
Some administrative, policy and juridical aspects in relation to groundwater protection (groundwater used as a drinking-water source) in the Netherlands

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1. Introduction

Historically in the Netherlands mainly surface water was the most important source for drinking water in the transition period from the 19th to the 20th century. Before and after that period the most important source for drinking water is fresh groundwater. Almost two third of the total amount of Dutch drinking comes from that source.

Only in the western part of the country groundwater is not very suitable to be used as drinking water because of the contact of groundwater with the salty water of the North Sea.

In the Netherlands drinking water is supplied by around 20 water supply companies. Nearly all of these companies with limited liability are government owned. Provinces and municipalities are exclusive shareholders.

The responsibilities, which these drinking water supply companies have in respect to drinking water: certainty of delivery, giving information to clients, cost-effective management and socially acceptable pricing. Furthermore water supply companies in the Netherlands are constantly working on the development and application of new technologies. A key objective for them is a reliable production process (quantity and quality).

2. Threats to fresh groundwater quality

In the Netherlands since the beginning of the industrial and agricultural evolution and also today particularly groundwater quality (in some cases also groundwater quantity) is threatened. At first it the threat seemed to be local, caused by point sources from for example waste disposal and accidental spills of hazardous chemicals on a minor scale. But in the 70's of the last century it became clear that the threat was not only of a much larger scale, but also longer lasting than was expected before. The greatest threats were caused by numerous human activities.

As yet stated a second serious impact on groundwater quality is caused by the intensified agriculture. Deterioration of groundwater quality in this respect is caused by the excessive use of fertilisers, pesticides, sewage sludge and animal waste.

Several groundwater pumping stations in agriculturally used areas were threatened by to high levels of nitrate, heavy metals and organic micro-pollutants originating from industry, traffic and agricultural originated diffuse pollution.

The yet mentioned other (quantity) problem for groundwater in the Netherlands emerged more recently: desiccation. More than 4.000 km² from natural groundwater depending ecosystems are apparently in an adverse manner affected in some way in relation to their specific local and regional characteristics.

3. Groundwater protection policy

Because of the threats already mentioned the Dutch government started in the 1980's to develop a national groundwater protection policy. This policy is part of the Dutch environmental protection policy. This policy is based on the 'guest in one's own house' philosophy (derived from mr. Pieter Winsemius, former Minister of Housing, Spatial Planning and Environmental Protection): 'Man has the right to organise his environment according to his views and to enjoy it, but he has also the duty to carry it over in a good condition for future generations.' Executing this environmental policy will hopefully lead to sustainability of the environment. The National Environmental Policy Plans (1991, 1994, 1995, 2000) of the Dutch government are based on the concept of sustainable development. Reaching a sustainable environment depends on applying basic principles like: the stand still principle, abatement at the source, polluter pays principle, precautionary principle, using best available technologies and application of best environmental practice.

To reach the goal of sustainability of the environment, the Dutch government elaborated a so-called two-track approach: a source oriented and an effect oriented track.

The **source-oriented** track is divided into attacking local of point sources and tackling diffuse non-point sources. The approach for local sources holds applying three (ICM) criteria: isolation, control and monitoring, which all together imply:

- carrying out isolation measures, such as impermeable layers and floors, to prevent the spreading of contaminating substances into the soil (including groundwater);
- taking control measures, today and in the future, to ensure that contaminating substances are handled responsibly, so that isolating measures are maintained and that the situation can be controlled even if isolating measures (should) fail;
- monitoring of isolating measures and of soil (including groundwater) quality.

Diffuse sources are struck in a different way. One of the methods is to define a link, mathematical or otherwise, between the application of substances and the preservation of a good soil and groundwater quality. On the long term an acceptable equilibrium between input and output of substances has to be reached. That will only be possible when 1) substances do not accumulate, 2) substances are not persistent, 3) substances are degraded in a natural way or 4) substances are removed by crops.

The overall objective of the **effect-oriented** track is to maintain such an environmental quality that the health and well being of people and the preservation of nature, materials and forms are ensured. Within the Dutch soil and groundwater protection policy this goal has been translated into the task of preserving the properties of soil and groundwater which are of importance for its ecological function as well as for its various possible economic functions, which exist close to each other or even above each other. Land use is frequently changing and human activities may often lead to irreversible changes in soil structure, chemical composition and biological conditions. This strategy of multi functionality is aiming at 'keeping all options open' for future generations.

