



# LIME FOR WATER PURIFICATION

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# Water – Essential for life

**S**MA Mineral is one of the largest producers of lime products in the Nordic countries. We have extensive experience of lime and handling lime. Applying lime, a product of nature, is the most natural method of resetting the balance in nature.

And its areas of use are many: from gardens, forestry, agriculture, and lakes, to steel mills, power plants, flue gas cleaning, pulp industry, and for water purification.

The path lime travels to its different areas of use can be viewed as an eternal ecological process, where very little of the raw material is wasted.

Lime is found in all geological formations, all over the world. It plays a versatile and practical role. SMA Mineral masters the many possibilities for using lime, as well as the technology, processes, and areas of use in which it plays a crucial role.

We have extensive experience of the industry. Our headquarters is located in Persberg, Värmland's largest mining region with a tradition stretching hundreds of years back in time.

One application in which SMA Mineral has specialized is water purification, for both waste- and drinking water.

Drinking water is essential for life, and must be of the highest quality. Our versatile, high-purity products encompass most areas of use in this application. Scientists have carried out considerable research on water, minerals, and health. For example, the calcium in the lime is vital for bone formation. Together with magnesium, it also protects against cardiovascular disease.

No doubt about it: lime is a natural, essential element in nature.

Lime is used in water treatment for precipitation, to raise the pH, and to adjust the hardness of the water. Raw water taken from municipal surface water or groundwater sources is purified and treated at a water treatment plant before it reaches the consumer.

The water is treated differently depending on the quality of the raw water. Lime products are often used in these contexts to raise the pH value of the water. Adding slaked lime induces precipitation of non-desired substances, such as humus, particles, and metals.

Research shows that minerals have a good effect on our health, especially calcium and magnesium supplements.

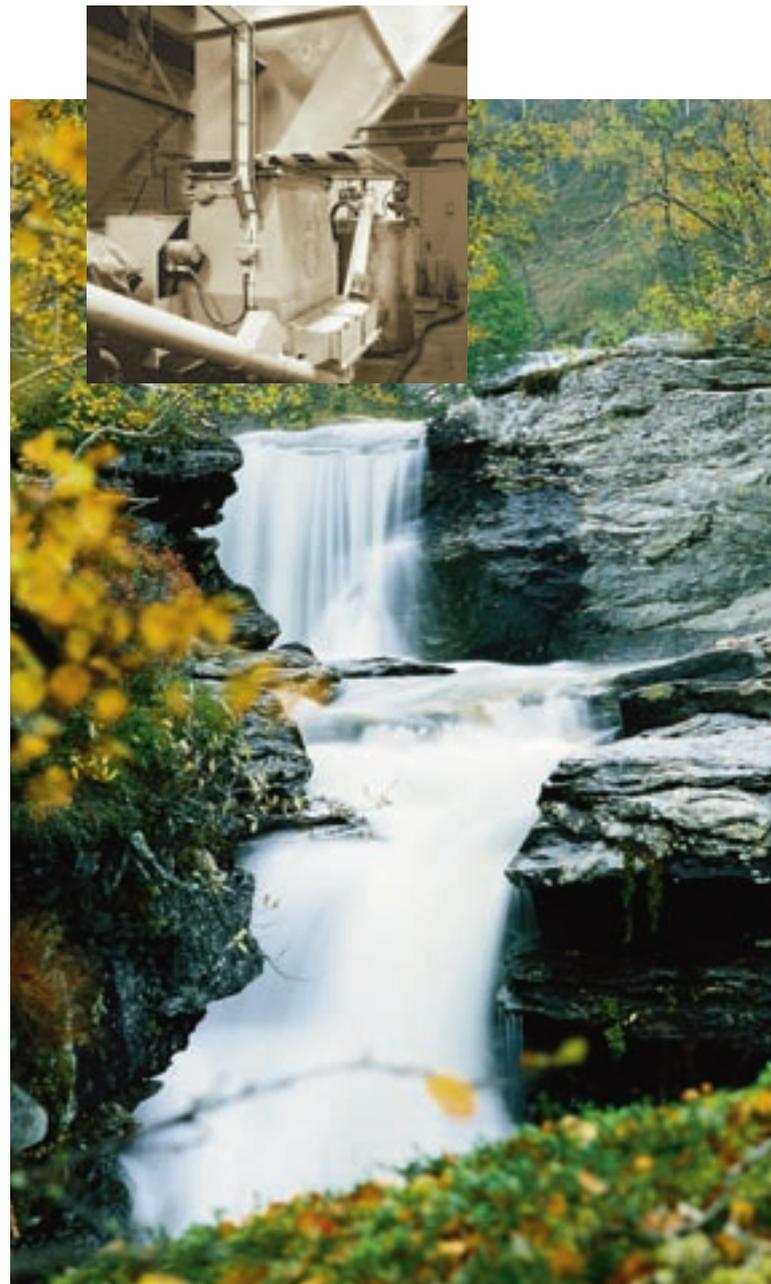
Slaked lime in combination with carbon dioxide is added to soft water from municipal sources to raise the alkalinity and the total hardness.

