

Corporate Social Responsibility Does Not Avert the Tragedy  
of the Commons -- Case Study: Coca-Cola India

Aneel Karnani  
Stephen M. Ross School of Business  
University of Michigan

Ross School of Business Working Paper  
Working Paper No. 1210  
October 2013

This work cannot be used without the author's permission.  
This paper can be downloaded without charge from the  
Social Sciences Research Network Electronic Paper Collection:  
<http://ssrn.com/abstract=2354022>

# Corporate Social Responsibility Does Not Avert the Tragedy of the Commons -- Case Study: Coca-Cola India

## Abstract

'Tragedy of the commons' is a powerful concept to analyze a variety of problems related to environmental sustainability. The commons problem can be solved if individuals behave altruistically. In the business context, this article studies the proposition that corporate social responsibility (CSR) can avert the tragedy of the commons by examining one case study in depth: Coca-Cola's bottling operations in Rajasthan, India. In spite of choosing a context favorable to the proposition, the results indicate that CSR does not avert the tragedy of the commons. To address the major environmental challenges, it is essential to develop regulatory regimes with appropriate incentives and ability to enforce sanctions.

Keywords: corporate social responsibility; tragedy of the commons; common-pool resource; environmental sustainability.

In one of the most cited scientific articles ever written, Garrett Hardin outlined 'the tragedy of the commons,' a powerful metaphor that the users of a commons are caught in an inevitable process that leads to the destruction of the very resource on which they depend.<sup>1</sup> It is now a central concept in human ecology and the study of the environment, and can be used to view a variety of commons related problems, such as population growth, environmental pollution, groundwater basins, forest management, climate change, fishing, wildlife habitats, and traffic congestion. The prediction of the inevitable tragedy assumes that all individuals are inherently selfish. The tragedy of the commons, of course, can be averted if individuals behave altruistically, and voluntarily act in the interests of others in the wider community. Translating this to the business context, the tragedy of the commons can be averted if companies have a corporate social responsibility (CSR) to go beyond making profits and achieve some positive social goals.

This article studies the proposition that CSR can avert the tragedy of the commons by examining a case study in depth. I choose a case study -- Coca-Cola's bottling operations in Rajasthan, India -- that is favorable to the proposition. The company Coca-Cola, both globally and in India, vociferously proclaims to be socially responsible. Since water is the critical input to Coca-Cola's operations, it is not surprising that the company emphasizes its water stewardship efforts, especially in the desert location of Rajasthan. In spite of choosing a context favorable to the proposition, the results indicate that CSR does not avert the tragedy of the commons.

Following Hardin's famous article, there is a vast literature on managing the commons. I provide a very brief overview of the critical concepts for solving the commons problem, and translate these ideas to the business context. There is also a vast literature on CSR, and the next section provides a brief overview of this concept, and links together these two fields. The rest of the paper describes the case study and draws conclusions about the effectiveness of CSR for averting the tragedy of the commons.

### **The Tragedy of the Commons**

Hardin explained the tragedy of the commons using the fable of a pasture open to all. Each herdsman 'rationally' adds more sheep because his expected benefits are greater than expected costs, since he selfishly ignores the costs imposed on the others. Thus, individual decisions cumulate to tragic overuse and the potential destruction of the commons. Subsequent research has argued that it is necessary to distinguish between the intrinsic nature of the resource and the property regime under which it is held.<sup>2</sup> Common-pool resources (CPRs) are characterized by 1) difficulty of excluding beneficiaries through physical and institutional means, and 2) subtractability, that is use by an individual reduces resources available to others. The literature identifies four types of property rights: open access (that is, no property rights), individual property, group property and government property.

Hardin has been criticized for confounding the intrinsic nature of the resource and the regime under which it is held. As Hardin later acknowledged, his argument applies to an open access CPR, or an "unregulated commons."<sup>3</sup> In the absence of rules for managing

the CPR, the fundamental problem is free riding along two dimensions: overuse without concern for the adverse effect on others, and a lack of contributions to maintain and improve the CPR. Solving CPR problems involves two distinct elements: restricting access, and creating incentives for users to invest in the CPR.

### **Altruism**

A critical assumption underlying Hardin's reasoning is that individuals are inherently selfish, "locked into a system that compels" them to pursue their own best interest. It is ineffective for society to appeal to an "individual exploiting a commons to restrain himself for the general good by means of his conscience." Using Darwinian logic, Hardin argued that "such an appeal is to set up a selective system that works towards the elimination of the conscience from the race."

The tragedy of the commons, of course, can be averted if individuals voluntarily act in the interests of others in the wider community.<sup>4</sup> Many scholars have argued that this seems to be the normal mode of human behavior. Human beings are prone to altruism, or concern for others. According to the US Department of Labor, about 65 million people volunteered at least once in 2011, at the median rate of 51 hours per year. Most, if not all, of the world's religions promote altruism as a very important moral value. A stream of research on reciprocal altruism is based on the theory of repeated games, and shows that "cooperation based on reciprocity can get started in a predominantly noncooperative world, can thrive in a variegated environment, and can defend itself once fully established."<sup>5</sup> Contemporary discussions of altruism are often based on evolutionary

theories such as reciprocal altruism and kin selection.<sup>6</sup> Some evolutionary biologists go so far as to argue that "morality is grounded in our biology."<sup>7</sup>

However, the rational actor model that posits strict self-interest dominates the field of economics, and is also influential in other fields including political science, sociology, ecology, and psychology. As Adam Smith said "we are not ready to suspect any person of being defective in selfishness."<sup>8</sup> This rational actor model explains why market institutions facilitate an efficient allocation of private goods, and is supported by much empirical research. It is not surprising that the bulk of research, especially in economics and political science, on solving CPR problems eschews altruism and focuses on property regimes.

