

## Carbon Disclosure Project

CDP 2011 CDP Water Disclosure 2011 Information Request

Bayer AG

### Module: Introduction - 2011 CDP Water Disclosure

#### Page: Introduction - 2011 CDP Water Disclosure

#### 0.1

##### Introduction

##### Please give a general description and introduction to your organization.

Bayer is a global enterprise with core competencies in the fields of health care, nutrition and high-tech materials. Our products and services are designed to benefit people and improve their quality of life. At the same time, we want to create value through innovation, growth and high earning power.

We are firmly aligned to our mission statement "Bayer: Science For A Better Life" and continue to optimize our portfolio, concentrating our activities in three high-potential, efficient subgroups with largely independent operations: HealthCare, CropScience and MaterialScience. These provide us with access to major global growth markets and are supported by our service companies.

As an inventor company, we plan to continue setting trends in research-intensive areas. Innovation is the foundation for competitiveness and growth, and thus for our company's success in the future.

Our knowledge and our products are helping to diagnose, alleviate or cure diseases, improving the quality and adequacy of the global food supply and contributing significantly to an active, modern lifestyle. Our expertise and innovative capability also enable us to offer solutions for protecting the climate and addressing the consequences of climate change. We are committed to the principles of sustainable development and to our role as a socially and ethically responsible corporate citizen. For us, there is a clear link between technical and economic expertise and social commitment. This, in turn, we define as our responsibility to work for the benefit of humankind, engage in strengthening civil society and make a lasting contribution to sustainable development.

At Bayer, we regard economy, ecology and social commitment as objectives of equal rank. We seek to retain society's confidence through performance, flexibility and open communication as we work in pursuit of our overriding goals: to steadily create corporate value and generate high value-added for the benefit of our stockholders, our employees and the community in every country in which we operate.

The Water Disclosure Report encompasses all Bayer subgroups: Bayer MaterialScience, Bayer CropScience, Bayer HealthCare as well as our service companies. They are, however, affected by water-related issues in a different manner, which will be outlined in the different sections of the report.

**Forward-looking statements:** This document contains forward-looking statements based on current assumptions and forecasts made by Bayer Group or subgroup management. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual financial position, development or performance of the company and the estimates given here. These factors include those discussed in Bayer's public reports, which are available on the Bayer website at [www.bayer.com](http://www.bayer.com). The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

#### 0.2

##### Reporting Year

##### Please state the start and end date of the year for which you are reporting data.

Enter the period that will be disclosed.

Fri 01 Jan 2010 - Fri 31 Dec 2010

#### 0.3

##### Reporting Boundary

##### Please indicate the category that describes the company, entities, or group for which you are reporting.

Companies over which financial control is exercised per consolidated audited financial statements

#### 0.4

##### Exclusions

**Are there any geographies, activities, facilities or types of water inputs/outputs within this boundary which are not included in your disclosure?**

No

**Module: 2011-Water-Management**

**Page: 2011-Water-1-ManagementGovernance**

**1.1**

**Does your company have a water policy, strategy or management plan?**

Yes

**1.1a**

**Please describe your policy, strategy or plan, including the highest level of responsibility for it within your company and its geographical reach**

Geographical reach	Description of policy, strategy or plan	Position of responsible person
Global	<p>The protection of natural resources, including water, is an integral part of Bayer's commitment to sustainability. Sustainability is a key element of Bayer's values and leadership principles. Values spelled out in our mission statement "Bayer: Science For A Better Life" include Leadership, Integrity, Flexibility and Efficiency, including the smart management of resources and the aim of ensuring sustainability. Our mission statement is supplemented by the Bayer Sustainable Development Policy, our commitments to the global Responsible Care initiative of the chemical industry and the 10 principles of the United Nations Global Compact. Bayer's commitment to protect resources is an integral part of these commitments. *** In 2005, as part of Bayer's commitment to sustainability, Bayer established ambitious sustainability-related goals with the five-year program of objectives "2006+". This program included water-related goals and applied to all Bayer subgroups and service companies worldwide. As a result of our 2006+ Group Program of Objectives, in 2010 we reached the goals of a 10 percent reduction in the discharge of TOC (total organic carbon) and nitrogen into receiving waters per metric ton of sales product.</p>	Individual board member
Global	<p>In accordance with the further development of our sustainability strategy, we launched an extensive Group-wide Sustainability Program in November 2009, which also includes water-related initiatives. In our Sustainability Program, we concentrate on three focus issues: alliances for sustainable health care, partnerships to provide more quality food, and solutions for climate protection and resource use. The program comprises nine lighthouse projects with concrete objectives and action plans. Within the focus issue "Climate protection and resource use", one lighthouse project is the Resource Efficiency Check, which was developed by Bayer Technology Services (BTS) in 2009 and rolled out in pilot projects in 2010. This methodology contains a holistic analysis of production-relevant resources such as energy, water and raw materials and leads to improvement measures for minimizing consumption and the resulting waste and emissions. Water is included as one important module with the focus on minimizing overall water consumption and reducing wastewater generation. In addition to the further rollout of the Resource Efficiency Check, BTS plans to develop further water-related tools, e.g., regarding water footprinting. *** Another water-related lighthouse project is being implemented by Bayer CropScience (BCS) in Indonesia to convert rice production from transplanted to direct-seeded rice, thus enabling farmers to increase their water efficiency. The results are up to 10 percent higher yields, better quality, lower water consumption (by around 5,000 liters per ha per rice cropping season) and a reduction in methane emissions of up to 30 percent. In 2010, this rice cultivation method in Indonesia was already</p>	Individual board member

Geographical reach	Description of policy, strategy or plan	Position of responsible person
Business unit: Bayer HealthCare	<p>practiced by over 8,600 small-scale farmers across an area of over 2,500 ha. *** BCS's Food Chain Partnership for Vegetables is a further lighthouse project that addresses the challenge of increasing scarcity of arable land and natural resources, in particular of water and energy. BCS works with partners to develop solutions for sustainable vegetable growing, e.g., in India. The objective of the project is to help a total of 65,000 Indian farmers grow vegetables on 50,000 ha in 125 individual projects by 2011. By increasing crop yields, natural resources such as water are used more efficiently, which is especially important in water-scarce regions such as India.</p> <p>All Bayer subgroups have implemented systems, policies or standards that meet their specific challenges with regard to water usage. Within its Responsible Care Roadmap, our subgroup Bayer HealthCare sets specific goals, which include goals to reduce the risk of soil/ground water contamination and measures to reduce freshwater consumption and wastewater emissions. As part of the global management systems, BHC developed two new Directives in 2010: the BHC Water Protection Directive and the BHC Directive on Waste Management. Both directives are applicable for all sites, organizational units and affiliate companies of BHC. The Water Protection Directive describes requirements for the management systems of BHC sites with regard to the protection of natural water bodies. It also describes organization and compliance aspects, processes for ensuring water protection as well as documentation and reporting requirements. The BHC site manager or BHC general manager at the site is responsible for setting site-specific water protection targets to fulfill the requirements set out in the directive. For example, the directive requires that the release of human or veterinary active pharmaceutical ingredients, their biologically active intermediates or metabolite products as well as contrast media to natural water bodies has to be as low as reasonably practicable. The same applies to the release of substances hazardous to the aquatic environment. Furthermore, the prioritization of measures for reducing the release of substances has to consider the relative hazardous potential of a substance to the aquatic environment as defined by its hazard category. The directive also includes wastewater management and preventive water protection measures, e.g., spill control. BHC commits its sites to develop, plan and implement water protection and waste management measures to achieve site-specific targets, e.g., within their EMAS management system as described in the risk management section for our site in Bergkamen, Germany.</p>	Individual board member
Business unit: Bayer MaterialScience	<p>Bayer's Bayer MaterialScience subgroup regulates, among other aspects, the efficient use of water in its HSEQ policy. Several sites have set site-specific water-related goals as part of their environmental management measures within their HSEQ management process, ISO 14001 certification or EMAS validation processes. *** Within the framework of our ISO 14001 certification, our sites undergo annual management reviews in order to follow up on site-specific targets. One of BMS's major water-using sites, Antwerp (Belgium), also performs a mid-year review in order to track its water-related targets. Current targets in Antwerp include, for example, the prevention of polyether concentration in wastewater and water-saving targets for the Makrolon<sup>TM</sup> production process at the site as further described below. In Belford Roxo (Brazil), our water goals are set within the ISO 14001 certification process. In addition, the state of Rio de Janeiro requires an additional annual obligatory environmental audit in which water-related indicators are audited. For our Spanish sites, the Association of Chemical Industry in Spain sets 5-year goals, including water reduction goals as further described below. Goal tracking is performed quarterly with our facility managers in Iberia.</p>	Individual board member
Business unit: Bayer CropScience	<p>In its corporate position "Our contribution to water use efficiency and protection," Bayer CropScience (BCS) commits itself to contributing to efficient water use at its own production sites and to water use efficiency improvements for farmers. Site-specific targets are set to account for local situations. For example, our</p>	Individual board member

Geographical reach	Description of policy, strategy or plan	Position of responsible person
	<p>BCS site in Canada set voluntary targets regarding wastewater quality and water reduction (e.g., reducing total domestic water use by 2% from 2009 to 2010, with additional 0.05% rates until 2016). However, the biggest saving potential relates to agriculture itself accounting for roughly 70% of the fresh water consumed in the world. Regarding sustainable agriculture, there is no single recipe that can be applied equally to all regions of the world. In 2010, BCS therefore developed "Sustainable Development Roadmaps" with country-specific measures. In Australia, the development of crops which may better cope with the consequences of climate change is a key focus. In 2009, BCS entered into a research partnership with the Commonwealth Scientific and Industrial Research Organization, Australia. One of the initial projects is dedicated to the development of wheat lines with improved yield potential and tolerance against abiotic stresses, e.g., drought, temperature and salinity. In the U.S., the focus is on conservation tillage. When harvested, broad acre crops leave behind stubble that is traditionally burned or ploughed in. Minimum tillage agriculture involves a reduced number of soil cultivations prior to crop plantings. As a result, rainfall is captured more efficiently. In Vietnam, adaptation of rice-based cropping systems is a key issue. Significant constraints in Vietnam's main rice area that limit the ability of farmers to adapt to the new hydrological regime led to the "Climate change affecting land use in the Mekong Delta: adaptation of rice-based cropping systems project" to develop, e.g., integrated soil, crop, nutrient and water management options. In India, BCS entered into a partnership with Punjab State Co-operative Supply and Marketing Federation to promote and develop a complete package of direct-seeded rice to save depleted water resources resulting from the present practice of transplanted rice. The project will be initiated on 200 hectares of field, with an expansion to 8,100 hectares in the next 3 to 5 years.</p>	

**1.1b**

**Does the policy, strategy or plan specify water reduction, quality or efficiency targets or other water-related goals?**

Yes

**1.1c**

**Please describe these water-related targets or goals**

Geographical reach	Type of target/goal	Target/goal	Additional information
Global	Quality of discharges	<p>Target: reduction in the discharge of TOC (total organic carbon) into receiving waters by 10 percent per metric ton of sales product, measured in kg per metric ton of sales product. Base year: 2005. End year: 2010. *** The specific volume of TOC (total organic carbon) fell to 0.136 kilograms per metric ton of sales product in 2010. The objective for 2010 has thus been fully met.</p>	<p>The target applies to the company as a whole. TOC values will continue to be tracked.</p>
Global	Quality of discharges	<p>Target: reduction in the discharge of nitrogen into receiving waters by 10 percent per metric ton of sales product, measured in kg per metric ton of sales product. Base year: 2005. End year: 2010. *** Nitrogen emissions fell by around 23 percent year-on-year. Given the increase in the volume of sales product produced, the specific nitrogen volume</p>	<p>The target applies to the company as a whole. Nitrogen values will continue to be tracked.</p>

Geographical reach	Type of target/goal	Target/goal	Additional information
North America	Absolute reduction	<p>improved to 0.0474 kg per metric ton of the volume of sales product produced, which was well below the target for 2010 of 0.0536 kg per metric ton.</p> <p>Target: absolute reduction of water consumption in selected North American sites ranging from 15 to 90 percent of absolute reductions depending on the specific site. Base year: 2010.</p>	<p>In 2010, water assessments were conducted for all Bayer HealthCare and Bayer CropScience sites in North America that are located in regions that are potentially threatened by water stress or sites that are heavy water users. As a result, water reduction targets have been established for the assessed sites ranging from 15 to 90 percent of absolute reductions. The analysis necessary for developing water reduction targets for our BMS industrial sites in North America is currently in progress with the goal of having these targets established by the third quarter of 2011.</p>
Spain	Efficiency	<p>Target: reduction of water consumption to 2.84 m3 per metric ton of sold product for Bayer Iberia. Timeframe: 2005-2010. *** Within the Responsible Care initiative, the Association of the Chemical Industry in Spain sets five-year goals for several parameters. For our sites in Spain we had a target of reducing our water consumption to 2.84 m3 per metric ton of sold product. We managed to go beyond this target, achieving a water consumption of 2.3 m3 of water per metric ton of sold product across all Spanish sites. For the next five years, we have the goal of reducing our water consumption even further to 2.26 m3 of water per metric ton of sold product.</p>	<p>At our sites in Spain, our water use is being closely monitored and discussed quarterly within the Iberia Technical Community. The target refers to all Bayer sites in Spain (across all Bayer subgroups). Tarragona is by far the biggest water consumer among our sites in Spain.</p>
Facility: Antwerp, Belgium	Other: Quality of discharges and water reduction	<p>Targets: Bayer's third-largest water-using site, Antwerp (Belgium), has set several water-related targets as part of its annual HSEQ management review. Targets set during the 2010 management review include: (1) making a detailed inventory of water consumption at the Antwerp site in order to decrease water consumption, (2) 11% water savings per wash line in Makrolon production in Antwerp, (3) preventing the overflow of the non-process wastewater tank into secondary containment, (4) decreasing the amount of wastewater by approximately 40 cubic meters per hour through an increase in the re-use of steam condensate, e.g., through treatment of steam</p>	<p>To achieve these targets, our site in Antwerp is undertaking a large variety of water-related projects. To achieve the water-saving target in Antwerp's Makrolon™ production process (see target 2), countercurrent flows are being installed in wash lines. Another project related to the Makrolon™ production line includes the purchase of less concentrated raw material, which avoids the need for diluting and can save more than 44,000 cubic meters of water per year. Furthermore, the site is undertaking a major wastewater improvement project in the polyether plant. The project is divided into two phases. Phase 1 comprising the removal of polyether from wastewater with</p>

Geographical reach	Type of target/goal	Target/goal	Additional information
Indonesia	Other: Product related targets	condensate with a reverse osmosis process, (5) increasing the efficiency of activated carbon in wastewater treatment, (6) avoiding polyether in wastewater by adapting the production process in the polyether plant. Timeframe: 2010-2011.	activated carbon has already been completed. Phase 2 with the objective of avoiding polyether in wastewater by adapting the production process (see target 6) is still ongoing.
		Target: reduction of water consumption in rice-growing by around 30 percent per year compared to conventional seeding methods through Bayer CropScience's (BCS) direct-seeding rice project in Indonesia.	The water reduction target applies to BCS's integrated program for sustainable rice-growing with a combination of new growing methods in Indonesia. The project involves the direct seeding of pregerminated rice and the efficient use of crop protection products and fertilizer. The direct-seeded rice project in Indonesia has already led to a reduction in water consumption of approximately 5,000 liters of water per hectare per rice cropping season.

## 1.2

What specific actions has your company taken to manage water resources or engage stakeholders in water-related issues?

