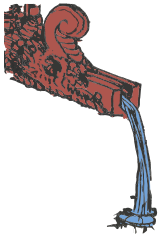
## Describe the pictures and tell stories



## Indicators of the pictures

- 28** Recharge are far away from the spring
- 29** Recharge area close to the spring
- 30** Marked recharge area close to the spring

- 31** Marked recharge area
- 32** Local community and experts visiting the recharge area
- 33** Well-managed recharge area



## 6. Water conflicts

### Aim of the topic

Participants understand that reasons for water conflicts are diverse and that these can be resolved.

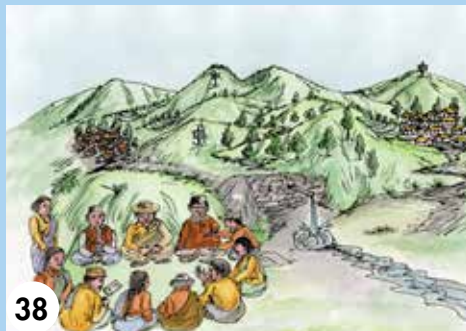
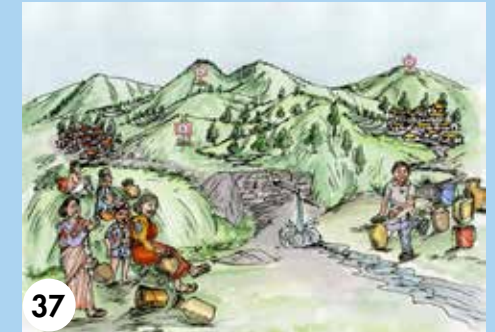
### Messages

- Scarcity is the major cause of conflicts related to springs.
- Access, equity, demand, and social norms (caste and social status) can lead to conflicts among the community.
- Earthquakes can impact spring discharge (increase, decrease, disappearance).
- The formation of water user groups and proper local governance structures with clear usage guidelines supports fair distribution of water.

Remember



## Describe the pictures and tell stories



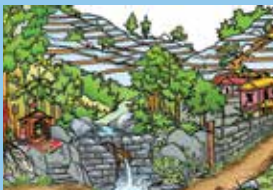




## Indicators of the pictures






- 34** Impacts of low spring discharge and water scarcity
- 35** Lower caste people at a spring
- 36** Higher caste people at a spring
- 37** Distribution and ownership problems

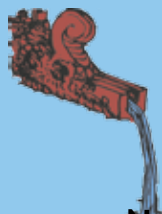
- 38** Water user group for equal distribution
- 39** High spring discharge before an earthquake
- 40** No spring discharge after an earthquake








## Summary of the pictures






No.	Picture	Indicator of Picture
1		Springwater flows throughout the year
2		Springs contributing to a river
3		Religious and cultural services of a spring
4		Woman drinking spring water
5		Woman cooking using spring water

No.	Picture	Indicator of Picture
6		Woman washing clothes using spring water
7		Man taking a bath using spring water
8		Washing dishes using spring water
9		Man giving spring water to livestock
10		Man watering vegetables using spring water



## Summary of the pictures

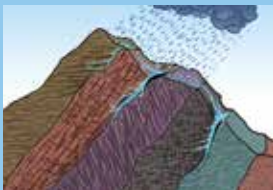



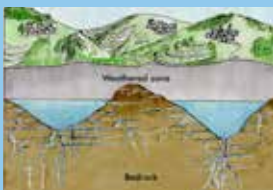
No.	Picture	Indicator of Picture
11		Micro-hydro electricity generation from springs
12		Agricultural system dependent on spring water
13		Intact ecosystem and sufficient spring water
14		Managed land with sufficient springwater
15		Plentiful spring water during the rainy season






No.	Picture	Indicator of Picture
16		Limited spring water during the dry season
17		Spring in high altitude mountains
18		Spring in the plains
19		Water cycle
20		Water stored in the ground





## Summary of the pictures






No.	Picture	Indicator of Picture
21		Groundwater movement inside rocks
22		Groundwater coming to the surface
23		Good quality spring water as a result of good land management
24		Soil ecosystem storing water
25		Soft rocks storing and transmitting a large amount of water






No.	Picture	Indicator of Picture
26		Hard rocks storing limited water, but not transmitting water
27		Soil layers
28		Recharge area far away from the spring
29		Recharge area close to the spring
30		Marked recharge area close to the spring





## Summary of the pictures

No.	Picture	Indicator of Picture
31		Marked recharge area
32		Local community and experts visiting the recharge area
33		Well-managed recharge area
34		Impacts of low spring discharge and water scarcity
35		Lower caste people at a spring

No.	Picture	Indicator of Picture
36		Higher caste people at a spring
37		Distribution and ownership problems
38		Water user group for equal distribution
39		High spring discharge before an earthquake
40		No spring discharge after an earthquake







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# 1 Springwater flows throughout the year









