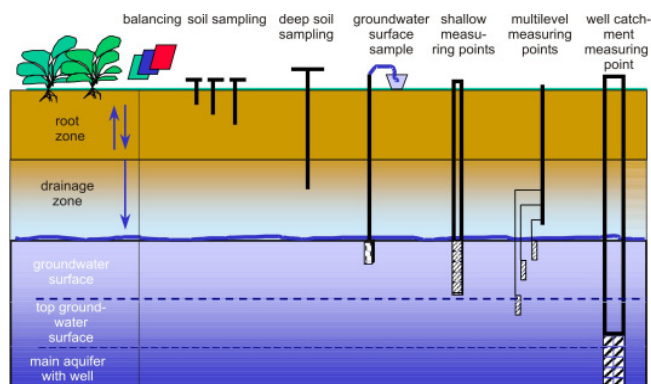


medium (soil or water) and the spatial and temporal references.

The analytical methods differ on two depth zones of application:

- Unsaturated zone (root and drainage zone)
- Saturated zone (shallow and deep groundwater)

The picture below reflects the variety of methods related to the different zones.



Instruments for efficiency control in soil and groundwater

Analytical methods: soil and water sampling

In the unsaturated zone, soil mineral nitrogen sampling in autumn (to measure late fall mineral-nitrogen in the root zone) is very common and widespread. This method, originally developed for the loess soils, is now established state wide. Common standards are important, e.g. setting the appropriate date of sampling to avoid nitrate leaching and to ensure a comparable database on the state level.

In the saturated zone shallow or multilevel measuring points may be appropriate, depending on the specific question.

Besides the consideration of the saturated and unsaturated zone an integrated monitoring system

also includes taking samples from drainage systems and surface watercourses.

If there are ditches with drainage systems, it is possible to control parcel-specific emissions. Because of very different site conditions, feasible efficiency control should not only rely on a single instrument.

Calculatory methods: nitrogen balances

Nitrogen balances are the appropriate tool to determine nutrient surpluses, e. g. at farm level. Within the project WAgriCo improved methods for the identification of an optimised nutrient management system on farm level, based on resilient nitrogen balances, was compiled. It is aimed to reward an optimised management of nutrient inputs (especially nitrogen). This valuable approach will be continued after the project end.

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WAgriCo

Water Resources
Management in **Cooperation**
with **Agriculture**

A Water Framework Directive
Project



Groundwater Monitoring and
Methods of Efficiency Control



Niedersachsen

The selection of the appropriate methods depends on the site conditions and the specific question. In general every method is related to the examined