



WWF

REPORT

SE

2015



NO WATER – NO BUSINESS

Water Risks in the Swedish Private Sector



“The private sector is dependent on water for production purposes. Due to global supply chains, local water issues can turn into business risks. Understanding and assessing these risks is strategically important for Swedish companies.”

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EXECUTIVE SUMMARY

The rapid growth of the global economy during the last few decades has improved material standards for many people and countries. However, this growth has come at a cost to the environment, including a high loss of biodiversity, degraded ecosystems and an increasing use of fossil fuels

which have in turn aggravated the greenhouse effect. Similarly, many regions already suffer from acute water scarcity, and yet the need for water resources is increasing rapidly around the globe, which will have a huge impact on the private sector.

Companies are becoming aware of their water dependence and risks for water and this year, the World Economic Forum ranked water crises as the number one risk in terms of impact for the global economy.

In comparison to many other countries, Sweden's water resources are abundant and relatively well managed. However, being a small, open economy, Sweden depends heavily on international trade and many Swedish companies have considerable aspects of their operations and sales abroad. Water is an integral part in the production of goods and services, thus the Swedish private sector depends on global water resources and how these are managed. This report aims to improve knowledge about water risks for Swedish companies, focusing on those having direct operations abroad.

The water risks for six different industry sectors with high water dependency and accounting for more than 50% of total turnover of Swedish companies abroad were analysed. Five of the six sectors belong to the manufacturing industry, the sixth being the fashion sector. Using the turnover of Swedish companies in different countries as a proxy for production, the report findings show that Swedish companies face medium to high water risks in their most important countries of production. These countries are primarily located in Western Europe, North America and East Asia. China stands out as having very high water risks and is also an important production country for many Swedish companies.

Supply chains normally span over several countries and companies are often unaware of the water risks they are exposed to further down their supply chains. Looking at some of the most common intermediate goods for the sectors examined (steel, cotton and rare earth elements), an even more diverse and alarming risk picture emerges where China's severe water situation poses a considerable risk to Swedish companies. These results should be seen as an indication that water risks, although sometimes difficult to spot, are commonplace and need to be taken into account and managed by the private sector. This means considerable challenges for Swedish companies, but also provides opportunities to develop new niches, products and collaborations with other stakeholders to secure the business in the long term.

For a company, in concrete terms, this means that water dependence, water risks and water impacts need to be investigated and understood, both in direct operations and in the supply chain in order to mitigate

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Water risks, although sometimes difficult to spot, are commonplace and need to be taken into account and managed by the private sector.”

ONLY 1%

OF GLOBAL WATER
RESOURCES IS FRESH-
WATER ACCESSIBLE FOR
HUMAN USE



The report findings show that Swedish companies face medium to high water risks in their most important countries of production.

the risks and find new opportunities for a more progressive and sustainable business. Subsequently, these risks and impacts need to be managed both by the company and its suppliers, but also together with other stakeholders dependent on the same water resources. Although the report focuses on six specific industry sectors, the recommendations are valid for any business; also with less water intensive operations. Indirect water dependence is often more difficult to understand, assess and manage for companies, but this does not make the risks any less real.

Water is a shared resource and therefore risks are shared. A company should not believe that approaching challenges on its own is enough to mitigate water risks, but rather needs to understand, take part in and sometimes initiate the collective approach of water management to secure a sustainable business environment.

Recommendations for the private sector

- 1) Identify and understand** its water dependency and the connected risks and impacts.
- 2) Apply best practice water management** in supply chains and operations. For some sectors guidance is already available, where it is not, work together with the sector to develop it.
- 3) In high risk areas engage in collective action** with other water users in the river basin including other business, NGOs, communities and government.

A THIRSTIER WORLD

During the last couple of decades, humanity has experienced unprecedented economic growth. This tremendous development has lifted millions of people out of poverty, but it has also increased pressure on natural

resources. Whether they are used to produce food, clothes, housing or energy, natural resources are the foundation for all economic activity. And a growing economy means more competition for those resources, with freshwater being one of the resources most heavily under stress.

Freshwater use is an integrated part of all businesses, whether it is used in direct manufacturing processes, for power generation, production of raw materials or intermediate goods. A growing, richer, world population not only means more consumption, but also changed consumption patterns where demand for more water intensive goods will continue to grow.

On top of this, the effects of climate change will make water availability more erratic and difficult to predict in the future. Global freshwater demand will increase by 55% by 2050 (WWAP, 2015) and the manufacturing industry alone is predicted to increase its water demand by 400% between 2000 and 2050 (WWAP, 2014).

Some increased water demand can be met by new technological advances and improved efficiency. But challenges go beyond technical solutions. During the last couple of decades – an era of unprecedented technological progress – water demand has grown twice as fast as population growth (WWAP, 2015).

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Global freshwater demand will increase by 55% by 2050 and the manufacturing industry alone is predicted to increase its water demand by 400% between 2000 and 2050.

748 MILLION

PEOPLE DO NOT
HAVE ACCESS TO SAFE
DRINKING WATER

Freshwater, a resource under pressure

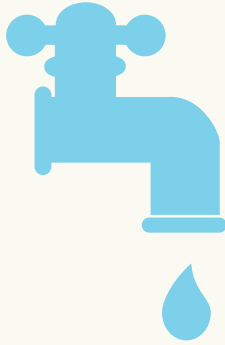
97% of global water resources consist of salt water, only 1% is freshwater accessible for human use, the remaining 2% being locked in ice caps (WWF, 2014).

Roughly one third of the world's population lives in water stressed areas and this number is expected to rise to two thirds by 2025 (Ceres, 2009).

748 million people do not have access to safe drinking water (WWAP, 2015).

From 1970 until 2010, populations of freshwater species declined by 76% (WWF, 2014).

Water demand will exceed supply by 40% in 2030 (KPMG, 2012).



ABOUT 70%

**OF GLOBAL FRESH-
WATER IS USED IN
AGRICULTURE**

In the 21st century, with several billion people aspiring to the lifestyle of the western middle class, relying solely on improving technologies will not be sufficient to face the water challenges that are rapidly emerging. The situation has already been acknowledged to some extent by the private sector: water supply crises have consistently ranked among the highest risks for the world economy at the World Economic Forum in Davos for four consecutive years. It is considered just as high a risk for a thriving world economy as fiscal crises and interstate conflicts (WEF, 2015).



Cotton and rice are thirsty crops. It can take up to 20 000 litres of water to produce 1 kg of cotton and 5 000 litres to produce 1 kg of rice.

The water-food-energy nexus

The multiple use of water creates an interconnectedness between many different sectors of society and the economy. Not only is water used in many process stages of different kinds of production, but water is used for energy generation and food production. Just as the demand for different industrial products and services will increase, the demand for energy and food will also soar in the coming decades.

In the US, roughly 40% of all freshwater withdrawals are made to generate or distribute energy (Ceres, 2009).

In China, more than 90% of power generation is dependent on stable water supply (CWR, 2015). Water also requires energy to be pumped, purified and distributed to its multiple users.

These connections between energy, food and water make the potential different trade-offs and synergies necessary to study and understand. For instance, solutions relying on higher energy consumption to decrease water consumption might end up using more water, since energy generation is dependent on water.

OVER 90%
OF POWER GENERATION
IN CHINA IS DEPENDENT
ON STABLE
WATER SUPPLY



The Three Gorges Dam, spanning the Yangtze River in Hubei province, China, is the world's largest power station.

FRAMING WATER RISKS

The ever increasing demand on freshwater already affects businesses today and is likely to have an even higher effect in years to come. In many parts of the world the days are gone when clean, plentiful water could be taken for granted. The private sector must be prepared for soaring water prices, stricter regulation and a wider and more intensive public debate and scrutiny of water use and potential misuse.

However, the challenging water situation also provides a business opportunity; companies who stay ahead and manage their water risks are in a good position to benefit from these challenges. Swedish companies having a long term commitment, ambitious code of conduct and technical and managerial know-how will stand a higher chance of becoming the winners in tomorrow's sustainable economy.

Companies also need to understand the increasing demands from shareholders, investors and media regarding how water risks are managed. Disclosure of such information demonstrates leadership and also mitigates risks that might affect shareholders. On the other hand, if not handled well, brand reputation will be damaged.

In this report, the risk assessment of different sectors is based on three types of risk: physical, regulatory and reputational. These risk types are often interlinked. For example water scarcity in a region (physical risk) can lead to authorities limiting water extraction (regulatory risk) or negative press towards a company competing for the water resources with local communities (reputational risk).