Geographical reach	Type of action	Action	Outcomes
Global, Group-wide	Direct operations	In 2010, Bayer further refined its water monitoring and reporting. Since the 1970s, Bayer has been measuring its water use. Water withdrawals and use are measured at site level and monitored regularly in our central Bayer Site Information System "BaySIS." BaySIS is an intranet-based tool for Group-wide HSEQ data capture and reporting developed by Bayer Business Services. BaySIS regularly queries water withdrawals by source type and further environmental key performance indicators (KPIs) such as emissions into water, e.g., nitrogen, TOC (total organic carbon), phosphorus, heavy metals and inorganic salt. Based on this set of bottom-up data, BaySIS allows analyses across several dimensions, e.g., water use, withdrawals and discharges by geography or subgroups/sites. In 2010, water recycling and reuse were included as additional KPIs in BaySIS.	BaySIS is a tool that generates transparency about Bayer's water use and serves as a basis for decision-making and the development of water-related actions. Furthermore, BaySIS allows monitoring of environmental key performance indicators (KPIs), such as monitoring of discharge volumes or emissions into water. By including additional water-related KPIs in BaySIS, monitoring and transparency were improved as a basis for the development of future water-related actions.
Global	Collective action	Bayer is an active member of the World Business Council for Sustainable Development. In 2010, Bayer CropScience (BCS) upgraded its membership and joined the WBCSD Water Leadership Group. As a member of the WBCSD Water	Stakeholder engagement activities such as our participation in the WBCSD Water Leadership Group or Bayer's participation in the Berlin Water Dialogues give Bayer the opportunity to keep up to date with knowledge on

Geographical reach	Type of action	Action	Outcomes
Global	Transparency	<p>Leadership Group, Bayer wants to actively contribute to the further development of water management processes and platforms. *** BCS is also participating in several local water-related roundtables and initiatives. For example, in Germany BCS is a voluntary member of a Water Roundtable, involving water providers and the agrochemical industry association, to support water protection. Similar initiatives also exist in the Netherlands. *** Furthermore, BCS was one of the corporate funding partners of the Berlin Water Dialogues 2011, where leading experts from water and water-associated sectors were invited to discuss current and future solutions from their perspectives.</p>	<p>important water-related matters (e.g., water footprinting), to exchange experiences and to support the further development of water frameworks and programs. As a result of the German Water Roundtable, a joint agreement between water providers and the agrochemical industry to promote preventive water body protection measures was signed in 2009. In 2010, a further agreement on specific measures was developed, including the development of a database to improve transparency on concentrations of crop protection substances in water, as well as the targeted monitoring of concentration levels in critical areas.</p>
		<p>At the end of 2008, Bayer signed the "CEO Water Mandate" as a voluntary commitment to regularly report on our progress on water. We will continue to support the UN Global Compact's CEO Water Mandate and will be working with our stakeholders to develop sustainable strategies for water use, implementing appropriate solutions and reporting on the progress made. *** Furthermore, Bayer took part in the Water Disclosure Project carried out for the first time in 2010 by the Carbon Disclosure Project.</p>	<p>Within the framework of the CEO Water Mandate we report on our strategies for the use of water, our sustainable solutions and the progress made. *** Bayer's participation in the Water Disclosure Project further increased transparency about Bayer's management of water-related issues, including, for example, water use and emissions into water. It also prompted internal discussions on water-related aspects such as the water-related risks arising. In addition, we organized workshops with our research and development departments in order to discuss water-related opportunities.</p>
Global	Supply chain and watershed management	<p>In 2010, Bayer took intensive action to further implement its Supplier Code of Conduct, which had been developed at the end of 2009. Among the issues addressed by the code of conduct is the responsible use of resources such as water. Bayer expects its suppliers to accept the sustainability principles set out in the code of conduct, which forms an integral part of our supplier selection and evaluation process. *** To further implement the Supplier Code of Conduct in 2010, it was integrated into our Group-wide electronic ordering system and contracts. Furthermore, the web-based training program developed to familiarize our procurement staff with present and future challenges relating to our code of conduct was used to train further employees with</p>	<p>Almost 100% of the relevant strategic purchaser group (more than 1,100 employees from 37 countries) has participated in the training course on the Supplier Code of Conduct. A further 200 employees with procurement functions were trained in 2010. *** Together with the evaluations performed in 2009, based on procurement spending we have already covered 50% of suppliers in the risk category with our supplier evaluation questionnaire and will continue to increase this percentage. The evaluations did not reveal any significant misconduct. However, as a result of the evaluations, pilot studies and audits, action plans were drawn up with several suppliers in 2010. These are</p>

Geographical reach	Type of action	Action	Outcomes
Global, Group-wide	Direct operations	<p>procurement functions in 2010. *** Using standard questionnaires, Bayer evaluated 147 suppliers, from China, India, Thailand, the Philippines and Guatemala in 2010 and another 124 suppliers selected by the subgroups from non-risk countries. These checks were supplemented by country-specific projects, e.g., an evaluation of more than 200 suppliers in India. *** Together with an independent external auditor we carried out three pilot sustainability studies on suppliers in China in 2010. In the future, we intend to carry out random audits on the data provided by suppliers in self-assessment questionnaires and check up on the agreed development activities. *** We also organized supplier days with more than 400 of our most important suppliers in China, Germany, Spain, the United Kingdom and India. *** Bayer also joined the Pharmaceutical Supply Chain Initiative. Among others, this initiative is planning to develop a Shared Audit System and standard for the industry.</p>	<p>documented centrally and their implementation is tracked. *** In 2010, we also reviewed our processes together with an external consultancy. As a result, the recommendations have been integrated into our targets for 2011: (1) Expand the present country-based risk approach with additional reviews of strategic and key suppliers from non-risk countries, (2) Step up the number of sustainability-specific supplier audits by independent, external auditors, (3) Improve central reporting and monitoring through stepwise integration of sustainability assessments into a Group-wide supplier management system. *** Our process is also subject to continual evaluation and we have set ourselves ambitious targets up to 2015. These include the following: (1) Inform all suppliers with purchase-order-relevant order volumes about the Bayer Supplier Code of Conduct, (2) Assess the sustainability performance of suppliers that represent <math>\geq 75\%</math> of the total procurement volume and <math>\geq 75\%</math> of the procurement volume from risk areas, (3) Annually audit the sustainability performance of at least 10% of the suppliers from risk areas or at least 15 suppliers.</p>
		<p>Bayer has also worked together with z_punkt, a renowned trend research institute, to design and develop a tool with which individual products and product groups can be analyzed in detail with respect to sustainability aspects: the Bayer Sustainability Check. The methods of the tool were certified by the internationally recognized Wuppertal Institute of Climate, Environment and Energy. *** The Sustainability Check assesses the sustainability impact of our products and product groups. The tool enables Bayer to systematically evaluate its product portfolio and align it to societal megatrends such as population growth or climate change. Among other uses, it can also be used to assess potential savings in water. The Bayer Sustainability Check compares the positive contributions to sustainability</p>	<p>Regarding water-relevant outcomes from the Sustainability Checks performed in 2010, there were no surprising water-related impacts identified for the products analyzed from our Bayer MaterialScience and Bayer HealthCare businesses. The sustainability impact of our oral contraceptives is especially relevant in the use phase. With regard to water, risks for the water environment is a key aspect that is tackled by Bayer HealthCare's environmental risk assessments as described in the risk section of this report.</p>

Geographical reach	Type of action	Action	Outcomes
Business unit: Bayer MaterialScience	Direct operations	<p>during product development, manufacture, marketing, use and disposal with potential negative effects. *** After being successfully tested in 2009, the Bayer Sustainability Check is now being introduced systematically throughout the Bayer Group. In 2010, the Sustainability Check was applied at Bayer HealthCare to assess the sustainability impact of oral contraceptives in the use phase. It was also applied in several projects at Bayer MaterialScience, for example, to assess the sustainability impact of polyurethanes used as insulation materials in cooling devices.</p> <p>Several water-related measures were implemented at site-level by our subgroup Bayer MaterialScience. Examples from 2010 include the following: *** (1) At our Tarragona site (Spain), a plant for the use of rainwater collected in a retention reservoir as cooling water went on stream in November 2010. The site also entered a cooperation with the Chemical Business Association of Tarragona, other local chemical companies and the respective water authority to reuse wastewater from two municipal wastewater treatment plants. A water treatment plant with a capacity of approximately 6.5 million cubic meters of wastewater per year is scheduled to begin operating in June 2011 as a result of this cooperation. Also, in order to improve the quality of discharges we installed activated carbon filters for the treatment of phenol deposits in 2010. *** (2) Our Baytown site (United States), one of Bayer's top 10 water-using sites, started a sustainability project in 2010 to identify water reuse and recycling opportunities. In cooperation with a local water supplier, a water consumption analysis was performed. The analysis showed that the site is efficient with the water being used but still had possibilities for generating reuse water. Therefore, a solution to reuse 75% of the cooling tower blowdown stream is being developed, which will, on average, save 12% of the cooling tower makeup water throughout the year. The site also managed to reduce its</p>	<p>The measures described led to the following outcomes: *** (1) At Tarragona, around 60,000 cubic meters of water (equaling about 7% of total water use at the site) will be saved per year as a result of using rainwater from a retention reservoir for cooling purposes. Approximately 240,000 cubic meters of treated wastewater can be used as process water as a result of the wastewater reuse project. Furthermore, the project will help to preserve the drinking water supply in the Spanish region of Catalonia. *** (2) Once completed, the water use efficiency project at Baytown will help to save approximately 300,000 cubic meters of water per year. The complete avoidance of phosphate emissions led to an overall reduction of phosphorus emissions into water of 88% across the whole Bayer Group. *** (3) At Krefeld-Uerdingen, the improvement in monitoring enables the site to regularly record heavy metal levels in the wastewater treatment plant.</p>

Geographical reach	Type of action	Action	Outcomes
Business unit: Bayer HealthCare	Direct operations	<p>emissions into water. Through process optimization in the production of Makrolon™, phosphate emissions were completely avoided in 2010. *** (3) Monitoring and reporting of heavy metal levels in the central wastewater treatment plant were improved at our Krefeld-Uerdingen site (Germany), the fifth largest water user at Bayer. *** (4) Our Map Ta Phut site (Thailand) managed to reduce its specific usage of demineralized water (DM) that is needed for the production of polycarbonate, e.g., through improved monitoring and by minimizing the time for flushing at the washing unit. Also, at the end of 2010 a project was launched to enable the reuse of process water for the production of carbon monoxide by installing a sand filter.</p> <p>Site-specific actions by our Bayer HealthCare subgroup to reduce its water consumption and improve wastewater quality in 2010 include the following examples: *** (1) In 2010, water savings potentials amounting to 460,000 cubic meters were identified at 16 BHC sites within the frame of site-specific energy efficiency assessments. To realize the identified savings, site-specific actions will be carried out over the next years (e.g., including the optimization of tower water systems at one site). The actions are monitored via BHC's energy efficiency Sharepoint. *** (2) In Berlin (Germany), specially treated ultrapure water for cleaning pharmaceutical production facilities could be saved through a process optimization. *** (3) In Bergkamen (Germany), the installation of additional activated carbon filters helped to reduce the emissions of total organic carbon (TOC) into water – significantly below the regulatory standard. Furthermore, the Adsorbable Organic Halogens (AOX) emissions were reduced through thermal treatment, which also resulted in lower wastewater fees. The site is also undertaking water consumption reduction measures. For example, reduction of water usage is achieved by replacing water ring pumps with vacuum pumps, resulting in reduced water and, accordingly, wastewater</p>	<p>The measures described led to the following outcomes: *** (1) Of the water savings identified during site-specific energy-efficiency assessments, a water reduction of 30,000 cubic meters could already be realized. *** (2) 3,000 cubic meters of specially treated ultrapure water per year could be saved through the process optimization at our Berlin site. *** (3) As a result of the installation of additional activated carbon filters at Bergkamen, TOC emissions were reduced from 70 to 23 metric tons per year. Moreover, total nitrogen emissions went down from around 20 to 10 metric tons per year. As a result of thermal treatment, AOX emissions were reduced by around 60 percent. Furthermore, through the replacement of water ring pumps with vacuum pumps, water consumption and, accordingly, wastewater volume is reduced by 9,500 cubic meters per year for each replaced pump. Diverting highly contaminated wastewater streams from an underground to above-ground pipeline resulted in easier maintenance, better detection of leakages and the improvement of ground and surface water protection.</p>

Geographical reach	Type of action	Action	Outcomes
Business unit: Bayer CropScience	Direct operations	<p>volume. Another project that was completed in April 2011 focused on diverting highly contaminated wastewater streams from running through an underground sewer system to an above-ground pipeline network.</p> <p>Site-specific actions were also taken at Bayer CropScience (BCS) sites. 2010 examples include the following: *** (1) At our Knapsack site in Germany, an additional wastewater pre-treatment stage was installed to improve the environmental balance in the production of trifluoromethyl-acetophenone (TFMAP). This additional pre-treatment stage, activated carbon adsorption, aims at avoiding the discharge of heavy smelling compounds to the central wastewater treatment plant in Knapsack. Furthermore, substances causing AOX emissions are eliminated from TFMAP process water before it reaches the central wastewater treatment plant. *** (2) In Kansas City, United States, discharges are currently being reviewed for optimization, including, for example, modifications to the primary water treatment process in settling tanks. *** (3) In Vapi, India, the focus is on the type of wastewater being emitted to the shared government water treatment facilities. Engineering controls are being introduced until 2015 to enhance these wastewater emissions.</p>	<p>(1) The improvement of wastewater pre-treatment at Knapsack will result in the elimination of odors and substances causing AOX emissions from TFMAP process water. The project is still running. Initial measurements have shown that the goals are very likely to be achieved. *** (2) Modifications to the primary water treatment process in Kansas City are expected to improve the utilization of tank capacity in the wastewater treatment facilities as well as improve wastewater quality. *** (3) The project currently running at Vapi is aimed at improving wastewater emissions.</p>
North America	Direct operations	<p>In 2010, Bayer North America undertook a comprehensive water reduction project. With the help of external consultants, the water footprint was evaluated for all Bayer sites in the United States and Canada. In addition, using the WBCSD Water Tool, all sites were evaluated with regard to potential water scarcity using the water scarcity index of the University of New Hampshire as well as the water scarcity analysis of the World Resources Institute. To account for future changes in water supply, current data as well as projections for 2025 were taken into account. All North American Bayer HealthCare and Bayer CropScience sites that are located in regions with potential water stress or scarcity in the next two decades or sites that are heavy water users were evaluated in detail to identify</p>	<p>As a result of the site assessments and in-depth evaluations, site-specific water reduction targets were identified for BHC and BCS sites in the United States and Canada that are located in regions with current or future water stress or scarcity or are heavy water users. The targets range between 15% and 90% depending on the specific sites. Furthermore, a best practice collection was compiled to enhance knowledge sharing between sites and regions.</p>

