

# Sanitary surveying

## Introduction

**On a visit to a water supply scheme, it is usually possible to spot any faults and deficiencies that could lead to the contamination of potable water if you know what you are looking for.**

Sanitary surveying is a formal inspection technique that records visible problems, enabling fieldworkers and community leaders to assess the likely quality of the water, relative to other sources, and to take remedial action.



# Contents

|  |    |
|--|----|
| Introduction .....                                   | 1  |
| Survey location points .....                         | 3  |
| What is the purpose of a<br>sanitary survey? .....   | 5  |
| What data are needed for a<br>sanitary survey? ..... | 6  |
| Sanitary-risk factors .....                          | 8  |
| Who should undertake<br>sanitary surveys? .....      | 11 |
| Illustrated sanitary report forms.....               | 12 |
| How are the sanitary-survey<br>results used? .....   | 14 |
| Further reading .....                                | 16 |
| About this note .....                                | 19 |

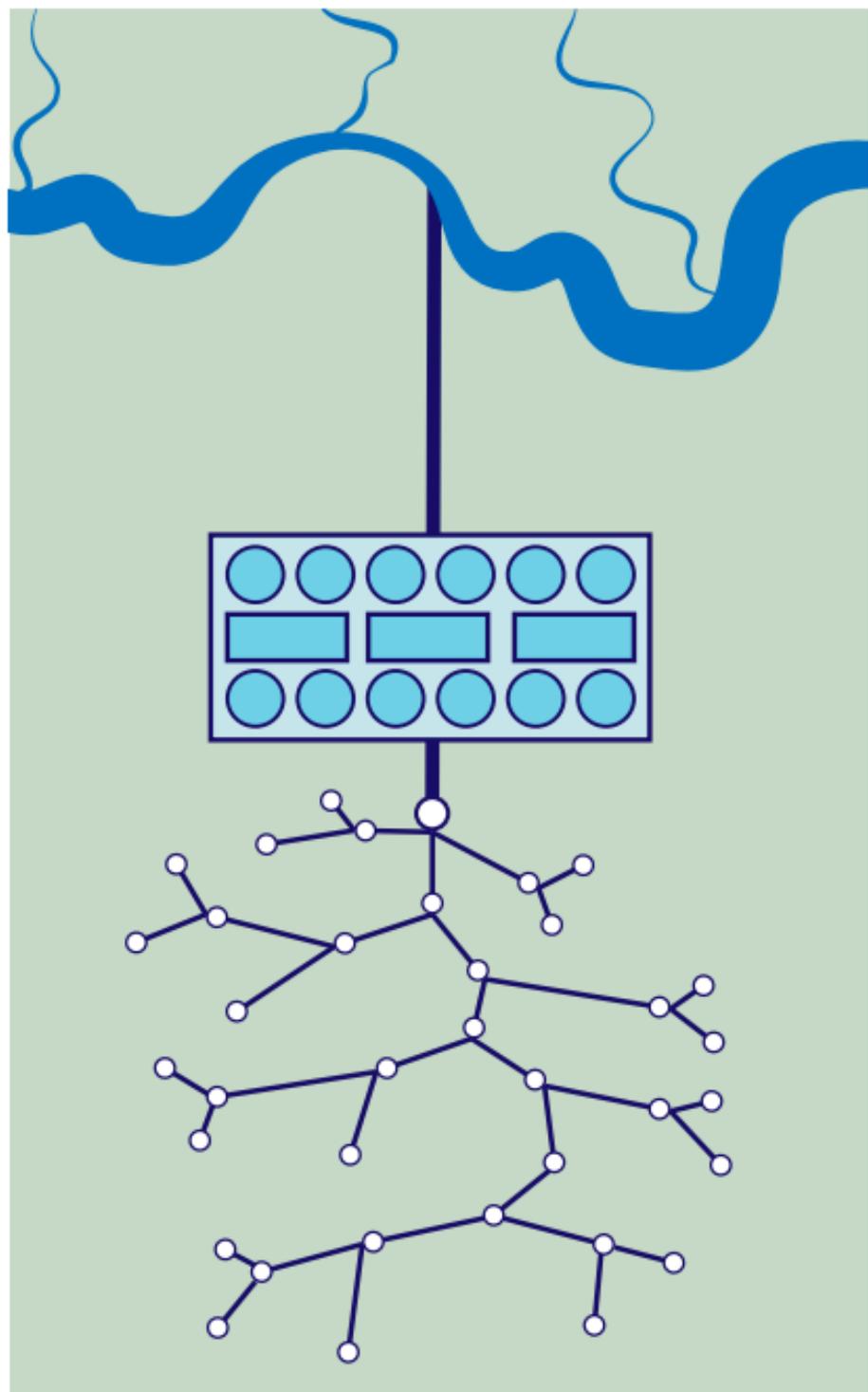


Sanitary surveying specifically identifies potential problems which may threaten drinking-water quality at the source, point of abstraction, treatment works, or distribution system. It relies on the inspection of physical installations by an inspector or a team of inspectors.