Another method is to let the water filter through a bed of limestone  $\text{CaCO}_3$  or dolomite  $\text{CaMg}(\text{CO}_3)_2$ . This protects water- and sewerage lines that require non-corrosive water.

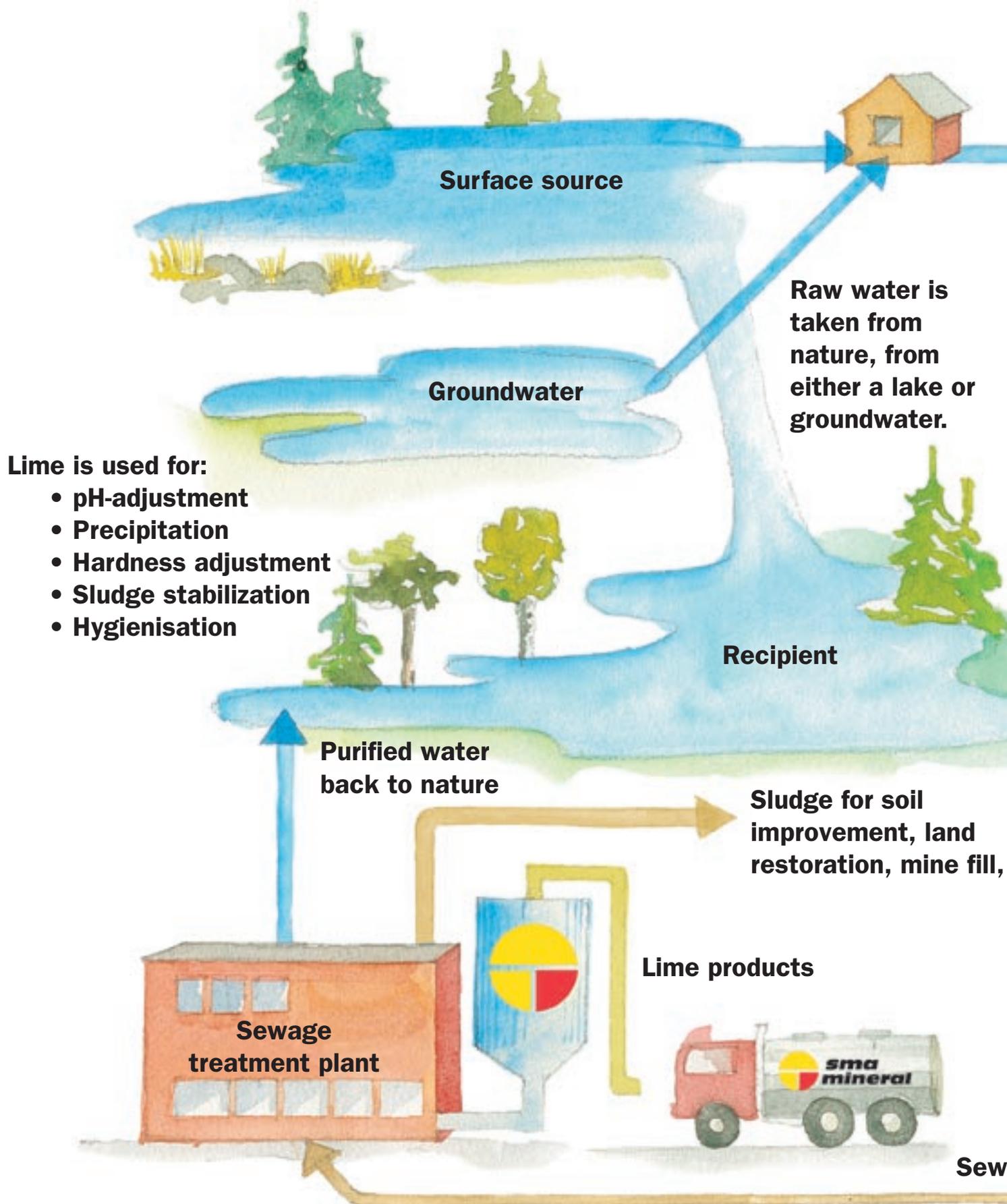
With the health aspect in the background, here is another argument for using a natural product for water treatment.

