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Requirements for water assessment tools: An automotive industry perspective

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ABSTRACT

Water availability is one of the greatest global sustainability challenges. Water is not available in adequate quantity and quality in many areas and water shortfalls are expected to increase. Businesses are facing water-related challenges due to inadequate water availability and poor resource management. Identifying and quantifying impacts is key to enabling companies to make effective management decisions. Several water assessment tools have been developed to help companies understand the complex nature of water challenges; however, there remain significant gaps in the datasets and inconsistencies in measurement and reporting of geographic water shortfalls. There is a need for more complete datasets containing information on water withdrawal and discharge, freshwater availability and depletion (spatially and temporally), water quality monitoring, reuse and recycling. We discuss four of the available water assessment tools (Global Water Tool, India Water Tool, Water Risk Filter and Aqueduct) and highlight those elements most critical to water-related business decisions.

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1. Introduction

Water is essential to life on Earth. Water is used for agricultural, industrial, municipal and recreational purposes and by natural ecosystems. Global water use has grown at twice the rate of population growth over the last 100 years [1]. Currently, 40% of the world's population lives in areas of water scarcity and an estimated 50% will be affected by 2025 [1]. Water scarcity generally can be defined as the lack of water supply, typically calculated as the ratio of human water consumption to available water supply [2]. Global water scarcity is expected to increase due to the growing population, economic development, more water-intensive energy production, dietary changes and climate change [3,4]. The Falkenmark Index [5] is commonly used to describe the level of water scarcity in a region by calculating the total renewable water supply per person annually and is often criticized for its shortcomings despite global acceptance [6]. For example, the index does not account for seasonal or spatial variability of water flows which may mask regional availability. Generally, water availability of more than 1700 m^3/person/year is considered acceptable, while below this level water scarcity occurs regularly. In areas with less than 1000 m^3/person/year, the lack of water limits human activities and business operations, while less than 500 m^3/person/year is viewed as a main constraint to human life. Water stress is a more comprehensive term for the lack of sufficient water to meet human and ecological demands, encompassing water scarcity as well as water accessibility, water quality and environmental flows (the presumed water runoff required for ecological health of each watershed) [2]. An area with ample supplies of contaminated (unusable or undrinkable) water would have water stress but not necessarily water scarcity [2]. The determination of water stress is rather subjective and depends on available data and local societal values, thus robust, quantitative assessments are currently not possible. However, water stress is considered a more relevant assessment of water risk than water scarcity due to the many aspects included.

The continued availability of sufficient water resources is unclear. As corporate value chains expand globally, water scarcity is creating new business challenges even in locations with previously ample water supplies. Businesses are facing diverse water challenges including more stringent water quality regulations, rising water costs, water allotments, growing community control over local water resources, and increased public scrutiny over water use and discharged water quality.

Confronted by these challenges, businesses are taking a more comprehensive approach to water management by developing global water strategies to minimize unfavorable operational, reputational, regulatory, and environmental impacts. Proactively, some companies are reporting their water use, water reduction targets and water-related actions to their shareholders, stakeholders and the public. Last year a survey of 184 Global 500 companies reported that more than 90% have water management plans in place and 63% have set water reduction targets for their direct operations. However, goals in other water-related areas are minimal: only 6% set concrete targets for community engagement, 4% for supply chain actions, 3% for watershed management, 1% for transparency and no respondents set concrete targets around public policy [7]. A company can reduce both water demand and costs by improving operational efficiencies in direct operations, which is often the most easily managed value chain sector. Increasingly, companies realize that their water practices may have impacts that reach into the local communities and surrounding ecosystems and that a robust water stewardship strategy will address water risks and impacts along the entire value chain. Business water risk refers to the likelihood of a water-related event which would have adverse impacts on the business, community or environment and may be related to company operations, local basin conditions or both.

Companies manage water depending on process requirements, the type of impacts, and the condition of the watershed(s) in which they operate. Companies can identify facilities in water-scarce regions (geographic “hotspots”) and prioritize investments in mitigation measures such as operational efficiency improvements, contingency planning, policy engagement and community outreach. Volumetric water consumption often does not adequately forecast a company's water-related business risks or impacts due to lack of context of their water use within the watershed. A more holistic approach to risk assessment includes a broadened perspective about the ability of nearby communities to access water, the adequacy of local water management practices and water allocation practices by sector. This knowledge leads to a more comprehensive understanding of the relative