## Survey location points

Sanitary surveys can be carried out at any one of the three points of a water-supply scheme (Figure 1). These are:

- at the **source and intake** (to assess whether the quality of the raw water is at risk, and whether the abstraction method is satisfactory);
- at the **treatment works** (to assess whether suitable treatment processes are being used, and whether correct procedures are being followed); and/or
- at the **distribution system** (to assess whether the quality of the water is put at risk during distribution).



**Figure 1.** Survey inspection points

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## **What is the purpose of a sanitary survey?**

In carrying out a sanitary survey, an inspector is identifying potential risks to the quality of the water (see Figure 2) — but she or he should also take the opportunity to make constructive criticism, leading to positive improvements. It should not be an opportunity to indulge in destructive criticism.

Undertaking a sanitary survey should be considered:

- when new water sources are being developed, to assess the water quality and any treatment needs;
- when comparing water sources for potential development;
- when contamination is suspected, to identify the likely cause;
- when there is an epidemic of a water-borne illness, to identify the likely cause;

- to interpret results from water quality analysis, to establish how the water became contaminated;
- as a routine exercise, to monitor sanitary conditions; or
- when there are significant changes (such as heavy rain or construction activity) which could affect water sources.

## **What data are needed for a sanitary survey?**

Certain basic data are needed to identify where sanitary surveys are required:

- population data for each town, village, and community;
- information on water sources;
- summaries, from past studies, of data for water quality;
- identification of sources for which no water-quality data is available;



**Figure 2.** This picture shows a woman collecting water from a stream which could be polluted by human excreta and urine, animal and domestic wastes, soaps and detergents, pesticides and fertilisers

- summaries of health records on the incidence of illnesses associated with water quality and sanitary conditions;
- correlation between outbreaks of illnesses, and water source and quality; and

- any water-treatment methods being used.

Sanitary surveying and water-quality analysis (either in a laboratory or in the field) are complementary activities; they are both important, and both have limitations (see Table 1).

## **Sanitary-risk factors**

During a sanitary survey, every insanitary situation that could increase the risk of illness is termed a 'sanitary-risk factor'.

The importance of each risk cannot always be quantified – some risks may be more important than others; some may combine unfavourably – but each risk needs to be eliminated if at all possible.

- Identified sanitary-risk factors are not ranked in order of priority; each risk receives equal weighting.
- Important, potential sanitary-risk factors — there are usually about ten

— should be identified. Equal ranking enables a sanitary-risk score (from 0 (no risk), to 10 (very high risk)) to be established, based on a sanitary survey. The use of 10 sanitary-risk factors (a standard number) makes comparing different sources easy. By using 10 sanitary-risk factors for each source, some risks may be omitted from lists. Some risks may be on-site (local); others may be off-site (remote/distant).

The reasons for the presence of sanitary-risk factors at water supply schemes may be attributed to any of the following:

- poor site selection;
- poor protection of the water-supply scheme against pollution;
- inappropriate construction;
- structural deterioration or damage; and/or
- lack of hygiene knowledge/education of users or local inhabitants.

**Table 1.** Water quality analysis and sanitary surveying

| <b>Water quality analysis</b>  |
|--|
| Water quality analysis is expensive, requires equipment and competent staff and, therefore, is not always easy to perform regularly or routinely                                 |
| Water quality analysis provides only a snapshot — a record of the water quality at the time of sampling  |
| Water quality analysis will indicate whether a water supply is contaminated; but will not usually identify the source of contamination   |
| <b>Sanitary surveying</b>  |
| Sanitary surveying is cheap, requires neither equipment nor highly-skilled staff, and may easily be performed regularly or routinely   |
| Sanitary surveying can reveal conditions or practices that may cause isolated pollution incidents or longer-term pollution   |
| Sanitary surveying reveals the most obvious possible sources of contamination, but may not reveal all sources of contamination, for example, remote contamination of groundwater |

## **Who should undertake sanitary surveys?**

The training and experience that inspectors require to be able to undertake sanitary surveys depends on the size of the population, but all inspectors should have a basic knowledge and understanding of water supply technology, public health principles, water supply operations, and management. A shortage of experienced staff should not prevent sanitary surveys being undertaken, although simple training programmes may be needed.