## 2 Springs contributing to a river









### 3 Religious and cultural services of a spring





## 4 Woman drinking spring water





## 5 Woman cooking using spring water







## 6 Woman washing clothes using spring water







## 7 Man taking a bath using spring water

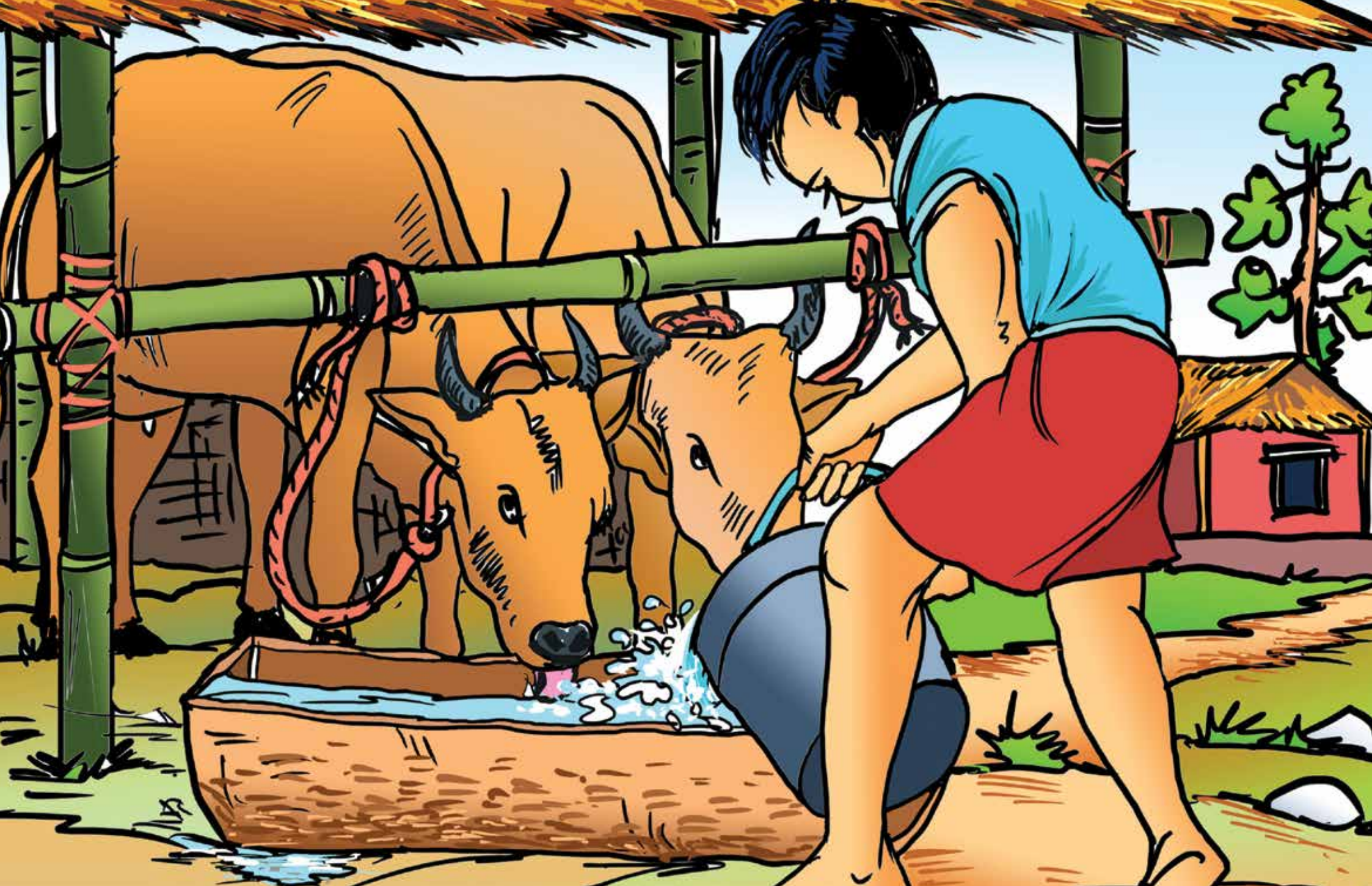




## 8 Washing dishes using spring water







## 9 Man giving spring water to livestock







## 10 Man watering vegetables using spring water







## 11 Micro-hydro electricity generation from springs



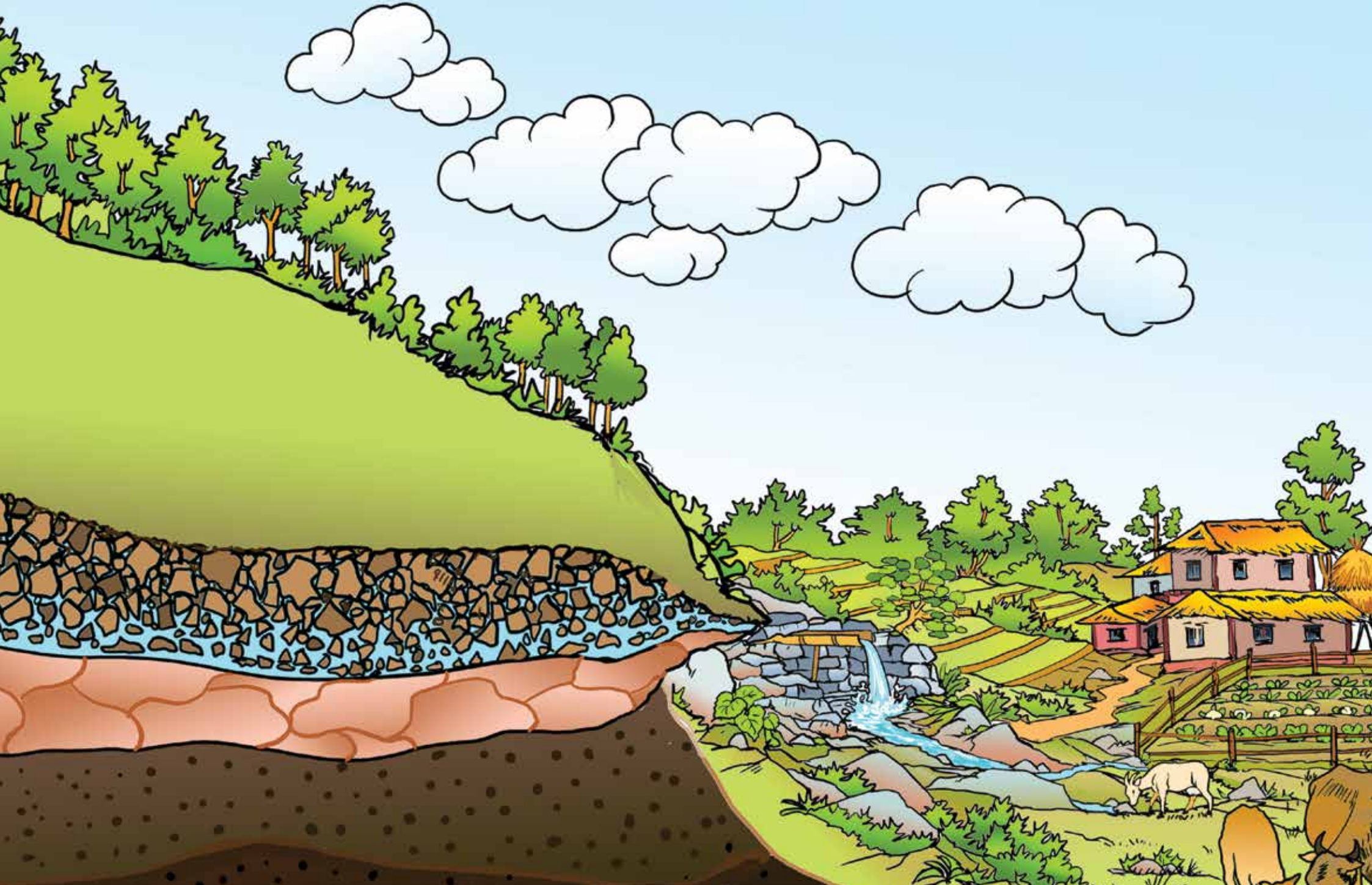