Slaked lime can also be used to soften water and reduce its carbonate hardness – a method that has long been known in areas with hard water.

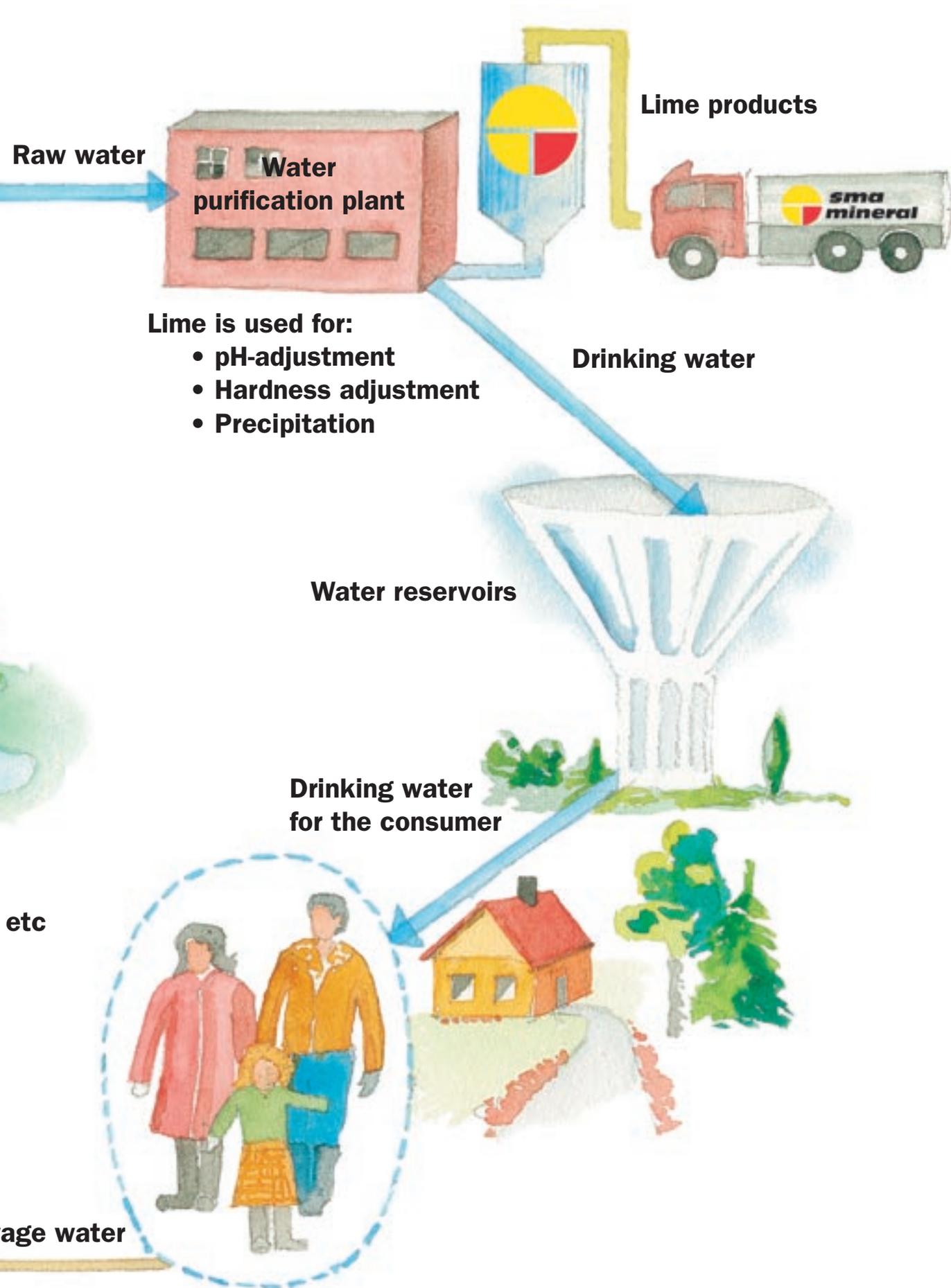
# Drinking Water Treatment



# Water Pur



# Purification





# Sewage Purification



**S**ewage treatment plants have the job of removing phosphorous and oxygen consuming substances from the water since these substances can destroy the water environment through “eutrophication”. Slaked lime is added in the chemical step to adjust the pH and to induce precipitation to change phosphorous into phosphate, among other things. A metal phosphate compound that is difficult to dissolve forms, which sediments to the bottom’s sludge phase, where other particles and nutrients are also deposited.

After the wastewater has undergone the purification process it is released to the recipient (the lake



system) again. Purifying wastewater results in sludge which contains substances that form mull, as well as elements such as nitrogen and phosphorous.

## Sludge Treatment

**L**ime is used for sludge treatment in the sewage treatment facility for three purposes: conditioning, stabilization, and hygienisation. Burnt and slaked lime are both suitable for these purposes. Sludge conditioning improves the dewatering properties of the sludge. In lime stabilization, the pH of the sludge is raised to an appropriate level and its consistency is changed. Adding burnt lime results in a “dry” end product, which is not the case for slaked lime. Both products raise the pH substantially, and are effective for hygienisation purposes. A high pH and/or a high temperature for a controlled period of time result in a hygienised end product.

Soil improvement, land restoration, fertilization, road fill and green areas are examples of areas where limetreated sludge can be used.