### **Property Regimes**

When a CPR is left to an open-access regime, that is, there are no enforced property rights, it results in degradation and destruction of the resource. In individual property regimes, resource rights are held by individuals who can exclude others; an example might be private ownership of grazing land bounded by a fence. For most CPRs, individual privatization is not a feasible option in practice; as an extreme example, it would be impossible to privatize the earth's ozone layer. Accordingly, most research on CPR problems does not consider this a viable solution. In group property regimes, resource rights are held by a group of users who can exclude others, and manage the CPR using various mechanisms such as communication, trust, reciprocity, reputation, sanctions, and binding commitments. Elinor Ostrom, Nobel Prize economist, has studied

a large number of commons problems in fisheries, grazing, forests, and irrigation systems, and shows how groups of users have developed local (as opposed to governmental) institutional arrangements to successfully manage CPRs.<sup>9</sup> User groups characterized by the presence of a community, small and stable populations, a thick social network, and social norms promoting conservation do better at establishing effective group rights schemes. In government property regimes, resource rights are held by a government (central or a lower level) that can regulate the CPR, and enforce incentives such as taxes and subsidies. For example, the government in Singapore imposes a toll on traffic in the central business district to control congestion. Empirical research has demonstrated that no property regime works well for all CPRs, and problems continue to exist in all property regimes. Elinor Ostrom has identified design principles associated with institutions that have successfully managed CPRs, with a special focus on group property regimes.<sup>10</sup>

The world's fisheries are in serious trouble due to overexploitation. In an open access regime, each fisherman has an incentive to 'race to fish' to outcompete the other fishermen, leading to eventual collapse of the fishery -- the tragedy of the commons. In a widely cited study, Worm *et al* estimated that about 27% of the world's fisheries were collapsed in 2003, and extrapolated the trend to predict that 100% of the world's fisheries could be collapsed by 2048.<sup>11</sup> The best way to protect the fisheries is to give the fishermen well-defined, long-term property rights to a share of the fish. In government regulated fisheries, as in Iceland and New Zealand, this has taken the form of a tradable share of a fishing quota.<sup>12</sup> In other countries, especially developing countries, some

fisheries are governed by a group property regime that gives rights over an expanse of coastal waters to a cooperative or fishing community, which then gives each licensed fisherman a fraction of the catch. Costello *et al* studied 11,135 commercial fisheries around the world between 1950 and 2003, and found that the collapse rate was cut in half among the fisheries managed by government or group property regime compared to open access fisheries.<sup>13</sup> This supports the view that altruism does not effectively help avert the tragedy of the commons, whereas group and government property regimes are effective. Although the global rate of adoption of rights-based approach has increased since 1970, unfortunately the spread of such schemes has been very slow. The study identified only 121 fisheries (out of 11,135) managed using a share of the catch schemes in 2003.

### **Business Context**

Neither Hardin nor most of the subsequent literature on managing CPRs explicitly analyze the situation when the users are modern corporations owned by shareholders and run by professional managers. Corporations are even less inclined to act altruistically to preserve the CPRs in open access regimes. According to neoliberal economic perspective, company managers have a fiduciary responsibility to their shareholders to maximize profits while conforming to the laws and norms of society.<sup>14</sup> The modern business corporation is "the one important actor in our market economy that *does* match Hardin's depiction of the implacably rational, self-interested economic agent."<sup>15</sup> So, it would seem that Hardin's dire prediction of the tragedy of the commons applies even more in an economic landscape populated by publicly traded companies.



The contrary, and more optimistic, view is that companies have a corporate social responsibility (CSR) and "decide voluntarily to contribute to a better society and a cleaner environment."<sup>16</sup> Thus, CSR is the corporate counterpart of altruism at the individual level, and will help avert the tragedy of the commons in a business context.<sup>17</sup> There is a vast literature on CSR, and simultaneously much controversy surrounding the concept.<sup>18</sup>

### **Corporate Social Responsibility**

For CSR to move beyond empty platitudes, it is necessary to clearly distinguish between socially desirable activities that are profitable and those that are unprofitable for the firm involved.<sup>19</sup> Much of the contemporary literature on CSR emphasizes its positive links to profitability.<sup>20</sup> The business case for CSR states that as companies behave more responsibly, they also become more profitable. One such recent article in the Harvard Business Review states "executives behave as though they have to choose between the largely social benefits of developing sustainable products or processes and the financial costs of doing so. But that's simply not true."<sup>21</sup> Another article in the Harvard Business Review proposes "a new way to look at the relationship between business and society that does not treat corporate success and social welfare as a zero-sum game."<sup>22</sup> Much of the popular business literature exhorting firms to be socially responsible is in this vein and assumes, at least implicitly, that all socially desirable behavior is perfectly consistent with the firms' self-interest. This, of course, is contrary to the very concept of a CPR, which is characterized by a free-rider problem. The essence of a CPR problem is that in an open access regime the interests of one user are not congruent with the collective

interests of society. Many contemporary societal problems clearly involve a CPR, and this view of CSR will not avert the tragedy of the commons.

For CSR to help avert the tragedy of the commons, it is necessary to define CSR as a company's responsibility to voluntarily undertake socially desirable behavior that decreases the firm's profits.<sup>23</sup> Only then does CSR become the business equivalent of altruism at the individual level, and help avert the tragedy of the commons. It is an empirical question whether firms in fact do practice (and not just proclaim) CSR and help avert the tragedy of the commons. The case study described below examines this proposition in the context of Coca-Cola India's bottling operations in Rajasthan, India.

The alternative to CSR for averting the tragedy of the commons is a property regime to manage the CPR (see Table 1). Due to the very nature of a CPR (especially a large, complex CPR), it is rarely feasible to assign property rights to firms individually. Moreover, private ownership by large corporations of a CPR, which are often perceived as public goods, would be politically difficult in most democratic countries. Most examples of successful group property schemes have been in the context of very local communities, such as villages in Switzerland and Nepal.<sup>24</sup> People live in the same village for generations and intend to live there for generations to come. The use of community sanctions and social pressure was an important element of the group property regime, as were communication, trust, reputation, and anticipation of future interactions. All these elements are difficult to establish in the business context, making group property rights a less viable solution. Ostrom *et al* acknowledge that the "humanity now faces new

challenges to establish global institutions to manage biodiversity, climate change, and other ecosystem services," and that these challenges will be particularly difficult because of the scale of the problem, cultural diversity, complexity of interlinked CPRs, accelerating rates of change, and need for unanimity. Thus, developing group property regimes in a business context with modern corporations will be rather difficult. It is not surprising that the success record of self-regulation by industries has been mixed at best.<sup>25</sup> Government property regime is in a sense the ultimate solution, because the government has the legitimate power of coercion to enforce the rules. Hardin referred to this as "mutual coercion, mutually agreed upon by the majority of the people affected." It is the role and the responsibility of the government in a democratic society to manage the CPRs; a necessary condition for this to succeed, of course, is a competent government.