## 12 Agricultural system dependent on spring water







## 13 Intact ecosystem and sufficient spring water







## 14 Managed land with sufficient springwater









## 15 Plentiful spring water during the rainy season









## 16 Limited spring water during the dry season







## 17 Spring in high altitude mountains



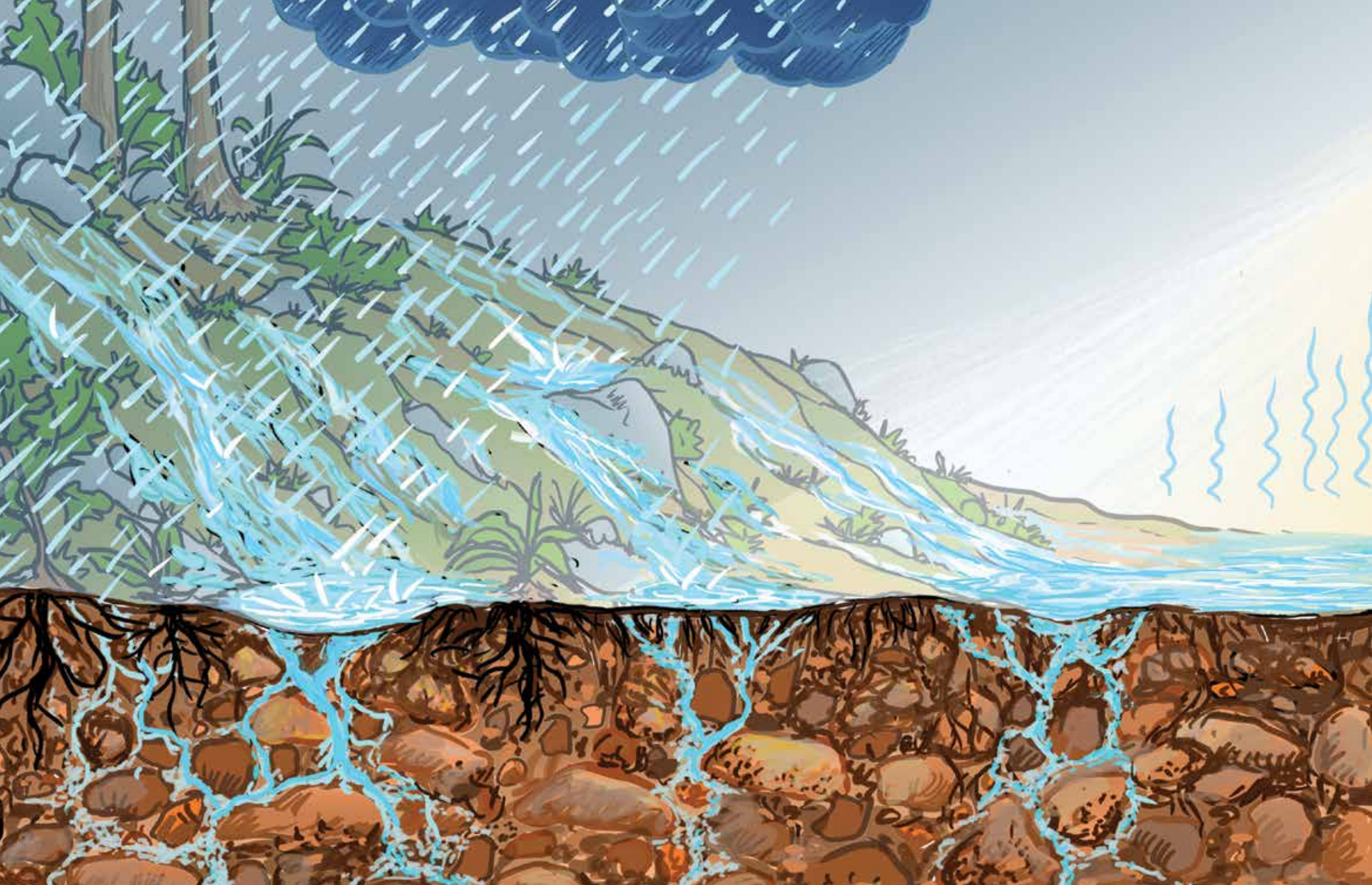






## 18 Spring in the plains

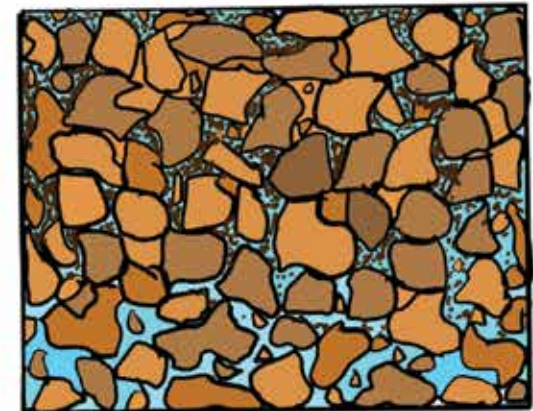
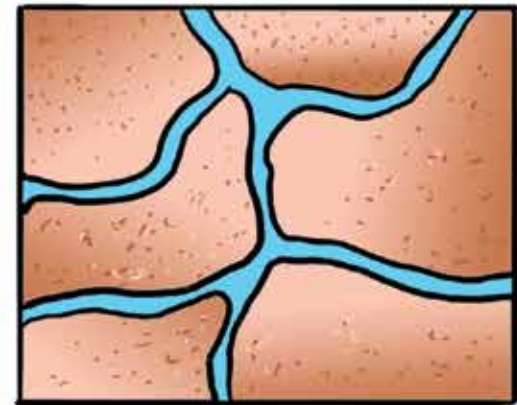
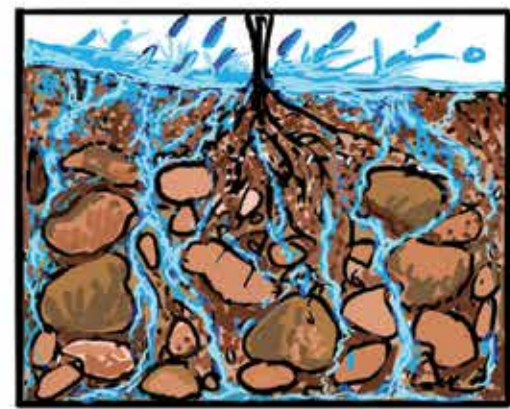
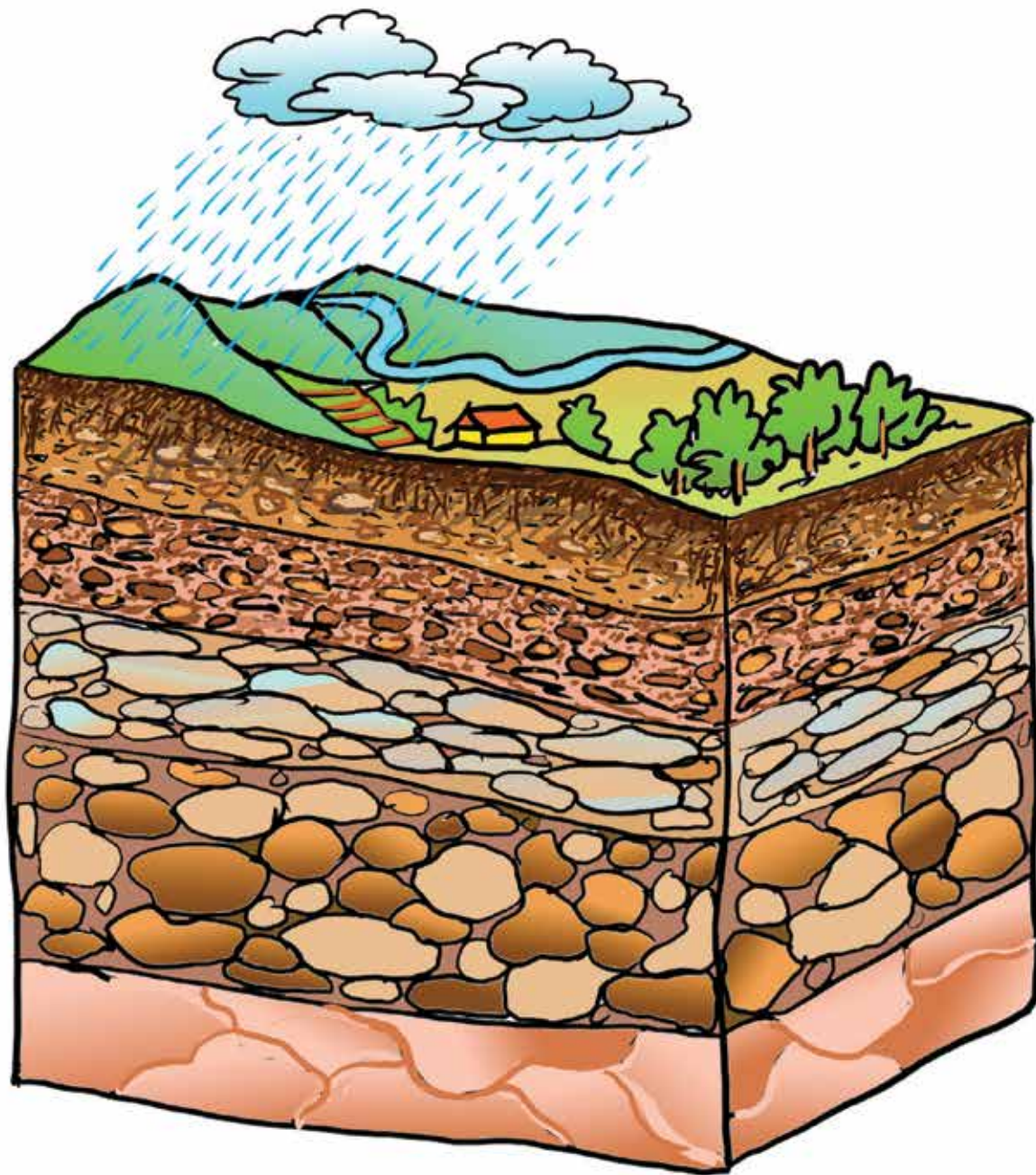