In the sixties of the last century, the Dutch government entered the era of 'planning for the future'. Between 1960 and 1970 the production of drinking water nearly doubled and a further strong increase was expected. The national government found that this problem should be coped with via central planning. A system of central planning was therefore developed during the early seventies of the last century. In 1975 the Water Supply Act came into force.

The central planning consists of two planning figures: a plan (to be set up every 5 years), which sets out the government's policy on drinking water supply. This plan gives a framework for developing infrastructure by the water industry to meet water demands looking 30 years ahead. The second planning figure is a more detailed 10-year water supply plan from the water supply industry (through

the Netherlands Waterworks Association: VEWIN). This plan has to be approved by the Minister for Environmental Protection after having consulted the provincial administrations.

In 1975 a supplement of the Water Supply Act obligated the provinces to draw up reorganisation plans and to submit these plans for ministerial approval and to appoint the leading water supply companies to implement take-overs. As a result of this governmental action the number of water supply companies decreased from 111 in 1975 to 22 today. It is expected that this number will further decrease to 17.

Water supply companies in the Netherlands work in principle on a non-profit basis.

The institutional framework of the public water supply is complemented by three important institutions:

0 VEWIN (Netherlands Waterworks Association);

0 KIWA (research, consultancy, testing and certification; owned by VEWIN and the water supply companies) and

0 VWN (Royal Association for Water Supply in the Netherlands).

4. Legislation relevant to groundwater quality protection

Dutch groundwater quality protection policy is among other things implemented by laws and rules. The most relevant Dutch acts¹ are: the Soil Protection Act, the Environmental Management Act, the Water Management Act, and the Groundwater Act. There is also relevant Community legislation².

Soil Protection Act (1987; fully revised in 1999)

Originally groundwater was protected through many different laws on a national, provincial and municipal level. At the end of the last century the Dutch government decided to develop an integral law. This Act came into force in 1987.

The Soil Protection Act obliges to prevent, and if necessary, to clean up soil and groundwater pollution.

This Act does not define groundwater, but groundwater is included in the definition of soil: 'the firm part of the earth with the **liquid** and gaseous components and organisms contained therein'.

The 1987 version of the Soil Protection Act contained two protection levels: a general protection level and a specific (area approach for groundwater: groundwater protection areas for water supply) protection level. The difference between these two levels is formed by the height of the acceptable risk level for soil pollution caused by certain human activities.

In groundwater protection areas for water supply potential harmful human activities are not tolerable or additional preventive measures (also provincial regulatory rules) are necessary on top of the measures on a national scale (general protection level).

The general protection level is/will be filled in via General Administrative Orders (GAO's), which are set on a national level.

At this moment the following GAO's are in force:

- on the application and spreading of manure on soil (1987);
- on the discharge of liquids into soil and groundwater (1990);
- on the application and spreading of sewerage sludge and organic household waste and compost on soil (1991);
- on dumping of solid waste materials (1993);

¹ Dutch Acts and General Administrative Orders are published (obligatory) in the Bulletin of Acts and Decrees).

² The scope of this presentation paper will not allow to work this out.

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- on storage of petrochemical products in underground tanks (1998);
 - on artificial recharge of aquifers (1993);
 - on composition and leaching standards for building materials (1999).

The section on the specific protection level of the Soil Protection Act has been transferred in 1999 to the Environmental Management Act (see further). Today groundwater protection areas are covering approximately 1400 km², i.e. almost 4% of the Dutch (land) territory.

Environmental Management Act (1993)

This Act has to be considered as a frame work act with a modular structure, which means that new chapters of environmental legislation can of will be added, partly already existing environmental acts on different environmental subjects.

The act holds f.i. a planning system on a national (obligatory), provincial (obligatory) and municipal (facultative/voluntary) level.

Numerous GAO's were formulated over recent years, legally based on this Act.

As stated before groundwater quality protection is to be considered a provincial task.

To clarify this point of policy responsibility of the provincial administration, some relevant passages of the Environmental Management Act, applying to groundwater protection, are here under quoted:

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1. At least **once every four years** the Provincial Council shall draw up a **provincial environmental policy plan** to steer the decisions to be taken by the Council and by government bodies to which provincial powers have been delegated, in the exercise of which the plan must be taken into account during the following four years and, it is expected, in the four years thereafter, with a view to protecting the environment.
2. The plan shall contain the main elements of the Provincial Council's environmental policy.
3. These main elements shall include at least the following:
 - a. the intended results in the relevant eight-year period - and, to the extent that these can reasonably be provided, the first four years - with regard to the quality of the various parts of the environment, also in view of the limiting purity values and the standard values laid down pursuant to or in accordance with Section 5.1, subsection one;
 - b. the intended results in the relevant eight-year period - and, to the extent that these can reasonably be provided, the first four years - with regard to the prevention, limitation or remedying of the consequences of human activities which pollute, impair or deplete the environment;
 - c. **the areas where the quality of the environment or one or more parts thereof requires special protection;**
 - d. the manner in which the government bodies referred to in subsection one shall seek to achieve and safeguard the intended results under a, b and c and the period within which this is to be done, as well as the level of priority attached to achieving the said results;
 - e. the financial and economic consequences which may reasonably be expected to ensue from the environmental policy to be pursued.
4. The areas referred to in subsection three, under c, shall include at least:
 - a. those areas which have been designated a protected natural monument or a national natural monument pursuant to the Nature Conservancy Act (Bulletin of Acts, Orders and Decrees 1967, 572), and
 - b. those areas which have been designated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, Treaty Series 1975, 84), unless stated otherwise at the time of designation.
5. The Provincial Council shall also indicate in the plan to what extent the proposed policy is consistent with, or entails revision of, **provincial water management policy**, provincial land use policy or provincial transport policy and to what extent and within what period it intends to revise the current provincial plan for water management as referred to in Section 7, subsection one of the Water Management Act, one or more current regional schemes as referred to in Section 4a of

the Spatial Planning Act or the current provincial transport plan as referred to in Section 5 of the Transport Planning Act.

Section 4.10

1. The provincial environmental policy plan shall be prepared by the Provincial Executive.
2. The Provincial Executives shall involve in the preparation of the plan those government bodies which in their view are most concerned with the issues to be addressed. These government bodies include at least the following:
 - a. the Provincial Executives of adjacent provinces,
 - b. the government bodies to which provincial powers have been delegated, in the exercise of which the plan must be taken into account, and
 - c. the inspector.
3. The Provincial Executives shall also involve in the preparation of the plan people living in the province and **natural and legal persons with interests in the province**, in the manner provided for in the ordinance drawn up pursuant to Section 147 of the Provinces Act.

Section 4.11

1. As soon as **the provincial environmental policy plan** has been finalised, the Provincial Executive shall give notice thereof by **forwarding it to Our Minister** and to the government bodies to which provincial powers have been delegated, in the exercise of which the plan must be taken into account.
2. The Provincial Executives shall **announce the finalisation of the plan in the Netherlands Government Gazette**, and shall indicate how cognisance may be taken of the content of the plan.

Section 4.12

1. Unless a new plan is drawn up earlier, the provincial environmental policy plan shall apply for a period of four years following the publication of its completion in accordance with Section 4.11, subsection two.
2. **The Provincial Council may extend the duration of the plan once by a maximum of two years.** The Provincial Executive shall send notification of a decision as referred to in the first sentence to Our Minister and the government bodies to which provincial powers have been delegated, in the exercise of which the plan must be taken into account, and shall publish it in the Netherlands Government Gazette.
3. **The current national environmental policy plan shall in any event be taken into account by the provincial authority when taking decisions** designated under this Act or in taking decisions pursuant to Acts referred to in the appendix to this Act, to the extent that in so doing the protection of the environment may or must be taken into consideration.
4. Subsection 3 shall not be applicable to decisions:
 - a. relating to a provincial policy plan for water management as referred to in Section 7, subsection one of the Water Management Act;
 - b. taken by the provincial authority instead of an agency of another public body, in the event of the failure of that body to fulfil an obligation.
5. Subsection 3 shall apply mutatis mutandis to decisions:
 - a. taken by an agency of another government body instead of the provincial authority, should the said authority fail to fulfil an obligation;
 - b. taken pursuant to provincial powers which have been delegated to an agency of another public body.

Section 4.13

1. Having heard the Provincial Executive, **Our Ministers may**, in the general interest, **instruct the Provincial Council regarding the content of the provincial environmental policy plan.** Such an

instruction shall state the period, within which the plan must be modified in keeping with the instruction.

2. In issuing an instruction Our Minister shall take into account the current national environmental policy plan.
3. Our Minister shall give notice of the decision containing the instruction by submitting it to the States General and publishing it in the Netherlands Government Gazette.