Insert Table 1 about here

### **Case Study: Coca-Cola India**

Social activists have long leveled various accusations against Coca-Cola, such as human rights abuses in Colombia, waste-disposal practices in India, and groundwater depletion in India.<sup>26</sup> This article examines in depth only one issue: groundwater use at one location, Kaladera, in the state of Rajasthan in India. According to the *Wall Street Journal*, "numerous NGOs both inside and outside India accuse Coke, among other 'crimes,' of sucking local Indian communities dry through excessive pumping" of groundwater.<sup>27</sup> There were protests against Coca-Cola in Plachimada, Kerala, starting in 2002. There has been a long running legal dispute between the Kerala government and the company; the

plant has been closed since 2004. There were similar protests that Coca-Cola bottling plants deplete the groundwater supply in Mehdiganj (Uttar Pradesh) and in Kaladera (Rajasthan). India Resource Center, a small NGO, has been a prominent critic of Coca-Cola India. Students Organizing for Labor and Economic Equality at the University of Michigan picked up on several accusations by social activists against Coca-Cola, and in 2004 formally requested the University of Michigan to cease doing business with Coca-Cola.<sup>28</sup> After a short suspension in 2006, the University resumed doing business with Coca-Cola, after the company agreed to the University's demand for an independent assessment, which was performed by The Energy and Resources Institute (TERI), a prestigious Delhi-based, not-for-profit, policy research organization. The TERI report was a particularly useful source for this article.<sup>29</sup>

The in-depth case research in this article is based primarily on personal interviews. I visited Delhi and Rajasthan for two weeks in 2011, and interviewed several Coca-Cola India executives both at the country headquarters in Delhi and the bottling plant in Rajasthan, government officials at both the federal and state levels, local farmers and village leaders in Kaladera, and NGOs concerned about the water situation in India. All data and statements obtained from Coca-Cola India executives and used in this article were confirmed by the company in written emails, which are available from the author.

The Coca-Cola case was chosen precisely because the company vociferously proclaims its social responsibility. Muhtar Kent, Chairman and CEO, states, "We support the United Nations Global Compact, and see our sustainability efforts first and foremost as the right

thing to do -- the continuation of responsible corporate citizenship that began in our earliest days as a company."<sup>30</sup> It should be noted that Muhtar Kent does not make a 'business case for CSR,' and instead defines CSR along the lines of this article. Coca-Cola India's website claims that "The Coca-Cola Company has always placed high value on good citizenship. ... Coca-Cola India provides extensive support for community programs across the country, with a focus on education, health and water conservation."<sup>31</sup> Several Coca-Cola India executives I met had business cards with some CSR slogan printed on the reverse side; here is one example: "Live Positively is our commitment to making a positive difference in the world so that sustainability is part of everything we do. Forever."

Given the nature of the company's products, it has appropriately focused its sustainability efforts on water resources. Muhtar Kent states, "At The Coca-Cola Company, we are transforming the way we think and act about water stewardship. It is in the long-term interest of both our business and the communities where we operate to be good stewards of our most critical shared resource, water."<sup>32</sup> The company claims that water stewardship "is now clearly embedded in both our business strategy and our vision for sustainable business growth."

### **Water Crisis**

The world faces a water crisis. According to the United Nations Environmental Program, 200 scientists in 50 countries identified water shortage as one of the two most worrying problems for this millennium (the other was global warming).<sup>33</sup> The World Water

Council believes that by 2020 we shall need 17% more water than available to feed the world. Today, one person in seven in the world does not have access to safe drinking water, and one in three lacks safe sanitation.<sup>34</sup> Compared to many other countries, India faces a more imminent water crisis. "China's 1.33 billion people each have 2,117 cubic meters of water available per year, compared with 1,614 cubic meters in India and as much as 9,943 cubic meters in the U.S., according to the Food and Agriculture Organization of the United Nations. The 1.2 billion people in India, where farmers use 80 percent of available water, will exhaust their freshwater supplies by 2050 at the current rate, the World Bank estimates."<sup>35</sup> The water crisis is predictably worse in the desert state of Rajasthan, where surface water is meager and the entire state is principally dependent on subterranean groundwater. Rajasthan has semi-arid to arid climate, and experiences frequent droughts (46 times during 1901-2002).<sup>36</sup>

The village of Kaladera (where the Coca-Cola plant is located), in the Jaipur district of Rajasthan, sits atop groundwater aquifers, which support many neighboring towns and villages. The Kaladera watershed, comprising an area of 309 square kilometers, was officially designated as "overexploited" – that is, the withdrawal rate exceeds the natural recharge rate -- by the Central Ground Water Board in 1998.<sup>37</sup> The TERI study in 2006 independently confirmed that the annual extraction of groundwater is "at least 1.35 times" the natural recharge rate; the government statistics indicate the exploitation ratio was 2.47 in 2004.<sup>38</sup> The groundwater level in Kaladera has dropped significantly from about 9 to 39 meters below ground level in the last twenty years, (see Figure 1). The rate of decline, which averaged 0.5 meters per year during 1984-1996, accelerated to 1.4 meters per year

during 1996-2006, according to the State Groundwater Department; Figure 1 indicates further acceleration since 2006.

Insert Figure 1 about here

The decline in the water table has clearly had a negative impact on the people (mostly farmers) living in the Kaladera area. The farmers said their livelihood had been affected due to increased cost of irrigation: they had to dig deeper wells and purchase more powerful pumps. More land was left fallow because of inadequate water supply for irrigation. They felt that the crop yield levels had been reduced, although there was no hard empirical evidence. The women emphasized that the water crisis had reduced their availability of water for drinking and domestic purposes, and they had to spend more time and effort fetching water. The women claimed that the yield of milk had gone down because they could not provide enough water to their cattle.

### **Causes of the Water Crisis**

Some of the stakeholders felt that one of the causes of the water crisis was reduced rainfall in recent years, but the empirical data do not support this explanation. The area has experienced mild to moderate droughts for eight of the past 25 years, but this is not abnormal given the even longer term pattern cited earlier.<sup>39</sup> The problem is the high variance in annual rainfall. The Kaladera area receives long-term average rainfall of about 600 mm per year, with a standard deviation of about 175 mm.

The real cause of the water crisis has been the increasing extraction of groundwater in the Kaladera area, which in turn is due to several factors. Water demand has grown along with population growth in the region of about 2.6 per cent per year. Higher household incomes and changes in lifestyle increasingly involve water intensive activities. The pace of urbanization, about 10-15 percent per decade, has also contributed to the growing water demand. Although no quantitative data are available, all stakeholders agreed that there has been a significant increase in the number of bore wells both for agricultural and industrial purposes.

While there has been a gradual shift towards industrial and service sectors, this is still mostly a rural area, and agriculture continues to be the predominant occupation. The TERI study estimated that in the Kaladera area, total groundwater extraction is about 50 million cubic meters per year, and that agriculture accounts for about 91% of total groundwater extraction, and domestic and industrial uses for the remaining 9%. The gross area under cultivation and cropping intensity both have increased over the past three decades. Farmers increasingly utilize electric pumps, more powerful pumps, and deeper wells contributing to growing water extraction. Cropping patterns in the region have shifted towards cultivation of water-intensive crops like groundnut, mustard, wheat, and millet. The problem has been exacerbated by the spread of free or vastly discounted electricity for farmers, who often pump out more water than needed. "A favorite boon of politicians courting the rural vote, the low rates have encouraged farmers to pump out groundwater with abandon."<sup>40</sup> Since electricity is unreliable and free, many farmers leave



their pumps on all the time, thus wasting water, according to many of my interview subjects.