## 19 Water cycle



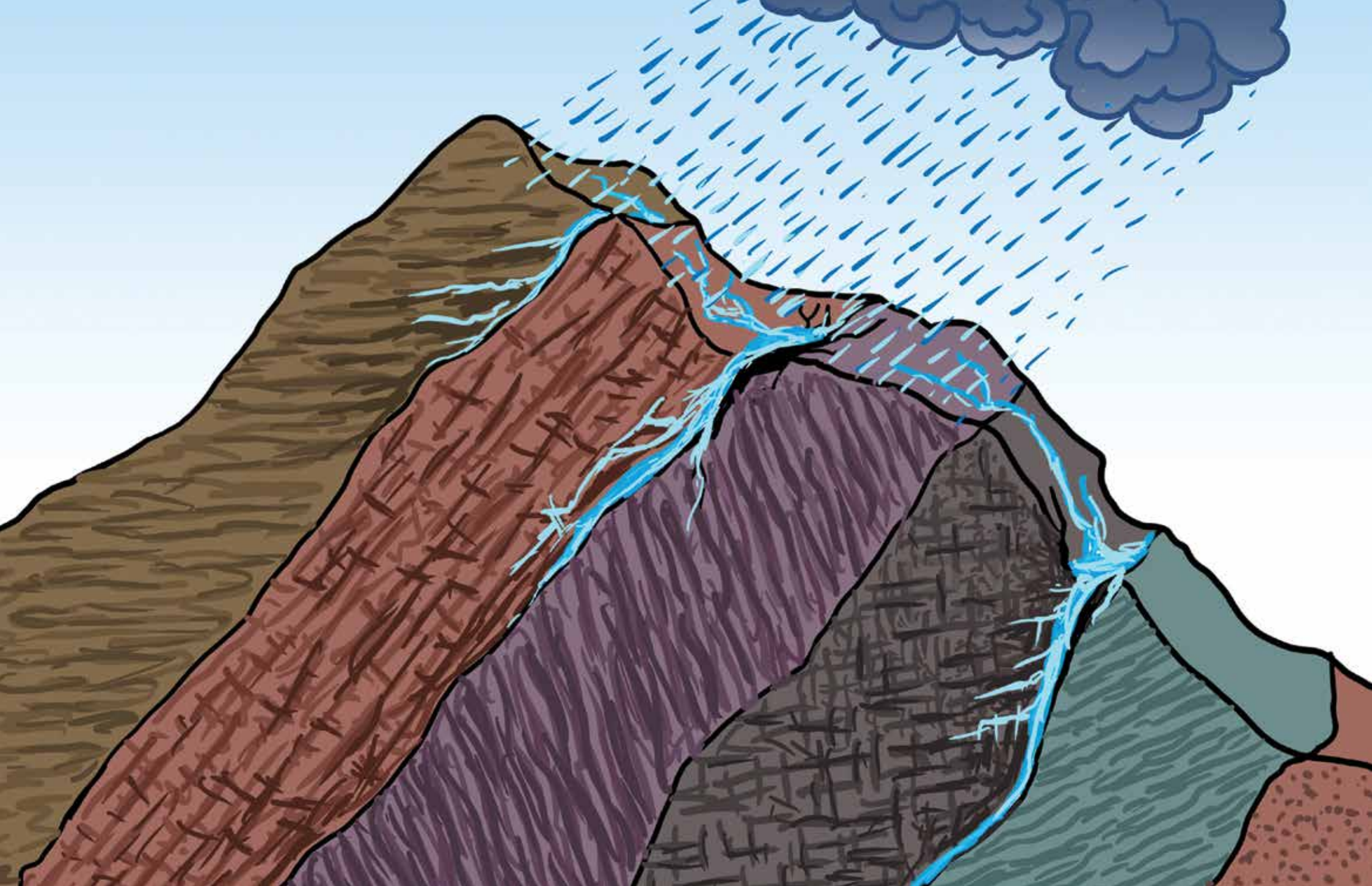




## 20 Water stored in the ground



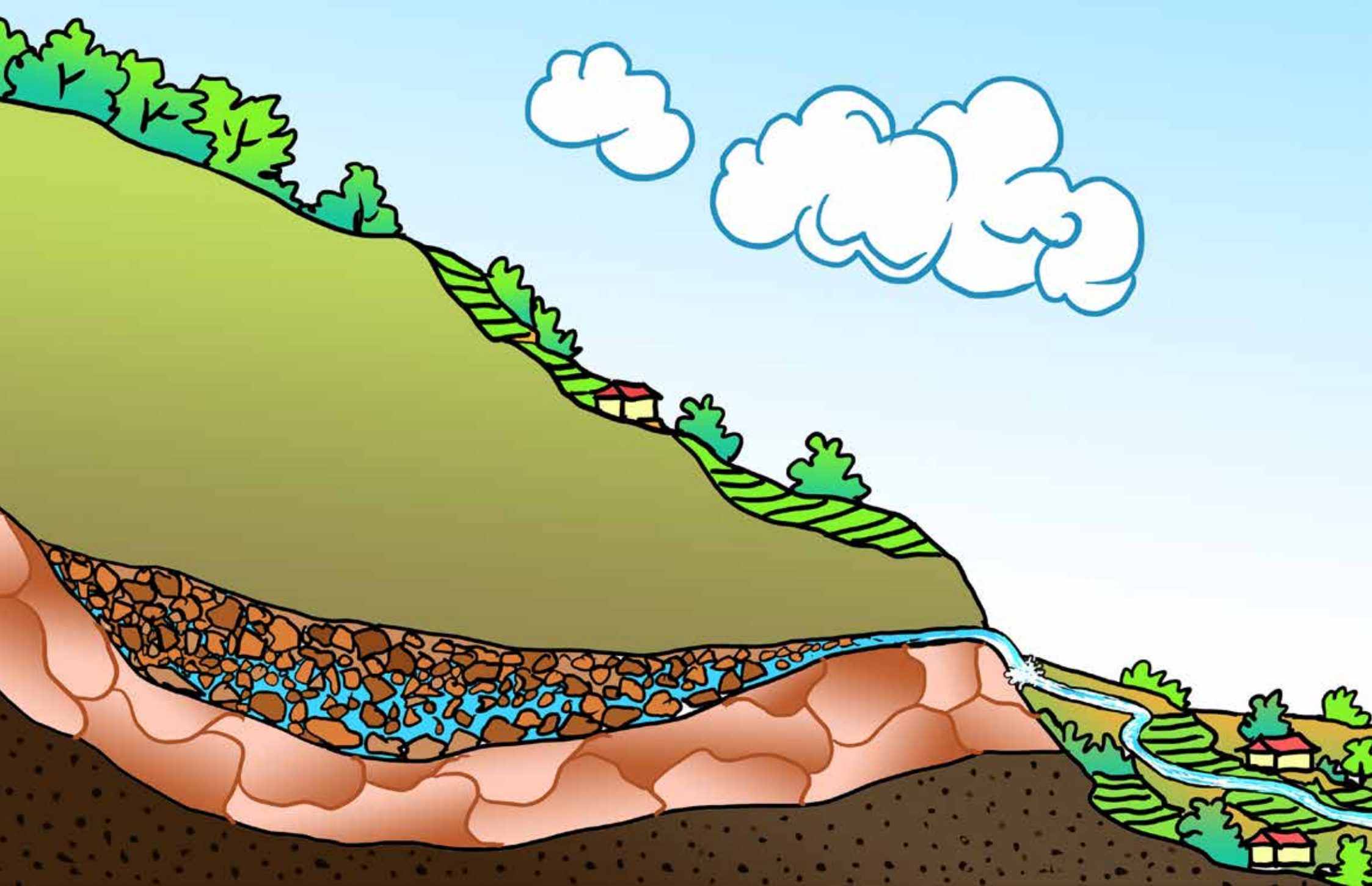






## 21 Groundwater movement inside rocks





## 22 Groundwater coming to the surface



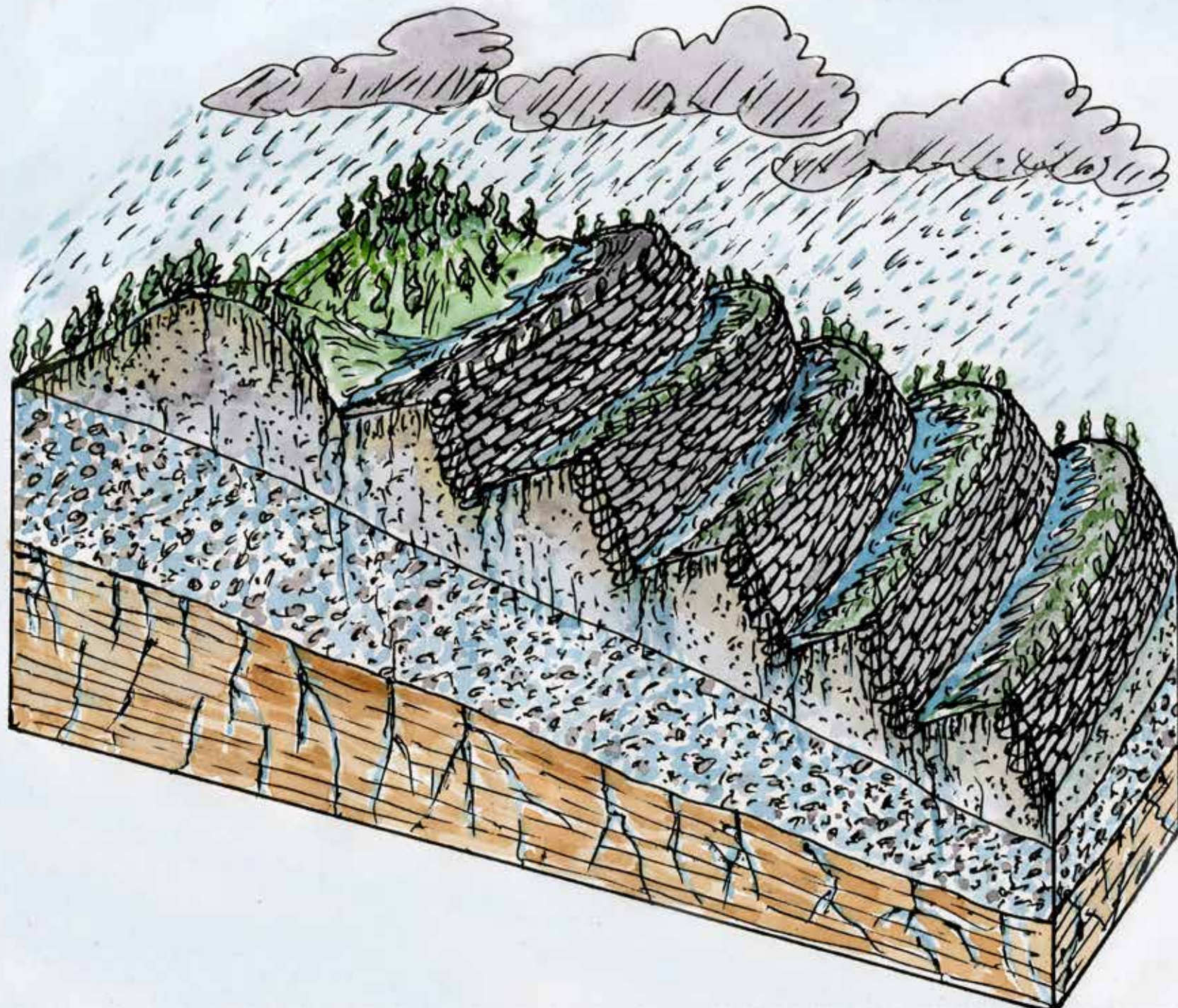






## 23 Good quality spring water as a result of good