§ 4.5 The provincial environmental programme

Section 4.14

1. The **Provincial Executive shall draw up an annual environmental programme.**
2. The programme shall in any event include:
 - a. a programme of activities for the protection of the environment to be carried out by the provincial authority in the next four years, including:
 1. a list of cases investigated and instances of serious pollution as referred to in section 1 of the Soil Protection Act and, with regard to those cases, a list of the activities to be carried out by or on behalf of the provincial authority or known by the provincial authority to be carried out by others over the next four years, and an indication of the moment at which the investigation or cleanup of those cases of pollution shall or should commence;
 2. a list of measures needed to combat noise annoyance over the next four years;
 - b. a summary of the financial consequences of the activities referred to at a., under 2, including the subsidies to be requested from the State;
 - c. a report of the progress made with the implementation of the current provincial environmental policy plan.
3. In drawing up the programme, the Provincial Executive shall take account of the current provincial environmental policy plan.

Section 4.15

1. **The Provincial Executive shall involve in the preparation of the provincial environmental programme the government bodies to which provincial powers have been delegated**, in the exercise of which the provincial environmental policy plan must be taken into account, or which are concerned with the activities referred to in Section 4.14, subsection 2, under a, 1^o.
2. Section 4.10, subsection 3 shall apply mutatis mutandis to the preparation of the programme, in so far as it relates to cases as referred to in Section 4.14, subsection 2, under a, 1^o.
3. The Provincial Executive shall give notice of the programme by submitting it to the Provincial Council with the draft budget and by forwarding it to Our Minister at the same time."

The provincial administration is obliged to develop and bring into force provincial legislation for groundwater protection:

" § 1.2 The provincial environmental ordinance

Section 1.2

1. The Provincial Council shall lay down an ordinance for the protection of the environment.
2. The ordinance shall comprise at least:
 - a. rules relating to the method of disposing of the categories of waste substances designated in the ordinance;
 - b. an instruction from the municipalities required to cooperate in the disposal of the categories of waste substances designated in the ordinance, as well as rules for the implementation of such cooperation;
 - c. **rules to protect the quality of the groundwater with a view to water abstraction in the areas designated by the ordinance;**

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- d. rules to prevent or limit noise pollution in the areas designated by the ordinance;
 - e. rules on the composition and procedures of the provincial environmental committee.

Section 7, subsection two, first sentence, of the Joint Regulations Act (Bulletin of Acts, Orders and Decrees 1984, 669) shall apply mutatis mutandis to the instructions issued by municipalities as referred to at b.

- 3. Further rules to protect the environment shall be laid down for the territory of the province or parts thereof by the ordinance in so far as, in the opinion of the Provincial Council, this is of more than municipal concern.
- 4. The ordinance may provide that rules laid down thereby shall apply only to one or more parts of the territory of the province, to be designated therein.
- 5. The ordinance shall contain no rules pertaining to the composition or properties of products.
Except in so far as this is necessary to the protection of the quality of the groundwater with a view to water abstraction in the areas designated by the ordinance, the ordinance shall contain no rules pertaining directly to establishments or to actions as referred to in Section 1, subsection one of the Pollution of Surface Waters Act. The ordinance shall not contain rules relating to agricultural enterprises in areas designated by Our Minister in agreement with our Minister of Agriculture, Nature Management and Fisheries."

Water Management Act (1989)

In this Act legislation is laid down in the interests of the coherence and efficiency of policy and administration in respect of water management as a whole and also further rules for the quantitative control of surface waters.

This law also holds a planning system:

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- 1. Provincial councils shall adopt a provincial plan setting out the main elements of water management policy in the province, taking into account the policy document referred to in article 3.
- 2. The plan shall also cover surface waters managed by central government, which have been designated by or pursuant to an order in council.
- 3. The main elements of the plan shall include:
 - a. the **establishment of the most important functions of the regional water management systems or parts thereof;**
 - b. **an indication, related to the functions referred to at a., of the desired development, operation and protection of the regional water management systems or parts thereof and of the intended timescale;**
 - c. **an account of the groundwater management policy to be pursued in accordance with the Groundwater Act** (Bulletin of Acts and Decrees 1981, 392) and an overview of the financial resources required for the said management;
 - d. **an account of the general nature and extent of the other measures and provisions** which will be required with a view to the development, operation and protection referred to at b.;
 - e. an indication of the financial and economic consequences which the intended policy can reasonably be expected to produce.
- 4. Provincial councils shall indicate in the plan the extent to which the main elements accord with or will require the amendment of provincial environmental policy or provincial planning policy, and the extent to which and the timescale within which they intend to revise the current provincial environmental policy plan or one or more current regional plans. The plan shall be accompanied by an explanatory memorandum.
- 5. The plan shall be revised at least once every four years. Provincial councils may extend that period by no more than four years.