Geographical reach	Type of action	Action	Outcomes
Europe	Direct operations	<p>water reduction potentials. The analysis necessary for developing water reduction targets for our Bayer MaterialScience industrial sites in North America is currently in progress with the goal of having water reduction targets established by the third quarter of 2011.</p> <p>In order to analyze the use of resources such as water in its entirety and identify measures to minimize consumption, Bayer Technology Services developed the Resource Efficiency Check in 2009. In 2010, the Resource Efficiency Check was tested in several pilots at Bayer CropScience and Bayer MaterialScience. *** The aim of the Resource Efficiency Check is to identify measures in production processes and processing procedures to enhance the resource efficiency of, for example, raw materials, water and solvents and thus limit emissions and waste. This will lead to process optimizations in the form of increased yields (reducing raw material usage and loss of products) as well as in recycling, the utilization of by-products, and wastewater or waste air treatment.</p>	<p>In 2010, one pilot project was completed at Bayer CropScience to analyze the resource efficiency at one European site of one product across the entire synthesis chain. Pilot projects at Bayer MaterialScience focused on optimizing individual plants in Europe. Water was an important topic within the pilots at one European plant focusing on the development of ideas for increasing the energy efficiency of wastewater treatment. Overall, the pilots showed that in terms of water consumption or water treatment, there was no significant improvement potential. The Resource Efficiency Check will now be implemented at additional sites, e.g., in the United States. In 2011, two pilots have already started at Bayer CropScience sites.</p>
Germany (Currenta)	Direct operations	<p>Currenta, a joint venture with Lanxess AG in which Bayer holds a 60% share, is the CHEMPARK operator at Bayer's Uerdingen, Leverkusen and Dormagen sites. To improve the quality of discharges, Currenta completed a six-year modernization project of a sedimentation tank in Leverkusen-Bürrig amounting to total investments of EUR 18 million. This made it possible to significantly reduce the concentration of nitrogen compounds in wastewater and, at the same time, to reduce the costs for secondary biological treatment processes. *** Following the start-up of a new wastewater pretreatment plant for Bayer CropScience at the CHEMPARK Dormagen site (Germany) at the beginning of 2010, Currenta is planning further improvements in the capacity of wastewater treatment plants in Dormagen through 2011. In addition, Currenta is also planning to supply environmentally friendly energy generated from industrial wastewater treatment sludge</p>	<p>The modernization of the sedimentation tank at Leverkusen-Bürrig led to a reduction in the concentration of nitrogen compounds in wastewater by over 40%. In a pilot project, it was shown that 20,000 metric tons of dehydrated wastewater treatment sludge generated each year in the biological treatment of chemical wastewater can be used to generate biogas despite its chemical contamination, provided that a treatment process newly developed by Currenta is placed upstream.</p>

Geographical reach	Type of action	Action	Outcomes
Indonesia, India	Supply chain and watershed management	<p>and liquid waste to the plants at the CHEMPARK Leverkusen site.</p> <p>(1) As part of its Food Chain Partnerships, Bayer CropScience (BCS) launched a direct rice seeding program in Indonesia in 2009. Within this program, Bayer helps farmers switch from the resource-intensive process of planting rice to seeding pre-germinated rice directly. While water consumption falls, the rice yield increases by around 10%. At the same time, emissions of the greenhouse gas methane are cut by around 30%. *** (2) Since 2009, BCS and Reitzel Groupe, an international food company, have been working together in a food chain partnership project in India. The aim of the project is to improve the yield and quality of gherkins by developing and implementing good agricultural practices (GAP). BCS contributes innovative crop protection solutions and technical expertise. In order to preserve natural resources such as water, farmers have been advised and trained on GAP including modern cultivation methods, the safe use of crop protection products and improved water management. *** (3) In 2010, BCS launched the Model Village Project in India aiming at introducing systematic droplet irrigation in seed production while helping to raise living standards in rural areas. This will raise the farmers' income, while at the same time contributing to a sustainable protection of the precious groundwater resources through the eco-friendly irrigation method.</p>	<p>(1) In 2010, the sustainable rice cultivation method in Indonesia was already being practiced by more than 8,600 small-scale farmers across an area totaling over 2,500 hectares. This method results in the reduction in water use of approximately 5,000 liters per hectare per rice cropping season. *** (2) The objective of the sustainable gherkin production project in India to develop and implement effective solutions to improve the yield and quality of gherkins was achieved in line with the principles of sustainable agriculture. This food chain partnership continues for the benefit of all the partners involved. Within the scope of the project, 5,000 farmers were advised by 45 agri-technicians. An increase in farmers' net income is among the benefits of the project. *** (3) The drip irrigation stage of the "Model Village Project" is to be rolled out in about 400 villages where BCS presently holds contracts with producers of cotton seeds. Following this step, additional measures will be developed to make sure that the financial gains of the productivity increases remain in the villages.</p>
China	Other: Support water-related research	<p>Bayer is supporting several water-related research projects at Tongji University in China: *** (1) Analysis of the Shanghai industry water footprint: The water footprint is an indicator of water use that looks at both direct and indirect water use of a consumer or producer. In a water-stressed world, the water footprint of products will be a key environmental indicator in the drive towards increased sustainable development. The aim of this project is to develop a model for a sustainability assessment of the water and energy footprint in Shanghai, and to provide assistance in policy-making. The project ran</p>	<p>The following outcomes have been achieved or are expected from the Tongji University research projects described: *** (1) The result of the Shanghai industry water footprint project is expected to be useful for promoting water and energy conservation in Shanghai. Existing water and energy footprint data in Shanghai were already collected and analyzed. For example, the researchers found out that the biggest water consumers in Shanghai are coal plants. Also, two case studies analyzing the water and energy footprint of the 2010 Shanghai World Expo</p>

Geographical reach	Type of action	Action	Outcomes
		<p>from January to December 2010. *** (2) Research is also under way on projects for the treatment of wastewater from the cassava bio-ethanol production process. This process was generating strongly polluted wastewater due to a lack of process technologies. *** (3) Another project supported by Bayer is a clean water project in Gansu province. In Huan County, Gansu Province, located in the northwest region of China, more than 30% of the local drinking water contains an elevated level of Cr(VI), which has imposed a serious threat to the safety of local people. The objective of the clean water project in Gansu province is to develop zero-valent iron-modified filters for Cr(VI) removal from drinking water. *** (4) Further projects are under way, e.g., to evaluate the water footprint in Chongming Island and to investigate the water quantity and quality in China and in Africa.</p>	<p>and the “Tongji Green Campus” were undertaken. Furthermore, surveys were carried out to investigate the public awareness and opinion on energy and water footprinting. *** (2) The wastewater from cassava bio-ethanol production is now being treated using a new patented anaerobic process. Important parameters, e.g., pH, temperature, HRT were studied to search for optimal conditions. As a result, anaerobic digestion for alcohol stillage treatment has been demonstrated as an effective and economic treatment technology, which is very important from a recycling, energy production and pollution reduction point of view. Research is still ongoing to find the optimal parameters for co-digestion of cassava stillage and excess sludge for hydrogen and methane production. *** (3) The lab experimental phase for the clean water project in the Gansu province has been completed, and a demonstration plant for Cr(VI) removal is under construction. The project demonstrated that zero-valent iron (ZVI) is an efficient and inexpensive reductant for Cr(VI). Under appropriate conditions, complete removal of Cr(VI) from solution has been achieved in the laboratory studies.</p>
Brazil	Community engagement	<p>(1) Since 2006, Bayer CropScience (BCS) has been supporting the “Nossa Agua” water project in Londrina, Brazil. The initiative of the Integrada Cooperativa Agroindustrial (Integrated Agribusiness Cooperative) from Londrina (state of Paraná) was launched based on BCS’s Water Project and has counted on the sole support of the company since 2006. The purpose of the project is to improve awareness among the cooperative’s members regarding the recovery of the river that borders forest and nurseries in Paraná by means of technical support provided by Integrada’s employees themselves. Forests that grow close to riverbanks and other water bodies have an important function in preserving the water equilibrium in the ecosystem. *** (2) Bayer</p>	<p>(1) Since its creation, Integrada has already supplied more than 700,000 native tree seedlings to its members who are aiming to recover the river bordering forest in 92 Paraná municipalities and has put upwards of 67,000 fish hatchlings in the rivers. *** (2) The Mandalla Project has already benefited upwards of 1,500 small farmers in rural settlements in Brazilian States such as Paraíba and Minas Gerais.</p>

Geographical reach	Type of action	Action	Outcomes
USA, China, Marocco, Pakistan, Venezuela	Community engagement	<p>CropScience has partnered with the Mandalla Agency, an NGO from João Pessoa (state of Paraíba), in developing the Mandalla Project since 2004. The company supports the project, the purpose of which is to produce food for the sustenance of small family farmers living in rural settlements in needy regions, both financially and technically. The project's methodology focuses on three basic issues: guaranteeing quality of life, economic productivity and environmental balance by means of actions that encourage the rational use of the existing potential, water, and to produce quality food at high productivity and with a high level of social responsibility in the best way possible to combat hunger and misery. By building hotbeds around circular tanks called "mandalas," the irrigation system allows for the planting of fruit and vegetables in these water-scarce regions. The water in the tank is also used to breed fish and birds. The UNICENTER Mandalla (the National Center for the Dissemination of Social Technologies) was established in Cutié (state of Paraíba) in 2005 and aims to train young people and adults to disseminate the Mandalla technology and, thus, continue developing other self-sustainable projects.</p> <p>(1) In 2008, the Bayer Science and Education Foundation set up the Bayer Sustainability Camp in Pittsburgh (United States) as part of the Bayer Climate Program. The third round of funding took place in the summer of 2010. During a two-week camp, students between the age of 14 and 16 can expand their knowledge and establish contact with like-minded students. They attend lectures, discuss key topics with experts and take part in excursions involving laboratory and fieldwork experiments. For example, the Climate Fellows navigate along rivers to collect soil and water samples, which they then evaluate. Since 2008, the foundation has contributed a total of EUR 86,582 to this initiative. *** (2) Within our focus on environmental education, we published a book on climate change in China. The cartoon book educates children about</p>	<p>(1) In the summer of 2010, 15 American and German high school students learnt about environmental sustainability issues during the third annual International Bayer Summer Sustainability Camp in Pittsburgh, United States. The students conducted hands-on field studies of aquatic biology on Western Pennsylvania's Allegheny, Monongahela and Ohio Rivers. They also attended environmental sustainability classes at Duquesne University. *** (2) The cartoon book on climate change was distributed to 200 schools in China. It also reached more than 100,000 children and parents at the Children's Environmental Protection Carnival in Shanghai. By the end of 2010, 20,000 Chinese and 10,000 English copies had been distributed. *** (3) Bayer is supporting the project in</p>

Geographical reach	Type of action	Action	Outcomes
		<p>problems related to climate change, including water-related topics such as drought and changing rainfall patterns. *** (3) In Morocco, we supported the project "Fondation du Sud" aimed at planting trees in order to halt the speed of desertification. *** (4) In 2010, our Bayer Cares Foundation donated EUR 50,000 to relief organizations in Pakistan to help flood victims. In Venezuela, Bayer donated medicines and food to be distributed to thousands of people affected after weeks of non-stop rains and mud slides.</p>	<p>Morocco to replant 5 million trees in the south of the country. Furthermore, research is being conducted on several tree species to find the ones best adapted to the dry conditions of Southern Morocco. The farm was officially inaugurated in 2009 and the distribution of young trees to village communities started in 2010. Bayer has committed financial support of approximately EUR 90,000 per year for a five-year period. *** (4) EUR 50,000 distributed to relief organizations in Pakistan were used to provide assistance in the form of food, emergency shelter, drinking water and water purification tablets for flood victims. Aid for victims in Venezuela amounted to over EUR 63,000.</p>

## Module: 2011-Water-RisksOps

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#### 2.1

**Are you able to identify which of your operations are located in water-stressed regions?**

Yes

#### 2.1a

**Please specify the method(s) you use to characterize water-stressed regions**

Method used to define water stress	Please add any comments here:
<p>Internal company knowledge Regional government assessments or databases WBCSD Water Tool WRI water scarcity definition</p>	<p>All Bayer sites that report water data to Bayer's Site Information System "BaySIS" have been mapped using the WBCSD Global Water Tool. In BaySIS, all production sites and non-production sites that are considered environmentally relevant report water-related key performance indicators on a regular basis. These sites represent approximately 99% of Bayer's total water use. To calculate the percentage of Bayer operations in water-stressed regions, we have applied the water stress measurement method of the World Resources Institute (WRI), which is included in the WBCSD Global Water Tool. According to this measurement method, regions suffering from periodic shortages, where annual renewable water supplies are below 1,700 cubic meters/person, are considered to be water-stressed. *** Within the process of drafting Bayer's first Water Disclosure Report in 2010, requests were sent to all major sites that are located in water-stressed or scarce regions according to the WRI analysis. This included major water-using sites, e.g., Leverkusen, Dormagen, Uerdingen in Germany and Antwerp in Belgium. According to the WRI analysis, these regions experience water stress or even water scarcity. However, according to our site managers, these sites are currently not experiencing any water stress or scarcity as appropriate technologies exist in the respective countries and at Bayer sites to ensure sufficient water supplies and safeguard production against temporary water shortages. A re-evaluation of our sites using the updated version of the WBCSD Water Tool in 2011 led to the same results. To complement the site requests from last year, we conducted in-depth telephone interviews with major water-using sites that are located in water-stressed or scarce regions according to the classification by the WRI. Furthermore, we evaluated external publications such as the country request sent to EU member countries within the framework of the EU water scarcity and droughts initiative. Based on these evaluations, we adjusted the number of water-stressed and scarce regions from the WRI analysis. The following list therefore only includes regions that are currently experiencing water stress or scarcity according to the WRI analysis and according to our site managers.</p>

<b>Method used to define water stress</b>	<b>Please add any comments here:</b>
	Furthermore, to ensure reporting relevance, we only took into account sites with more than 0.1% of Bayer's total water use.

**2.1b**

**Please list the water-stressed regions where you have operations and the percentage of your total operations in that area**

<b>Country</b>	<b>Region within country</b>	<b>Proportion of operations located in this region (%)</b>	<b>Further comments</b>
Brazil	Rio de Janeiro state (GHAASBasin3457)	0 – 10	Our site in Belford Roxo accounts for 0.16% of Bayer's total water use. According to the WRI analysis, this site is located in a region with extreme water scarcity. Our site managers confirmed this analysis. The site is mainly using river water for production, which is treated by a water treatment plant. However, water scarcity is being temporarily experienced due to the high pollution of the river from sanitary wastewater. In these cases, municipal water needs to be withdrawn. Currently, a reservoir is being constructed by Bayer and partners to safeguard against temporary water shortages and to reduce the consumption of municipal water.
Spain	Catalonia (GHAASBasin4110)	0 – 10	Our Catalonian site in Tarragona accounts for 0.20% of Bayer's total water use. According to the WRI analysis, this site is located in a region with extreme water scarcity. Our site manager in Tarragona confirmed this analysis. The site has taken extensive action to reduce water consumption. Temporary water shortages are especially experienced in summer due to an increased number of tourists in the region. Therefore, water use is restricted by the government. However, since the 1980s, Bayer has not experienced any production impacts due to the low water use and appropriate measures at the site.
Thailand	Map Ta Phut (GHAASBasin3111)	0 – 10	Our site in Map Ta Phut accounts for 0.88% of Bayer's total water use. According to the WRI analysis, this site is located in a region with water scarcity. After two years of low rainfall, the site experienced temporary water shortages in 2005. To safeguard production against future water scarcity, appropriate measures have been taken, e.g., the connection to water reservoirs with bigger water reserves. In addition, a special committee, including representatives from Bayer and other companies that are located at the industrial estate, has been set up to constantly monitor water supply.

**2.2**

**Do you use other indicators (besides water stress) to identify operations which are located in regions subject to water-related risk?**

No

**2.3**

**Please specify the total percentage of your operations that are located in the regions at risk which you identified in questions 2.1 and/or 2.2**

1.2%

## 2.4

Please specify the basis you use to calculate the percentages used for questions 2.1 and/or 2.2

Basis used to determine percentage	Please add any comments here
Other: Total water use	Water use is measured at site level and monitored regularly in our central Bayer Site Information System "BaySIS". Water use represents net water withdrawals after discharges to third parties. For example, Bayer's service company Currenta, a joint venture with Lanxess, in which Bayer holds a 60% share, is the CHEMPARK provider at Bayer's Uerdingen, Leverkusen and Dormagen sites. At these sites, Currenta supplies water to all CHEMPARK companies including third parties. Third-party supply is deducted from Currenta's total water withdrawals to calculate water use that can be attributed to Bayer.

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## 2.5

Are you able to identify which of your key water-intensive inputs (excluding water) come from regions subject to water-related risk?