Assessing water risks

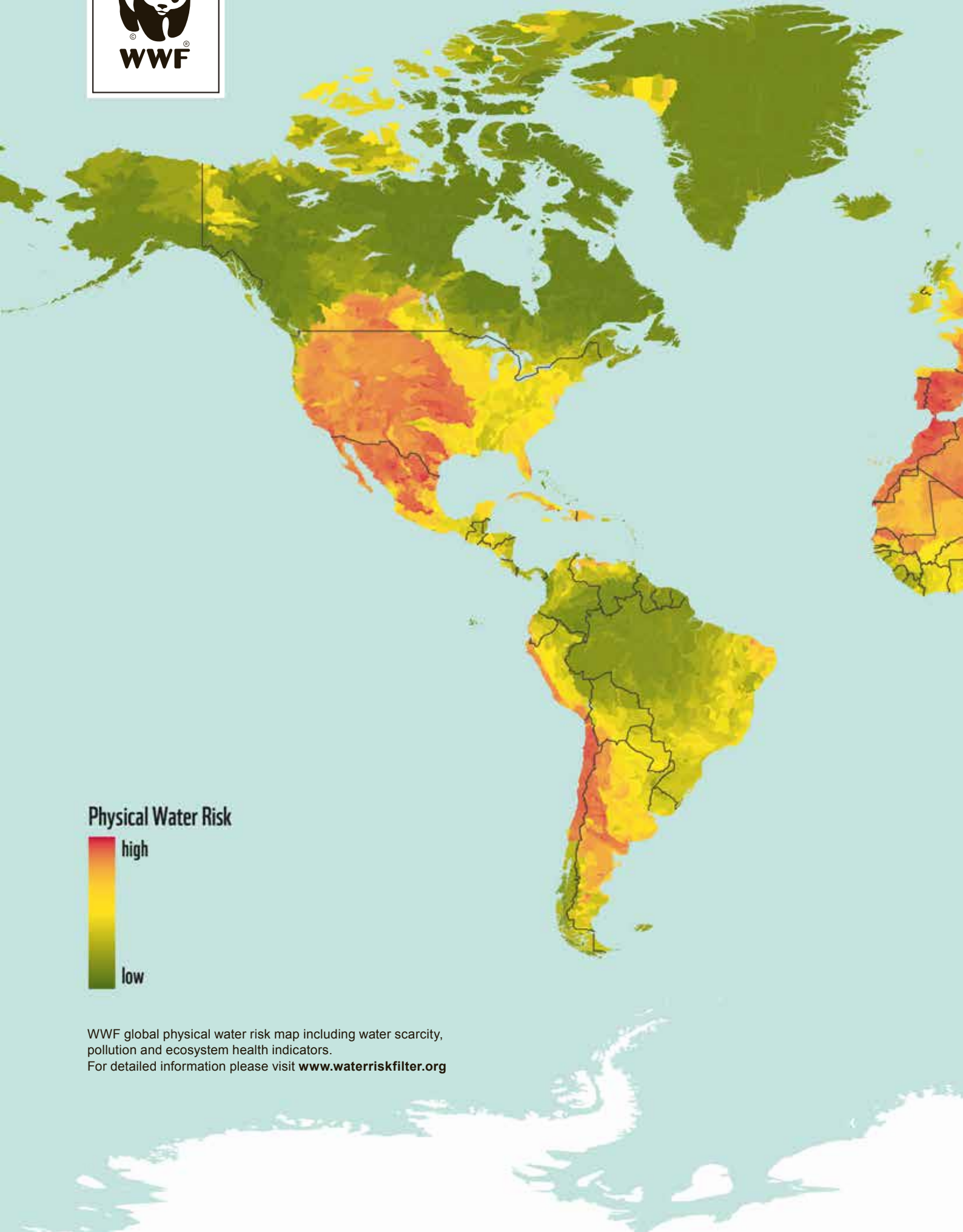
In order to assess water risks, WWF and Deutsche Investitions- und Entwicklungsgesellschaft have developed the Water Risk Filter (WWF-DEG 2011). This tool considers water risks from both a geographical and a company viewpoint.

When looking at geographical water risks, river basins need to be considered. A river basin is the land area drained by a river and its tributaries. Companies, communities and individuals who are dependent on water from the same river basin will affect and be affected by one another's use and management of that water. Therefore, a company must understand the risks prevailing in river basins where it is operating directly or indirectly.

Since every company has its own needs and conditions regarding water use, company risks vary. The initial company risk score depends on high level industry information. By filling in a facility specific questionnaire the company risk becomes more detailed. The company risk is the risk that can be addressed directly through investment, efficiency measures and advanced water management practices.

See Table 1, page 12, for a description of the different types of water risks.

In many parts of the world the days are gone when clean, plentiful water could be taken for granted.



Physical Water Risk



WWF global physical water risk map including water scarcity, pollution and ecosystem health indicators.
For detailed information please visit www.waterriskfilter.org