land management

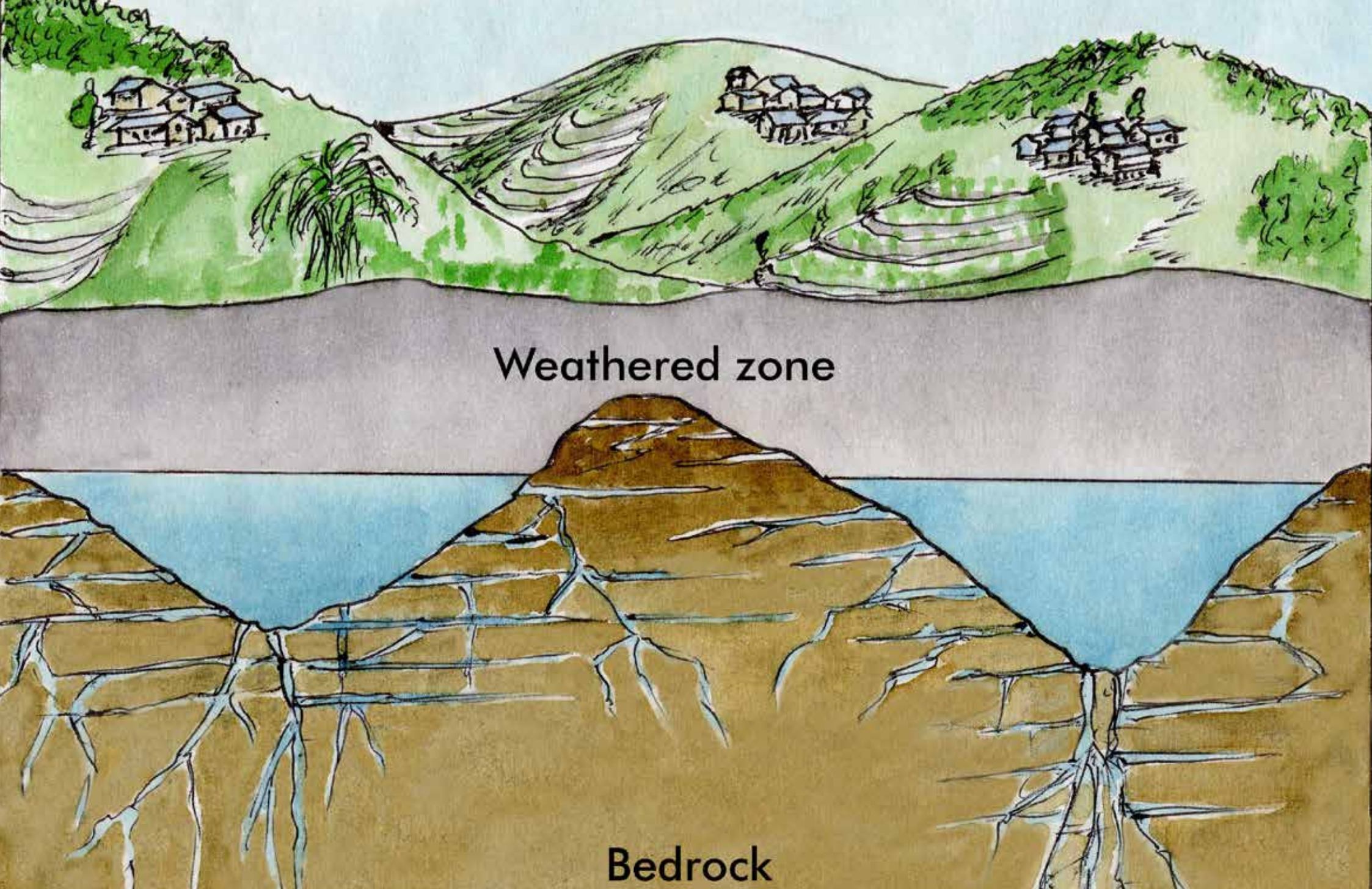






## 24 Soil ecosystem storing water





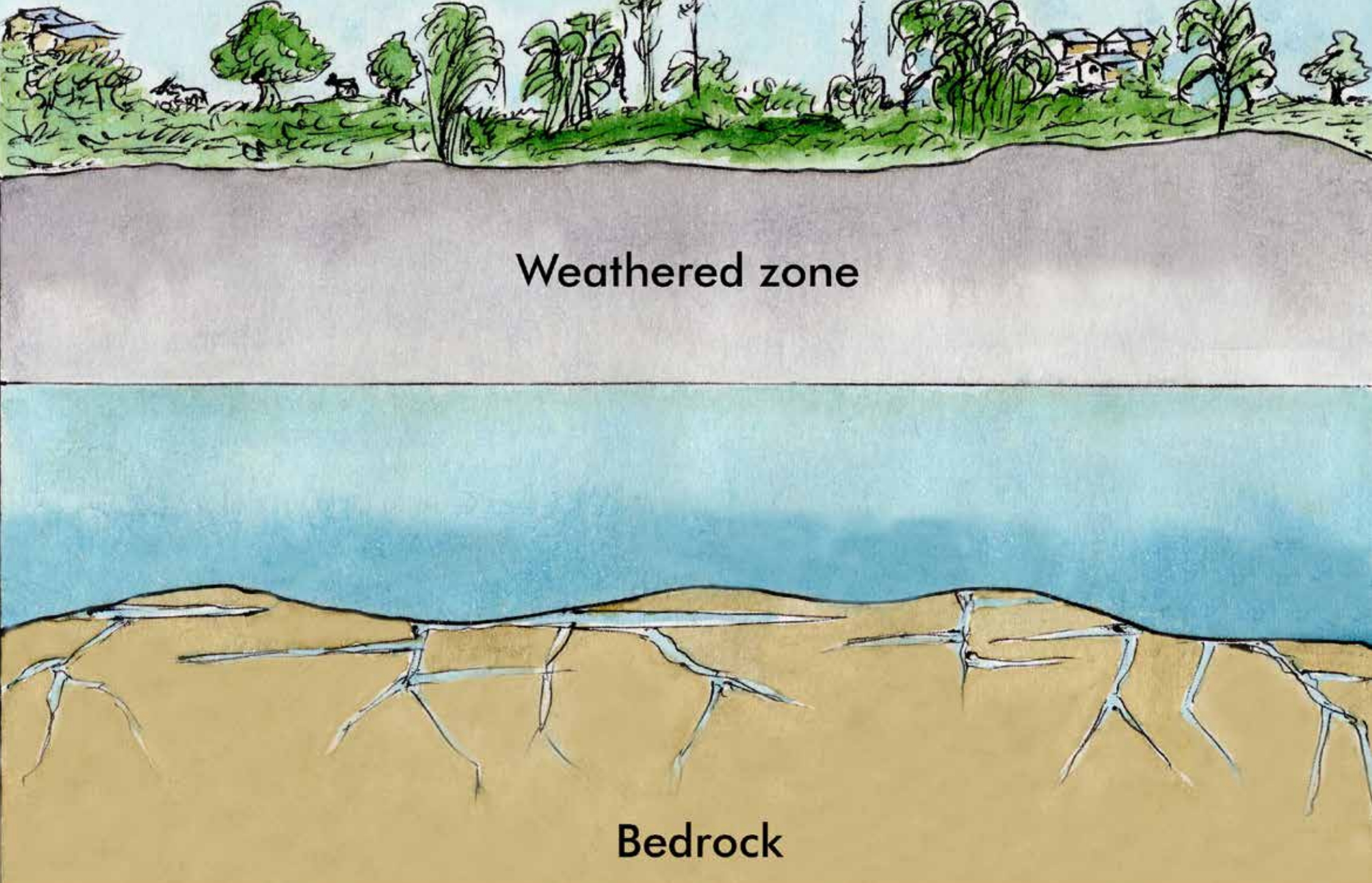
Weathered zone

Bedrock

## 25 Soft rocks storing and transmitting a large amount of water



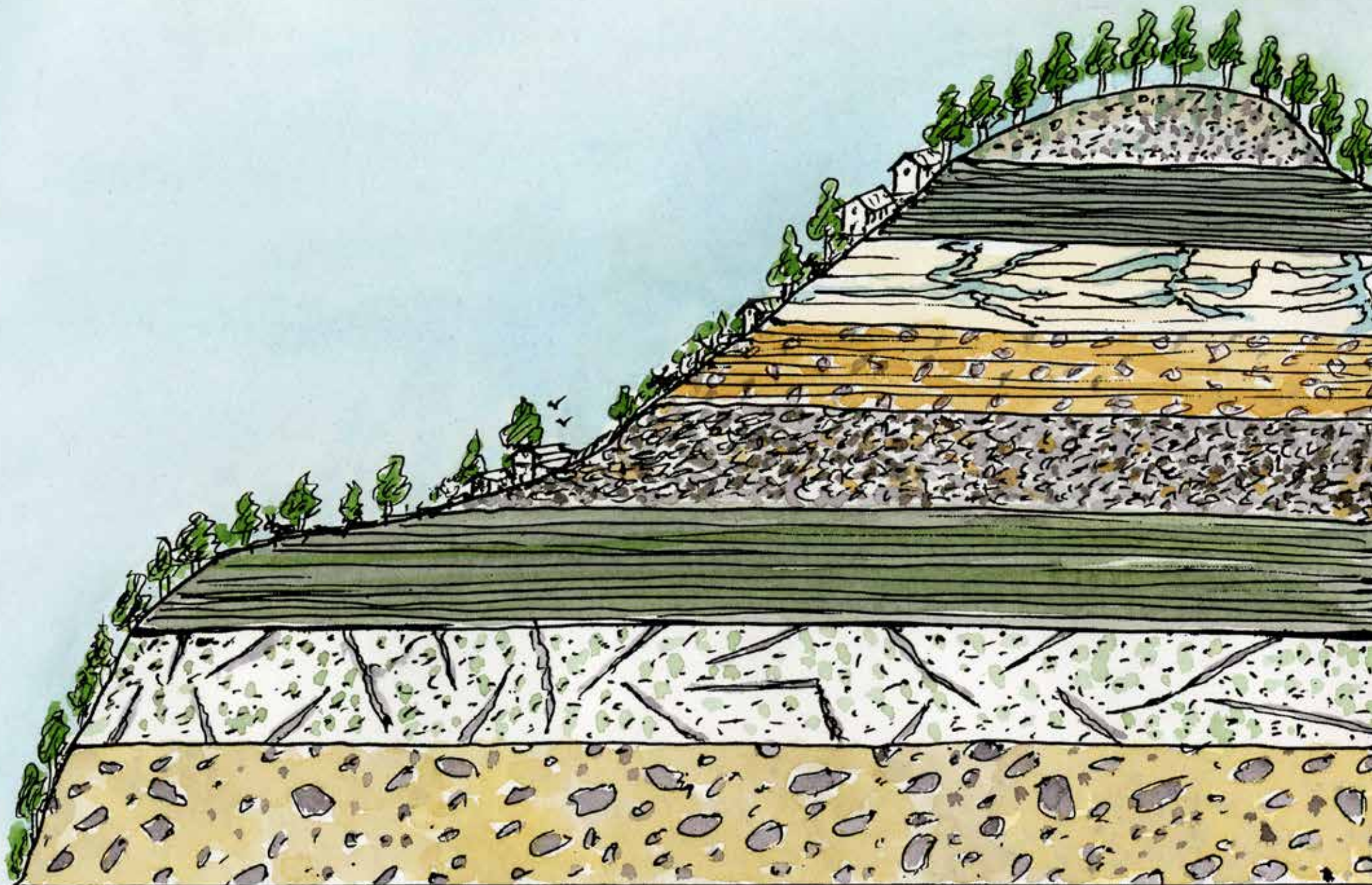