Yes

## 2.5a

Please state or estimate the percentage of your key water-intensive inputs (excluding water) that come from these regions

Inputs	Proportion of material that comes from region at risk (%)	Unit used for calculating percentage	Regional information or further comments
BHC: API inputs	11 – 20	Value of material purchased	The inputs are coming from suppliers in emerging countries, in which regions with potential water scarcity exist according to the WRI analysis. With regard to our API inputs, this especially affects suppliers in China and India. Although we do not centrally record the exact location of the production sites, we assumed that these suppliers are most likely to be affected by water scarcity as several regions in China and India are classified as water-scarce regions according to the analysis by the World Resources Institute. Furthermore, we assumed that our suppliers in developed countries are not very likely to be affected by water scarcity as our own site managers did not confirm any water scarcity issues because appropriate measures exist in these countries and sites to safeguard water supplies.
BCS inputs	0 – 10	Value of material purchased	BCS does not depend on supplies of water-intensive inputs from regions at risk because Bayer CropScience has approximately 150 different active ingredients in its portfolio and uses diverse suppliers for raw materials, intermediates or active ingredients. Many substances are sourced from different regions in the world. Also in BCS's manufacturing network there is flexibility to produce substances at different sites in different regions. Therefore, if water scarcity affects the production of a certain supplier, potential supply shortages can be balanced out through sourcing from a different region.
BMS inputs	0 – 10	Value of material purchased	In general, there are no significant water-related risks in the petrochemical supply market. Key materials for our Bayer MaterialScience business are purchased on spot markets. Furthermore, our large suppliers are global players, which have production sites in different countries. If temporary water shortages appear in one country, we expect that our suppliers can source from other countries to ensure supplies. In the past, water-related risks have not impacted our supply chain.

## 3.1

Is your company exposed to water-related risks (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?

Yes

## 3.1a

Please describe the current and/or future risks to your operations, the ways in which these risks affect or could affect your operations and your current or proposed strategies for managing them

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Europe	03. Physical: Increased water stress or scarcity (leading to e.g. disruption to operations, higher commodity/energy prices)	Some of Bayer's European sites in Germany, Spain, Belgium and Switzerland are located in areas classified as water-stressed or water-scarce by the World Resources Institute. Due to climate-related changes, water supplies could decrease in the future. Although no interruption of business operations is expected as Bayer has appropriate measures in place to ensure sufficient supply, a further decrease in water supplies in the future could put adaptive pressure on Bayer's energy supply and management, e.g., in cooling towers.	> 20	Several Bayer sites in Europe are located in regions that are considered water-stressed or water-scarce according to the classification of the World Resources Institute (WRI). Using the WBCSD Global Water Tool, Bayer has mapped all production sites and sites that are especially environmentally relevant against the WRI water scarcity index (representing 99% of Bayer's water use). *** Even though water shortages could present a risk for water supply at certain Bayer plants located in Europe, we are currently not significantly affected by this risk as protective measures have been taken to ensure sufficient supplies. For example, our water tower in Dormagen and storage tanks in Uerdingen and Leverkusen help to safeguard our operations from temporary water shortages. *** Nevertheless, we are aware of the fact that changes in precipitation patterns could affect Bayer sites in Europe. However, so far, there is no indication that the	Bayer's strategy mitigates risks from increased water scarcity by focusing on reducing water consumption in affected sites and ensuring water supply through protective measures. Concrete measures to mitigate the impact of increased water stress or scarcity in Europe include the following: (1) Bayer has special operating plans in place for high and low tide in the Rhine to ensure constant water supply at these sites. As the site manager and operator in Uerdingen, Leverkusen and Dormagen, Currenta provides water to all companies with CHEMPARK. To ensure sufficient water supply, Currenta constantly monitors the seasonal availability of water using groundwater simulations. (2) As already described above, Bayer is taking several measures to reduce water consumption. These measures include the following: ** (a) At Bayer HealthCare's (BHC) site in Bismarck, Germany, 3,000 m3 of specially

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
				<p>exposure of Bayer's sites to weather-related risks will increase in the future. The probability of a significant impact from these risks is thus rated extremely low.</p>	<p>treated ultra-pu water for clean pharmaceutical production plant can be saved e year as a result a process optimization. ** By performing specific energy efficiency assessments in 2010, BHC identified potential savings in water consumption at sites. A water saving potential of 460,000 m3 was identified and is going to be realized in the next year *** (c) EMAS measures at Bergkamen, Germany, include new water- and wastewater-related plans, e.g., reduction in water usage and wastewater volume by replacing water ring pumps with vacuum pumps (d) At our Bayer MaterialScience (BMS) site in Tarragona, Spain a plant for the treatment of rainwater collected in a retention reservoir as cooling water was launched in November 2011. This will allow savings of around 60,000 m3 of water per year, corresponding to approx. 7 percent of the site's total water consumption *** (e) To safeguard the supply of drinking water in the region of Catalonia, Spain a project was initiated in July 2010 for the reuse of wastewater from two municipal treatment plants. Upon completion water treatment plant with a capacity of approx.</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Americas	03. Physical: Increased water stress or scarcity (leading to e.g. disruption to operations, higher commodity/energy prices)	<p>According to the World Resources Institute, some Bayer sites in the United States and Brazil are located in water-scarce regions. Although no interruption of business operations is expected as Bayer has appropriate measures in place to ensure sufficient supply, a further decrease in water supplies could put adaptive pressure on Bayer's energy supply and management, e.g., in cooling towers.</p>	> 20	<p>Several Bayer sites in the United States and Brazil are located in regions that are considered water-stressed or water-scarce according to the classification of the World Resources Institute (WRI). Using the WBCSD Global Water Tool, Bayer has mapped all production sites and sites that are especially environmentally relevant against the WRI water scarcity index (representing 99% of Bayer's water use). *** Even though water shortages could present a risk for water supply at certain Bayer plants, we are currently not significantly affected by this risk as protective measures have been taken to ensure sufficient supplies. *** Nevertheless, we are aware of the fact that changes in precipitation patterns could affect Bayer sites in the United States and Brazil. However, so far, there is no indication that the exposure of Bayer's sites to weather-related risks will increase in the future. The probability of a significant impact from these risks is</p>	<p>6.5 million m3 of wastewater per year will begin operating in July 2011. Of this treated wastewater around 240,000 m3 is to be made available to Bayer for use as process water at our site Tarragona.</p> <p>Bayer's strategies to mitigate risks from increased water scarcity focus on reducing water consumption in affected sites and ensuring water supply through protective measures. Bayer measures to mitigate the risk of increased water stress or scarcity in North and South America include the following: ** (1) At our Bayer Material Science site in Baytown, United States, a water consumption analysis was carried out in cooperation with the water company. It was confirmed that the site was using water efficiently. To reduce water consumption further, a project was initiated for reuse of wastewater. The aim of the project in Baytown is to improve water usage efficiency. As a result of the project, once completed, the plant can save around 300,000 m3 of water per year. 75% of the cooling tower blowdown stream is reused. *** (2) In 2010, Bayer North America conducted a water risk assessment for the North American region. With the</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Asia	03. Physical: Increased water stress or scarcity (leading to e.g. disruption to operations, higher commodity/energy prices)	According to the World Resources Institute, some Bayer sites in China, India and Thailand are located in water-scarce or water-stressed regions. Although no interruption of business operations	> 20	<p>thus rated extremely low.</p> <p>Several Bayer sites in Asia are located in regions that are considered water-stressed or water-scarce according to the classification of the World Resources Institute (WRI). Using the WBCSD Global</p>	<p>help of external consultants, the water footprint evaluated for a Bayer sites in the United States &amp; Canada. In addition, using WBCSD Water Tool, all sites were evaluated with regard to potential water scarcity using the water scarcity index of the University of New Hampshire as well as the water scarcity analysis of the World Resources Institute. To account for future changes in water supply, current data as well as projections for 2025 were taken into account. Detailed assessments of water reduction potentials were then conducted at Bayer HealthCare and Bayer CropScience sites that are located in regions with potential water stress or scarcity over the next two decades. Water reduction targets between 15% &amp; 90%, depending on the specific site were set and concrete improvement measures developed. In 2011, it is planned to roll out the assessment to Bayer MaterialScience sites.</p> <p>Bayer's strategy to mitigate risks from increased water scarcity focuses on reducing water consumption in affected sites and ensuring water supply through protective measures. For</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		is expected as Bayer has appropriate measures in place to ensure sufficient supply, a further decrease in water supplies could put adaptive pressure on Bayer's energy supply and management, e.g., in cooling towers.		Water Tool, Bayer has mapped all production sites and sites that are especially environmentally relevant against the WRI water scarcity index (representing 99% of Bayer's water use). *** Even though water shortages could present a risk for water supply at certain Bayer plants, we are currently not significantly affected by this risk as protective measures have been taken to ensure sufficient supplies. *** Nevertheless, we are aware of the fact that changes in precipitation patterns could affect Bayer sites in China, India and Thailand. However, so far, there is no indication that the exposure of Bayer's sites to weather-related risks will increase in the future. The probability of a significant impact from these risks is thus rated extremely low.	example, in 2011 water reserves in the Map Ta Phou region became very low, after 10 years of reduced rainfall. Emergency measures had to be executed by individual companies and the government because the water reservoirs were not connected well enough to ensure sufficient supply. Meanwhile, the reservoirs have been connected with bigger water reserves so the Bayer is not expecting any significant risks from reduced water supplies. *** Nevertheless, in order to mitigate the risk of water scarcity at our sites in Map Ta Phou, we have taken measures to reduce our specific usage of demineralized water (DM) for production of bisphenol A (BPA) by reusing treated water from the bottom of a wastewater stripping column. Also, reuse of process water for the production of carbon monoxide was possible at a sand filter has been installed. We constantly monitor the development of water supply in future, a special committee, including representatives from Bayer and other companies that are located in the industrial estate, has been set up.
Other: Europe	02. Physical: Flooding	Some of our European sites in Germany, Spain and Belgium are	> 20	Our German production sites in Leverkusen, Uerdingen and	Bayer's strategy to mitigate the risk described encompasses

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		<p>potentially threatened by flooding, e.g., of the river Rhine.</p>		<p>Dormagen are potentially threatened by flooding of the River Rhine. Bayer also operates other sites in Europe potentially threatened by floods. A change in the frequency of storms and floods could disrupt operations at these sites, possibly leading to a shut-down of production plants or the destruction of our property. *** Although Bayer identifies these risks as potentially apparent, there is no indication that the exposure of Bayer's sites to weather-related risks will increase in the near future. To date, natural disasters have not caused major damage to our production plants or resulted in a significant loss of production. An evaluation of the last 50 years showed that there have not been any changes related to our sites' exposure to weather-related risk. Also, the probabilities for worst-case scenarios and the need for additional protective measures are estimated to be very low.</p>	<p>preventive measures such reinforcing dike monitoring systems, appropriate insurance cover and emergency response systems. Concrete measures include the following: *** (1) Among others, Bayer Emergency Response System BayERS also covers risks related to water shortage or flooding. This helps to protect employees, the environment at production sites and consequent safeguards Bayer business results. BayERS is a mandatory element of the integrated HSEQ management system at Bayer production sites designed to ensure appropriate crisis management in event of unusual occurrences. For non-ad-hoc and non-catastrophic events, Bayer closely monitors critical trends and is prepared to take action wherever the situation requires. *** (2) Bayer operates three production sites (Leverkusen, Uerdingen and Dormagen) that are potentially threatened by flooding of the River Rhine. All three sites are protected by dikes that have been reinforced in recent years. Germany as a whole has a comprehensive flood monitoring system in place. Bayer's service company Currenta, which manages and operates the</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Asia and United States of America	02. Physical: Flooding	A potential increase in storms and floods could especially affect our Asian site in Caojing, China, and Map Ta Phut, Thailand, and our Baytown site in the United States in the future. Furthermore, our Indian sites could be subject to heavy	> 20	Bayer operates three sites in Asia and the United States located in coastal regions (Baytown, Map Ta Phut and Caojing) that are exposed to the risk of hurricanes. Also, some Bayer production sites	<p>sites, has access to this system and monitors developments closely. In the event of extreme weather conditions it triggers the appropriate measures at sites that are at risk. During the mid-1990s, a new flood protection system was developed in the region. Currently this is accompanied by development and reinforcement of the protection concept. Furthermore, we have reinforced walls at our affected production sites as a protective measure. *** (3) protect against financial losses to natural disasters. Bayer spends approximately 10 million per annum globally on insurance. Risk exposure is closely monitored. So far there has not been any increase in water-related risk and there is no increase expected in the foreseeable future. Therefore the current insurance coverage is sufficient to protect Bayer economically from physical risks as there are no costs expected to arise from an increase in these risks, e.g. due to floods.</p> <p>Bayer's strategy to mitigate the risk described encompasses the following preventive measures: *** (3) Bayer has three production sites located in coastal regions which expose the risk of</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		<p>monsoons. In addition to affecting our operations and production facilities, storms, floods and heavy monsoons could also lead to infrastructure and privacy losses.</p>		<p>located in Asia are potentially threatened by floods. A change in the frequency of storms and floods could disrupt operations at these sites, possibly leading to a shut-down of production plants or the destruction of our property. Extreme weather conditions could also destroy the surrounding infrastructure, affecting employee commuting or essential supplies. *** Although Bayer identifies these risks as potentially apparent as they are outlined by the IPCC, there is no indication that the climate-change-induced exposure of Bayer's sites to weather-related risks will increase in the near future. To date, natural disasters have not caused major damage to our production plants or resulted in a significant loss of production. An evaluation of the last 50 years showed that there have not been any changes related to our sites' exposure to weather-related risk. Also, the probabilities for worst-case scenarios and the need for additional protective measures are estimated to be very low.</p>	<p>hurricanes. The sites have comprehensive disaster management programs in place ensuring the safety of the workforce, the environment and production assets. For example, the Caojing site has developed an extensive emergency response plan (ERP) based on environmental, safety and health impact assessment. The ERP includes at least two training sessions per year for Bayer staff on how to act in case of an emergency including in abnormal weather events. *** (2) Manufacturing in some parts of the world (e.g., India) may be subject to particularly heavy monsoons. Comprehensive monitoring systems are in place at these sites to ensure appropriate reaction times and risk management responses. *** As described above, to protect against financial losses due to natural disasters Bayer spends approximately 10 million per annum globally on insurance. Risk exposure is closely monitored. So far there has not been any increase in water-related risk and there is no increase expected in the foreseeable future. Therefore the current insurance coverage is sufficient to protect Bayer</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Europe and United States of America	09. Regulatory: Regulation of discharge quality/volumes leading to higher compliance costs	Permits for wastewater discharge/regulations on discharge quality are becoming more and more stringent related to the implementation of the EU Water Framework Directive. This could increase wastewater treatment costs. Furthermore, a potential increase in regulations on discharge quality could also occur under the U.S. Safe Drinking Water Act. We generally expect regulations at both the state and the federal level in the United States to become tighter in terms of what is tested, what levels of certain chemicals are permissible and a drive for new technology to remove undesirable contaminants. This could increase wastewater treatment costs in our U.S. operations.	1 – 5	Tighter permit procedures for wastewater and increasing regulations on discharge quality could affect the operations of all Bayer subgroups in the EU and United States as decentralized process measures at site level would become necessary to improve wastewater quality. For example, in Germany, increased regulations can further limit the entry of hexachlorobenzene into the river Elbe. However, the risk exposure is rather limited as only 10 to 20% of Bayer's wastewater needs to be treated. In addition, critical water is extensively tested and treated in treatment plants. *** Furthermore, 85% of Bayer's water use is once-through cooling water. This water is only heated and does not come into direct contact with chemical or pharmaceutical substances. It can simply be fed back into the natural water cycle without any treatment.	economically for physical risks a there are no co expected to ari: from an increa these risks, e.g due to climate change. Bayer's strateg mitigate the risk described is ba on implementin site-specific ac to improve the quality of discharges and life-cycle evaluations of significant investments. ** All Bayer subgroups are constantly monitoring discharge level ensure complia with current regulation. In addition, site-specific actions taken in order t improve the qu of discharges. Current project include, for example, wastewater treatment with activated carboc and thermal treatment at Bergkamen, Germany. Anot project is curre running in Knapsack, Germany desig to improve the environmental balance in the production of trifluoromethyl-acetophenone using an impro wastewater pre treatment stage (2) According to Group Directive investments ab EUR 10 million evaluated with regard to their environmental impact. The "Ecological Assessment" includes both a product and process evalua