Personal qualities are very important. Inspectors should be thorough, professional, conscientious, honest, and constructive; what is learned will depend on how thorough and perceptive the inspector is.

The elimination of certain sanitary-risk factors might be difficult. Major repairs or improvements or identifying suitable

water-treatment processes may require specialist assistance.

## **Illustrated sanitary report forms**

Sanitary-survey reports should be done quickly, and be simple and accurate. This is straightforward if illustrated report forms are used. Figures 3 and 4 show a report form for a protected well – and similar documents can be prepared or adapted for other water sources and situations.

On one side of the form there is a schematic illustration of the water source and abstraction point, the treatment process, or distribution system. Possible sanitary-risk factors are identified by numbers, which correspond to the questions opposite. Each question should be phrased in such a way that a 'Yes' answer indicates a sanitary-risk factor.

The number of 'Yes' answers (indicating sanitary risks) gives the sanitary risk

score, and an indication of the likely risk of a water source or supply scheme being contaminated. (See box below).

The following categories of sanitary-risk score are frequently used:

| <b>Sanitary risk score</b> | <b>Assessment of risk</b> |
|----------------------------|---------------------------|
| > 9                        | Very high                 |
| 6, 7, 8                    | High                      |
| 3, 4, 5                    | Moderate                  |
| 0, 1, 2                    | Low                       |

Analysis of water samples in the field or in a laboratory is necessary to confirm whether contamination has occurred.

By using illustrated report forms, inspection teams can:

- identify possible points of contamination for a water source or supply scheme;
- quantify the level of risk for each water source or supply scheme;

- provide a visual illustration of where there are risks, and why; and
- retain a clear record — providing guidance for the user of the remedial work needed.

Use of Yes/No questions indicates whether a risk is possible, but does not identify the relative importance of the risk.

Scoring systems that attempt to assess the severity of the risk are more difficult to use because different inspectors may assign different scores to the questions.

## **How are the sanitary-survey results used?**

One copy of the inspection form should be handed to the user, and a second copy filed/stored. Prior to a sanitary survey, the inspector should study the past inspection forms for each water source. A sanitary survey will only be fully effective if action is taken to eliminate

the sanitary-risk factors identified. All interested parties (water quality agencies, water supply agencies, etc.) should be informed of any necessary improvements.

Sanitary surveys of treatment plants should be conducted regularly (at least once a year) or when evidence (such as water quality analysis) suggests that they are necessary.

If water quality is found to be unsatisfactory, take the following action:

- Repeat the analysis of water samples from the affected area to check the reliability of the initial unsatisfactory findings.
- Carry out a sanitary survey.
- Carry out a more detailed investigation of the source, intake, treatment works and distribution system.

- Carry out remedial repairs, construction work or improvements to remove the sanitary-risk factors identified.
- Repeat the analysis of water samples from the affected area to check whether remedial work has been successful.

## Further reading

HOWARD, G., 2002. *Water Quality Surveillance: A practical guide*.

Loughborough, UK: WEDC, Loughborough University.