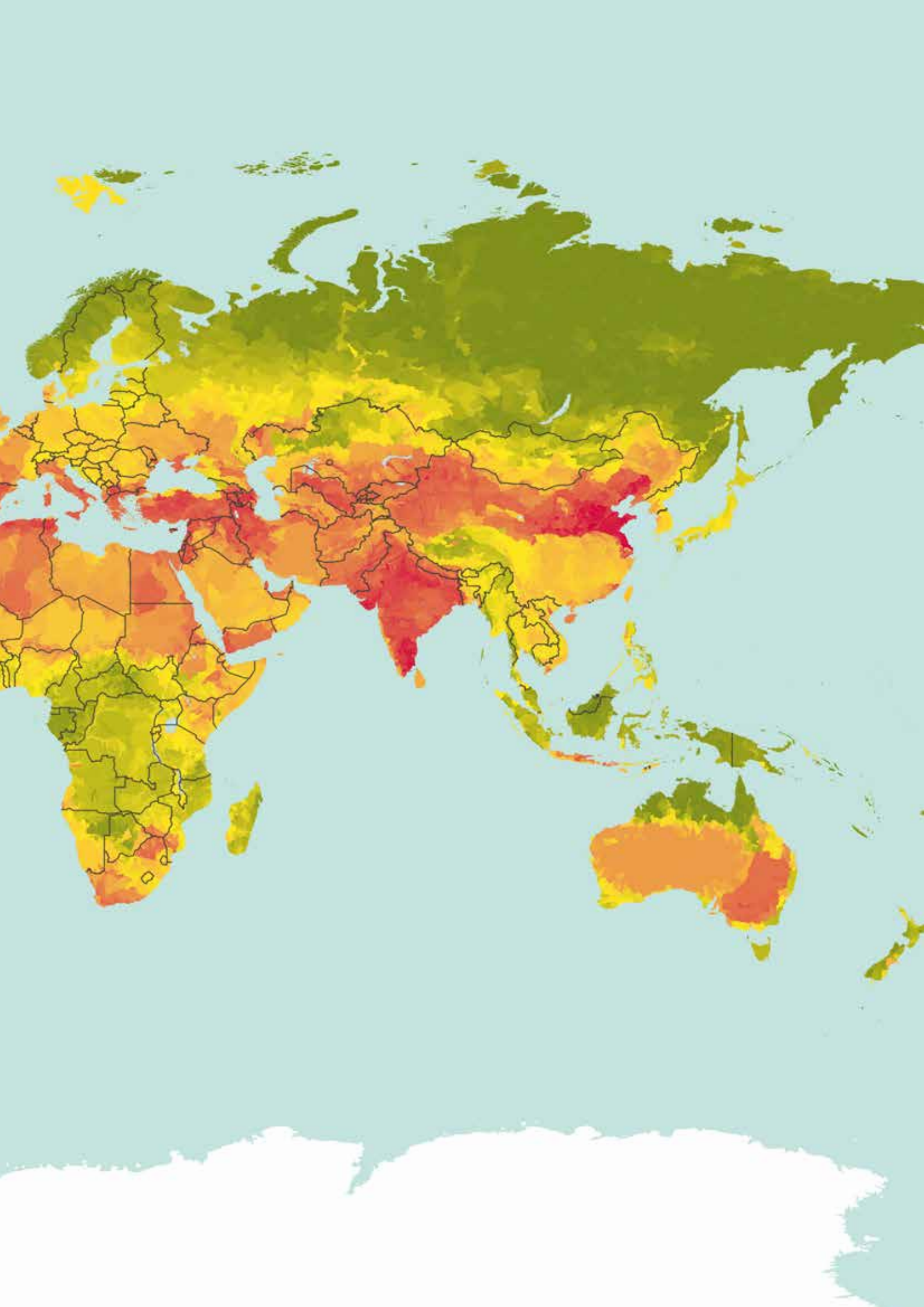


TABLE 1. Types of water risks

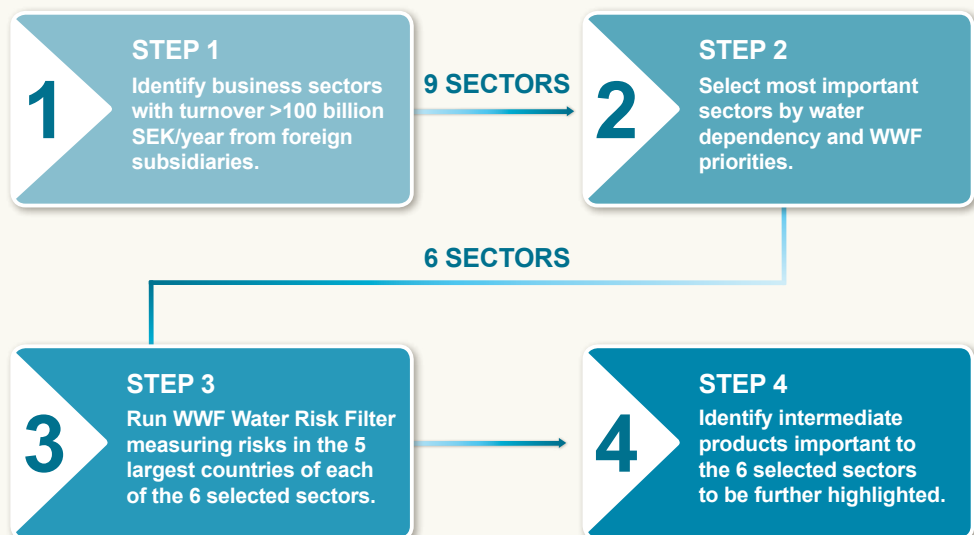
	Physical risk	Regulatory risk	Reputational risk
Basin related risk (linked to location)	Water quantity (scarcity, flooding, and droughts) and quality (pollution) within the river basin and the impacts this might have on society and the environment.	Strength and enforcement of water regulations and the consequences of restrictions by public institutions; either felt through direct regulatory action or from neglect, blockages or failure.	Perceptions around water use, pollution and behaviour that may have negative impacts on the company brand and influence purchasing decisions. Public perceptions can emerge rapidly when local aquatic systems and community access to water are affected.
Company related risk (linked to behaviour)	Water quantity and quality issues related to the performance of the company and its supply chain.	The potential for changes in pricing, supply, rights, standards, and licence to operate, for a particular company or sector – or the lack of regulations.	When the actions of the company are poorly executed, understood or communicated with local stakeholders and where perceptions and brand suffer as a consequence.

By using the Water Risk Filter, a company or facility receives a risk score for the river basin-related risk and the company-related risk respectively. Scores range from 1 to 5, with 1 indicating lowest risk and 5 highest risk. The final risk score for both basin-related and company-related risk is calculated by weighing indicators of physical, regulatory and reputational risks. For further details on the Water Risk Filter, visit waterriskfilter.panda.org.

Analysing water risks for Swedish companies

A methodology of four steps was developed for the analysis of water risks facing Swedish companies. Figure 1 shortly describes the steps. Data for subsidiaries of Swedish companies is available on country level and not on river basin level. Therefore, river basin risk has been transformed to country risk. For a more comprehensive explanation of the methodology, please see Appendix A.

FIGURE 1. Methodology overview



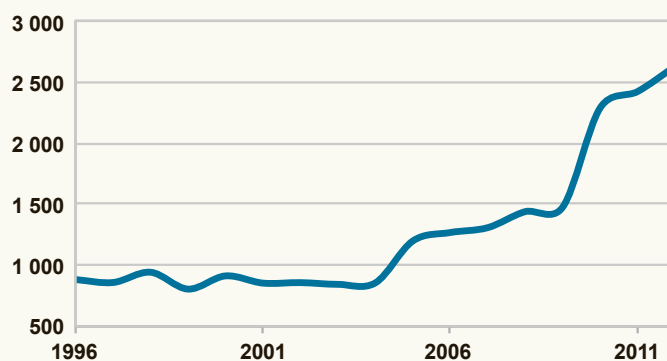
WATER DEPENDENCY AND WATER RISK - PRIVATE SECTOR

Sweden is a small open economy and many Swedish companies have been acting in global markets for centuries. This presence provides business opportunities for Swedish companies, but it also makes companies dependent on natural resources and how these

are managed in other countries. This is especially true of water, since it is managed regionally and is not a traded commodity.

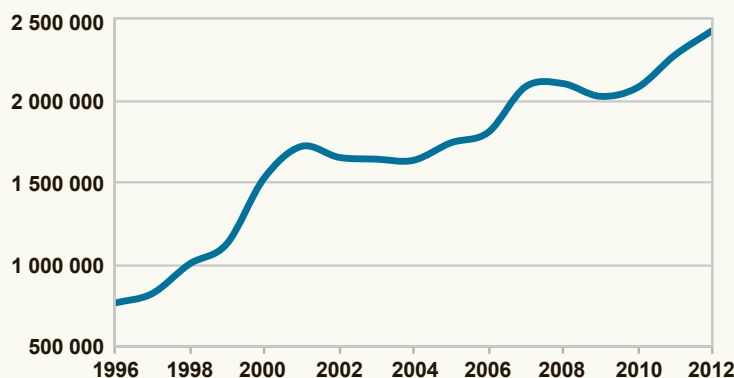
During the last two decades, the global presence of Swedish companies has increased. The number of companies having subsidiaries abroad has risen by 190% from below 900 to over 2,600 over the course of less than 20 years (figure 2). The number of employees outside Sweden has doubled and almost reached 1,300,000 during the same time period (figure 3). (SCB, 2014)

FIGURE 2. Companies with subsidiaries abroad



Development of number of Swedish companies having subsidiaries abroad from 1996 until 2012.

FIGURE 3. Employees abroad



Development of number of employees in Swedish companies abroad from 1996 until 2012.

5 OF THE 6 SELECTED SECTORS

BELONG TO THE MANUFACTURING INDUSTRY

Nine business sectors (out of 88¹) had a turnover higher than 100 billion SEK abroad in 2012 (SCB, 2014). Five out of the nine business sectors belong to the industrial sector, two belong to the service sector and two are denoted as “others”. Estimating the most water dependent of these nine sectors and taking into account the priorities of the WWF water stewardship program, six sectors were chosen for further analysis of water risk (Table 2).

Five of the six selected sectors belong to the manufacturing industry, which is a high priority for WWF because of its intensive water use and impact on ecosystems. The manufacturing industry is using water directly through many of its industrial processes. This direct link is likely to increase understanding of water dependence, making it a potentially strong driver for transformational change. The sixth sector, retail, is only indirectly connected to water use and water risks, as it is a service sector selling items from the industrial or agricultural sector. Turnover from subsidiaries located abroad in the retail sector amounted to 147 billion SEK in 2012. Looking at turnover abroad of one of the largest Swedish fashion brands from 2012, it is clear that retail abroad for Swedish companies to a large extent is based on the fashion sector. Therefore, this report will not look at water risks in the retail sector in general, but only the fashion sector.

TABLE 2. Business sector

- *Manufacture of motor vehicles*
- *Manufacture of machinery*
- *Manufacture of electronic products*
- Electricity, gas, steam and air conditioning supply
- *Manufacture of basic metals*
- *Manufacture of fabricated metal products*
- *Retail*
- Specialised construction activities
- Telecommunications

The nine largest sectors by turnover from subsidiaries abroad, manufacture of motor vehicles having highest and telecommunications lowest turnover of the nine. The sectors marked in bold italics were selected to be investigated further with regards to water risk.

TABLE 3. Presence of Swedish subsidiaries

China	5
Germany	5
US	5
France	3
Belgium	2
Brazil	2
Japan	2
UK	2

List of countries appearing at least twice in the top five of turnover for each of the six selected business sectors

For each of the six selected sectors, the five largest countries by size of turnover were listed. The geographical location of subsidiaries is clearly biased to Western Europe and the US, with China, Japan and Brazil as notable countries located in other parts of the world (table 3). A few other countries appear in the top five of the six selected sectors, but only once.

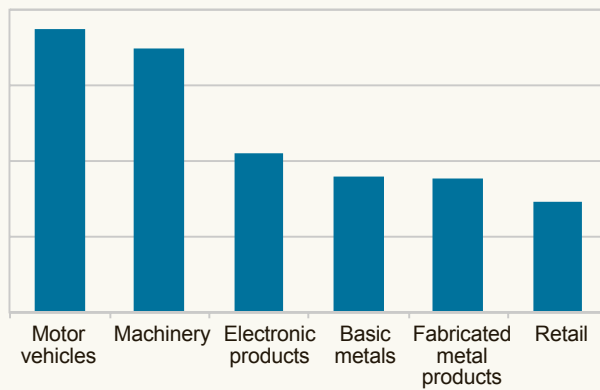
Two of the six selected sectors, manufacture of motor vehicles and manufacture of machinery, have a substantially larger turnover than the remaining four (figure 4). Combined turnover of the six sectors exceeds 50% of total turnover of subsidiaries abroad for Swedish companies (figure 5). (SCB, 2014)

¹ See Appendix A for explanation of division of business sectors.