The Coca-Cola plant was established in 1999 in an industrial park operated by the Rajasthan State Industrial Development & Investment Corporation (RIICO), a state government agency. The Coca-Cola plant has four bore wells that are 100 meters deep, but operates only two wells at a given time. It is not the only water-dependent factory in the park; others include Rajshri pulp, Oswal paper, Rajasthan liquors, and MRK pipes. In its early years of operation, the Coca-Cola plant withdrew about 200,000 cubic meters of groundwater per year, which is about 0.4% of total groundwater extraction in the Kaladera area.<sup>41</sup> In recent years, Coca-Cola has reduced its water usage to about 100,000 cubic meters annually, and therefore might account for about 0.2% of total water extraction. Even at its current levels, Coca-Cola is one of the largest users of groundwater in the Kaladera area, and might be the single largest user. It is certainly perceived by the local people as the largest user of water. Coca-Cola's water consumption can be decomposed into the volume of beverages produced and the water usage ratio (defined as water consumed divided by volume of beverages produced). The production volume, of course, is driven by market demand in the region; the plant has always operated at about 30% or less of its installed annual capacity. The water usage ratio has come down steadily over the last ten years from about 4.0 to about 2.0. While Coca-Cola has implemented various measures to improve its water efficiency, the largest factor driving down the water usage ratio is the shift from refillable glass bottles to plastic (polyethylene terephthalate) bottles, which significantly reduces the water needed to

wash the bottles. Thus, the Coca-Cola plant has reduced its groundwater extraction by about half in the last several years, but at the expense of increasing the problem of non-degradable plastic bottles.

Coca-Cola's negative impact on the groundwater aquifer is compounded by the fact that its peak production, and hence its water extraction, occurs in the summer months April-June, which coincides with the acute water stress period in the region. At the localized level, defined as 2 km radius around the plant, the TERI study estimated that the Coca-Cola plant accounts for less than 2.7 percent of total water extraction 70 percent of the time, and less than 0.9 percent for 40 percent of the time. At its worst, in May 2004, the Coca-Cola plant alone accounted for about 8% of the total water extraction at the localized level.

### **Unregulated Commons**

The law in India historically has been that access to and use of groundwater is a right of the landowner; there are no restrictions at all on who can pump groundwater, how much and for what purpose.<sup>42</sup> As result of the rapid expansion of groundwater use and the depleting supply, the central government has tried since the 1970s to persuade the states to adopt groundwater legislation. In general, water law in India is largely based at the state level. A few states (such as Kerala) only recently have adopted groundwater acts, but Rajasthan is not one of them.

The Planning Commission of the Government of India issued in 1997 a Report of the Expert Group on 'Ground Water Management and Ownership' that argued that "since ground water is an open access resource, the tragedy of the commons often occurs where everyone tries to extract as much water as she can and degrades the resource."<sup>43</sup> The report concluded, "the Central Government has the obligation to see that groundwater use does not lead to environmental degradation." However, there has been no action (except very recently -- see the Epilogue at the end of this article). In response to my question about the lack of an appropriate regulatory regime, the chairman of the Central Ground Water Board replied, "we are thinking about it."

The state government of Rajasthan drafted in 1999 a State Water Policy to manage and regulate water resources. In its current version, the policy states that "planning and development of water resources needs to be governed by the state's perspective" to ensure "a judicious and equitable, and sound economic" allocation of water resources to different sectors: drinking water, irrigation, power generation, and industrial, in that order of priorities.<sup>44</sup> "Exploitation of groundwater resources should be so regulated as not to exceed recharging possibilities, and also to ensure social equity." The policy advocates, "water rates shall be so decided that it conveys the scarcity value of water to users and foster the motivation for economy in water usage." The state government should prepare projects for artificial recharge of groundwater. All these recommendations are obviously sensible, but none have been enacted so far. Thus, in Rajasthan all landowners (homeowners, farmers, and businesses) legally can extract as much groundwater as they like without concern for other users.

The Kaladera area was assessed to be "overexploited" by the Central Ground Water Board in 1998. The Coca-Cola plant was established in the RIICO industrial park in 1999 and commenced production in 2000. The plant sunk four bore wells, and had permission for a maximum of five wells. It is not clear why RIICO gave this permission. The TERI report speculates about the lack of coordination between the Central Ground Water Board, the Central Ground Water Agency, the State Ground Water Department, and RIICO. When I asked the head of the State Ground Water Department about the role of his department in the RIICO permission, he replied that he did not know since it was before his time, and he "guessed" that his department had not been involved. Finally in 2004-05 RIICO refused to permit establishment of water-intensive industry in the area.

### **Plant Location**

Since Coca-Cola claims to be socially responsible, one might expect that the company would not locate a water-intensive plant in a water-stressed area. I asked Coca-Cola India executives why the company had located the plant in Kaladera after the government had officially declared the area to be water "overexploited." Their response was "consistent with our Company requirements, Environmental Due Diligence was conducted before we set up operations. ... The plant was set up after obtaining all necessary clearances from the relevant departments of the government. We do not share due diligence reports externally. These reports may contain sensitive information of both - business and legal nature." The TERI study cites a similar response from the company on this topic. This

lack of explanation, let alone a socially responsible explanation, reduces the credibility of Coca-Cola's CSR statements.

A plausible argument is that it is unfair to criticize Coca-Cola for its decision in 1999 to locate the plant in Kaladera, since that pre-dated the company's current emphasis on water stewardship. In 2002, in an effort to move towards more sustainable operations management, the company published its first environmental report.<sup>45</sup> In 2003, the company announced an Environment and Water Resources Department and appointed Jeff Seabright as a vice president to head the department. When asked to explain the firm's new global water strategy, Jeff Seabright told *The Economist* in 2005 that, "water is to Coca-Cola as clean energy is to BP," using an unfortunate choice of analogy.<sup>46</sup> It is possible that awareness and actions about environmental sustainability at the Indian subsidiary lagged these initiatives at the global corporate level. The counterargument would be that the issue of water scarcity, especially in Rajasthan, was quite obvious even in 1999, and a socially responsible company would not have located a water intensive plant in that area, and that the current proclamations about water stewardship are just a public relations strategy in response to social activism -- so called 'greenwash.'

Even more curious than the state government permitting a Coca-Cola plant in a water-stressed area is the fact that the state government gave a tax incentive to Coca-Cola. Coca-Cola India executives stated that "according to the tax incentive schedule of the Government of Rajasthan, Hindustan Coca-Cola Beverages [a wholly-owned subsidiary of the company] was entitled to sales tax incentive of an amount equivalent to the

investment for setting up the green field plant amounting to Rs. 39 crores [about \$9.1 million, in 1999]." It would have been more logical for the Rajasthan government to exclude water-intensive businesses from the general economic development incentives. A profit maximizing company would be expected to exploit the government's perverse incentive system. The fact that the government scheme set the incentive amount equal to the investment in the plant might also explain why Coca-Cola built a plant with so much excess capacity.

