

The Tragedy of the Commons and the Battle For Water in Mexico

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Abstract: Published in 1968, Garrett Hardin's article entitled "The Tragedy of the Commons" has been a foundational article in both environmental and corporate social responsibility research. Hardin argues that there are a finite number of natural resources in the world and these resources can only support a finite population. Hardin also argues that individuals will not take a utilitarian approach in the management of resources that are available to all. The tragedy of the commons theory is that if people have access to "free" resources, they will abuse the privilege in using them. Elinor Ostrom responded to the Tragedy of the Commons theory with her seminal work "Governing the Commons" which presents the argument that self-governing institutional arrangements made among critical stakeholders can effectively manage the commons. The article concludes with an example of the challenges in Mexico for managing the commons of water, and the challenges and successes of stakeholders self-governing this vital resource.

Keywords: Tragedy of the Commons, Water Management, Stakeholder Self-Management

1. INTRODUCTION

In 1968, the journal Science published Garrett Hardin's article entitled "The Tragedy of the Commons". With an acknowledgement of the work by Malthus, Hardin argues that there are a finite number of natural resources in the world and these resources can only support a finite population. Hardin also argues that individuals will not take a utilitarian approach in the management of resources that are available to all. The tragedy of the commons theory is that if people have access to "free" resources, they will abuse the privilege in using them.

Although Hardin is known for his development of the theory, this concept can be traced back to Aristotle who claimed that when people have common access to a resource, that resource will receive the least amount of care. The underlying premise of the tragedy of the commons is that if people have free unrestricted access to a finite resource, the resource will be overexploited which will ultimately result in the destruction of that resource. From an environmental sustainability perspective, the tragedy of the commons will result in the eventual use of all the earth's natural resources due to the lack of a diligent control process on the use of the resources.

The example Hardin gives in his article describes cattle farmers who use an open pasture for their cows for grazing. Since there is no financial cost for the farmers to use the land, the farmers will bring more and more cattle onto the field for grazing. There is a financial incentive for each farmer to bring an additional cow to the field which will result in a negative benefit for all the other farmers since there will be less grazing land available for the other cows. The net result is that there will no longer be any grass in the field due to the overexploitation of the field by the farmers.

Hardin does not agree with Adam Smith's theory of the invisible free market hand guiding the actions and self-control of individuals as it relates to natural resources. Hardin argues that the self-interests of individuals do not convert to be beneficial for the many. Hardin continues his argument by stating that the tragedy of the commons is not only specific to land use but also the common goods of air, water, soil, forests and energy sources. Hardin's solution to the tragedy of the commons is to privatize natural resources or have the state control it so that the "owner" will protect the resources to the benefit of all.

2. Self-Governing Systems as a Response to the Tragedy of the Commons

In her seminal work “Governing the Commons”, Nobel Prize winner Elinor Ostrom refuted Hardin’s conclusion that individuals do not have the capacity to manage the commons. While Hardin argues that users of the commons are rational and selfish who only focus on short-term financial gains, Ostrom states that stakeholders have the ability and the incentive to work together to control and monitor a common good.

Ostrom presented empirical results which demonstrated that users develop self-governing institutional arrangements to focus on long term resource sustainability by communicating and cooperating with each other and agreeing to terms in which the commons will be managed. These self-governing organizations are effective in preventing tragic outcomes without having a single entity owning the commons.

Ostrom gives the example of the maintenance of grasslands in Russia and neighboring Mongolia. Satellite images show the Russian grasslands, controlled by central government policies, have more environmental degradation than the self-organized group property system in Mongolia. The Mongolian government allowed the local farmers to continue to implement their traditional group-property institutions which include the shifting to different pastures during the change of seasons. Alternatively, Russia had imposed government owned agricultural collectives which involved the establishment of permanent settlements and does not allow rotation of the grasslands which impedes their ability to recover after use. This example fundamentally refutes Hardin’s argument that there has to be an “owner” of the resource in order for that resource to be managed effectively.

Ostrom presents the concept of the self-governing process of Common Pool Resources (CPR). A CPR traditionally has focused on terrestrial and marine ecosystems that can be simultaneously viewed as both depletable and renewable. The characteristic of these resources is that the use of one resource reduces the quantity or quality available to others and the use of the resources by others adds to the negative attributes of a resource. The underlying principle of the CPR is that different stakeholders have a vested interest in managing natural resources and will work together to effectively manage these resources.

There are a number of challenges of the governance of CPR which include: determining the size and carrying capacity of the resource system, the measurability of the resources, the temporal and spatial availability of the resource flows, how quickly the resources can regenerate and whether resources move (e.g., water, wildlife, fish) or are stationary (e.g., trees, plants). The ability to solve CPR problems are based on either restricting access or creating incentives for users to invest in the resources instead of overexploiting the resource.

It is important to note that Ostrom is not concluding that privatization or government control of natural resources are not viable options for the long-term management of commons. Ostrom argued that unique situations required unique solutions in that ownership and self-governance can be both viable options in some circumstances, but those options may not be available in all circumstances.