Welding robots in a car factory. Water is essential to car production, especially for producing steel which makes up two thirds of the weight of a car.

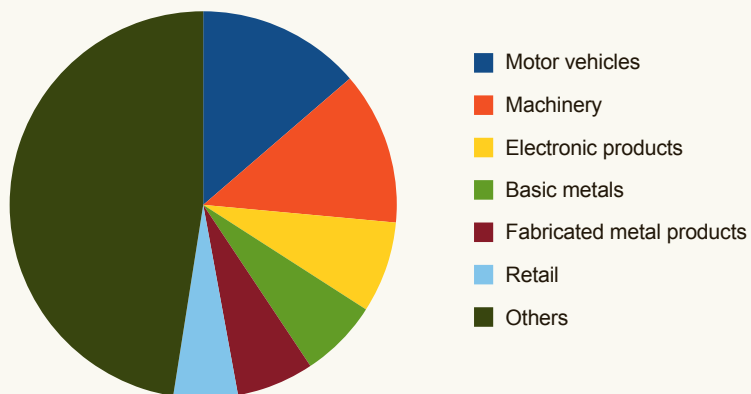
FIGURE 4. Sector size



Turnover in bn SEK abroad for each of the six sectors chosen for analysis of water risk.

The six selected sectors make up for more than 50% of total turnover abroad for Swedish companies.

FIGURE 5. Relative sector size



Analysing water risks for different sectors

In this analysis of water risks for the Swedish private sector, turnover of Swedish companies in different countries have been used as a proxy for production in that country. Although turnover does not equal production, it is a good starting point to examine water risks for the Swedish private sector. A description of the six selected business sectors including graphs of the results from the Water Risk Filter showing country risk and company risk can be seen below. The sizes of the bubbles in the risk graphs indicate the size of turnover in that specific country relative to the other countries of the sector.

**MORE
THAN 23
MILLION
CARS**

**WERE PRODUCED
IN CHINA IN 2014**

Manufacture of motor vehicles

With sales abroad reaching over 375 billion SEK in 2012, the manufacture of motor vehicles is the largest business sector for Swedish enterprise groups, and employs more than 80,000 people. Since 1996, the number of employees abroad has risen by almost 70%. This is in line with global vehicle production, which has risen by roughly the same percentage in the last 15 years (OICA, 2015). Although the industry has grown since the turn of the century, geographical shifts have occurred. In 1999 USA was by far the largest producer of vehicles, totalling more than 13 million in a year, with Japan in second place of just under 10 million vehicles. In 2014, China produced more than 23 million cars while the US and Japan both decreased their production, but still staying among the top three (OICA, 2015).

Vehicles are high-tech products consisting of a wide range of different materials and intermediate goods. Vehicle production is also at the very end of the supply chain, making it almost impossible to grasp the complexity of the entire supply chain both geographically and process wise. Therefore, highlighting specific water risks for the sector is difficult and requires transparent traceability of suppliers. Additionally, the industry is experiencing a shift where more and more alternatives to vehicles running on fossil fuels emerge. This is an interesting and positive development, but introducing new materials and processes will bring another set of water risks which also have to be managed.

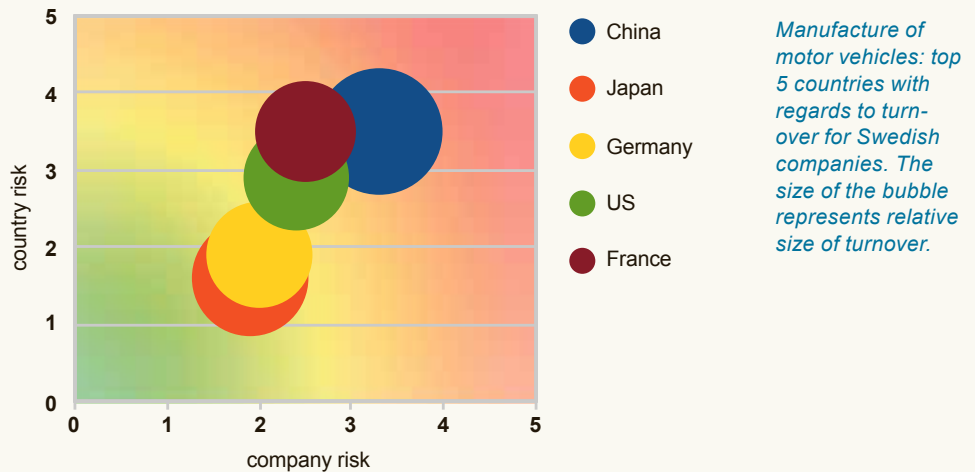


The long and complex supply chain makes many of the water risks for vehicle manufacturing difficult to spot.

Turnover for Swedish companies is highest in East Asia, followed by Western Europe and the US. Looking at the results of the Water Risk Filter, China stands out with high water risk while Japan and Germany have low risk in motor vehicle manufacturing (figure 6).

Looking at the results of the Water Risk Filter, China stands out with high water risk

FIGURE 6. Risk chart for manufacture of motor vehicles



Manufacture of motor vehicles: top 5 countries with regards to turnover for Swedish companies. The size of the bubble represents relative size of turnover.

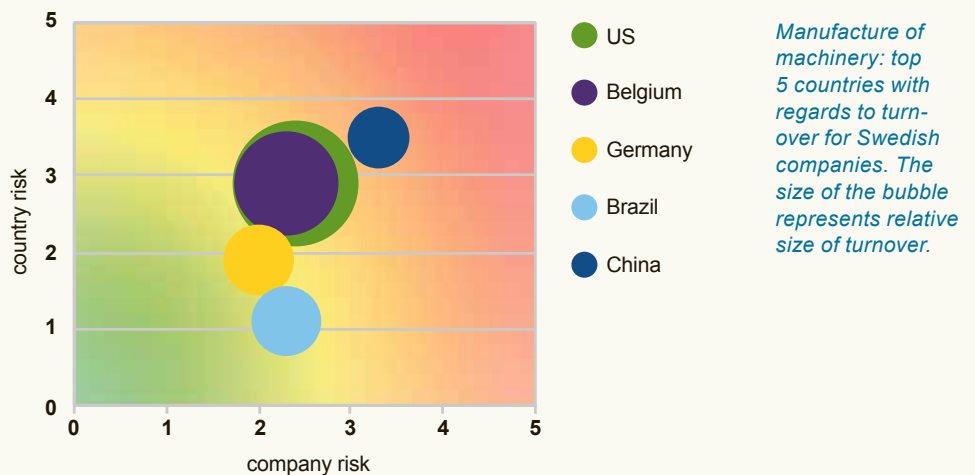


Manufacture of machinery is the second largest sector for Swedish companies.

Manufacture of machinery

This is a rather diverse sector, spanning from manufacturers of machinery for heavy industry such as quarrying and metallurgy to machinery for food and beverage processing and turbines used in hydropower plants. Almost the size of the automotive sector, with its 350 billion SEK in turnover in 2012, it is by far the second largest business sector for Swedish companies with direct operations abroad, employing almost 120,000 people. Some of the products from the sector are consumer products, but the majority are machines and equipment used for the production of other goods and services. Just as for the automotive industry, many of the products in long, complex and dynamic supply chains entail an abundance of potential water risks. Looking at the direct operations of Swedish companies, China stands out with high risk, both company and country-wise (figure 7).

FIGURE 7. Risk chart for manufacture of machinery



Manufacture of machinery: top 5 countries with regards to turnover for Swedish companies. The size of the bubble represents relative size of turnover.

9 m³
OF WATER

IS REQUIRED TO PRODUCE AN INTEGRATED CIRCUIT OF 30 CM

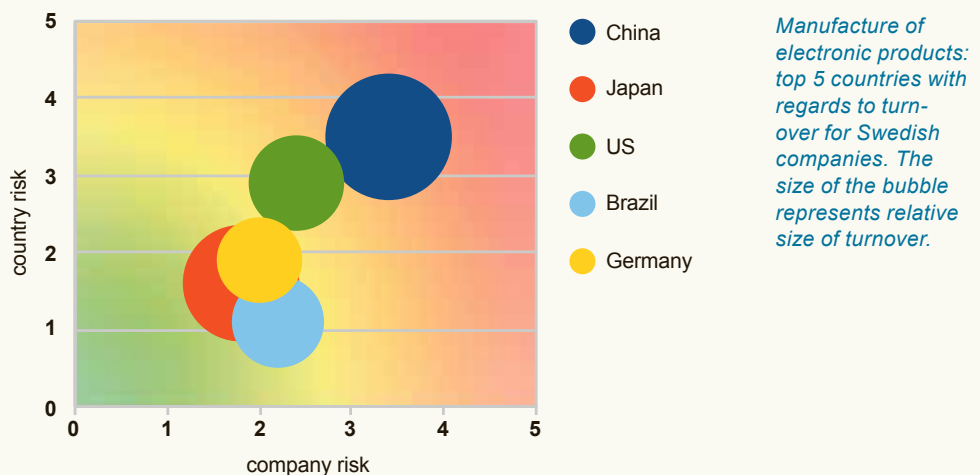


Mobile phones contain several components, which all require huge quantities of purified water when being produced.