### **Kaladera Plant**

The TERI report recommended that Coca-Cola evaluate its options for the Kaladera plant, "such as:

- Transport water from the nearest aquifer that may not be stressed (could be quite a distance from the existing plant)
- Store water from low-stress seasons (may not exist!)
- Relocate the plant to a water-surplus area
- Shut down this facility."

In spite of the fact that Coca-Cola chose TERI to conduct the independent assessment, the company has rejected these four alternatives. Instead the company argues that its Kaladera plant is completely consistent with its CSR and water stewardship policies. First, the company argues that its plant's "water consumption is very limited and has no impact or very minimal impact on the local ground water regime." Second, the company claims it has built rain water harvesting structures around Kaladera that recharge the

groundwater aquifers with 15 times the volume of the water extracted by the plant. Both these arguments are problematic.

### **Small User**

The argument that Coca-Cola is a small user of groundwater is conceptually flawed. As Hardin explained in his seminal paper, each user of a CPR sees his impact on the resource as being small -- that is the nature of a CPR.<sup>47</sup> The aggregate impact of all users thinking like this is exactly what leads to the tragedy of the commons. Aside from this, Coca-Cola's argument about being a small user is also empirically flawed.

Coca-Cola India cites a Central Ground Water Board study that the total groundwater extraction in 2005 was divided as follows: 95.06% for irrigation, 4.33% for domestic use, and only 0.61% for industrial use. These numbers are somewhat more 'favorable' to industrial use, and hence to Coca-Cola, than the TERI numbers (9% for domestic and industrial use combined). In a letter to the University of Michigan, the company stated "Coca-Cola is a relatively small user of water in Kaladera; the plant taps far less than one percent of the area's available water."<sup>48</sup> At the other extreme, Coca-Cola's external affairs manager for Northern India told a reporter that the Kaladera plant accounted for "3 percent of the area's groundwater."<sup>49</sup> I estimated above that the Coca-Cola plant accounted for 0.2% to 0.4% of total water extraction. Overall, the Coca-Cola plant probably accounts for somewhere between 0.2 to 1.0 percent of the total water extraction in the area.<sup>50</sup> The TERI report concluded that the plant's operations in Kaladera "would continue to be one of the contributors to a worsening water situation and a source of

stress to the communities around." It is clearly true that agriculture accounts for the bulk of groundwater extraction, and this use alone exceeds the natural recharge rate of the Kaladera aquifers.

But that does not mean we should not pay any attention to the other lower usages of groundwater. Agriculture supports far more people and livelihoods than does industry in the Kaladera area, and it is necessary to 'normalize' the water usage by taking that into account. The Kaladera watershed in 2001 had a population of over 620,000 people, and more than 92,000 farmers. By comparison, the Coca-Cola plant, which is quite mechanized, employs about 70 to 250 people, depending on the season, with higher employment in the peak summer months. As a rough calculation, assume that domestic use accounts for 4% of total water consumption, Coca-Cola employs 150 people at its plant, and agriculture supports 92,000 livelihoods (ignoring the fact many family members usually work on the family farm – an assumption generous to Coca-Cola), then the plant would be 'entitled' to only 0.15% of total water usage. Thus, the Coca-Cola plant is not a low user of groundwater compared to this 'entitlement' calculated on a per person basis. Moreover, according to the government policy the priorities for water use are: drinking, agriculture, power generation, and industrial, in that order. This would further reduce industry's, and Coca-Cola's, 'entitlement' of water. And within the industrial sector, it is unlikely that the Indian society would rate carbonated soft drinks as a high priority.



## **Rain Water Harvesting**

Coca-Cola has built 140 rain water harvesting (RWH) structures (mostly recharge shafts dug into the ground) in the Kaladera area, but how much water they recharge into the aquifers is contentious. The TERI assessment found that, during field visits to randomly selected shafts they were "all in a dilapidated state." The company told TERI that maintenance of the structures had been included as a CSR target plan for 2007. I visited a RWH structure on the roof of a school, and all the pipes were broken making it impossible for it to collect any rainwater. I also visited a recharge shaft that was clogged up and could not function. However, I was taken to both these structures by India Resource Center, an anti-Coca-Cola NGO. The company told me these structures would be repaired before the rainy season, and showed me a recharge shaft that was in good shape. The company further said, "for most rain water harvesting structures the ownership, and hence long term sustenance, lies with the communities where the structures are built." This casts at least some doubt about the long-term functioning of the RWH structures.

More important is the issue of how much water the RWH structures recharge into the aquifers, even assuming proper maintenance. Coca-Cola does not actually measure the water going into the aquifers, contrary to what Jeff Seabright, Vice President Environment & Water Resources, promised to the University of Michigan on January 11, 2008, "as part of our commitment going forward, we will install measuring devices that will verify the amount of water recharged."<sup>51</sup> When I asked various Coca-Cola India executives why the company did not measure the water recharged, three executives gave

three different answers: it is technologically infeasible (that is not true), it is too expensive (in that case, install the meters on only a few shafts), and the villagers would steal the meters (in that case, find a way to lock down the meters) -- none of these seem valid reasons to break the company's explicit commitment.<sup>52</sup> The company's external affairs manager told a reporter a yet different reason: a meter would require sending someone manually to check it after each rainfall -- easy to do that in a country with cheap labor, and there are automatic meters.<sup>53</sup> Instead of actually measuring the recharge, the company uses a mathematical model to calculate the "recharge potential" of the RWH structures. When I asked for the mathematical model and its assumptions with the intent of getting it examined by a hydrogeologist, the company responded, "the calculations shown in the spread sheet are an internal document and not meant for external usage." Coca-Cola has retained the consulting firm Golder to audit and assess the artificial recharge projects, but refused to share that report too. "Their report is part of our company's internal program and meant for internal audiences only." There is thus absolutely no evidence to support the company's claim that it recharges 15 times the amount of water it withdraws. If nothing else, such lack of transparency is contrary to the spirit of CSR. It is also contrary to Coca-Cola's acknowledgement in the letter mentioned above, "we are a user of water in a highly water-stressed area, and the burden of proof is on us to demonstrate that we can reconcile our operations with local community and watershed needs." The company is not keeping its own explicit promises.