Ostrom does admit that user self-governance would not necessarily always result in the optimal natural resource management but this system can yield an optimal solution in some types of common resource problems. For example, Ostrom describes a farmer managing a water irrigation system in Nepal which yields higher performance levels than the state run system. This example validates Ostrom’s argument that community control can optimize the natural resources due to the more intense vested interest as a stakeholder than the government runs system. Ostrom also presents the same variance in performance by comparing different forestry management systems in Bolivia.

Ostrom argues that solutions must be based on a polycentric approach in which the strategic decisions are customized to the unique cultural variances of the local communities. By using a polycentric framework, the state, privatization, and user self-government can all be incorporated within the complex economic and institutional systems to be able to create an optimal solution. As a result, a polycentric approach embraces the needs, expectations and diversity of the various stakeholders who are impacted by the depletion of these natural resources.

The foundation of resource governance is understanding the different types of property rights systems used to regulate CPR. The four types of property rights are: 1. Open access which is the absence of any enforcing

property rights, 2. Group property which is the resource rights held by a group of users and individuals outside the group do not have access to the resources, 3. Individual property which is the resource rights controlled exclusively by individuals and 4. Government property which the resource rights held by the government.

However, Ostrom does warn that the tragedy of the commons will occur in highly valued open access commons which do not have an effective governance system. The government plays four keys roles in fostering polycentric systems which embraces the solution to tragedy of the commons issues. These four roles are: 1. using the threat of imposing a government controlled solution if the local stakeholders cannot come to an agreement on the solution. 2. Providing a source of neutral and transparent information to minimize/eliminate self-serving biases in the decision-making process. 3. Giving access to a setting in which negotiations can take place in creating low-cost enforceable agreements. 4. Monitoring compliance and sanction variances in the program implementation stage.

3. A Mexican Example of the Tragedy of the Commons

The access to clean water is imperative for the sustainability of life on earth. However, challenges such as drought, overexploitation and pollution have put immense pressure on various stakeholders in the ability to manage this critical natural resource.

3.1 Water as a Human Right

On July 28, 2010, The United Nations General Assembly passed Resolution 64/292 which declared the recognition of access to water and sanitation as a human right and that water and sanitation are essential in the ability of protect all human rights. With this human right comes access to safe clean, accessible and affordable drinking water and sanitation for all. Less than a year later, in May 2011, the World Health Organization also recognized water and sanitation as a human right. However, in 2020, a third of the world's population lacks access to safe drinking water and an estimated 4.2 billion people lack access to safe sanitation.

In February 2012, the human right to water and sanitation was approved as an amendment to the Mexican Constitution. The amendment requires that every person in Mexico have access to affordable, accessible, and safe water in sufficient amounts for domestic uses.

3.2 The Mexican Mismanaging of the World's Most Critical Common

The area which what would eventually become Mexico City was established by the ancient Aztecs who built the city of Tenochtitlan in the year 1325 on top of Lake Texcoco to ensure the long term sustainability of the settlement by continuous access to fresh water. They could be considered the originators of the first self-governing water management system in Mexico. In the 1600s, the conquering Spaniards did not understand or want the Aztec sustainable water system which used dikes and canals to control and save the water for future use. The Spaniards replaced the water system with street and squares, drained the lakes, and clearcut the surrounding forest. The result did not only have an irreparable impact on the long-term sustainability of the area, but also resulted in the area now being susceptible to flooding since there were no longer any natural barriers or channels for the water to flow from the rain. There were numerous examples of flooding that occurred during the Spanish reign including floods that drowned the city for five straight years.

Over the centuries, the water extraction resulted in the groundwater moving further and further underground with the result of the lakebed becoming dry with the compacting of thick salty based clay. The compaction cannot be reversed with the result of the sinking of Mexico City at an annual rate of twenty inches in a phenomenon known as subsidence. It is estimated the ground will continue to compact for another 150 years which will result in the sinking of up to 30 meters.

Mexico City stopped all groundwater drilling within the city in the 1950s and shifted its drilling to outside the city which also facilitated the sinking of the city. Despite having a heavy rainy season from May to September, concrete now covers the original aquifer so rainwater is not able to refill it which would reduce the level of sinking. As a result, Mexico City is forced to use water that is located in water reservoirs located up to thousands of kilometers away from the city. It is estimated that Mexico City's access to natural water could decrease by up to 17 percent by 2050 due to increasing in average temperatures through drought and water evaporation and the

development of algae blooms in warm reservoirs.

Climate change has also had a significant impact by yielding widespread and severe droughts for decades. The water reservoirs in Cutzamala provide a quarter of the city's water but the water levels were 18 percent below normal levels. As a result, city officials have decided to reduce the flow of water from this reservoir which has reduced tap water access to the residents of Mexico City.

One of the many challenges for Mexico City is that it lacks a comprehensive sanitary wastewater treatment system which hinders the ability of the city not only for water collection, but also keeping existing water clean. Mexico City's water infrastructure is old and numerous pipes are constantly leaking. It is estimated that Mexico City loses 1,000 liters of water per second through their water pipe system. An integrated rainwater collection system does not exist so that when it rains, the rainwater is often mixed with sewage and, therefore, is unusable.