Manufacture of electronic products

This is also quite a diverse sector, but with products containing a relatively high degree of advanced technology, such as semi-conductors, which require vast amounts of water; producing an integrated circuit of 30 centimetres requires about nine cubic meters of water (CWR, 2014). Turnover for Swedish companies is high in China, which is in line with the majority of global production facilities for integrated circuits being located in East Asia (CWR, 2014) where water risks are becoming more apparent each year. Once again, China stands out as the country with the highest water risks (figure 8).

FIGURE 8. Risk chart for manufacture of electronic products



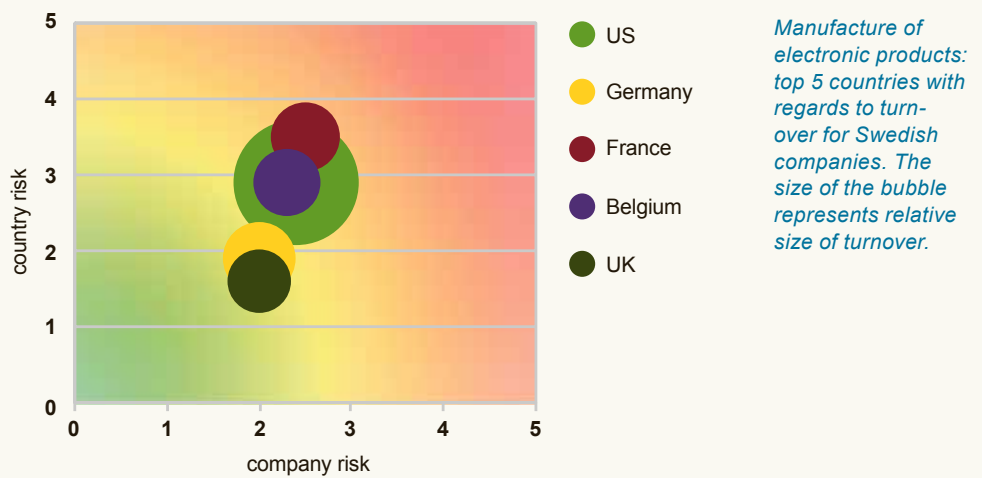
“Global manufacturing of basic metals by volume has also soared during the last 15 years; copper and nickel by almost 50%, zinc by 70%, aluminium by 100% and iron ore by 180%.

Manufacture of basic metals

Basic metals include metals such as nickel, zinc, copper and especially iron and steel. The sector does not include mining and quarrying activities, but the subsequent processing of mining products.

For Swedish companies, the sector has grown by more than 40% counting number of employees abroad from 1996 until 2012 and employs more than 40,000 people. Global manufacturing of basic metals by volume has also soared during the last 15 years; copper and nickel by almost 50%, zinc by 70%, aluminium by 100% and iron ore by 180% (USGS, 2014). The majority of turnover for Swedish companies stems from Europe and North America, presenting low to medium water risks (figure 9).

FIGURE 9. Risk chart for manufacture of basic metals

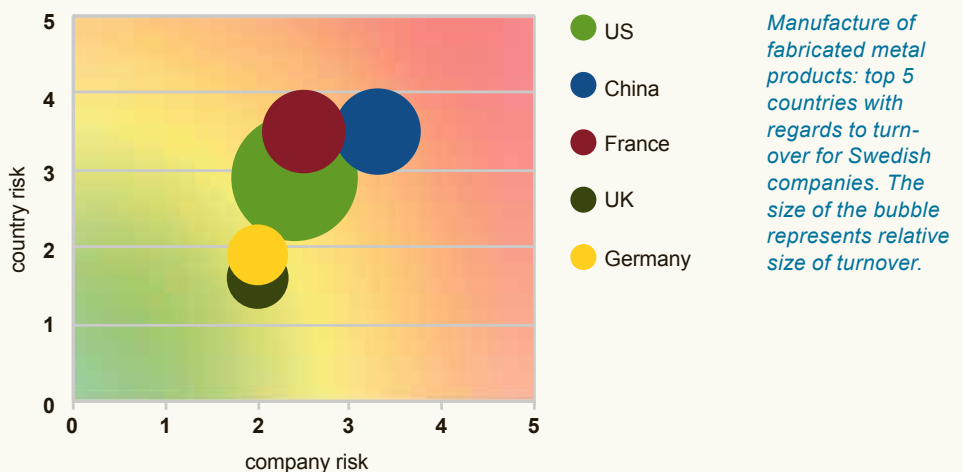


Fabricated metal products is another water intensive sector which is growing quickly.

Manufacture of fabricated metal products

This is another relatively broad sector, with products ranging from nails and tools to cutlery and metallic containers, but several products from the sector can be used as intermediate goods for other industries. As for several sectors, China stands out with high risk, whereas the other top countries with direct operations for Swedish companies have medium risk (figure 10).

FIGURE 10. Risk chart for manufacture of fabricated metal products



Fashion

As discussed above, this report will focus exclusively on fashion retail and not general retail.

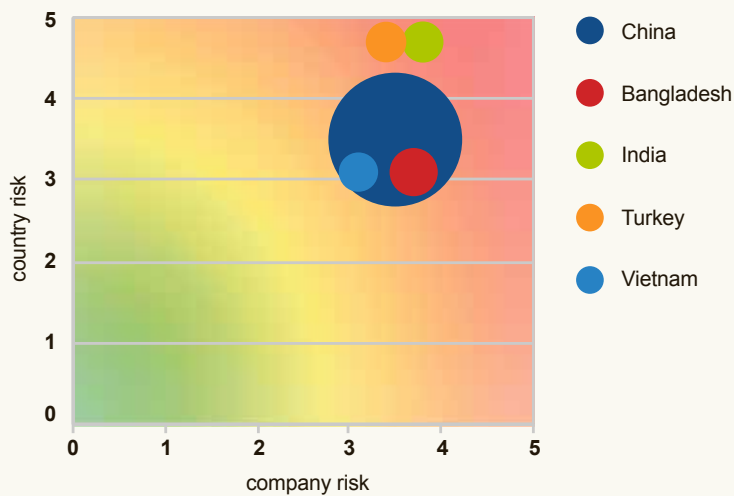
For the fashion industry, water dependency can be derived especially from the production of raw materials – such as cotton – and dyeing and washing of textiles and clothing. Not only do the processes require a lot of water, but there is also a high risk of deteriorating water quality.

However, for fashion retail, the link between production location and turnover is normally quite small (e.g. Norway is the number one country for Swedish retailers, but no textile or clothing production for Swedish companies takes place in Norway). Therefore, instead of using data from the countries with highest turnover for Swedish companies, graphs were extracted from the Water Risk Filter for the five largest global producers of clothing where the dyeing and washing processes take place – China, Bangladesh, India, Turkey and Vietnam (OECD/WTO/IDE-JETRO, 2013).

The risk graph is quite different from earlier ones, with high water risks both country and company-wise (figure 11). All countries are located in Asia, where population and therefore pressure on water resources is high and water management often limited.

The five largest global producers of clothing are all located in Asia, where pressure on water resources is high.

FIGURE 11. Risk chart for production of clothing



Clothing production: top 5 countries with regards to turnover for the sector globally. The size of the bubble represents relative size of turnover.



Risk graphs from the Water Risk Filter all show a similar pattern, with Western European countries and the US having limited or medium water risks. China is an outlier in many of the graphs with high water risks both on country level and for sector-specific risks. The graphs show countries with the highest turnover for Swedish companies. Turnover has been used as a proxy for production and subsequently water risks.



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clothing.

“
Since cotton is the most important raw material for the entire sector, fashion brands need to assess the water risks they face with regards to cotton production.



Water risks for common intermediate goods

In the first part of the analysis, water risks for different geographical markets, based on where Swedish companies have their highest turnover, were examined. The results showed worrying, yet not alarming, results with China particularly showing high water risks. However, the situation is more complex than described through first analysis.