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Europe – Bayer HealthCare	05. Regulatory: Changed product standards (leading to loss of sales or development costs for new products)	Current discussions to derive Environmental Quality Standards for additional substances under the EU Water Framework Directive, which either have to be phased out (priority hazardous substances, PHS) or have to be limited to certain levels in surface water (priority substances), are particularly relevant for Bayer HealthCare's ethinylestradiol and estradiol active ingredients. *** In 2010, ethinylestradiol and estradiol were for the first time	1 – 5	If any BHC substances are included in the PHS list, discharges, losses or emissions will have to be ceased or completely phased out in the long term (within 20 years after adoption of the requirement). Thus inclusion in the PHS or priority substance list might have a financial impact on our business in terms of increased safety measures and limitations to our product portfolio. Current discussions are	<p>The process evaluation assesses the impacts of new investment projects on organisms and the environment which are specific to the location of the facility. Points to be concentrated on in the process evaluation are resource consumption (e.g. water use, energy, raw materials), emissions situation (e.g., emissions into air and water at the facility location, and an assessment of raw materials, intermediates and products with regard to the sufficiency of the data and risk potentials. For substances with hazardous (ecotoxicological) characteristics, evaluations of the risks to humans and/or the environment are carried out, depending upon the potential danger and local circumstances in each case.</p> <p>Bayer's strategy to mitigate the risk described is mainly focused on the involvement in the EU process and the improvement of our scientific basis with regard to the respective substances. *** BHC continuously engages in activities to analyze the impact of its products and ingredients on the environment and to improve the scientific basis in this respect. Under current EU legislation, Bayer conducts environmental</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		<p>included in the discussions concerning the re-evaluation of the substance lists. The results from the discussions are not clear yet. Possible scenarios range from the exclusion of pharmaceutical ingredients from the EU discussions to their inclusion in the PHS list. Although we currently expect them not to be included as PHS on the substance list, a proposal for the final list of the European Commission will only be submitted in fall 2011. This proposal will be subject to political decision processes involving the European Parliament later on.</p> <p>*** In the future a "watch list" will be prepared, which will most likely include pharmaceuticals. After a monitoring period, a risk-based decision will be taken in order to move some substances to the priority list, if needed. ***</p> <p>Additionally, market authorization of animal health products may be limited or denied due to environmental risks.</p>		<p>focusing, in particular, on BHC's ethinylestradiol and estradiol active ingredients. For priority substances, Environmental Quality Standards under the EU Framework Directive define maximum concentrations in environmental water bodies. As a result, monitoring programs as well as measures for reducing discharges and emissions of these substances will be developed by EU Member States. This may increase site requirements in the EU, e.g., requirements for certain wastewater treatment technologies or standards, or enlarged monitoring obligations. Increasing requirements on wastewater treatment might impact Bayer through increased water prices charged by water providers. *** With regard to our Animal Health division, there is also a certain risk that market authorization or specific indications may be denied or limited based on environmental risks deriving from groundwater and/or surface water assessments.</p>	<p>assessments a standard procedure for drug applications. ** To further improve the scientific basis for the analysis of the impact of active ingredients in the environment and to understand the potential risks, BHC has set up a task force "Pharmaceuticals in the Environment" (PIE). The PIE task force cooperates with national authorities to enable an improved understanding of the further development of Environmental Quality Assessments (EQA) (EMEA, FDA). * (3) Furthermore, BHC is engaging in different public projects. For example, BHC is represented in the Advisory Council on the PILLs partnership, contributing its knowledge to the research project "Water for People" which runs from 2007 to 2011 with the purpose of conducting research on wastewater treatment. *** (4) BHC also actively engages with policymakers and industry associations on this topic, e.g., DG Environment Working Group on the EFPIA EHS network and the VFA Environmental and Safety group. For example, through the European association of pharmaceutical industry (EFPIA) BHC is involved in the EU process with the aim of</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
Other: Europe	05. Regulatory: Changed product standards (leading to loss of sales or development costs for new products)	Increasing requirements regarding the use of crop protection products under existing and upcoming EU Directives (e.g., new Registration Directive, Water Framework Directive, and sustainable use directive for plant protection products) may lead to restrictions in some uses of crop protection products and an increasing need for measures to reduce the concentration of the respective active ingredients mainly in surface water. The regulations of the new EU registration policy concerning crop protection product requirements took immediate effect throughout Europe from June 14, 2011, while the directive governing the sustainable use of crop protection products will be implemented in national laws as of December 14, 2011. *** Furthermore,	1 – 5	The water quality standards mentioned present a risk, in particular, for our Bayer CropScience (BCS) business. Increasing requirements regarding contamination limits of crop protection products under existing and upcoming EU Directives pose a potential risk for individual BCS products. So far, the impact on the BCS portfolio was very limited. *** According to the EU Water Framework Directive the targeted improvement in water quality should be measurable by 2015. The resulting country legislations are still in the implementation phase. Thus, at this point it is not possible to predict if any increased restrictions will apply to BCS products. *** In the	providing its knowledge on t environmental assessment of ethinylestradiol. Bayer also participate the “Environment and Safety” expert working groups the German Association for Animal Health (Bundesverband für Tiergesundheit) and the IFAH Europe (International Federation for Animal Health) Environmental Safety Group as well as in the respective coordinative and political bodies these associations  Bayer's strategy mitigate this risk aims at preventing potential water pollution through e.g., strict analysis of contamination levels during product development and education on the correct application of our products BCS's R&D organization initiated several actions to minimize the risk of water contamination; BCS R&D guidance takes this into account. For example, within R&D process, leaching is a criterion and only active ingredients that pass the regulatory limits will be developed. (2) the EU legislation represents the strictest regulation worldwide in this respect, the EU limits are used as an orientation for worldwide Bayer research. Currently, a process is running in Belgium to analyze

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		<p>since the adoption of the Water Framework Directive (WFD) in 2000, the EU water policy has moved towards an integrated approach on the basis of the concept of river basin management aimed at achieving good quality of EU waters by 2015. However, many challenges are still to be overcome. A new European Commission initiative: "Blueprint for safeguarding European Waters", which will be implemented in the next 2-3 years, is the response to these challenges. It will aim to ensure good quality water in sufficient quantities for all legitimate uses. The time horizon of the Blueprint is 2020. This initiative will comprise the assessment of the River Basin Management Plans delivered by the Member States under the WFD, a review of the EU action on Water Scarcity and Droughts, a review of the vulnerability of water and environmental resources to climate change and other man-made pressures and a Fitness Check, which will address the whole EU water policy within the framework of the Commission Better Regulation approach. *** The Blueprint will have a special focus on agriculture, which is especially relevant for our Bayer CropScience business. Within the review of the River Basin Management Plans of Member States, diffuse</p>		<p>past, there have been cases where BCS withdrew products from the market due to increasing requirements regarding their concentration in water. *** The potential financial impact on BCS cannot be estimated as there is a high level of uncertainty as to which products might be affected in the future. On the other hand, the increasing legislation affecting crop protection products could also have positive financial effects for BCS. In the case that competitor products are affected by the increasing requirements, BCS could benefit from increased legislation if it can offer substitutes for the affected products. *** As already mentioned, the EU Blueprint will have a special focus on agriculture. It is not possible yet to estimate the potential business impact of the Blueprint on Bayer as first discussions will be held only at the end of this year. At the beginning of 2012, the input of respective stakeholders is expected.</p>	<p>PPP (plant protection products) concentrations water bodies to enhance BCS's knowledge base (3) BCS also take preventive actions to ensure the correct use of its products. Country-specific training programs are provided to achieve the safe and most efficient use under all agronomic conditions. (4) Several years ago BCS started to phase out WHO Class I products. For example, we discontinued the sale of products containing endosulfan worldwide at the end of 2010. Marketing activities for aldicarb will cease worldwide by 2012 at the latest. BCS will rigorously continue to successively reduce WHO Class I products. (5) In France, BCS has successfully implemented a biobed under the brand Phytobed. It is the first system to receive approval from the French Ministry of the Environment and Sustainable Development for use in all kinds of agricultural operation. A biobed works as follows: a pit in the ground is sealed with a waterproof film, filled with a mix of straw and organic material and covered with a layer of grassy material. When farmers clean their sprayer equipment on the biobed, the water drains into the pit and the</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		pollution from agriculture is one of the issues addressed.			organic material biodegrades the pesticide. This simple and low price solution to minimize pollution from pesticide use (6) Bayer is also involved in discussions with relevant authorities to support regulatory frameworks regarding the inclusion of substances in the future list of priority substances. BCS has recently joined the WBCSD Water Leadership Group. BCS will continue to contribute its experience and expertise to support appropriate solutions in scientific committees and partnership-based collaborations.
Other: Germany, Spain, China	06. Regulatory: Higher water prices	<p>Through a regulation on biodiversity, the system of water use fees can be affected in Germany. In the federal state of North Rhine-Westphalia, discussions have been taking place about the continuous reduction of the existing fee for water use from groundwater resources over the next 10 years until its final abolishment.</p> <p>The new federal state government in North Rhine-Westphalia has just presented a new legislative proposal, which aims at keeping the current fee and may even increase water prices by 5 cent per cubic meter. *** In China, due to water scarcity, water prices have increased over the past years and are expected to increase further in the future. Similarly, due to water scarcity, water</p>	Current	Potentially higher water prices in North Rhine-Westphalia can affect Bayer operations in Leverkusen, Dormagen and Uerdingen. An increase in water prices of 5 cents per cubic meter could result in additional total costs of about EUR 29 million up to 2018 (approximately EUR 3.6 million per year between 2011 and 2018) for all companies operating in Leverkusen, Dormagen and Uerdingen, including Bayer sites that are located at the respective CHEMPARK sites. *** As a result of the increasingly strict environmental protection legislation in China, we have seen an	<p>Bayer's strategy mitigating the potential risk of increasing water prices focuses on water use reduction measures. *** For example, at the Shanghai Chongqing Industrial Park, water supplier is generating demineralized water from treated organic wastewater for wastewater recycling and water saving. *** Furthermore, at a site in Tarragona, Spain, a plant for the use of rainwater collection in a retention reservoir as cooling water was launched in November 2011. This will allow savings of around 60,000 m<sup>3</sup> of water per year, corresponding to approximately 1 percent of the total water consumption. *</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
					<p>addition, to safeguard the supply of drinki water in the reç of Catalonia, Si a project was initiated in July 2010 for the rei of wastewater t two municipal treatment plant Upon completic water treatmen plant with a capacity of approximately t million m3 of wastewater per year will begin operating in Jul 2011. Of this treated wastew around 240,00( is to be made available to BM for use as proc water at our siti Tarragona. *** addition, within Responsible Ci initiative, the Association of t Chemical Indus in Spain sets fi year goals for several parameters. Fc our sites in Spa we had a target reducing our w: consumption to 2.84 m3 per me ton of sold proc We managed to beyond this tar, achieving a wa consumption of m3 of water pe metric ton of sc product across Spanish sites. I the next five ye we have set ourselves the g of reducing our water consump even further to m3 of water pe metric ton of sc product.</p>
China	09. Regulatory: Regulation of discharge quality/volumes leading to higher compliance costs	<p>prices could also increase in Spain.</p> <p>In China, environmental protection is receiving increasing attention as well. The central government, from the State Council to the Ministry of</p>	1 – 5	<p>increase in water prices in recent years. For example, in Beijing and Shanghai, water prices practically doubled over the last 10 years (2000-2010). Furthermore, in Caojing, the price of demineralized water increased by 14 percent in comparison to the previous year. This trend is expected to continue. This will have a financial impact on our operations in China as higher water prices will increase our operating costs.</p> <p>Due to Bayer's high quality standards worldwide, Bayer should not be significantly affected by the changes in the regulation on wastewater</p>	<p>In all our operations worldwide, we apply the same wastewater discharge standard, which set according to strictest regulat</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		<p>Environmental Protection (MEP), devotes considerable attention to environmental protection. At the end of 2010, the MEP collected suggestions for the modification of the Integrated Wastewater Discharge Standard. As a result, it was decided that COD levels will be modified from 80-100 mg/l to 60-80 for discharges into rivers and from 150 to 120 for discharges into the sea. Even though the previous standard is still effective and there is no clear schedule when the new regulation will be implemented, a number of local governments, e.g., Beijing, Shanghai, Guangzhou and Shandong, already drafted much stricter standards. Furthermore, a lot of new standards targeting specific industries are being implemented, in which the COD level is also stricter than in the standard mentioned above. For example, in 2010, 10 wastewater discharge standards for specific industries were approved and an additional three new standards have been issued up to mid-2011.</p>		discharges in China.	<p>that applies to : of our sites. As these standard are well above current standar in China, this safeguards our operations from risks due to increasing wastewater standards in CI Furthermore, B supports water-related research China to improve water quality at transparency. Currently, severe water-related projects are being supported at Tsinghua University, Chongming. These include, for example, a project focusing on the treatment of strongly pollute wastewater from the cassava bio ethanol production process and a clean water project in Gansu province to develop zero valent iron-manganese filters for Cr(VI) removal from drinking water, elevated Cr(VI) levels have imposed a serious threat to the safety of local residents. Further projects are under way, e.g. to evaluate the water footprint in Chongming Island.</p>
Other: Developed countries	16. Other: Reputational damage	<p>There are several topics discussed in the public arena that could pose potential reputational risks for Bayer, e.g., thermal discharges of cooling water from production into rivers and the detection of chemical substances in ground and surface water.</p>	Current	<p>The risks described can have a potential negative impact on Bayer's reputation. For example, crop protection products in water can lead to negative publicity for the entire industry, regardless of the substances' toxicity and amount, and regardless whether</p>	<p>To mitigate reputational risk Bayer takes extensive action to ensure the correct application of our products and proactively engages in stakeholder dialogue. *** (1 Bayer is constantly analyzing the concentrations of our substances</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
				<p>they are caused by Bayer's operations or operations of competitors or suppliers. Bayer CropScience (BCS) is working to achieve a proper use of crop protection products. However, the risk of an application failure, which could result in detectable concentration in water, cannot be excluded. A resulting negative media response could impact Bayer's reputation. *** Regarding reputational risk from thermal discharges, 85% of Bayer's water use is once-through cooling water. This water is only heated and does not come into contact with products. It is therefore simply fed back into the natural water cycle. There have been discussions about potential negative ecological consequences on the river ecosystem from a warming up of rivers. Bayer is constantly monitoring its thermal discharges. Within the national implementation plans of the Water Framework Directive, the state of North-Rhine Westphalia has taken thorough measurements in the Rhine, where Bayer operates three of its largest sites – Leverkusen, Uerdingen and Dormagen. The measurements have shown that there are no signs of river warming in the Rhine. However, the topic</p>	<p>water and take active measure protect ground surface water. service compar Currenta has a active groundw protection prog and designatec protection zone for drinking wat exist in its wate plants. To redu chemical residt in our discharg water is treatec using advancec water treatmen technologies. * (2) Bayer CropScience (E is taking action ensure the corr application of it products. In addition to the requested labe BCS is offering visuals (brochu flyers, videos) t demonstrate se and efficient us We are also training farmer: correctly use oi products and a investing in research to constantly impr the products. Ir addition, BCS t the "E-Label Server" to reco data for all products marke in Europe and j of Asia, South America and Ai In 2010, the glc rollout of the E-Label Server focused on Vietnam, Thail: Indonesia, Malaysia and tl Philippines. Als the External Adverse Incide Guideline gove the internal reporting charn worldwide for incidents involv BCS products. (3) Bayer is als actively engage a continuous dialogue with B stakeholders</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
				could be taken up by NGOs and lead to increased media coverage in the future, which could have a potential negative impact on Bayer's reputation.	including employees, customers, suppliers, investors, neighbors, NGOs, politicians and general public. take the needs of our stakeholders seriously and seek to contribute to solving the pressing issues of our time – based on our values and in harmony with internal and external directives and laws. This helps us to maintain our reputation as a sustainable company. Examples of our stakeholder dialogue in 2011 include: (a) active participation in international initiatives and associations, e.g. UN Global Compact: "Care for Climate", CDP Water Mandate and LEAD, ECONSENSE, ACC, ECPA, CEFIC and our cooperation with UNEP; (b) cooperation with and support of, scientific and research institutions e.g., strategic alliances with Tongji and North Carolina Universities; cooperation with the International Rice Research Institute; (c) active dialogue and cooperation with NGOs, politicians and society, e.g. by sponsoring the Berlin Water Dialogues.
Other: Developed countries	16. Other: Reputational damage	Reputational risks can also arise from the occurrence of active pharmaceutical ingredients in the	Current	Negative publicity, e.g., press coverage or NGO campaigns regarding the potential impact of	Bayer's strategy mitigating the described risk encompasses the use of advanced wastewater