# On Loan from Nature

Nature lends us the water we drink and consume – it should be treated and purified with this in mind. Safe, healthy drinking water is one of our hottest environmental issues. Our products are like natural raw materials, and with their high purity, a natural choice for this application.

## The Entire Chain

The combination of large production and storage capacity and our own transport organization serve as the basis for reliable deliveries to our customers. But it takes more than just good products and efficient distribution. The way we handle lime and our methods for using lime products are also vital for meeting our customers' needs and demands.

## Water Purification Products

- Burnt lime,  $\text{CaO}$  – *Boda, Oxelösund, Røyttä, Mo i Rana*
- Slaked lime,  $\text{Ca(OH)}_2$  – *Rättvik, Røyttä*
- Limestone,  $\text{CaCO}_3$  – *Gåsgruvan, Oxelösund, Kullsberg, Kalkkimaa*
- Dolomite,  $\text{CaMg(CO}_3)_2$  – *Kullsberg, Kalkkimaa, Loukolampi*
- Magnesium oxide,  $\text{MgO}$  – *Porsgrunn*
- Magnesium hydroxide,  $\text{Mg(OH)}_2$  – *Porsgrunn*

SMA Mineral has its own process and technology department that tailors technical solutions for each company. This means that we can design material handling systems including silo construction projects.





**SMA Mineral AB**

Box 329, SE-682 27 FILIPSTAD, Sweden, Phone +46 (0)590-164 00, Fax +46 (0)590-164 28

[www.smamineral.com](http://www.smamineral.com) [sma@smamineral.com](mailto:sma@smamineral.com)