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6. A decision adopting or revising a plan or extending the period within which it must be revised shall be announced in the Government Gazette. A decision adopting or revising the plan shall be forwarded with the plan to Our Ministers."

Groundwater Act (1981)

The objective of the Groundwater Act is to balance the interests involved with the development of groundwater resources. The provinces have the primary responsibility for groundwater management. The Groundwater Act provides the administrative framework and legal instruments (permits and general rules) to regulate abstraction of groundwater and artificial recharge of aquifers. Based on the Groundwater Act provinces may put a levy on groundwater extraction to pay investigations related to groundwater management and for financial compensation in case of withdrawal of permits and unaccounted damages. This levy is very low (approximately NLG 0,01 per m³/year).

5. Groundwater knowledge and management tools

Knowledge is necessary for ruling and managing (To rule is to know). That also counts for the protection of groundwater quality. Sound groundwater protection thus is only possible if a certain basic knowledge is available: adequate information about characteristics of the subsurface, natural man induced processes, sources and behaviour of pollutants and environmental impact.

In the Netherlands three important tools for use in groundwater protection and management are applied: monitoring, mapping and modelling.

Monitoring

groundwater levels

From the 1940's onwards the number of observation wells in the Netherlands increased to over 16.000 in 1970, with typical screen depths varying from 2 to 300 meters beneath the soil surface. The monitoring objectives of the wells were multitude. The need for a national monitoring network resulted after a co-operation process with national and provincial authorities in a national network of about 4.000 observation wells.

Objectives of the national network are:

- characterising the groundwater regime on a regional scale;
- gaining insight in general temporal trends in groundwater levels and piezometric heads;
- establishing a reference basis for other (detailed) monitoring networks.

groundwater quality

In the Netherlands a national groundwater quality monitoring network was established in the period 1979-1984. The number of observation wells is 390. Each well has at least two well screens (between 5-15 m and 15-30 m below the surface). The objectives are:

- describing and diagnosing the present groundwater quality in relation to land use, soil type and geohydrological conditions;
- identifying the long-term changes in equality (trend analysis);
- indicating the extent of human influence on groundwater quality;
- providing data for evaluation of protection policies.

Complementarily, regional monitoring networks as well as local networks aiming at groundwater protection areas have been set up.

Mapping

A wide range of basic maps (also in a digitalised form) is available, depicting physical, chemical and biological properties and parameters of soil and groundwater.

Basic map information in combination with additional information is used for drawing so-called vulnerability maps. These maps are used for management and/or policy decision-making and policy of spatial planning. Geographical Information Systems (GIS) are used to help produce the maps. Other information is also added to GIS: polluting sources, emissions and probability of their occurrence, objects to protect, groundwater protection areas, environmental properties to be effected and the actual vulnerability assessment.

These GIS maps can be used for instance:

- to set policy and implementation priorities;
- to develop and implement area differentiated protection policies;
- for site selection in relation to activities;
- for taking protective and mitigating measures.

Modelling

A large number of numerical groundwater models are available in the Netherlands, mainly for supporting the decision making process. Modelling for this purpose started some 25 years ago.

There are also groundwater management models in use covering whole provinces and even the whole country. Most models are only dealing with groundwater levels and groundwater flow patterns.

In recent years in the Netherlands emphasis is shifted to simple models to calculate local, regional or even national scale loads of pollutants, accumulation in the soil and/or leaching to groundwater (for instance nitrates and pesticides). These models are often used in an integrated way with monitoring and mapping using geographical information systems (GIS, see above).

6. Changes in strategy (example of the Utrecht province)

Groundwater protection policy is not a static process. As society develops, groundwater protection policy has to develop to meet new challenges and threats.

Underneath some latest Dutch developments are shortly described. An example was taken from practical policy developments on groundwater protection in the Utrecht province.