I interviewed Professor M.S. Rathore, a specialist in water resource management, and Director of the Center for Environment & Development Studies, Jaipur, Rajasthan, who

asserted that there is “no possibility” of Coca-Cola's RWH structures recharging so much water. The TERI report also concluded "since the rainfall is scanty, the recharge achieved through such [rainwater] structures is unlikely to be meaningful." Coca-Cola states that the cost of constructing a recharge shaft is about Rs. 20,000-22,000, which is equivalent to about \$500. Thus the total cost of the 140 shafts would be about \$70,000. By way of comparison, Coca-Cola India's annual revenues are probably in the order of \$1.8 billion, and it plans to invest \$2 billion in India over the next five years.<sup>54</sup> If the recharge shafts are so effective, one wonders why not build many more and reverse the decline in the water table.

### **Conclusions**

The objective of this study is not to demonize Coca-Cola; nor should the company be canonized. The company is behaving like most profit-maximizing firms. It is just unrealistic to expect companies to help solve CPR problems through voluntary CSR. That raises the question what can society expect of companies behaving in a responsible manner. Fortunately there are many situations where private interests and public welfare are aligned. There are many actions firms can take, and do, that simultaneously increase profits and social welfare. Executives should ensure that they undertake all such actions. Coca-Cola has reduced the water usage ratio at the Kaladera plant from 4.0 to 2.0. This win-win solution has helped reduce Coca-Cola's operating costs and also reduced the need for groundwater extraction. Switching to plastic bottles has reduced Coca-Cola's transportations costs while also reducing water used for washing bottles. The TERI assessment did not find pesticides above health standards in the process water used in

Coca-Cola plants. Ensuring elimination of pesticides in its products is good for Coca-Cola's reputation and brand image and also good for public health. This is the so-called 'business case for CSR' or 'corporate shared value.'<sup>55</sup>

Responsible behavior implies that executives are transparent about the social impact of their actions. Extravagant promises, lack of transparency and lack of accountability have led to a cynical view that the CSR programs of many companies are merely 'greenwash.' Coca-Cola took a positive step when it agreed to a third-party independent assessment by TERI. But, it needs to go further to be truly responsible. Coca-Cola India makes strong claims about the quantity of water its RWH structures recharge into the aquifers, but is not transparent about how it arrived at its estimate. The TERI report recommended that Coca-Cola "make its water programme more transparent to local communities and interested stakeholders, and accountable at the facility and country level."

When private interests and public welfare are in conflict (as in CPR problems), government intervention is often necessary. Companies behaving in a responsible manner should not manipulate the political process to obstruct government intervention. Robert Reich, the former U.S. Secretary of Labor, argues that firms wishing to enact CSR need only avoid lobbying and being involved in the political process.<sup>56</sup> As the Indian government struggles with how to regulate groundwater extraction, Coca-Cola and other companies should not use their lobbying resources to stymie the political process to the detriment of effective democracy.

## **Regulatory Regime**

Underground aquifers are a perfect example of a CPR, characterized by difficulty of excluding users and subtractability. Privatization of the Kaladera aquifers clearly is not a technically feasible option. The Kaladera watershed in 2001 had a population of over 600,000 living in many villages and towns, more than 92,000 farmers, over 25,000 irrigation pumps, spread over an area of 309 square kilometers. It is difficult to see how a 'thick' community would evolve here to develop a group property regime to 'self-regulate' the groundwater supply. This CPR problem is compounded by the fact that there are three types of users: households, farmers, and factories, with differing interests and culture. In any case, a group property regime has not been developed. As the above discussion shows, the government has failed in its responsibility to develop regulations to manage and sustain the groundwater aquifers. Lacking a property regime, the only remaining alternative to avert the tragedy of the commons is altruism and CSR. There is no evidence of the farmers individually behaving in an altruistic manner. Nor is there evidence that businesses, including Coca-Cola, have significantly restrained themselves from extracting groundwater. It is unfortunate, and not surprising, that the prediction of the tragedy of the unregulated commons is coming true for the Kaladera watershed.

The case study discussed above does not support the proposition that CSR will avert the tragedy of the unregulated commons. The case of Coca-Cola in Rajasthan is clearly favorable to the proposition since the company proclaims its CSR so vehemently. Coca-Cola is a very profitable and could easily afford to pay for CSR activities. It is a

consumer facing company with a very powerful brand; a favorable CSR image would enhance its reputation with consumers, and conversely the company would be susceptible to public pressure from social activists. CSR related to water resources is integral to the company's core business, and not some peripheral activity. A groundwater aquifer is a very localized resource with well-defined boundaries, making it easier to see the impact of one user's actions. If CSR is not effective in this benign context, there is little chance of, say, the cement industry significantly reducing air pollution through CSR, where the above favorable conditions are not present.

The lessons to be learnt from this case study are much broader than Coca-Cola and Kaladera. Unless we regulate the commons, tragedy looms for Kaladera, for Rajasthan, for India, and for the world, with regard to water and other CPRs. "As per internationally accepted norms, a person needs 2,000 cubic meters of water per year. However, life can go on even at 1,000 cubic meters. But in Rajasthan we are already at 650 cubic meters mark. ... In few years, the availability will reach the absolute scarcity mark of 500 cubic meters. Previous studies have shown that migration begins at this mark," said Ram Lubhaya, principal secretary for water resources, state government of Rajasthan.<sup>57</sup>

According to the 2012 draft of the National Water Policy, "skewed availability of water between different regions and different people in the same regions is iniquitous and has the potential of causing social unrest."<sup>58</sup> Many of the environmental challenges the world faces, from greenhouse gases to wildlife habitats, involve a common-pool resource.

Asking companies to voluntarily act in the public interest will not be enough to solve

these problems. It is essential to develop regulatory regimes with appropriate incentives and ability to enforce sanctions.