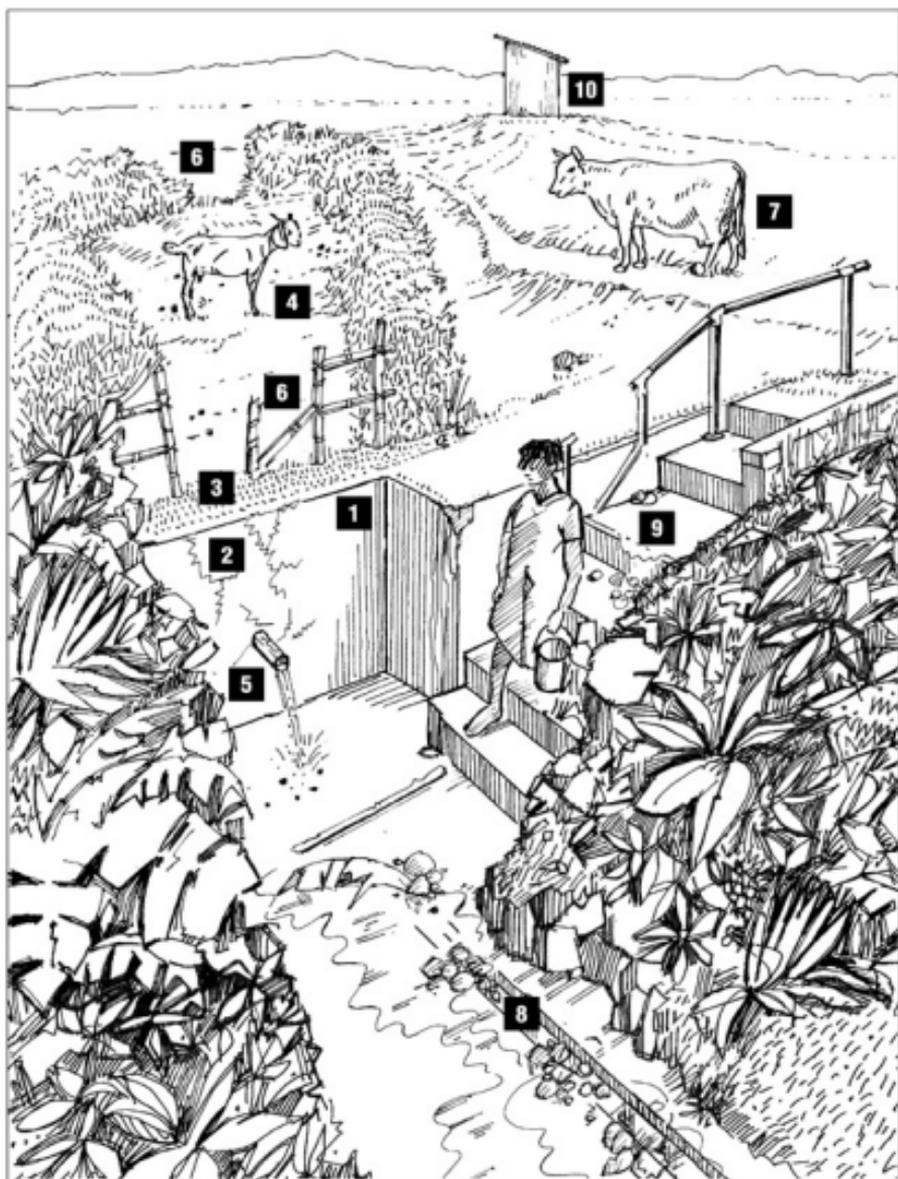
WORLD HEALTH ORGANIZATION (WHO), 2011. *Guidelines for drinking-water quality: Surveillance*. (4th edn.) Geneva: WHO.

This note is also available in print as WEDC Guide No. 14.

| <b>I Type of facility</b>  |   | <b>PROTECTED SPRING SOURCE</b> |                                     |
|--|---|--------------------------------|-------------------------------------|
| 1.   | General information   | Health centre .....            |                                     |
|  |   | Village .....                  |                                     |
| 2.   | Code no. ....   | Address .....                  |                                     |
| 3.   | Water authority/community representative signature.....   |                                |                                     |
| 4.   | Date of visit .....   |                                |                                     |
| 5.   | Water sample taken? .....   | Sample no. ....                | Thermotolerant coliform grade ..... |
| <b>II Specific diagnostic information for assessment</b>   |   |                                |                                     |
|  |   |                                | <b>Risk</b>                         |
| 1.   | Is the spring source unprotected by masonry or concrete wall or spring box and therefore open to surface contamination? |                                | Y/N                                 |
| 2.   | Is the masonry protecting the spring faulty?  |                                | Y/N                                 |
| 3.   | Is there an unsanitary inspection cover in the masonry?   |                                | Y/N                                 |
| 4.   | Does the area surrounding the spring contain contaminating silt or animals?   |                                | Y/N                                 |
| 5.   | If there is an overflow pipe, is it unsanitary?   |                                | Y/N                                 |
| 6.   | Is the area around the spring unfenced?   |                                | Y/N                                 |
| 7.   | Can animals have access to within 10m of the spring source?   |                                | Y/N                                 |
| 8.   | Does the spring lack a surface water drainage channel, or if present, is it nonfunctional?                              |                                | Y/N                                 |
| 9.   | Are there faults to the access to the spring which could be dangerous and/or lead to contamination?                     |                                | Y/N                                 |
| 10.  | Are there any latrines uphill of the spring?  |                                | Y/N                                 |
|  |   | Total score of risks .....     | /10                                 |
| Contamination risk score: 9–10 = Very high; 6–8 = high; 3–5 = intermediate; 0–2 = low                                  |   |                                |                                     |
| <b>III Results and recommendations</b>   |   |                                |                                     |
| The following important points of risk were noted: ..... (list nos 1–10) and the authority advised on remedial action. |   |                                |                                     |
| Signature of sanitarian .....  |   |                                |                                     |

**Figure 3.** An example of a sanitary report form courtesy of WHO

Note: Illustrations such as the one pictured below may not be comprehensive. They may need adaptation, and should not be a substitute for thinking!



**Figure 4.** Example of a sanitary report form illustration showing risk factors

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## About this note

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