## 26 Hard rocks storing limited water, but not transmitting water



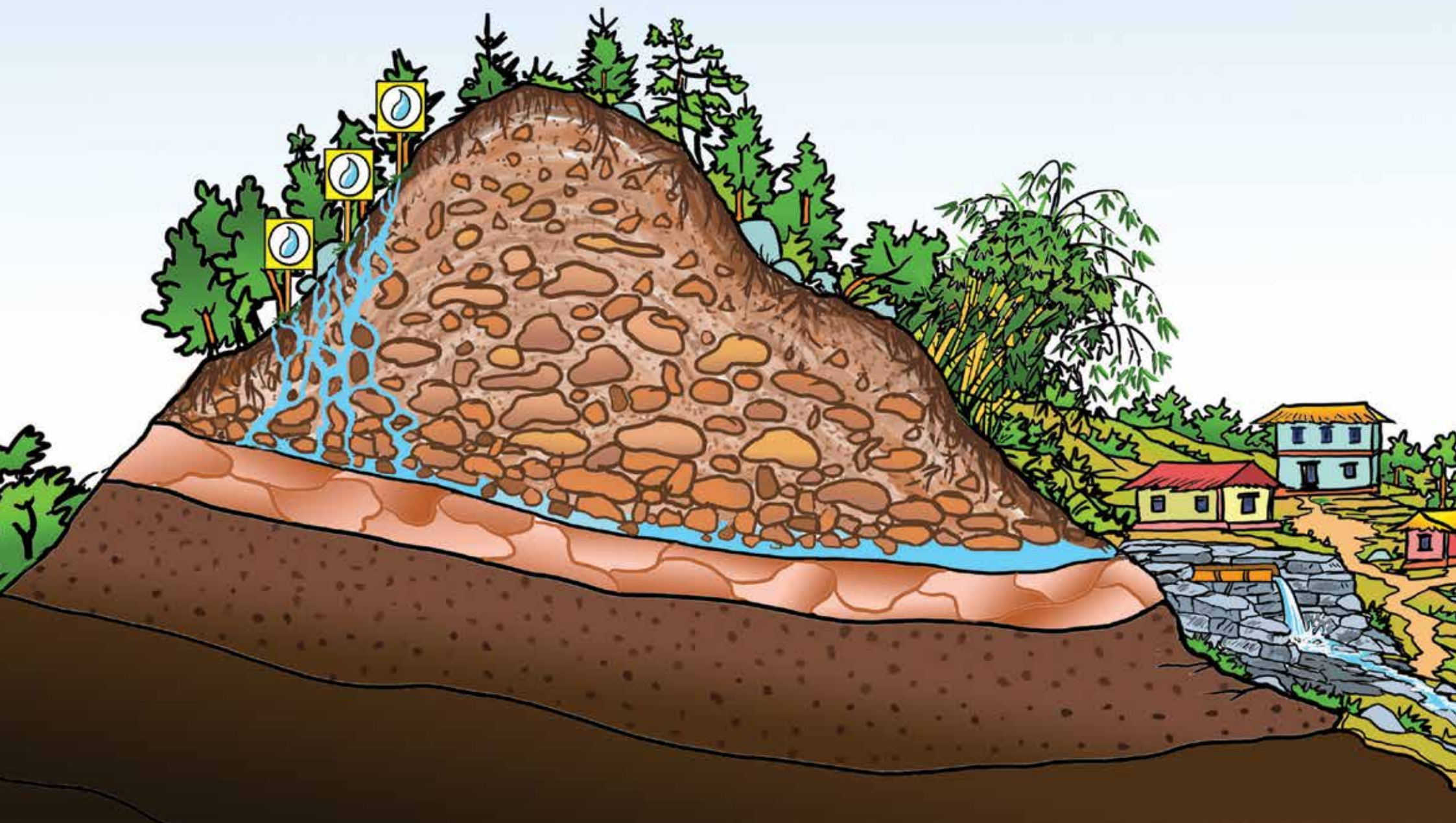






## 27 Soil layers

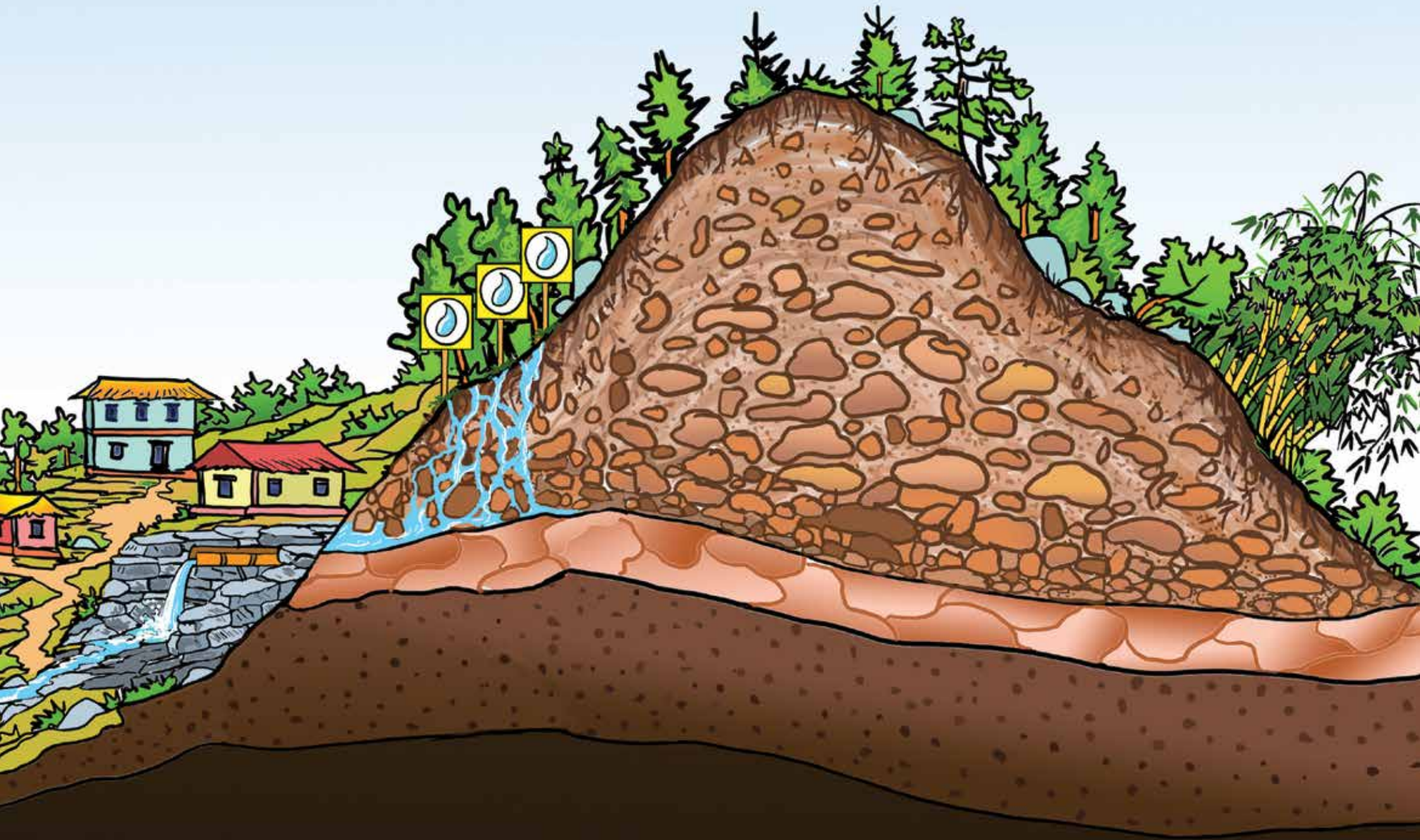




## 28 Recharge area far away from the spring



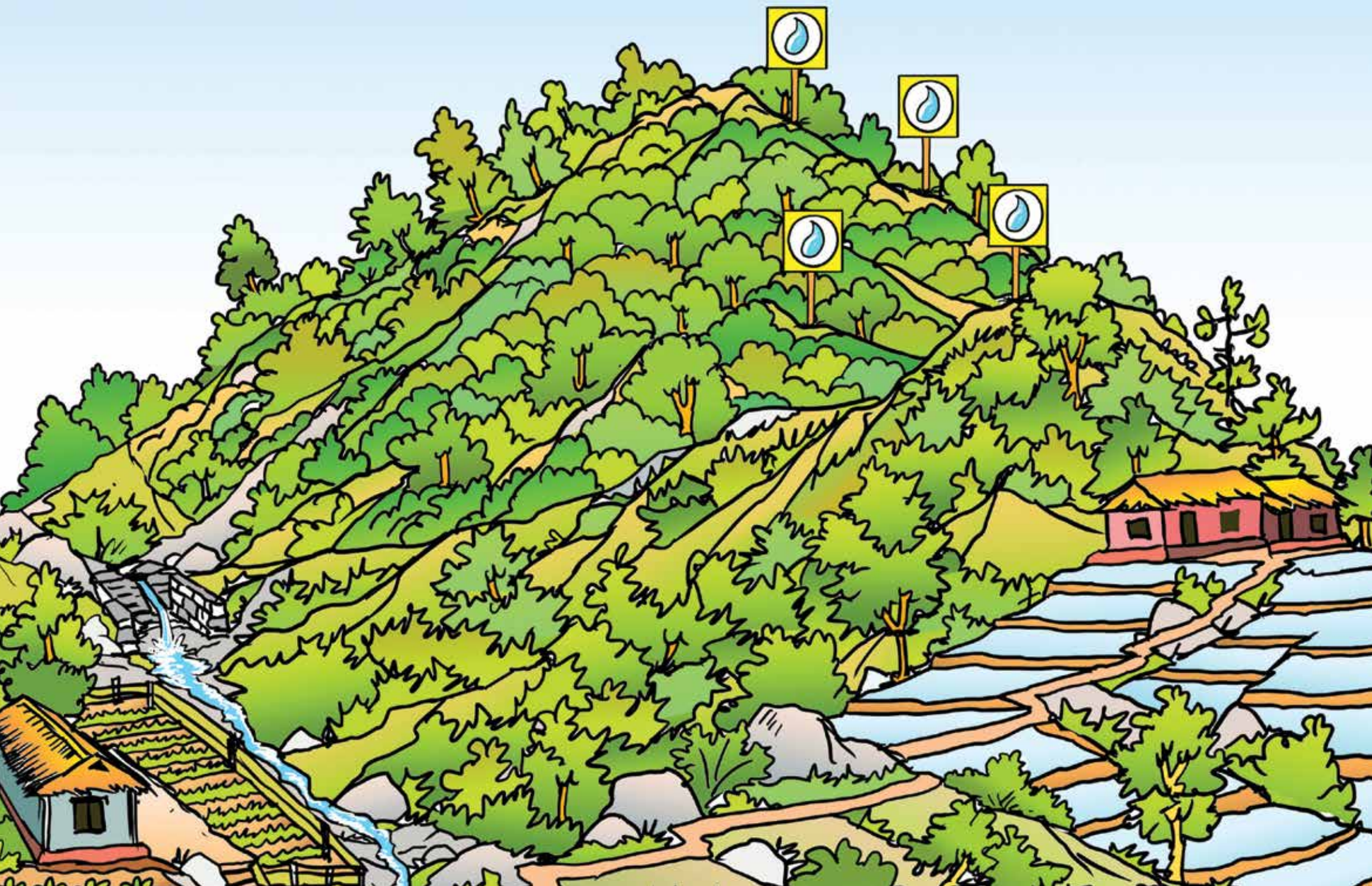




## 29 Recharge area close to the spring





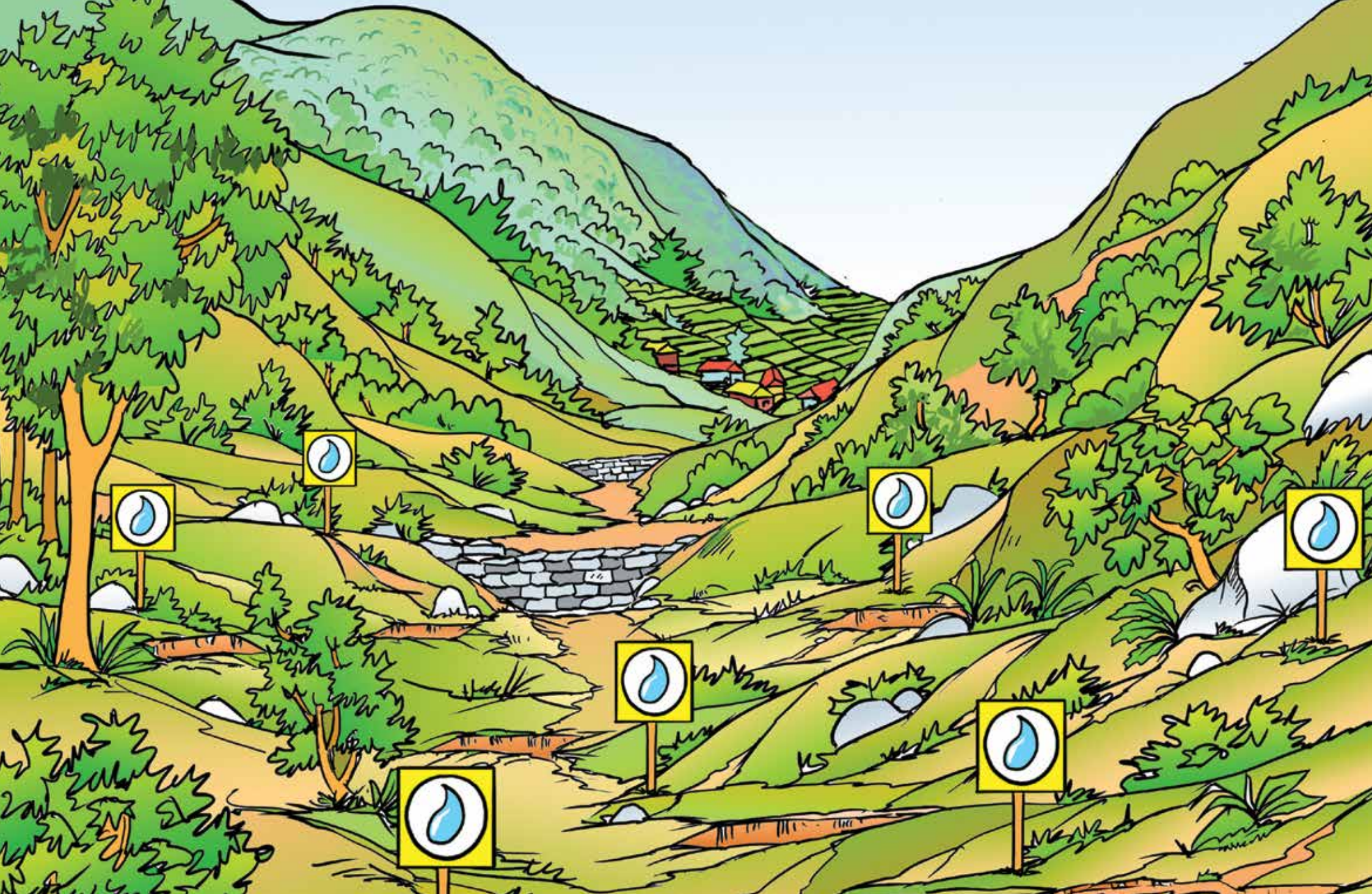