Until the year 2001 the Utrecht provincial groundwater protection policy can be sketched as follows:

AREA	LEGAL REGIME	LEGAL INSTRUMENT (provincial environmental ordinance)	ACTOR	OTHER INSTRUMENTS
30 Water abstraction zones (pumping stations included)	Strict rules (only water winning)	Absolute prohibition Enforcement Compensation	Province/municipals Prov./mun. Municipals/province/water supply companies	- spatial planning - subsidising
18 Groundwater protection areas	Rules for activities - within establishments - outside establishments	Absolute prohibition Instructions in environmental license	Province Municipal	- spatial planning (list of forbidden establishments) - subsidising (national)

		Exemption General rules Enforcement: - within establishments - outside establishments Compensation	Province Municipals Province, General Inspection (Ministry of Agriculture) Municipal/province/ water supply company	
Drilling free zones	Rules for drilling deeper than 40 metres	Prohibition Exemption General rules Enforcement	Province Province Province Province	

The Utrecht Province evaluated in 1997 the provincial groundwater protection policy within the period until 1997. It was concluded that the policy had to be changed, because former provincial policy was too much based upon extensive, complex and to detailed regulation for groundwater protection areas. Besides that aspect not only the province was also executing its own policy (giving exemptions, in advising, compensation, enforcement), while municipals were also executing the provincial policy in respect to establishments (with a confusing overlap)³.

The effectiveness of the provincial policy could and should be improved by focussing provincial legislation to each specific water abstraction zone, to use other instruments as there is municipal spatial planning⁴ and the provincial administration should aim on a clear division of tasks and roles for the province on the one side and municipals on the other side. Practically the provincial administration and involved municipalities apparently had insufficient (personal) capacity for enforcement and seemed to have given less priority than planned to execute policy made decisions. Water supply companies, municipals and provincial government should cooperate more in the future serving the public interest.

Summarising the 'old' groundwater protection policy of Utrecht (until 2001) that policy included:

1. 30 areas to protect;
2. 3 different kinds of protection zones (with different degrees of protection);
3. mainly provincial environmental regulation;
4. two competent authorities;
5. also spatial planning and;
6. stimulation of good behaviour.

The new Utrecht provincial policy (after evaluation in 1997) is based upon the following principles and approaches:

1. more effective and efficient protection. This means that where the current protection is not or less effective and inefficient current protection measures shall be ended or reconsidered;
2. Risk assessment and approach, which leads to enlisting all threats to groundwater quality and priority setting for each threat (what to deal with first?). Is the current provincial legal system (provincial environmental ordinance) appropriate enough in reducing these threats and in

³ Within the Dutch legal system administrative responsibilities, tasks and roles have to be separated (interests are not to be mixed).

⁴ In the Netherlands a municipal spatial plan has an exclusive juridical status, i.e. that citizens are directly legally bound to such a plan (which is based on the Dutch Spatial Planning Act).

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- excluding unacceptable risks? Has the provincial ordinance to be adapted in that respect?
 3. Sustainable and durable protection. Protection is considered to be a long term effort;
 4. A balance between theory and practice;
 5. An interactive policy process (i.e. shared responsibilities).

The new Utrecht groundwater protection policy consist of the following concrete elements:

- deregulation (less and better legislation/rules). The provincial environmental ordinance will be modernised, i.e. will be made better accessible, more readable and flexible. Implementing a 'general care obligation';
- differentiated rules (vulnerability level of an groundwater area will be the leading principle). The provincial ordinance will contain packages of rules applying to one, two or three types of water abstraction zones (depending on vulnerability level of the particular water abstraction zone).
- protection of 100-year zones⁵;
- spatial planning. Executing municipal spatial planning influences directly water winning interests in water abstraction zones. In the future municipals in the Utrecht Province will have to take into account these interests for their spatial planning.
- area oriented approach. This means working with area dossiers (enlisting area properties, evaluating future social developments, cooperation between municipals, water supply companies and sometimes water boards in tackling area threats to groundwater quality). Agreements are and will be made and are to be recorded in those dossiers.
- other instruments will be applied: stimulation actions, realising the general protection level (Soil Protection Act), enforcement actions, soil/groundwater clean up, communication, 'escort/facilitating group' on a administrative level.

8. In conclusion

In the Netherlands the main source for drinking water is fresh groundwater. The protection of the quality and quantity of fresh groundwater has been delegated by the national government to the Dutch provinces. Provinces are responsible for developing protection policies for groundwater (quality and quantity). Municipal administrations and the public drinking water supply industry are executing provincial drinking water policy decisions.

The current and new provincial protection policy approach can both be characterized as partly source, partly effect and also area oriented.

On a national and provincial scale a wide range of legal and non-legal instruments are available for serving the public interest of good fresh groundwater quality and sufficient fresh groundwater as the most important source for drinking water.

Drinking water in the Netherlands is supplied by companies, which are government owned, because drinking water supply is considered to be of a public and not a private interest.

The field of groundwater protection is not at all static. New challenges and upcoming threats have to be met. The existing planning, legal and administrative system seem to be adequate, efficient and effective for the future.

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