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The response of small and medium-sized enterprises to potential water risks: an eco-cluster approach

I.E. Nikolaou [a, *], M.K. Nikolaidou [b], K.P. Tsagarakis [a]

[a] Business and Environmental Technology Economics Laboratory (BETECO), Department of Environmental Engineering, Democritus University of Thrace, Xanthi 67100, Greece
[b] Center of Strategy, Nyenrode Business Universiteit, Straatweg, 25-3621 BG, Breukelen, The Netherlands

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ABSTRACT

This paper investigates the perception of mangers of small and medium-sized enterprises (SMEs) in undertaking collaborative forms to overcome the weaknesses faced by individual SMEs in an attempt to tackle production and operational risks associated with water issues. It particularly examines the effect of water related problems on the operations of SMEs mainly as a result of excessive and sudden environmental changes (e.g. droughts and floods) and strict public policy requirements (e.g. the Clean Water Act). Current literature examines these reasons at an individual firm level and mainly for large firms. To fill this gap, this paper focuses on examining these issues in SMEs. A case study was conducted on a sample of 10 SMEs located in Northern Greece and operating in the food industry in order to examine the perceptions of managers/owners of SMEs regarding the suitability of collaborative forms to face potential water risks. The findings showed that despite the low awareness of managers/owners of SMEs concerning the effects of water risks on their operations, they considered collaboration between SMEs as a good tool for eliminating water risks and gaining financial benefits.

1. Introduction

The increasing needs of the business community and modern society for water resources in conjunction with the acute effects of climate change on water resources are laying the grounds for a dangerous economic and social environment (Arnell, 2004). Arnell (2004) pointed out that between 53 and 206 million people might move into the water-stressed category by 2020, while between 374 and 1661 million people might face problems from water stress. Certain water risks for the business community could be associated with physical risks (e.g. drought and floods), regulatory risks (e.g. compliance costs with wastewater act), reputation risks (e.g. water hazardous accidents) and litigation risks (e.g. penalties related to water issues imposed from government) (JP Morgan, 2008; CERES, 2010a, 2010b; Nikolaou et al., 2014). The effects of water risks are not uniform for each industry. For instance, it is extensively supported that the agricultural sector will face droughts and insufficient water in the future (Smit and Skinner, 2002). Similarly, it is known that a number of tourism sectors (e.g. beach resorts, winter sports and water sports) are directly influenced by water risks either from rising sea levels or frequent droughts (Martin, 2005). Different levels of water risk could be met in different countries. Botzen et al. (2010) concludes that the Netherlands might face droughts and they suggested insurance companies should incorporate some of those risks into the insurance contracts. In other countries (e.g. Germany and Switzerland), it appears that people are very aware of flooding risks (Siergist and Gutscher, 2006).

In particular, food production is a water intensive sector where water needs reach approximately 90% of the total water volume, while only less than 10% of water resources are required to cover human consumption and domestic needs (Kirby et al., 2003). Olmez and Kretzschmar (2009) rank the food industry third in water use and wastewater discharges following the chemical and refinery industries. The food industry addresses water problems by using specific practices either proactively or reactively to achieve water savings and eliminate wastewater discharges. Some popular techniques appropriate for the food industry are the Hazards Analysis Critical Control Point (HACCP) and Life Cycle Analysis (Celaya et al., 2007; Jin et al., 2008). The former technique offers a set of seven principles to facilitate producers to identify the critical points necessary to assure food safety and the latter develops a

* Corresponding author. Tel.: +30 2451079392; fax: +30 2541079397.
E-mail address: inikol@env.duth.gr (I.E. Nikolaou).

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complete approach for auditing water risks throughout the product life cycle.

Many of the current studies add a lot of practical knowledge to present understanding regarding the reasons why large firms take water risks into consideration by examining some specific parameters such as the maturity of management procedures, the need for financial resources and the better training of staff (Celaya et al., 2007; Nikolaou et al., 2013). The lack of research on SME literature on how they address these risks will be dealt with by utilizing key elements from relative field of corporate environmental management and mainly by examining the weaknesses faced by SMEs in their effort to tackle environmental (including water) problems (Hillary, 2004; Lee, 2009). Some weaknesses for SMEs are the lack of adequate financial resources, low staff education, asymmetry information, and distorted perception of managers about environmental management and environmental risks. These problems make SMEs reluctant to adopt environmental management practices at a single firm level.

The inability of individual SMEs to manage environmental risks might be overcome through strategic alliances and collaboration with other organizations such as firms, universities and financial institutions. This view has gained ground since it seems to be a good response of SMEs to economic globalization and a positive reaction of SMEs to the requirements of environmental legislation under the current economic crisis (Karaev et al., 2007). This paper aims at examining how the food industry could address the potential water risks though mutual actions (e.g. common sewage treatment) and strategic alliances (e.g. finance common R&D projects for avoiding water risks). This study was conducted on a sample of 10 SMEs that operate in the food industry which are located in the region of Evros, Greece. The findings show that managers of food SMEs are willing to undertake collaborative forms to avoid potential water risks.