## 30 Marked recharge area close to the spring









## 31 Marked recharge area





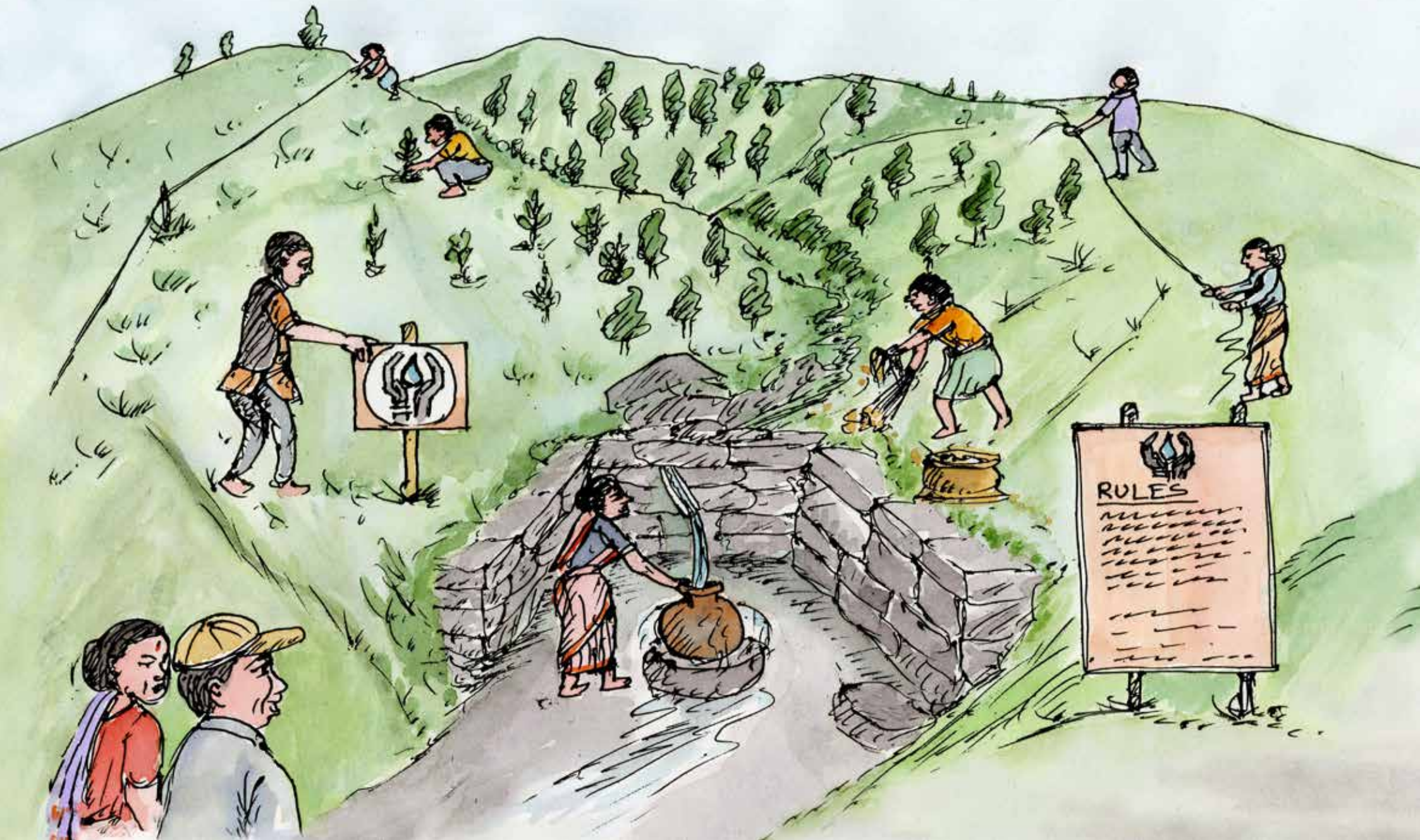




## 32 Local community and experts visiting the recharge area







## 33 Well-managed recharge area







## 34 Impacts of low spring discharge and water scarcity





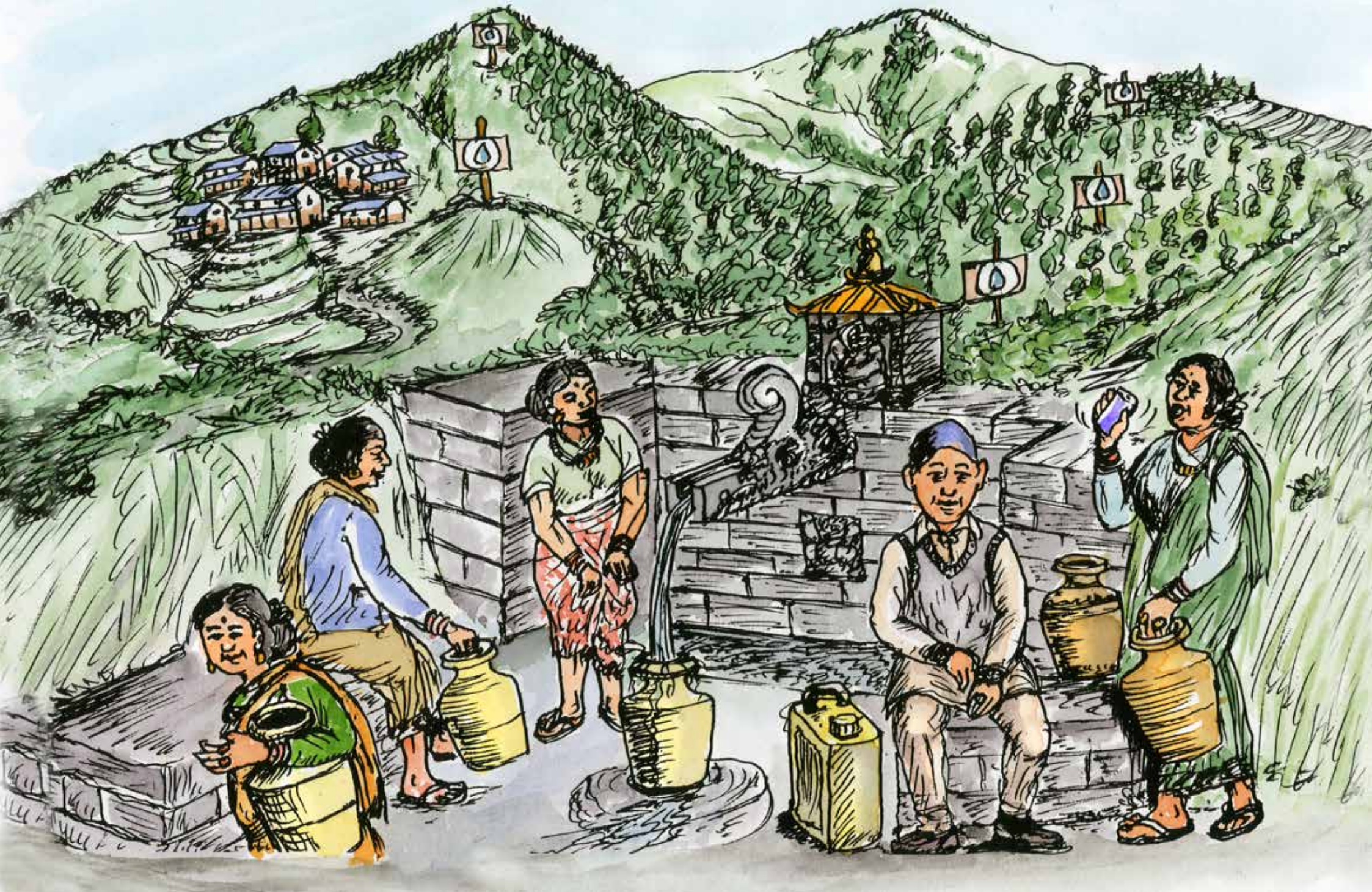