The graphs extracted from the Water Risk Filter are based on data of turnover for subsidiaries of Swedish companies. This provides a good starting point to examine the water risks connected to businesses, but turnover in one country does not guarantee actual production. In many cases it is likely that the last production step takes place in the country where the highest turnover is recorded, but companies today operate through global supply chains. Water risks appear throughout the supply chain and since these are not under the direct control of a company, they are often more difficult to spot and manage. Therefore, to make a solid water risk assessment of all business sectors presented, a more thorough supply chain analysis for each one would be necessary.

**UP TO 20,000
LITRES OF
WATER
IS USED TO PRODUCE
1 KG OF COTTON**

Even though the six selected sectors cover a lot of different potential businesses, they have some common traits regarding intermediate goods and raw materials used. Three different products – steel, rare earth elements (REEs) and cotton – are described to give a broader perspective of the water risks faced by Swedish companies. The five manufacturing sectors are all dependent on steel to a very high degree, whereas cotton is the most important raw material in the sixth sector – fashion. The history of using REEs is relatively short, but the materials are rapidly gaining importance in several industrial and consumer goods applications and present an interesting example of water dependence in a global economy. The list of intermediate goods and raw materials could have been made longer and this selection should not be seen as exhaustive or as taking all water risks connected to the different sectors into account.

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Steel production has risen by 700% since 1950 and in line with the global trends of a growing population, increased urbanisation and shifting consumption patterns, demand for steel will most likely continue to rise.

Steel

For all different types of manufacturing, steel is arguably the most common intermediate product. This also applies to the sectors described above, except for the fashion industry. For the automotive industry for example –almost two thirds of the weight of a car is steel (Blain, 2012). For many of the fabricated metal products, steel makes up the total weight of the end product; containers, nails and locks. Machinery and electronic products both use steel as a main component. For manufacturing of basic metals, steel is often the final product. New applications are continuously found for steel; it is the most important component of wind turbines and also important in the construction of solar panels (World Steel Association, 2014). Steel production has risen by 700% since 1950 and in line with the global trends of a growing population, increased urbanisation and shifting consumption patterns, demand for steel will most likely continue to rise (OECD, 2012).

The main inputs needed to produce steel are iron ore and coke. In particular, quenching of coke is very water intensive, often leaving a large amount of contaminated water in the process. It takes more than 700 litres of water to produce 1 kg of steel (Kluender, 2013). China is by far the most important producer of both steel and coke, accounting for approximately 50% of global steel output and more than 60% of coke production (OECD, 2012). As has already been shown, China is a country with huge water challenges, both regarding quality and quantity of water. Therefore, any industry sector – almost every sector discussed in this report – using steel somewhere along its supply chain has a potential water risk connected to the Chinese steel industry.



The five manufacturing sectors are all dependent on steel to a very high degree. The picture shows steel shovel production in a manufacturing enterprise in Tangshan City, Hebei Province, China.



REE open pit mine located in California, USA. Most REE-mining is carried out in similarly arid environments in China.

Rare Earth Elements

Rare earth elements (REEs) have become increasingly important in many manufacturing industries. Thanks to their properties of low resistance – making them a sought after part in electrical circuits – they are highly useful in all kinds of technical components. REEs are used in catalysts, batteries, mobile phones, computers etc. In other words REEs are very important to the three largest business sectors highlighted in this report; the automotive industry, machinery and electronic products.

Rare earth elements (REEs) have become increasingly important in many manufacturing industries. Thanks to their properties of low resistance – making them a sought after part in electrical circuits – they are highly useful in all kinds of technical components.

REEs were practically not used before the 1950s, but became popular when their potential was realised. In the last 30 years, production has quadrupled. More interestingly, since China started mining REEs in the mid-1980s, they have completely taken over the market and now account for 97% of global production (Haque, 2014). One reason for this development is that China's supply of REEs is relatively high, but REEs do exist in similar extent in many parts of the world comparable to those found in China. Mining of REEs is technically not very different from other types of mining, but since the ore is low graded, larger amounts have to be excavated. This also means that the water footprint for mining REEs is higher than mining other metals. The world's largest REE pit is located in inner Mongolia, an arid area with high water risks (Hao, 2015).

With increasing demand for technical products and batteries as one likely solution to make the vehicle fleet independent of fossil fuels in the future,

CHINA & INDIA

PRODUCE MORE THAN
HALF OF THE WORLD'S
COTTON



demand for REEs will most likely continue to rise. China might continue to produce the vast majority of REEs for years to come, but it is also possible that new mines will open and that recycling will become more commonplace. Whatever the solutions will be, a business using REEs in its products would be wise to more closely examine the water risks connected to mining and refining of REEs.

Cotton

Cotton is produced on all continents, albeit farming in Europe is minimal. The five largest producers – China, India, US, Pakistan and Brazil – account for more than 75% of global production. China and India alone produce more than half of the world's cotton (OECD-FAO, 2013).

Cotton represents nearly half the fibre used to make clothes and other textiles worldwide, and even though many other materials are becoming more and more popular in the fashion industry, cotton will remain the most important raw material in the textile and clothing sector for a long time to come.

Up to 10% of the global use of pesticides is for cotton production, even though less than 3% of the world's crop land is planted with cotton. Additionally, cotton is a very thirsty crop: it can take more than 20,000 litres of water to produce 1 kg of cotton and 73% of global cotton harvest comes from irrigated land (WWF, 2013).

In short, cotton is predominantly grown in countries with medium or high water risks, often in arid areas, is extremely water consuming and runs a high risk of severely impacting water resources and the surrounding ecosystems. Being the most important raw material for the entire sector, fashion brands need to assess the water risks they face with regards to cotton production.



The examples of steel, REE and cotton production show that it is not enough for a company to only focus on direct operations to understand and manage water risks. The three examples give important, but limited, insight into potential water risks facing different business sectors. Every company should understand that to some degree, they have potential water risks which have to be managed in all parts of its supply chain.

WATER STEWARDSHIP – FROM RISK TO OPPORTUNITY

As has been shown, Swedish companies face several water risks, but these risks are often beyond the direct control of the company itself. Because reducing water risks often requires a complex approach, companies are increasingly using practical frameworks such as WWF's water stewardship model. By using this model, companies are able to understand and lower their water-related risks, while contributing to sustainable water management at their local level of engagement.

Becoming a good water steward requires shifting from ad hoc and charitable initiatives to recognising water as a strategic and core business issue that is material to long term profit and growth.

Water stewardship goes beyond being an efficient water user. It means contributing to the responsible and sustainable management of freshwater resources, and finding solutions for risks shared with other stakeholders; unless an entire river basin is managed in a sustainable way, one company's improved efficiency will possibly be overshadowed by increased use by a competitor or a neighbouring community. This makes water a shared resource with shared risks and shared responsibilities. Becoming a good water steward requires shifting from ad hoc and charitable initiatives to recognising water as a strategic and core business issue that is material to long term profit and growth.



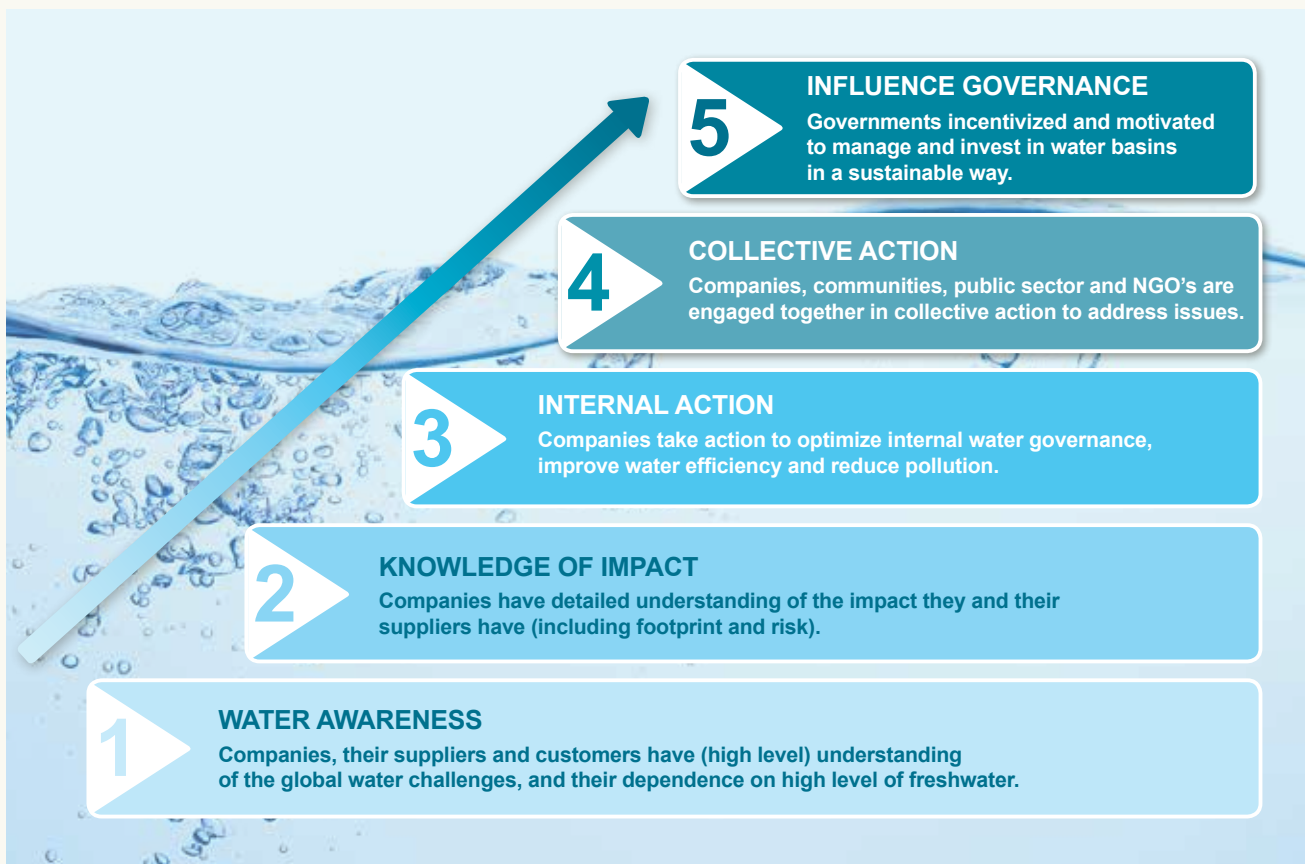
For a comprehensive description of the five steps of the model and relevant case studies, please see the report *From Risk to Resilience: Does your business know its water risk?* (WWF 2015).