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
		<p>environment and respective media coverage. Broad public attention may additionally arise from the fact that pharmaceuticals in the environment are sometimes featured in connection with human health risks via drinking water contamination.</p>		<p>pharmaceuticals in the environment and drinking water, especially due to metabolites through human or animal sediments, might impact the overall reputation of the pharmaceutical industry. However, so far, press coverage on this topic has not targeted one pharmaceutical company in particular. The risk of a negative impact on Bayer's reputation is today considered low and there is no reasonable financial impact to be estimated for this risk.</p>	<p>treatment technologies, transparency a research. *** (1) Bayer is constantly analyzing the concentrations substances in water and take active measure protect ground surface water. I service compar Currenta has a active groundw protection prog and designatec protection zone for drinking wat exist in its wate plants. To redu chemical residu in our discharg water is treatec using advancec water treatmen technologies. I- load wastewater from our pharmaceutical production is treated especie rigorously, e.g. using UV-activ: wastewater oxidation by hydrogen pero: or low-pressure wastewater oxidation. For example, wastewater froi API production from contrast media producti at our Bergkarr and Elberfeld plants in Germ: is treated by wastewater incineration. W strive to keep chemical residu in the soil and groundwater as as possible and closely monitor risks. We condi tests on ecotox and on the dispersal and degradation behavior of our pharmaceutical *** (2) Bayer contributes to r transparency regarding the environmental</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
					<p>connected to pharmaceutical Bayer supports initiative by the Swedish Association of t Pharmaceutica Industry to voluntarily prov and publish environmental of pharmaceuti on the Swedish market as part the Swedish Doctor's Prescribing Gu available on www.fass.se. A environmental to be published undergoes an independent external review Publication of c started in 2005 medicines on tl Swedish marke had been evaluated by th end of 2010. ** Bayer also participates in important rese projects. A spe activity in the context of cooperation wit various partner primarily from t water resource industry, is the European PILL project (Pharmaceutic: Input and Elimination from Local Sources) described above which is sched to run from 200 2011. The PILL partnership foc on traces of hu pharmaceutical the context of wastewater treatment. As it seems efficient undertake measures at hi concentration p sources, the collaboration focuses on the development of local treatment facilities for hospitals and</p>

Country or geographical reach	Risk type	Risk description	Timescale (years)	Potential business impact	Risk manager strategies
					nursing homes BHC is represe on the scientific advisory comm of PILLS.

### 3.2

**What methodology and what geographical scale (e.g. country, region, watershed, facility) do you use to analyze water-related risk across your operations?**

Risk methodology	Geographical scale
<p>All risks that could jeopardize a sustainable increase in the company's value are evaluated within our corporate governance system and recorded in our risk management database BayRISK, which explicitly covers risks related to the environment. This includes water-related risks that have the potential to affect Bayer at facility level (e.g., through storms or water shortages), regional level (e.g., state or federal legislation), or global scale (e.g., reputational risks). We regularly monitor additional potential risks that are not included in BayRISK but may have the potential to become relevant in the future. Our country HSEQ and sustainability managers and Climate Champions in the U.S., India and China monitor relevant changes and risks and report them to the Corporate Environment and Sustainability Department or within the SD/HSEQ community bodies. Physical risks related to water are further covered by the Bayer Emergency Response System as part of our HSEQ management system. *** To analyze different types of risks, we use different methodologies and approaches: (1) To analyze potential risks from water stress or scarcity, Bayer uses the WBCSD Water Tool to identify facilities that are located in watersheds with current or expected water stress or scarcity. The findings are discussed with the relevant subgroups and site managers to evaluate our risk exposure. Additional risks, e.g., flooding are evaluated at site level within our HSEQ management process based on past incidents and weather-related changes in the respective regions. (2) Risks from current or upcoming regulations are regularly monitored and evaluated by our liaison offices in Berlin, Brussels, Washington and Beijing and our site managers. (3) Additional water-related risks are monitored globally and on a regional scale and, together with relevant physical and regulatory risks, discussed by the Community Council HSEQ and the Community Board Technology, Innovation and Environment (CB TIE) at corporate level, which meets on a quarterly basis. *** In addition, Bayer used its participation in the first Water Disclosure in 2010 to conduct a structured analysis of frameworks and tools that helped us identify additional water-related risks (e.g., GEMI Water Planner, water risk reports by WRI/JP Morgan, UNEP FI, CERES/Pacific Institute, Lloyd's).</p>	Facility

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### 3.3

**Do you require your key suppliers to report on their water use, risks and management?**

No

### 3.4

**Is your supply chain exposed to water-related risks (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?**

Yes

#### 3.4a

Please describe the current and/or future risks to your supply chain, the ways in which these risks affect or could affect your operations and your current or proposed strategies for managing them

Country or geographical reach	Risk type (to supplier)	Risk description	Timescale (years)	Potential business impact (to responding company)	Risk management strategies (by responding company)
Other: parts of Europe, Americas and Asia	03. Physical: Increased water stress or scarcity (leading to e.g. disruption to operations, higher commodity/energy prices)	In general, our suppliers are exposed to the same physical risks as Bayer. Thus, our suppliers are also exposed to risks of increased water stress and scarcity. According to the water stress analysis by the World Resources Institute this could affect Bayer suppliers in certain regions of Europe, the Americas and Asia. Affected areas include watersheds in Belgium, Germany, Spain, Switzerland, the United States, Brazil, China, India, and Thailand. Due to climate-related changes, water supplies in these regions could decrease in the future. This might put adaptive pressure on the operations of Bayer's suppliers as well as on our ship-based supply chain and energy management.	> 20	Increased water stress or scarcity could lead to disruptions of operations of Bayer suppliers due to temporary water shortages or to an increase in energy prices. Although Bayer identifies these risks as significant and potentially apparent, so far there has been no indication that the exposure of Bayer's sites or suppliers' sites to water-related risks will significantly increase in the future. The probability of a significant impact from these risks is thus rated as very low. Droughts leading to temporarily low water levels, e.g., in the Rhine, could also exert adaptive pressure on the Bayer supply chain and energy management. Below a certain threshold, disruption could be caused to the ship-based parts of Bayer's supply chain and shortages in energy supply could be	Bayer mitigates supply chain risks by diversifying the supplier base, therefore reducing the dependency on a few selected suppliers. There are only few cases where Bayer relies on a single source of supply. It is highly unlikely that two independent suppliers are adversely affected at the same time. In addition, over the year, temporary shortages can be balanced out. *** For example, Bayer CropScience has approximately 150 different active ingredients in its portfolio and uses diverse suppliers for raw materials, intermediates and active ingredients. It is not very likely that a major share of key suppliers would be affected by business disruptions. Many substances are sourced from different regions of the world. Also in BCS's manufacturing network there is flexibility to produce substances at different sites in different regions. *** Key supplies for Bayer MaterialScience's business are purchased on the spot market.

Country or geographical reach	Risk type (to supplier)	Risk description	Timescale (years)	Potential business impact (to responding company)	Risk management strategies (by responding company)
Other: parts of Europe, North America and Asia	02. Physical: Flooding	As described in question 3.1.a, several regions in Europe, North America and Asia relevant to Bayer and its supply chain are exposed to risks from flooding or extreme weather events. For example, parts of Belgium, Germany, Spain, the United States, China, India and Thailand might be potentially affected by an increase in extreme weather events such as storms and floods, e.g., due to climate change. This could potentially disrupt the business operations of our suppliers or the surrounding infrastructure in the region.	> 20	experienced due to the use of water-cooled utilities in the Rhine delta. However, so far water shortages have only been of a temporary nature without any significant financial effects on Bayer.	Furthermore, large BMS suppliers are global players with business operations in several countries so that supply chain disruptions in one country can be balanced out.
				In general, our suppliers are exposed to the same physical risks as Bayer. Thus, in some regions, our suppliers are also exposed to the risk of flooding, which could disrupt their operations leading to a potential disruption of Bayer's supply chain. Although Bayer identifies these risks as significant and potentially apparent, so far there has been no indication that the exposure of Bayer's sites or suppliers' sites to water-related risks will significantly increase in the future. The probability of a significant impact from these risks is thus rated as very low. *** Nevertheless, we recognize the risks that could result from major disruption to	As described above, Bayer mitigates supply chain risks by diversifying the supplier base, therefore reducing the dependency on a few selected suppliers. There are only few cases where Bayer relies on a single source of supply. It is highly unlikely that two independent suppliers are adversely affected at the same time. In addition, over the year, temporary shortages can be balanced out.

Country or geographical reach	Risk type (to supplier)	Risk description	Timescale (years)	Potential business impact (to responding company)	Risk management strategies (by responding company)
				<p>the business operations of one of our key suppliers and to the transportation and distribution infrastructure as a result of extreme weather events such as floods. These risks are particularly relevant in Europe and North America, where Bayer has a major share of its production facilities. However, there is no indication at this point of a climate-change-related increase in extreme weather events at Bayer or supplier sites or in surrounding regions. *** Furthermore, water-related risks, especially storms and floods, are temporary phenomena and can be balanced out during the year. When the Mississippi was flooded, there were temporary supply chain shortages for six weeks. However, they could be balanced out afterwards without any significant impact on the business. Thus, there is no indication</p>	

Country or geographical reach	Risk type (to supplier)	Risk description	Timescale (years)	Potential business impact (to responding company)	Risk management strategies (by responding company)
Other: Developing countries	16. Other: Reputational damage	<p>Low enforcement of wastewater standards for pharmaceutical or chemical suppliers especially in developing countries can lead to incidences of increased pharmaceutical or chemical concentrations in environmental water bodies and potentially also in drinking water. Increased concentrations of active ingredients from pharmaceutical or chemical production can be picked up by the media or NGOs, drawing public attention to the topic. This could especially lead to media coverage in developed countries, where the topic receives higher attention, and potentially affect the reputation of the entire industry. For example, in 2008, a scientific study conducted by a Swedish researcher reported high concentrations</p>	1 – 5	<p>that water-related physical risks could have significant financial implications for Bayer.</p> <p>Bayer carefully selects its suppliers and has started a structured process to analyze water-related issues in supplier operations. Therefore, we rate the probability of a potential reputational risk from an incident of increased pharmaceutical or chemical concentrations in environmental water bodies or in drinking water within our own supply chain to be rather low and do not expect any significant financial implications. However, if the topic is picked up by the media or NGOs, a certain reputational risk exists for the entire industry.</p>	<p>Bayer took intensive action to further implement its Supplier Code of Conduct, which had been developed at the end of 2009, as the main strategy to protect against sustainability related supplier risks, including reputational ones. The code comprises the areas of ethics, employee relations, management systems, and HSEQ. Within the HSEQ section, it includes water-related questions, e.g., regarding water management and responsible water use. *** Prior to the publication of the code, nearly 100% of the relevant purchaser group participated in a training course to get acquainted with the contents. A further 200 employees with procurement functions were trained in 2010. *** Supplier self-assessments and audits are used to check whether the demands made by the Bayer Supplier Code of Conduct are being implemented and complied with along the supply chain. The</p>

Country or geographical reach	Risk type (to supplier)	Risk description	Timescale (years)	Potential business impact (to responding company)	Risk management strategies (by responding company)
		<p>of active pharmaceutical ingredients in the effluent water of an Indian town. The media picked up on the topic and there was a high degree of publicity on it, especially in Sweden. Although Bayer was not affected by the public discussion and did not have any relationships to suppliers in the respective region, the issue posed a potential risk for the reputation of the entire industry. A similar incident could happen at any time.</p>			<p>suppliers to be checked are selected using a country-based risk approach based on our country index for sustainability risks derived from the risk assessments of various international indices such as the Corruption Perception Index published by Transparency International. On the basis of this risk approach, we used standard questionnaires in 2010 to evaluate 147 suppliers, mainly from China but also from India, Thailand, the Philippines and Guatemala. Together with the evaluations performed in 2009, based on procurement spending we have already covered 50% of suppliers in the risk category. In addition, 124 suppliers from non-risk countries were evaluated in 2010 selected by the subgroups using business-related criteria. These checks were supplemented by country-specific projects, e.g., an evaluation of more than 200 suppliers in India. Together with an independent external auditor we had pilot sustainability studies carried out on suppliers in China in 2010.</p>

Country or geographical reach	Risk type (to supplier)	Risk description	Timescale (years)	Potential business impact (to responding company)	Risk management strategies (by responding company)
					<p>*** The data compiled from the supplier questionnaires and audits are used to determine whether specific suppliers meet Bayer's requirements or whether we need to define further development measures and goals in collaboration with them. Action plans were drawn up with several suppliers in 2010. These are documented centrally and their implementation is tracked. So far, we have not identified any infringements that were so serious that they resulted in exclusion or termination of contracts with suppliers.</p>

Page: 2011-Water-4-Impacts

#### 4.1

**Please describe any detrimental impacts to business related to water your company has faced in the past five years, their financial impacts and whether they have resulted in any changes to company practices**

In the previous five years, detrimental impacts related to water especially came from temporary water shortages and flooding. This has impacted our businesses two-fold. On the one hand, water shortages and droughts in general affect Bayer CropScience's business by increasing the volatility of our business. On the other hand, temporary water shortages as well as flooding have impacted our supply chain and our operations.

##### **(1) Impacts to our Bayer CropScience's (BCS) business:**

BCS sales are always subject to seasonal fluctuations, depending on weather conditions. Droughts in important markets of the world pose a general business risk for BCS. As the parts of the world where droughts occur can vary, financial impacts change each year. In 2010, droughts especially affected Australia and China. In general, droughts increase the volatility of our business as a whole, making it more difficult than in other industries to plan sales.

To respond to water-related impacts, BCS constantly monitors the risk. BCS has further initiated a dedicated project investigating the impact of climate change on our business. However, climate-related changes to water conditions around the world can also represent a business opportunity for BCS. As described in the next section, BCS is conducting various research projects on reducing abiotic stress, such as droughts, in plants. BCS is also offering a broad range of products that focus on increasing yield and thus increasing water efficiency as well as products that can be used with water-efficient technology, e.g., drip irrigation. To ensure sufficient food supply in regions with increasing water scarcity, demand for these products is expected to rise in the future.

**(2) Impacts on our supply chain and own operations:**

Some Bayer sites had to cope with temporary water shortages in the past five years. Our ship-based supply chain for our Uerdingen site (Germany) was temporarily affected by low water levels in the Rhine. However, as the shortage was only of a temporary nature, this did not cause any significant financial damage. Low water levels of the river Rhine can occur from time to time. To mitigate this risk, Bayer's service company Currenta, which manages and operates our sites in Uerdingen, Leverkusen, and Dormagen, constantly monitors the water level in the Rhine. Furthermore, our supply chain was temporarily disrupted due to the flooding of the Mississippi river (United States). However, this only led to temporary shortages, which could be balanced out again over the course of the year.