The rest of the paper is classified in four sections. The first section includes the literature review regarding the food industry and water risks, SMEs weaknesses, and the strengths of collaborative forms for SMEs to face water and environmental problems. The second section describes the methodology, the research framework and the research questions. The third section provides methodology and the fourth includes the results of the research. Finally, the fifth section presents the conclusions.

2. Literature review

Today, the food industry is facing various challenges throughout its supply chain as a result of globalization, the rapid reforms of public policy in many countries of the European Union, the lack of available financial and environmental resource, the continual alteration of consumer tastes and structural problems such as the increasing number of SMEs (Fritz and Shiefer, 2008). The food industry faces some additional environmental and social problems such as the effects of global warming and extreme weather events as well as the social criticisms regarding production techniques and ethical issues (Maloni and Brown, 2006). A range of direct and indirect risks concern the food industry's operations. In particular, the food industry might be directly affected by water scarcity in its day-to-day operations due to the high need for water in its production processes, while indirectly could face production problems from delays of raw materials through supply chain problems (e.g. effects of extreme weather events on transportation).

The water risks could be physical risks, regulation risks, reputational risks and litigation risks (CERES, 2009). The first type includes water shortages and disruptions through the supply chain of the food industry as a consequence of the climate change effects and weather extreme events and therefore certain dangers in the food production (Tirado et al., 2010; Garrity et al., 2010). Actually, the food industry is dependent on the agricultural and fish sectors for its ongoing production processes which are exposed to physical risks associated with climate change (CERES, 2009; WWF, 2009). Tirado et al. (2010: p. 1745) supports that the fish industry and overall food industry might put at risk their operation due to the *"ocean warming, and climate change related acidification and changes in ocean salinity"*. Current frequency and severity of weather extreme events disrupt the transportation of food products to different regions, countries and supply chain stages (Koetse and Rietveld, 2009), also many pathogens have been presented on fresh food products due to sharp changes in climate in the overall supply chain of different regions (Rosenzeig et al., 2001).

The second type of water risks are risks to corporate reputation mainly associated with dissatisfied stakeholders (e.g. consumers, investors and local communities) due to any environmentally unfriendly behaviour of the food industry concerning water resources. Some types of reputational risks could be associated with likely accidents and untreated wastewater effluent discharges of firms into water bodies. In particular, many oil companies (Royal Dutch Shell Group and British Petroleum) have made efforts to decrease air emissions and water discharges in order to protect their reputation since they have come under considerable public criticism (Anderson, 2002). CERES (2010a, 2010b) has reported that the bad reputation of a firm would place pressure on the brand value and furthermore on consumer loyalty and the regulatory authorities trust (e.g. reduce of sales and stringent regulations). Food companies would face the disapproval of their stakeholders following a wastewater accident or in the case where firms have avoided investing in wastewater treatment facilities (Lehtinen, 2012). Additional fears of the food industry are associated with the bad water quality in a region (as a result of environmentally unfriendly behaviour of local firms and domestic procedures) which could sway the public trust concerning the local agriculture products and increase the possibility of consumers moving to alternatives markets (Gengenbach and Weikard, 2010). Lambooy (2011) states that tensions between the business community and local community regarding safe drinking water could damage the image of firms and either of them could lose their license to operate of face an increase in operation costs.

The third type of risk for the food industry (and for all other sectors as well) is associated with costs incurred for food companies to align their operation with the sanitary taxes, waste control taxes, and legislation standards (Sanchez et al., 2011). The regulatory risks are a consequence of the severity of the recent regulatory regime for water related issues which strongly enforce firms to seek certain management practices to fulfil the requirements of present legislation (The CEO Water Mandate, 2009; Trienekens and Zuurbier, 2008). A stricter regulatory regime creates steady pressure on the food firms' operation (financial and technological) and increases the needs of public authorities to audit periodically the evolution of environmental performance of the food industry (Fulponi, 2006; CERES, 2010a, 2010b). Such an example is the EU legislation (2006, 2011) on water scarcity, droughts and pollution of aquatic environment. The response of the food industry to these requirements is made through investments in new technologies and management practices (The CEO Water Mandate, 2009). Galka (2004) proposes some essential strategies in order for the agricultural sector to *preserve conserve* suitable amounts of water so as to avoid operational discontinuities in the overall supply chain during the year. Even though the regulatory regime would have positive effects on the corporate environmental and financial management (Porter and van der Linde, 1995), a stricter regulatory regime might create some significant barriers for food SMEs which might drive them out of the market (Gerbens-