## **Epilogue**

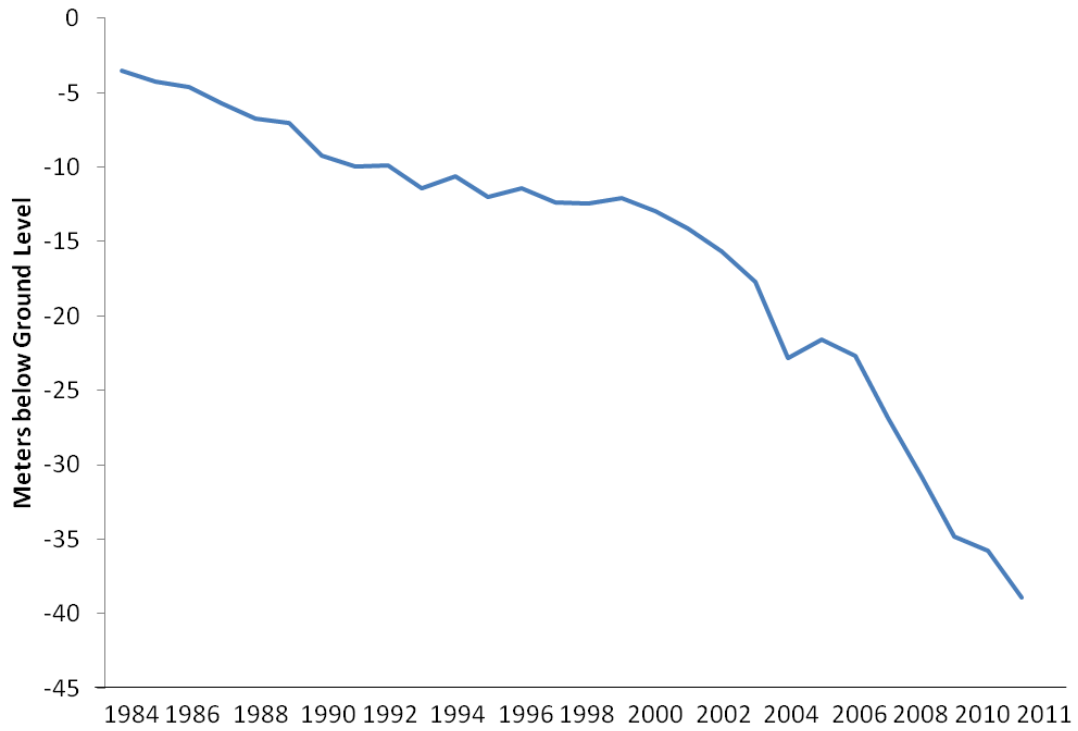
In pursuance of Supreme Court orders, the Government of India constituted the Central Ground water Authority (CGWA) in 1997 for the purposes of regulation and control of groundwater development and management. The CGWA has not been particularly active till recently. On November 15, 2012, the CGWA introduced new 'Criteria for Evaluation of Proposals for Ground Water Abstraction.'<sup>59</sup> The CGWA categorizes some parts of the country as "notified" areas for the purposes of regulation of ground water development. The new CGWA rules state "permission to abstract ground water through any energized means *will not be accorded* for any purposes other than drinking water" (emphasis in the original). The Govindgarh block, which includes Kaladera, was 'notified' on August 13, 2011.<sup>60</sup> In areas non-notified by CGWA, but declared overexploited by CGWB, "industries using water as raw material/water intensive industries like packaged drinking water, mineral water industries, distilleries, breweries, soft drink manufacturing industries, textiles, paper & pulp, etc. *shall not be granted NOC* [no objection certificate] for groundwater withdrawal" (emphasis in the original). The Kaladera area had been declared overexploited by CGWB back in 1998. The Coca-Cola plant in Kaladera clearly would not be permitted under the new rules.

**Table 1. Solving the CPR Problem**

<b>Regime</b>	<b>Context of individuals</b>	<b>Business context</b>
<b>Open access</b>	Altruism. Very few examples of success.	CSR. More research needed.
<b>Private property</b>	Individual(s) own the CPR (e.g. grazing land). Necessary condition: technologically feasible to easily exclude others.	Firm(s) own the CPR. Unlikely to be technically feasible. More importantly, unlikely to be politically feasible.
<b>Group property</b>	Many successful examples, almost all at level of local communities. Necessary condition: ‘thick’ community capable of fostering trust, making binding commitments and enforcing sanctions.	Self-regulation. Unlikely to be successful without enforcement mechanisms, particularly for large, complex CPR. Difficult to develop a ‘thick’ community among firms.
<b>Government property</b>	Many successful examples. Necessary condition: competent government.	Many successful examples. Necessary condition: competent government. Particularly difficult if the CPR cuts across national boundaries.



**Figure 1. Groundwater levels in Kaladera area**



Source: Central Groundwater Board (available at: <http://gis2.nic.in/cgwb/Gemsdata.aspx>), and Rajasthan Groundwater Department.

- 
- <sup>1</sup> Garrett Hardin. 'Tragedy of the Commons.' *Science*, vol. 162, p. 1243-8, December 1968.
- <sup>2</sup> Elinor Ostrom, et al. 'Revisiting the Commons: Local Lessons, Global Challenges.' *Science*, vol. 284, p. 278-282, April 1999.
- <sup>3</sup> Stephen Hesse. 'Will common sense dawn again in time?' *The Japan Times*, July 26, 2006.
- <sup>4</sup> Pat Barclay. 'Trustworthiness and competitive altruism can also solve the "tragedy of the commons."' *Evolution and Human Behavior*, vol. 25, p. 209-220, 2004.
- <sup>5</sup> R. Axelrod and W.D. Hamilton. 'The evolution of cooperation.' *Science*, vol. 21(1), p. 1390-6, 1981.
- <sup>6</sup> R.L. Trivers. 'The evolution of reciprocal altruism.' *Quarterly Review of Biology*, vol. 46, p. 35-57, 1971.
- <sup>7</sup> Samir Okasha. 'Biological Altruism.' *Stanford Encyclopedia of Philosophy*.
- <sup>8</sup> Marc Hauser. *Moral Minds*. Harper Collins, 2006
- <sup>9</sup> Adam Smith. *A Theory of Moral Sentiments*. 1804. Reprinted by Oxford University Press, 1977, p. 446.
- <sup>10</sup> Elinor Ostrom. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press, 1990.
- <sup>11</sup> Elinor Ostrom. *ibid*.
- <sup>12</sup> Boris Worm, et al. 'Impacts of biodiversity loss on ocean ecosystem services.' *Science*, vol. 314, p. 787-790, 2006.
- <sup>13</sup> 'How to stop fishermen fishing.' *The Economist*, February 25, 2012.
- <sup>14</sup> Christopher Costello, et al. 'Can catch shares prevent fisheries collapse?' *Science*, vol. 321, p. 1678-1681, 2008.
- <sup>15</sup> Milton Friedman. 'The social responsibility of business is to increase its profits.' *New York Times*, 13 September, 1970.
- <sup>16</sup> Wade Rowland. 'Corporate social responsibility and Garrett Hardin's 'tragedy of the commons' as myth and reality.' *The Journal of Corporate Citizenship*, Autumn 2009.
- <sup>17</sup> European Commission. 'Green Paper - Promoting a European Framework for Corporate Social Responsibility.' 2001. Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52001DC0366:EN:HTML> [Accessed 10 November, 2010]
- <sup>18</sup> C.J. Shultz II and M.B. Holbrook. 'Marketing and the tragedy of the commons: a synthesis, commentary, and analysis for action.' *Journal of Public Policy & Marketing*, vol. 18(2), p.218-229, Fall 1999.
- <sup>19</sup> See, for example: Clive Crook. 'The good company,' *The Economist*, 20 January, 2005. Daniel Franklin. 'Just good business.' *The Economist*, January 17, 2008. David Vogel. *The Market for Virtue*. Brookings Institution Press, Washington D.C., 2005. Aneel Karnani. 'Doing well by doing good: the grand illusion.' *California Management Review*, vol. 53(2), Winter 2011.
- <sup>20</sup> Aneel Karnani. 'CSR stuck in a logical trap.' *California Management Review*, vol. 53(2), Winter 2011.
- <sup>21</sup> David Vogel. *The Market for Virtue*. Brookings Institution Press, Washington D.C., 2005, page 19.
- <sup>22</sup> Nidumolu Ram, C.K. Prahalad, and M.R. Rangaswami. 'Why sustainability is now the key driver of innovation.' *Harvard Business Review*, September 2009.
- <sup>23</sup> M.E. Porter and M.R. Kramer. 'Strategy and Society.' *Harvard Business Review*, December 2006.
- <sup>24</sup> Aneel Karnani. 'CSR stuck in a logical trap.' *California Management Review*, vol. 53(2), Winter 2011.
- <sup>25</sup> Elinor Ostrom. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press, 1990.
- <sup>26</sup> Aneel Karnani. 'Doing well by doing good: the grand illusion.' *California Management Review*, vol. 53(2), Winter 2011.
- <sup>27</sup> Mark Thomas. *Belching Out the Devil*. New York: Nation Books, 2008. Michael Blanding. *The Coke Machine*. New York: Avery, 2010.
- <sup>28</sup> Steve Stecklow. 'How a global web of activists gives Coke problems in India.' *The Wall Street Journal*, June 7, 2005.
- <sup>29</sup> Andrew Hoffman and Sarah Howie. 'Coke in the Cross Hairs: Water, India, and the University of Michigan.' Case 1-429-098. GlobalLens, William Davidson Institute at the University of Michigan, July 25, 2010.
- <sup>30</sup> *Independent third-party assessment of Coca-Cola facilities in India*. The Energy and Resources Institute, Delhi, 2008.
- <sup>31</sup> *2010/2011 Sustainability Report*. The Coca-Cola Company, 2011.