Flooding has also affected our South Charleston site (United States), which had to temporarily shut down. However, shutdown and infrastructure repair costs were insignificant.

**Page: 2011-Water-5-Opportunities****5.1**

**Do water-related issues present opportunities (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?**

Yes

**5.1a**

**Please describe the current and/or future opportunities, the ways in which these opportunities affect or could affect your operations and your current or proposed strategies for exploiting them**

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
Other: Bayer CropScience: drought tolerance	Approximately 70 percent of the world's water is consumed by agriculture. Thus, water-related opportunities especially exist for Bayer CropScience's (BCS) agricultural business. Opportunities are especially present in three areas: (a) improving the resistance of plants against abiotic stress such as droughts, (b) improving water use efficiency of plants and thereby ensuring good yields under suboptimal growth conditions, (c) improving the effective use of water by supporting improved cultivation techniques. *** Regarding the improvement of plant resistance against abiotic stress, BCS has focused its research work for more than a decade on the impact of changing weather patterns on the yield of food and fiber crops – primarily an increased occurrence of extreme weather events such as floods, droughts or heat. These factors cause abiotic stress to	11 – 20	Water-related opportunities present additional sales opportunities for Bayer CropScience's business as a whole, with sales of EUR 6.8 billion in 2010 since the agricultural business is tied to water and weather phenomena. The reductions in yield resulting from abiotic stress factors (e.g., water shortages, heat and excessive rainfall) are in some cases up to 80%. Climate change could make the situation even worse. Therefore, BCS is focusing on improving crop resistance against both climate change as well as pests and diseases. *** BCS is well positioned to	BCS's strategy to exploit these opportunities focuses on research into increasing the stress resistance of plants. This includes in-house research and collaborations with research institutions across the globe. Specific activities include the following: (1) In the last two years, BCS signed cooperation contracts with the Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia, and Evogene, Israel, to accelerate the development and introduction of improved wheat varieties in terms of drought tolerance, yield fertilizer and water use efficiency. Research activities include, e.g., the testing of abiotic stress genes. (2) Drought tolerance of cotton is researched in cooperation with, e.g., Michigan State University and Plant Research International targeting different drought-related

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
	<p>plants and are responsible for dramatic yield losses in many agricultural regions of the world. BCS is developing technologies that respond to these challenges. For example, BCS is marketing innovative crop protection products under the proprietary name "Confidor® Stress Shield" capable of protecting against both biotic and abiotic stress factors. Recent research has also shown that this technology, when used in the insecticide Gaucho®, can make rice plants more resistant to fluctuations in the salt content of brackish water. Our current research activities within the field of drought tolerance focus on improving abiotic stress resistance of different traits to exploit additional opportunities in this area within the next 10 to 20 years. *** For a further description of opportunities related to improving water use efficiency (b) and improved cultivation techniques (c), see the descriptions in the rows below.</p>		<p>offer solutions that increase yields and help plants to cope with increasing scarcity, for example by increasing the stress tolerance of plants and their ability to cope with changing weather patterns (particularly extreme temperature fluctuations and precipitation).</p>	<p>pathways and water use efficiency. (3) BCS is also involved in publicly funded national and international research projects on abiotic stress. Partners include, e.g., Cambridge, Leeds and Rockefeller University. (4) Bayer is a founding member of the Climate-KIC, one of three Knowledge and Innovation Communities launched in 2010 by the European Commission and the European Institute of Innovation and Technology to address Europe's innovation gap. Among others, the Climate-KIC focuses on projecting, forecasting and managing climate extremes as well as on putting in place adaptive water management. CACHES (Climate Adapted Crop Health Expert System) is one of the projects that Bayer is participating in, which concentrates on climate-related modeling. Also, BCS has just signed a new project focusing on solutions to abiotic stress. (5) BCS is participating in the German-wide research consortium Cropsense led by the University of Bonn and Research Center Juelich. BCS also committed to actively participate in the German Plant Phenotyping Network (DPPN) under the leadership of Research Center Juelich and IPK Gatersleben as soon as the network has been approved and launched by the German Ministry of Education and Research (expected for 2011). (6) Together with partners such as UC San Diego, University Hanover and University of Montana,</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
Other: Bayer CropScience: yield increase	<p>As described above, further opportunities exist for our BCS subgroup related to improving the water use efficiency of plants to maintain good yield in drought conditions which can also lead to yield increase in non-stress conditions. According to UN studies, the world's population will grow by over two billion between now and 2050. Increasing the "crop per drop" ratio through net water gains by enhancing crop yield will be essential for safeguarding food supplies in the future. Bayer crop protection products and traits are increasing yield and water use efficiency, e.g., by reducing the yield-reducing effects of biotic and abiotic stresses on crops.</p>	11 – 20	<p>As described above, water-related opportunities present additional sales opportunities for Bayer CropScience's business. *** Population growth and the reduction in arable land (e.g., due to salinization) are just two factors that increase the necessity for higher-productivity crops. BCS is excellently positioned to offer solutions that increase yields. Consequently, BCS is running a number of research projects worldwide in order to research possibilities for enhancing yields of different crops, in many cases by at least 10 percent.</p>	<p>BCS will evaluate technologies to improve photosynthetic efficiency and to increase energy reserves. This can help plants to cope better with stress such as reduced water reserves and can lead to yield increases in non-stress conditions.</p> <p>Another focal point of our strategy to exploit water-related opportunities is BCS's focus on further research into increasing yields. Specific research activities in this area include the following: (1) The cooperation with CSIRO in Australia already mentioned is also dedicated to improving fertilizer use efficiency, including phosphorus and nitrogen. Besides improving yields, nutrient efficiency leads to the release of less substance into groundwater. (2) Cotton yield enhancement is being researched in cooperation with, for example, the Shanghai Institute of Biological Sciences and Texas Tech University. One of the objectives of this research is to develop cotton varieties with an enhanced yield potential of at least 10 percent. (3) Increasing the harvest index of oilseeds is another lighthouse research project of our BCS subgroup being performed in cooperation with, among others, universities in Bath, Cardiff, Hanover and Gent. Objectives of this research are the modification of plant architecture, the improvement of photosynthetic efficiency and the increase of grain yield components. (4) Furthermore, BCS has</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
Other: Bayer CropScience: water use efficiency	<p>The third area of opportunity for Bayer CropScience's (BCS) agricultural business is related to improvement in the effective use of water, for example by supporting improved cultivation techniques. Bayer is promoting water-saving cultivation systems such as the direct seeding of pregerminated rice. In Indonesia, BCS is working with farmers and local government representatives to convert rice production from transplanted to direct-seeded rice. The results are higher yields, better quality, and an up to 30 percent reduction in water consumption and methane emissions. Also, BCS products enable farmers to use conservation tillage. When harvested, broad acre crops (such as wheat, barley and oats) leave behind stubble that is traditionally burned or ploughed in. Minimum tillage agriculture involves a</p>	Current	<p>As described above, water-related issues affect Bayer CropScience's business as a whole, with sales of EUR 6.8 billion in 2010, since the agricultural business is tied to water and weather phenomena. Agriculture, being the biggest water consumer, needs sustainable water efficiency measures. BCS is excellently positioned to offer products that support improved cultivation techniques and therefore improve water management in agriculture. This is particularly important in the light of increased water scarcity in</p>	<p>recently opened an expanded seed research laboratory in Singapore dedicated to supporting the development of new high-yielding and high-quality pest and heavy-weather-resistant seed varieties and hybrids, representing an investment of about EUR 20 million over the next five years. Also, BCS is investing another USD 20 million in the construction of a new greenhouse at Research Triangle Park to expand BioScience research in the United States. In addition, BCS is conducting research into increasing rice yields by at least 10 percent in cooperation with, for example, Evogene, the National University of Singapore and Senesco.</p> <p>A further strategy for exploiting water-related opportunities encompasses BCS's efforts to improve water management in agriculture. Specific activities include the following: (1) As part of its sustainable development roadmap in Vietnam, BCS is involved in the "Climate change affecting land use in the Mekong Delta: adaptation of rice-based cropping systems project." This project aims to develop integrated soil, crop, nutrient and water management options. (2) BCS also participates in a sustainable gherkin production project in India, which aims to preserve natural resources such as water. Thus, farmers have been advised and trained on good agricultural practices, including the safe use of crop protection products and improved water management. (3) Bayer Confidor® was</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
	<p>reduced number of soil cultivations prior to crop plantings. As a result, rainfall is captured more efficiently, thereby maximizing soil water so that farmers can make the most of every drop that falls. In the United States, conservation tillage is already used in 90 percent of cotton cultivation. In India, drip irrigation is a major cultivation technique for preventing the further descent of groundwater.</p>		<p>many regions worldwide.</p>	<p>among the first products on the market that could be used in drip irrigation. Current research focuses on further water-efficient irrigation techniques, e.g., controlled droplet irrigation and reducing the need for water as a carrier. (4) BCS is focusing its research on water management, introducing products that improve plant health while reducing inputs. Some of these products feature Bayer's StressGard formulation technology that among other benefits can reduce irrigation and protect against heat stress. BCS is committed to developing new products that not only deliver superior results on biotic stress management (weeds, insect pests and diseases), but also help turf managers regulate their water inputs in the face of water use restrictions and periods of excessive heat and drought. To develop these products, Bayer has entered into research collaboration with North Carolina State University's turfgrass program within the College of Agricultural and Life Science to help design and evaluate new plant health products for turf. One of the major targets of this research is to address the issue of water use efficiency. In February 2011, BCS introduced Nortica®, which contains the bacteria <i>Bacillus firmus</i>. Nortica helps manage nematode populations by creating a living barrier of protection around turfgrass roots. The product acts by improving root growth and as a result also provides a sustainable method for reducing</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
Other: Bayer Technology Services	<p>Water-related opportunities also exist for the advanced wastewater treatment technologies developed by our service company Bayer Technology Services (BTS). *** In the 1980s, Bayer developed Tower Biology, an aerobic technology optimized, in terms of energy usage, for industrial wastewater treatment, which is successfully positioned on the market. Another innovative technology is LOPROX®, a decentralized wastewater pretreatment technology, especially suitable for wastewater with poorly oxidizable components. LOPROX® is used primarily for the pretreatment of wastewater upstream of biological treatment. The poorly degradable organic components of the water are partially oxidized and rendered more biodegradable. LOPROX® is already operating in different Bayer plants, e.g., in La Felguera (Spain), Cilegon (Indonesia) and Leverkusen (Germany). It is also used for external customers in the Middle East. The process is being constantly improved by BTS and tailored to clients' needs. *** A mechanical wastewater process is applied by Bayflotech®. Bayflotech® is a high-performance flotation process that uses the effects of pressurized dissolved air – a clarification method that is optimized in terms of energy and operating parameters,</p>	Current	<p>Today, about 30% of Bayer Technology Services' wastewater treatment business comes from external sales. Increasingly, BTS also focuses on wastewater treatment technologies for other industries (e.g., de-inking of printing wastewater). As BTS's solutions are very energy-efficient, their market potential is expected to rise even further with increasing energy prices.</p>	<p>water use on turfgrass in areas under nematode pressure that struggle to survive the summer heat and intermittent rainfall.</p> <p>(1) To exploit opportunities for marketing BTS solutions externally, BTS is continuously investing in R&amp;D for wastewater technologies. Current research focuses, e.g., on solutions for using membrane bioreactors in combination with Tower Biology, the reduction of pharmaceutical concentrations in water and the recovery of contaminated water in the oil industry. Also, BTS is adapting LOPROX® technology so that the oxidation can take place in a neutral chemical environment to prevent the use of strong acids, leading to a cost reduction. In the future, BTS's water treatment knowledge could serve to develop improved desalination techniques. (2) In 2010, Makhteshim Chemical Works (MCW), the biggest producer of crop protection products in Israel, adopted LOPROX® technology to pretreat heavily polluted wastewater before it is sent to a wastewater treatment plant. As a result, the MCW's facility falls under the strict compulsory limits for discharges in Israel. (3) The Resource Efficiency Check has been tested in two pilot projects in Bayer subgroups in the U.S. and Europe. Two further pilots are being implemented. In addition, the first efforts have been initiated to market the Resource Efficiency Check externally. *** BTS is currently undertaking</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
Other: Bayer MaterialScience	<p>resulting in high purification of the water, with approximately 99 percent of solid matter removed. *** BTS has also developed several analysis tools presenting water-related opportunities, e.g., the Resource Efficiency Check, which results in improvement measures that can be used to minimize water and energy consumption and to identify potential savings. *** BTS has further developed its Wastewater Recycling Tool, offering a rough estimation of possible savings using wastewater recycling technology and helping to reduce discharge prices. It also involves an evaluation of whether it makes sense to implement in-house wastewater treatment facilities.</p>	Current	The opportunities described are expected to positively affect BMS sales. Until now a market potential for the sales of TPU films of 50 to 100 tons (EUR 0.5 -	<p>the EcoBay project to bring all sustainability solutions together. The Resource Efficiency Check serves as a basis for carbon and water footprinting. As a next step, a Sustainable Development Dashboard will be developed to support monitoring, accounting and reporting at site-level. With this Dashboard, a scorecard can be developed to benchmark different sites. Water will be one of many KPIs included. Currently, the project is rolled out in the U.S. (4) To strengthen the focus on given opportunities, Bayer established a separate platform within the Community Council Technology organization, which works on an international company-wide level. The task of this group - with experts from all our business groups - is to analyze and promote projects for energy efficiency and environmental protection, including new technologies for water treatment and recovery. An internal Group-wide intranet platform serves to inform about project results, as guidance for practical application and to initiate the development of new innovations. A current focus is, e.g., the development of new solutions for the pretreatment of micro pollutants.</p>
	<p>New opportunities are also arising for Bayer MaterialScience's business, for example for polyurethanes that can be used in moving bed bioreactor technology or the sales of hydrochloric acid. Hydrochloric acid, a by-product in BMS's</p>			<p>BMS has entered into different partnerships to exploit water-related opportunities that arise for BMS materials that can be used in water and wastewater treatment. (1) Bayer MaterialScience has signed a Non Disclosure Agreement</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
	<p>isocyanate production, can be used for the production of flocculants, which are used in water and wastewater treatment. This opportunity is especially relevant in Germany. *** Furthermore, Bayer MaterialScience is planning to expand sales of thermoplastic polyurethane (TPU) films to worldwide markets for use in aeration membrane applications for wastewater treatment.</p>		<p>1 million) has been identified. Furthermore, BMS has entered into a strategic partnership with the Finnish company Kemira to exploit opportunities that arise from the use of hydrochloric acid. This partnership not only benefits BMS but also provides benefits to Kemira itself and the environment. Hydrochloric acid, a by-product that is formed during BMS's production of isocyanate, will be directly supplied via an internal pipeline to Kemira, which will use the product for the production of flocculants for water and wastewater treatment directly on-site. This will ensure a long-term and cost-efficient source of hydrochloric acid for Kemira. Furthermore, the on-site use of hydrochloric acid avoids additional transportation needs, also benefiting the environment.</p>	<p>with two other companies in order to prepare a partnership related to moving bed bioreactor technology. Moving bed bioreactor technology allows the biological degradation of pollutants in water with the ability to handle various loadings from a variety of sources. In this partnership polyurethane foams are intended to be used as supporting carrier to improve the degradation of pollutants. In principle BMS would be raw materials provider for the foam preparation. Recently a new technology has been found for the removal of endocrine disrupting agents, which could eventually increase the added value of the technology and consequently the participation of BMS in the business. Evaluation of the technology and possible business model are under discussion. (2) BMS has established contact with several companies working with TPU membranes. The identification of potential new partners and expansion to the worldwide market are very important factors for the further growth of this business. (3) To exploit water-related opportunities that arise for the application of hydrochloric acid, BMS has entered into a strategic partnership with Kemira, a Finnish company offering water treatment services. Kemira is locating to the CHEMPARK Dormagen site, Germany, and Tarragona, Spain. From 2012 onwards, at these two sites, Kemira will produce flocculants to treat water and wastewater. For the</p>

Country or geographical reach	Opportunity description	Timescale	Potential business impact	Strategy to exploit opportunity
				production of flocculants, Kemira will use hydrochloric acid, which arises as a by-product from BMS's isocyanate production facilities at these sites. Kemira will be able to withdraw the hydrochloric acid from an internal pipeline at these sites.