Guiding water stewards

Standards are a useful step to help any business improve its management practices and reduce the impact of operations and supply chains.

The Alliance for Water Stewardship (AWS) is a global partnership which has developed a standard for water stewardship applicable for facilities using freshwater in their operations.

The standard supports improvements in on-site water management such as efficiency and reducing pollution. Furthermore, it also helps to prepare companies to work beyond the fence line, setting the stage for collective action and governance engagement.



The WWF water stewardship model consists of five steps. The first three steps focus mainly on managing a company's direct water risk. But as has been shown, companies also face basin related risks over which they have little direct control. To be able to manage these risks and reap long-term rewards, it is necessary for companies to also engage in the two final steps of the stewardship model.



1. Water awareness

Understanding water scarcity and quality challenges and how they might affect business is a critical starting point. It is essential to raise awareness with relevant staff across the organisation, including the CEO, senior management and supply chain. This involves:

- Understanding the general water context, including economic, social and environmental issues.
- Examining the company's dependence on freshwater, both quantity and quality, along the supply chain.
- Understanding what investors expect on water and how the company is perceived by media and customers regarding water issues.



2. Knowledge of impact and risk

The next step is to understand where water comes from, where it is discharged and how this affects the environment. This involves:

- Identifying locations of direct operations and suppliers. This can be difficult, but is necessary to understand which river basins are relied upon.
- Identifying high-risk hot spots and analyse them with risk tools e.g. the WWF Water Risk Filter, which provides a risk assessment on facility level.



3. Internal action

The third step is about acting in those areas where a company has direct control, such as operations or at first tier suppliers. Suppliers further down the chain can also constitute water risks, but can be more difficult to influence. This involves:

- Building strategic and operational support internally for water stewardship. To state the necessity of a strategic approach on water, show the company's dependence on fresh water along the supply chain combined with the situation for global freshwater resources.
- Ensuring the company is complying with legislation and applying best practices related to water management.
- Identifying and targeting key suppliers that can be influenced and that could have the most impact on the business. For example by the value or volume of products sourced from each.
- Ensuring suppliers are compliant with relevant legislation by requiring self-reporting and undertaking inspections for a list of water-related compliance requirements. In countries with poor regulation, compliance may not mitigate risks and additional voluntary action may be needed.
- Providing advice and information to suppliers to help raise awareness of the risks and ensure suppliers are assessing them robustly.
- Establishing a corporate water stewardship policy and an implementation plan that includes goals with time-bound targets (e.g. on water efficiency and pollution reduction), actions to mitigate water risks and impacts (e.g. ensuring legal compliance) and a monitoring and reporting plan.



4. Collective action

Collective action involves companies stepping beyond their own operations and those of their suppliers to engage a variety of other stakeholders to improve water management more widely. The ultimate aim for any collective action project is to strengthen the way in which water resources are governed. This involves:

- Working from key water risk hotspots and identifying key river basins in which the company's input is likely to have the most impact. Identify what capacity the company has to engage and consider the types of interventions that are likely achievable and in how many river basins.
- Understanding what efforts are already under way in the river basins identified and how the company can contribute. Work on water resource management is already underway in most river basins across the world and private sector water stewards should recognise the importance of their positive role in these conversations.
- Supporting collective action in water risk hotspots by engaging with local basin stakeholders such as municipalities, governments, other companies, farmers and NGOs.
- Learning, adapting and sharing the lessons learnt. This will improve the water projects the company is engaging in and enable others to learn from them. It will also facilitate scaling up water stewardship work.



5. Influence governance

Once improvements are made on behalf of a group of businesses or catchment water users, it is in their best interests to ensure these gains are locked in through improvements in strengthened governance. Businesses can support governments to improve the way water is managed for the benefit of all and at the same time, apply pressure on those companies lagging behind who continue to affect water risks. This involves:

- Mapping the policy landscape. Do risks originate from a lack of policy or poor implementation of existing water policies? If it is a lack of policy, use the collective action platform to demonstrate good practice and lobby for new policies. If implementation is the problem, demonstrate through the project how policy can be put into practice.
- Being transparent. Involvement in influencing water governance must aim to benefit all stakeholders. It is important to make sure that a company has its own house in order before engaging on public policy and that all key stakeholders are represented in any decision-making.



Karl-Johan Persson is CEO of the Swedish fashion brand H&M – an aspiring water steward.

H&M - an aspiring water steward

Swedish fashion brand H&M and WWF launched a partnership in 2012, working according to the water stewardship model.

Since then, H&M have set up different levels of training for all their 100,000+ employees on water, conducted yearly water impact assessments of their first tier suppliers using the Water Risk Filter and initiated a highly ambitious strategy on working with suppliers to minimise water risks and negative water impact. H&M requires their suppliers to comply with several requirements on water use and water management, understanding that in the long run this makes perfect business sense both to H&M and their suppliers.

H&M and WWF have also initiated a pilot project with an industrial park in the Taihu basin, west of Shanghai, famous for its thriving industrial sector, but also for its strained water resources. The project encompasses all elements of the two last steps of the stewardship model; collective action is undertaken not only together with other fashion brands, but also with other industries, local communities and local authorities and politicians, with the aim of improving water management at the basin level.



CONCLUDING REMARKS AND RECOMMENDATIONS

Global water challenges are abundant and already affect all parts of society; the private sector is no exception. These challenges often require complex solutions, which can feel overwhelming to any company wanting to engage. But not taking on these challenges

is not an option for the private sector, since water is much too important for business.

Without proper water management, the potential for a healthy business environment will deteriorate in several parts of the world in the long run. On the other hand, companies who take this and other environmental challenges seriously and prepare for the future, will gain advantages over their competitors. It is crucial to understand that the challenges are too complex and overarching to be solved company by company. Rather, what is needed is strong cooperation between the private sector, public sector, local communities and NGOs.