- 
- <sup>31</sup> Company website: [http://www.coca-colaindia.com/ourcompany/company\\_highlights.html](http://www.coca-colaindia.com/ourcompany/company_highlights.html). [Accessed March 7, 2012]
- <sup>32</sup> *The Water Stewardship and Replenish Report*. The Coca-Cola Company, January 2011.
- <sup>33</sup> Alex Kirby. 'Dawn of a thirsty century.' *BBC News*, June 2, 2000.
- <sup>34</sup> Aneel Karnani. *Fighting Poverty Together*. New York: Palgrave Macmillan, 2011.
- <sup>35</sup> Cherian Thomas, et al. 'Coca-Cola, Intel, farmers battle for water in China, India.' *Bloomberg*, May 25, 2010.
- <sup>36</sup> M.S. Rathore. 'State level analysis of drought policies and impacts in Rajasthan, India.' Working Paper 93. International Water Management Institute, Colombo, 2005.
- <sup>37</sup> See <http://wrmin.nic.in/writereaddata/linkimages/anu11326762704.pdf>. [Accessed April 2, 2013]
- <sup>38</sup> *Ground Water Scenario: Jaipur District*. Central Ground Water Board, Western Region, Jaipur, 2007.
- <sup>39</sup> M.S. Rathore. 'Groundwater exploration and augmentation efforts in Rajasthan -- a review.' Jaipur: Institute of Development Studies, 2005.
- <sup>40</sup> Somini Sengupta. 'India digs deeper, but wells are drying up.' *The New York Times*, September 30, 2006.
- <sup>41</sup> Company data based on personal interviews with Coca-Cola India executives, available in a written email.
- <sup>42</sup> Philippe Cullet. 'Water law in India.' Working Paper 2007-01. International Environment Law research Center, Geneva, 2007.
- <sup>43</sup> Available at: [http://planningcommission.nic.in/reports/genrep/rep\\_grndwat.pdf](http://planningcommission.nic.in/reports/genrep/rep_grndwat.pdf). [Accessed April 2, 2013]
- <sup>44</sup> 'State water policy.' Water Resources Department, Government of Rajasthan. Website: <http://waterresources.rajasthan.gov.in/5swp.htm>. [Accessed March 7, 2012]
- <sup>45</sup> Andrew Hoffman and Sarah Howie. 'Coke in the Cross Hairs: Water, India, and the University of Michigan.' Case 1-429-098. GlobalLens, William Davidson Institute at the University of Michigan, July 25, 2010.
- <sup>46</sup> 'Coca-Cola: In hot water.' *The Economist*, October 6, 2005.
- <sup>47</sup> Garrett Hardin. 'Tragedy of the Commons.' *Science*, vol. 162, p. 1243-8, December 1968.
- <sup>48</sup> Coca-Cola's letter to the University of Michigan, January 11, 2008. Available at: <http://www.vpcomm.umich.edu/pa/key/pdf/MichiganTERILetter.pdf>. [Accessed March 7, 2012]
- <sup>49</sup> Michael Blanding. *The Coke Machine*. New York: Avery, 2010, p. 232.
- <sup>50</sup> As discussed earlier, Coca-Cola's share is larger at the 'localized' level of 2 km radius.
- <sup>51</sup> Coca-Cola's letter to the University of Michigan, January 11, 2008. Available at: <http://www.vpcomm.umich.edu/pa/key/pdf/MichiganTERILetter.pdf>. [Accessed March 7, 2012]
- <sup>52</sup> This is the only company statement in this article for which I do not have a written confirmation.
- <sup>53</sup> Michael Blanding. *The Coke Machine*. New York: Avery, 2010, p. 258.
- <sup>54</sup> Coca-Cola does not publish the financial results for the Indian subsidiary. Articles in the business press in India estimate the Indian market for carbonated soft drinks to be about \$3 billion, and Coca-Cola's market share to be about 60%.
- <sup>55</sup> M.E. Porter and M.R. Kramer. 'Strategy and Society.' *Harvard Business Review*, December 2006.
- <sup>56</sup> Robert Reich. *Supercapitalism: The Transformation of Business, Democracy, and Everyday Life*. New York: Alfred Knopf, 2007.
- <sup>57</sup> Anindo Dey. 'Water crisis in Rajasthan to force migration, says study.' *Times News Network*, May 19, 2010.
- <sup>58</sup> 'Skewed availability of water potential for social unrest: government.' *The Economic Times*, February 5, 2012.
- <sup>59</sup> Available at: <http://cgwb.gov.in/CGWA/documents/Approved%20Guidelines%20for%20evaluation%20of%20proposals.pdf>. [Accessed April 2, 2013]
- <sup>60</sup> See [http://cgwb.gov.in/CGWA/Notified\\_areas.html](http://cgwb.gov.in/CGWA/Notified_areas.html). [Accessed April 2, 2013]