## 35 Lower caste people at a spring









## 36 Higher caste people at a spring





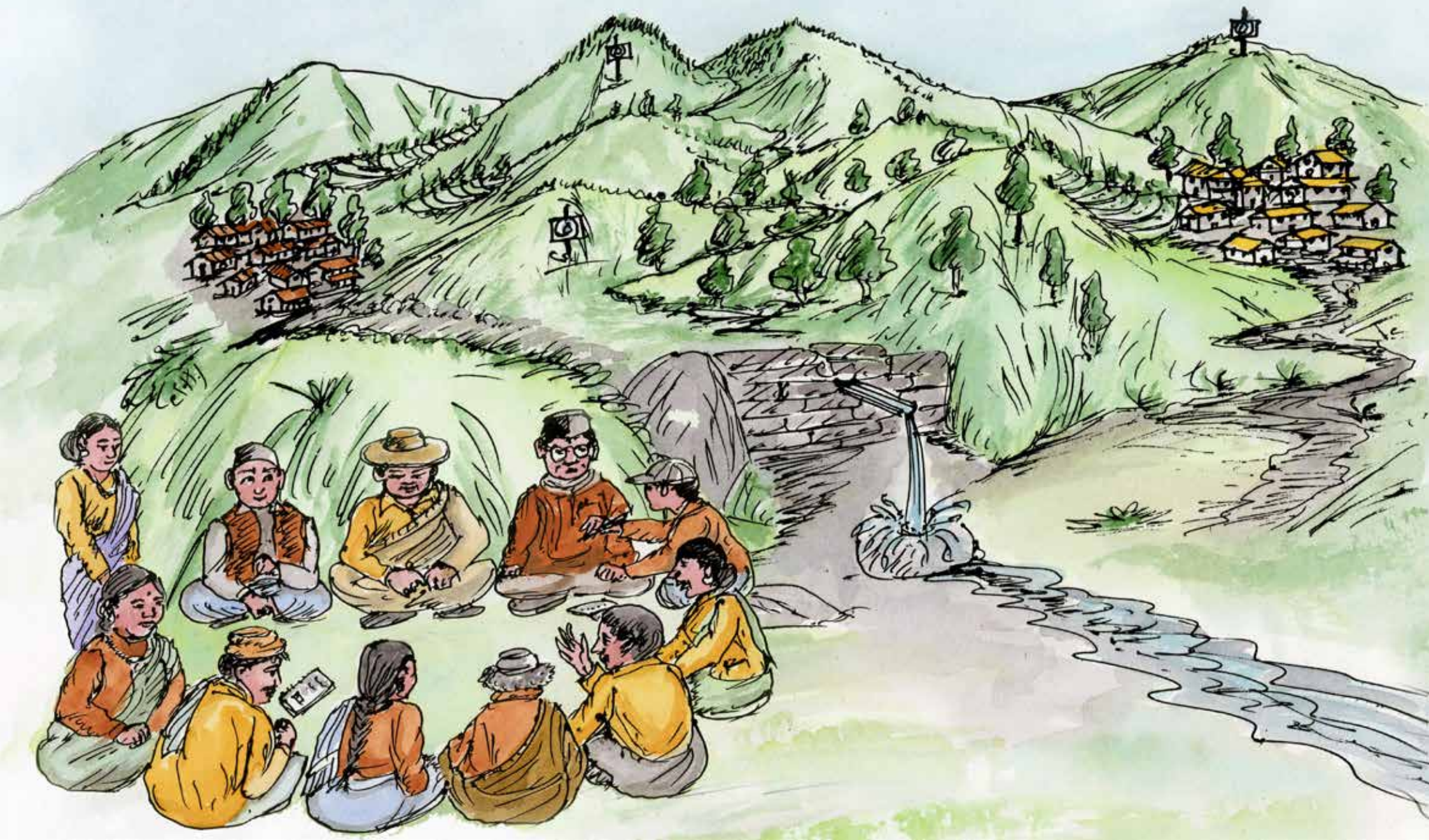




## 37 Distribution and ownership problems







## 38 Water user group for equal distribution







## 39 High spring discharge before an earthquake









## 40 No spring discharge after an earthquake