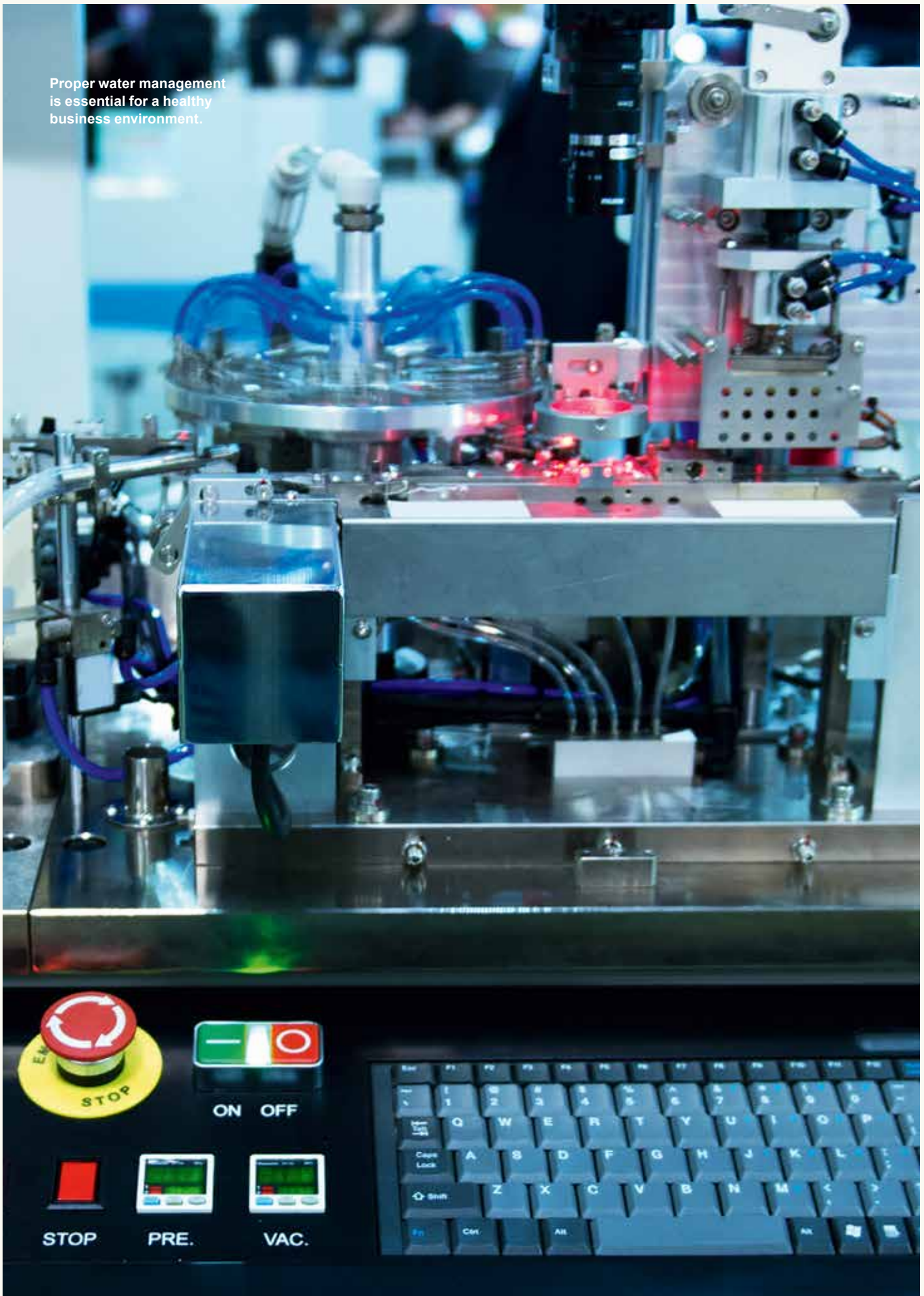
“
Companies who take environmental challenges seriously and prepare for the future, will gain advantages over their competitors.”

This report deals with the largest Swedish business sectors, mainly different types of manufacturing. However, the recommendations apply to all kinds of businesses. Although many sectors use water indirectly, water dependency may still be crucial. On the contrary, risks might be more difficult to spot and manage for sectors with an indirect water dependency and the reasons to engage are therefore high. This is the case for sectors such as food retail, construction and the financial sector. Their suppliers – or as in the case of the financial sector, their clients – may have very high risks in their direct operations or supply chains, which need to be explored further. Failure to do so, reduces the opportunity to properly manage business risks.

To start managing water risk, it is recommended that the private sector:

- 1) **Identifies and understands their water dependency and connected risks and impacts.** This means understanding water use in direct operations and the supply chain, both geographically and from a technical viewpoint. A complete mapping of the supply chain is next to impossible, but getting a basic idea of the general situation is often sufficient to make a good assessment of impacts and risks.
- 2) **Develops or applies best practice water management solutions, preferably together with similar brands.** A lot of guidelines on how to work with direct operations and suppliers to improve water management and decrease both water risks and impact throughout the supply chain already exist for many business sectors. These should be used and improved, and if necessary adapted to local situations.
- 3) **Engages in collective action.** This requires a long term commitment in the areas where risks have been identified and means acting together with not only other brands in the same sector, but rather all major stakeholders in the catchment area, meaning other companies, local and/or national decision makers and local communities. Often this will take place in states with limited capacity of governance, making it even more important for the private sector to engage and provide support to local authorities.

Proper water management is essential for a healthy business environment.





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Appendix A - Methodology

The assessment of water risk for Swedish companies is based on data from the administrative agency Statistics Sweden (SCB). SCB provides data on turnover for subsidiaries of Swedish companies globally. Data has been collected every year since 2010, but with a considerable time delay. This report builds on data from 2012, which is the most recent data available. A Swedish company is defined as one where at least 50% of the voting shares are owned by Swedish citizens. Data is grouped into 88 different business sectors, in line with the second level of accuracy of NACE-SNI2007². For every business sector, SCB provides data on accumulated turnover of subsidiaries of Swedish companies in all countries. The methodology consisted of four steps:

In the first step, the largest business sectors by turnover outside Sweden were identified; 100 billion SEK³/year was chosen as the lower limit and resulted in the identification of nine different business sectors. Subsequently the eight largest countries of operations within these business sectors were listed. SCB chooses not to make all data on country level public, due to 1) rules of privacy when few companies are active in one specific country, and 2) when data on country level is regarded as uncertain (e.g. companies report turnover from regional subsidiaries rather than from specific countries). This sometimes leads to a mismatch between accumulated turnover on global business sector level compared to summarizing turnover from all individual countries in that specific business sector, the latter amount being smaller. Using share of turnover from all 88 business sectors per country, an estimate for turnover in specific countries where data is lacking, was calculated. This inevitably creates a risk of misjudging the size of turnover in specific countries. However, rather than providing exact figures of turnover and connected water risks in specific countries, the report gives a general indication of how Swedish companies depend on water, what this means from a business risk perspective and how these risks can be addressed.

In the second step, six out of nine business sectors deemed most relevant were selected for further examination. This selection was made through an overall assessment based on:

- Water dependency of the sector. Generally speaking, the more water dependent the sector, the higher the risk. Service sectors were assessed as less water dependent than production sectors or service sectors selling manufactured goods.
- Priorities of WWF⁴. WWF have listed six sectors in their freshwater strategy, which were matched with the nine sectors identified by turnover. The WWF priority sectors are a) Food and beverage, and their agricultural suppliers; b) Textiles, clothing and attire, and their agricultural suppliers; c) Mining; d) Heavy industry including pulp and paper and chemicals; e) Financial institutions, including insurance; and f) Retail

In the third step, the WWF-DEG Water Risk Filter (WRF) was used to assess water risks for the business sectors identified in the listed countries. The Water Risk Filter assesses water risk of businesses on two levels: 1) river basin- and 2) company level. River basin-related risks depend on the geographic origin of the product and are calculated using location-specific risk indicators within a framework of physical, regulatory, and reputational water risk categories. The company-related risk uses the same framework with the three risk categories mentioned above, but is based on national and international level data relevant to the particular business sector. For specific facilities, additional data on company level can be provided by users of the filter to get a more precise risk assessment for that facility. However, for this report water risks are assessed on business sector level and not on a company level, therefore only the pre-defined data in the Water Risk Filter was used.

River basins rarely coincide with national borders, but turnover data from SCB of Swedish subsidiaries only exist on country level. To adjust for this, basin-risk on country level was assessed considering a worst case scenario, where the subsidiary is presumed to be located in the river basin with the highest basin-risk of the country.

The three first steps provide an initial assessment of water risks faced by the six selected business sectors. However, recorded turnover of a subsidiary in a specific country does not guarantee that production and therefore water risks are directly connected to that country, since supply chains today are complex and of a global character. In the fourth step, intermediate goods and raw materials common to some of the supply chains of the selected business sectors were identified and risks connected to these further highlighted.

² NACE is an EU- system with four levels of detail describing different business sectors. SNI is the corresponding Swedish system, which was in use before Sweden joined the EU in 1995. SNI was revised in 2007, and NACE and SNI2007 are interchangeable.

³ May 2015, 1 USD=8.2 SEK

⁴ WWF's freshwater strategy states that water management decisions are made by captains of industry in the agriculture, mining and energy sectors, and driven by investors and financial institutions as well as politicians. To achieve engagement both inside and outside the "water box" to improve water governance we will have to understand the power structures in water and related sectors at the global, regional and national levels.



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Design and production:

Odelius & Co – In A Box AB # 15–2965

Printed at: Norrmalmstryckeriet, Stockholm



FROM RISK TO OPPORTUNITY

- Water Risks in the Swedish Private Sector

55% BY 2050

Global fresh water demand will increase by 55% in 2050

40% IN 2030

Water demand will exceed supply by 40% in 2030



SWEDISH PRIVATE SECTOR

The Swedish private sector is affected by how global water resources are managed.

400% BY 2050

The manufacturing industry is predicted to increase its water demand by 400% by 2050.

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