**Page: 2011-Water-6-tradeoffs**

**6.1**

**Has your company identified any linkages or trade-offs between water and carbon emissions in its operations or supply chain?**

Yes

**6.1a**

**Please describe the linkages or trade-offs and the related management policy or action**

Linkage or trade-off	Policy or action
Linkages between reducing water and at the same time energy have been identified within our energy reduction measures. Energy reduction measures can also directly contribute to saving water. For example, we are trying to avoid steam leakages, thus contributing to both energy and water reduction.	Within Bayer's Sustainability Program we have set ambitious targets for reducing CO2 emissions. These include a 15% CO2e reduction target for Bayer CropScience. Bayer MaterialScience just raised its 2005-2020 specific emission reduction target from 25 to 40% CO2e per metric ton of product sold. Furthermore, Bayer HealthCare's target was raised from a 5 to a 10% absolute reduction up to 2020. To achieve these targets, Bayer has, for example, developed the Bayer Climate Check. With this tool, we can evaluate the production plant itself, all the raw materials and the energy needed for production and logistics up to the factory gate. In total, 140 plants were analyzed between 2008 and 2010 using the Bayer Climate Check, covering approx. 85% of production-related CO2 emissions. In total, a feasible potential of CO2e emission savings (direct and indirect process emissions) of more than 10% CO2e corresponding to roughly 500 kt CO2e per year was identified. Some of the energy efficiency measures identified also contribute to water savings. For example, BHC has set up a database to monitor all energy efficiency savings and corresponding measures that have been identified during the Climate Check as well as during additional site-specific assessments. The total amount of water savings identified and recorded in BHC's energy efficiency database amounts to 460,000 cubic meters.
Linkages between reducing water and at the same time greenhouse gas emissions have also been identified in Bayer CropScience's lighthouse project in Indonesia focusing on direct-seeded rice. Unlike the customary wet rice cultivation, by which growers set young plants in flooded paddies by hand, direct seeding involves the dry planting of pre-germinated rice by machine. This increases yields by up to 10 percent, saves enormous quantities of water, reduces the need for fertilizer and lowers emissions of the greenhouse gas methane by up to 30 percent, which is produced	As part of the Bayer Sustainability Program, BCS is actively promoting water-saving cultivation systems by implementing a program for sustainable rice cultivation, working with farmers and local representatives to convert rice production from transplanted to direct-seeded rice in Indonesia. This results in up to 10% higher yields, better quality, lower water consumption and an up to 30% reduction in methane emissions. The mitigation potential has been shown through farm level research in cooperation with the International Rice Research Institute. The project has also been officially approved by the Clean Development Mechanism (CDM) Executive Board of the UNFCCC as a new methodology reducing anaerobic decomposition of organic matter in rice cropping soils and thus leading to the reduced generation of methane.

Linkage or trade-off	Policy or action
<p>through fermentation in stagnant water.</p> <p>One trade-off between water use and energy exists in water treatment technologies. To reduce the persistence of active ingredients from our chemical production in water and thus improve the quality of our discharges, Bayer is using sophisticated wastewater treatment technologies. The higher the concentration of substances in water, the more CO<sub>2</sub>-intensive the respective treatment technology. For example, burning water as an effective treatment technique for water with high concentrations produces a lot of CO<sub>2</sub> emissions. At some sites, we have introduced new treatment technologies such as ozone oxidation or LOPROX® processes. This reduces the burning of water and results in fewer CO<sub>2</sub> emissions.</p>	<p>To some extent, we cannot prevent the trade-off described as we need to conform with wastewater quality standards and, in many cases, they are met thanks to the application of complex and energy-intensive wastewater treatment technologies. Advanced wastewater treatment technologies are required in order to protect human health and the environment. They also play an important role in the mitigation of reputational risks.</p>
<p>Another trade-off between water and energy exists in water supply itself, which can be energy-intensive. For example, 32% of industrial energy use is needed for pumping capacity.</p>	<p>We are currently taking action to tackle the trade-off described. For example, Bayer HealthCare's Bergkamen site, with the help of the German Energy Agency, has analyzed energy-saving potentials for its eight cooling water pumps. The optimization of the pumps, e.g., through a new control system, will lead to annual energy savings of EUR 109,000, reducing CO<sub>2</sub> emissions by up to 670 metric tons. Furthermore, with the help of the Resource Efficiency Check, which has been developed by Bayer Technology Services, linkages and trade-offs between water and energy will become more transparent. The Resource Efficiency Check analyzes all production-relevant resources such as energy, water and raw materials and leads to improvement measures for minimizing consumption.</p>

## Module: 2011-Water-Account

### Page: 2011-Water-7-Withdrawals

#### 7.1

Are you able to provide data, whether measured or estimated, on water withdrawals within your operations?

Yes

#### 7.1a

Please report the water withdrawals within your operations for the reporting year

Country or geographical reach	Withdrawal type	Quantity (ML/yr)	Proportion of data that has been verified (%)	Comments
Germany	Surface	22762	76 – 100	
Germany	Groundwater	25364	76 – 100	
Germany	Municipal water	488	76 – 100	
Germany	Rainwater	647	76 – 100	
United States of America	Surface	12685	76 – 100	
United States of America	Groundwater	77	76 – 100	
United States of America	Municipal water	136	76 – 100	
United States of America	Rainwater	97	76 – 100	

Country or geographical reach	Withdrawal type	Quantity (ML/yr)	Proportion of data that has been verified (%)	Comments
Belgium	Surface	3014	76 – 100	
Belgium	Municipal water	90	76 – 100	
Belgium	Rainwater	62	76 – 100	
Thailand	Municipal water	3301	76 – 100	
China	Groundwater	35	76 – 100	
China	Municipal water	2392	76 – 100	
China	Rainwater	331	76 – 100	
Switzerland	Groundwater	374	76 – 100	
Spain	Groundwater	78	76 – 100	
Spain	Municipal water	99	76 – 100	
Spain	Rainwater	709	76 – 100	
Brazil	Surface	374	76 – 100	
Brazil	Municipal water	248	76 – 100	
India	Groundwater	20	76 – 100	
India	Municipal water	490	76 – 100	
Rest of world	Surface	2546	76 – 100	
Rest of world	Groundwater	800	76 – 100	
Rest of world	Municipal water	156	76 – 100	
Rest of world	Rainwater	50	76 – 100	

## 7.2

**Are you able to provide data, whether measured or estimated, on water recycling/reuse within your operations?**

Yes

## 7.2a

**Please report the water recycling/reuse within your operations for the reporting year**

Country or geographical reach	Quantity (ML/yr)	Proportion of data that has been verified (%)	Comments
Germany	10453	76 – 100	
United States of America	1985	76 – 100	
Belgium	419	76 – 100	
Thailand	338	76 – 100	
China	9	76 – 100	
Spain	596	76 – 100	
Brazil	70	76 – 100	
India	1	76 – 100	
Rest of world	446	76 – 100	

## 7.3

**Please use this space to describe the methodologies used for questions 7.1 and 7.2 or to report withdrawals or recycling/reuse in a different format to that set out above**

### Share of cooling water:

Approximately 85% of Bayer's total water use is once-through cooling water (including losses due to evaporation). This water is only heated and does not come into contact with products. It can therefore simply be fed back into the natural water cycle. In line with the CDP guidance, cooling water is not included in the reporting of Bayer's water use in response to question 7.1a. The total amount of cooling water across all sites in 2010 was approximately 396 million m3.

### Reporting methodology:

In line with the CDP guidance, the countries included in the water accounting section represent countries in which Bayer sites are exposed to potential risks of water stress or scarcity according to the World Resources Institute and with a total annual water use in these regions of at least 0.1% of Bayer's overall water use. Overall, the countries reported in this section represent 96% of Bayer's total water use.

All water withdrawals are reported as net water withdrawals after transmission to third parties. Water is transmitted to third parties at sites where Bayer subgroups or service companies act as site managers and operators. For example, Currenta, a joint venture with Lanxess AG in which Bayer holds a share of 60%, is the CHEMPARK operator in Uerdingen, Leverkusen and Dormagen. 61% of Currenta's water withdrawals are transmitted to third parties at these sites.

#### **Data collection process:**

Since the 1970s, Bayer has measured its water use. Water withdrawals and use are measured at site level and monitored regularly in our central Bayer Site Information System "BaySIS." BaySIS is an intranet-based tool for Group-wide HSEQ data capture and reporting developed by Bayer Business Services. BaySIS regularly queries water withdrawals by source type and further environmental key performance indicators (KPIs) such as emissions into water, e.g., nitrogen, TOC (total organic carbon), phosphorus, heavy metals and inorganic salt. Based on this set of bottom-up data, BaySIS allows analyses across several dimensions, e.g., water use, withdrawals and discharges by geography or subgroups/sites. In 2010, water recycling and reuse were included as additional KPIs in BaySIS.

The above distribution of net water use by source is based on reported withdrawals by source type. To determine the distribution of Bayer water use by source type, transmissions to third parties have been subtracted from total withdrawals. In this calculation we assumed that our transmissions to third parties as well as the composition of our cooling water have the same water mix as our withdrawals.

#### **Water recycling and reuse:**

As one measure to increase transparency, water recycling and reuse was included in BaySIS as an additional KPI in 2010. Therefore, in contrast to Bayer's first Water Disclosure Report, for which we made a rough estimation of the amount of water recycled and reused across Bayer's sites, this year the amount was recorded in our global reporting system and verified by Ernst & Young. As a first step, the amount of water recycled and reused was reported without taking into account the number of cycles in which the water was used. The total amount of water recycled and reused including the number of water cycles is therefore significantly higher. We will further refine our reporting, including an assessment of how many times this water is used, in the next reporting year.

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#### **7.4**

##### **Are any water sources significantly affected by your company's withdrawal of water?**

No

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#### **7.4b**

##### **You may explain here why your company's withdrawal of water does not significantly affect any water sources**

To identify water sources significantly affected by our withdrawals we used the UNEP and WCMC (World Conservation Monitoring Centre)'s World Database on Protected Areas and mapped our production sites against the internationally protected areas included in the database using a geo-information system. The World Database on Protected Areas includes approximately 1,000 areas that are classified as Ramsar-listed wetlands, UNESCO-MAB Biosphere Reserves, ASEAN Heritage or areas protected under the World Heritage Convention or the Barcelona Convention.

Furthermore, we discussed with all Bayer subgroups and individual sites that are located within a radius of 3 km to the above mentioned water bodies with significant water use (specifically our sites in Antwerp and Brunsbüttel) whether any water bodies were significantly affected by withdrawals of Bayer sites.

The analysis showed that no Bayer production site with significant water use (>0.1% of total water use) is located within a radius of 3 km from any of the above mentioned protected areas. Therefore, we did not identify any water body to be affected by our withdrawals according to the CDP definition:

- (1) There are no withdrawals that account for an average of 5% or more of the annual average volume of a given water body.
- (2) There are no significant withdrawals from water bodies that are recognized as particularly sensitive.
- (3) There are no significant withdrawals from a Ramsar-listed wetland or any other nationally or internationally proclaimed conservation area.

**Page: 2011-Water-8-Discharges**

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#### **8.1**

**Are you able to identify discharges of water from your operations by destination, by treatment method and by quality using standard effluent parameters?**

Yes

### 8.2

**Did your company pay any penalties or fines for significant breaches of discharge agreements or regulations in the reporting period?**

No

### 8.3

**Are any water bodies and related habitats significantly affected by discharges of water or runoff from your operations?**

Yes

#### 8.3a

**Please list any water bodies and related habitats which are significantly affected by discharge of water or runoff from your operations**

Country	Water body	Impact	Company action and outcomes
Germany	Elbe	Gradual discharge of a total of around 600 kg of sulfuric acid at a ship loading/unloading station over a long period due to a leak in the pipework.	Bayer took care of the leak in the pipework in order to eliminate the cause of discharge.

#### Further Information

To identify any habitats affected by Bayer discharges, we used two analysis methods:

(1) We used the UNEP and WCMC (World Conservation Monitoring Centre)'s World Database on Protected Areas and mapped our production sites against the internationally protected areas included in the database using a geo-information system. The World Database on Protected Areas includes approximately 1,000 areas that are classified as Ramsar-listed wetlands, UNESCO-MAB Biosphere Reserves, ASEAN Heritage or areas protected under the World Heritage Convention or the Barcelona Convention.

(2) To supplement this analysis, we discussed with all Bayer subgroups whether any water bodies were significantly affected by discharges. Furthermore, we performed a site request to our major water-using sites in water-scarce and stressed regions and conducted telephone interviews with major-water using sites exposed to water-related risks asking whether any water sources were affected by their discharges.

No site reported any habitats that were significantly affected by Bayer discharges or runoff. Only our site in Brunsbuettel, Germany, reported that the discharge point for treated wastewater is a Natura 2000 area (Schleswig-Holsteinisches Elbaestuar). However, the site also reported that the conservation objectives are not affected by the discharge of our wastewater. Bayer constantly monitors wastewater discharges to ensure compliance with regulatory standards and conservation objectives. Due to these measures to mitigate the effect of our discharges on the water body, we did not include the water body into the list above in line with the CDP guidance.

Furthermore, in accordance with our internal voluntary commitment, we report any leakage of substances with a high hazard potential from a quantity of 100 kilograms. In the 2010 reporting, only the leakage incident described in question 8.3a has been reported.

#### Page: 2011-Water-9-Intensity

### 9.1

**Please provide any available financial intensity values for your company's water use across its operations**

Country or geographical region	Financial metric	Water use type	Financial intensity (US\$/ML)	Please provide any contextual details that you consider relevant to understand the units or figures you have provided.
Other: Bayer total	Revenue	Withdrawals	98089	The figure represents the water intensity for Bayer as a whole. Bayer's water use

Country or geographical region	Financial metric	Water use type	Financial intensity (US\$/ML)	Please provide any contextual details that you consider relevant to understand the units or figures you have provided.
Other: Bayer total	EBITDA	Withdrawals	17573	<p>includes cooling water since cooling water represents a significant share of our total water use (approximately 85 percent). All figures are based on 2010 accounts. For the Bayer Group, financial figures are reported in EUR. Therefore, to calculate water intensity in USD/ML, we used the average exchange rate for the year 2010. The average exchange rate EUR/USD for this reporting period was 1.3239395.</p> <p>The figure represents the water intensity for Bayer as a whole. Bayer's water use includes cooling water since cooling water represents a significant share of our total water use (approximately 85 percent). All figures are based on 2010 accounts. For the Bayer Group, financial figures are reported in EUR. Therefore, to calculate water intensity in USD/ML, we used the average exchange rate for the year 2010. The average exchange rate EUR/USD for this reporting period was 1.3239395.</p>

## 9.2

Please provide any available water intensity values for your company's products across its operations

Country or geographical reach	Product	Product unit	Water use type	Water unit	Water intensity (Water unit/product unit)	Please provide any contextual details that you consider relevant to understand the units or figures you have provided.
Other: Bayer total	Manufactured sales volume	tonne	Withdrawals	Other: cubic meter	46	The figure represents the water intensity for Bayer as a whole. Bayer's water use includes cooling water since cooling water represents a significant share of our total water use (approximately 85 percent). The product volume is based on manufactured sales volume.

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