3.3 The Black Market for Water in Mexico City

It is estimated that approximately eight percent of Mexico City's 21 million residents do not have regular access to piped water. The availability of water to the residents of Mexico is impacted by a number of factors. The water enters Mexico City from the west and loses pressure as it moves toward the city. The soil where the water pipes are located is soft and shifting which makes the pipes prone to break and increases the difficulty of maintaining them. In addition, the growth of off the grid communities can increase the demand for water which has not been included in the city's water grid. Approximately 43 percent of the water that enters the Mexico City water system cannot be accounted for due to leaks, theft or unregulated tapping of the water.

Delivering water in Mexico City can become a potentially life and death proposition for the drivers. The drivers can potentially be held at gunpoint as desperate residents and/or thieves stop the trucks and either take the water or force the driver to drive to another area where the water is dispersed in what could be considered an equivalent to a kidnapping.

Other avenue for the truckers to obtain water is through illegally tapping wells outside the city and filling unregulated water tankers. The truckers would then sell the "stolen" water to residents in local neighborhoods. The trucker would set the price for the water depending on the demand and the scarcity of the supply of water during that specific time period.

As a result, water access is severely limited in low income areas since the residents cannot afford to pay the ongoing shifting price of water. The water that does reach their neighborhoods is often poor quality and can be contaminated. It is estimated that in Mexico, contaminated water is the number one reason for death of children between the ages of 1 and 5.

The Mexican government does provide public tanker serviced to provide water for showering, washing dishes and preparing food for free. However, it is not enough for all day to day activities. This discrepancy is highlighted in the use of water in rich versus poor neighborhoods in Mexico City. In rich neighborhoods, the average daily use of water is between 800 and 1,000 liters per person. In poorer neighborhoods, the average individual daily usage of water is 29 liters. The average cost of water is \$0.41 per liter if it comes from the public water system. The price increases to \$1.03 for water that is delivered by public water trucks and skyrockets to \$4.23 for water from private water trucks.

Even the water pressure is unequal across Mexico City. In the wealthy areas where there are golf courses, the water pressure can be up to 14 kg per square centimeter which is enough to run water sprinklers. In the commercial areas in the city center, the water pressure can be half of the 14 kg where in the poorer neighborhoods the water pressure can be just 500g per square centimeter which results in a trickle of water in the tap, when the water is available. Because of this large variance in price, 92 percent of the population of Mexico City pays a total of \$558 million annually for water through legitimate avenues, while the 8 percent who do not have regular access to piped water pay \$475 million annually.

4. The Challenge of Self-Governing a Commons

In indigenous communities in Mexico such as the San Lorenzo Huitzilapan Otomi community, access to water has been based on collective work. Through this self-governing process in this town of 18,000 people approximately 60 kilometers west of Mexico City, there are 10 autonomous community water management groups that are responsible and accountable for water supply in their areas. The community group had set up the first water collection system in 1960 which uses pipes to catch water that runs down the local forest laden hills, The water moves through 200 drains, and it is deposited in two or three wells which the community can use. The water system costs the local residents approximately two dollars a month for maintenance. The water is a human right amendment was a dramatic change from the previous 1992 National Water Law in Mexico which did not recognize the right of native inhabitants and allowed the government's National Water Commission (CONAGUA) to grant water permits to whoever wanted to apply for them.

CONAGUA does not support these self-governing systems and considers them a nuisance since they are outside the jurisdiction of their enforcement. CONAGUA has issued over 29,000 water concessions to individuals, companies and municipalities which cover approximately 35 billion meters. Local indigenous groups claim that their human right to water has been violated due to their restriction to water availability, lack of water quality, lack of access to information and participation, accountability and justice related to water use. The complaints are based in part, on CONAGUA overriding the self-governing system by granting water concessions for the same water access.

4. Summary

The Tragedy of the Commons highlights the complex nature of managing natural resources. Even the fundamental resource of water demonstrates that there are significant variances as to who has access to clean water and how much consumers pay for the water. As was mentioned in the paper, natural resources could be best managed through a combination of government, private and stakeholder led coalitions. It is through this combination of different systems that the necessary flexibility in monitoring and maintaining access to life supporting resources is allowed.

References

1. Anonymous. 2018. The 11 Cities Most Likely to Run Out of Drinking Water – Like Cape Town. BBC.org. February 11.
2. Emilio Godoy. 2021. Indigenous Peoples in Mexico Defend Their Right to Water. Inter Press Service. September 18.
3. L. O'Hanlon. The Looming Crisis of Sinking Ground in Mexico City. EOS. April 22.
4. Garrett Hardin. 1968. The Tragedy of the Commons. Science. 162:3859. 1243-1248.
5. Leo Heller. 2020. 10th Anniversary of the Recognition of Water and Sanitation as a Human Right by the General Assembly. United Nations Human Rights: Office of the High Commissioner. July 28.
6. Carrie Kahn. 2018. Mexico City keeps Sinking as Its Water Supply Wastes Away. NPR.org. September 14.
7. Michael Kimmelman. 2017. Mexico City Parched and Sinking, Faces a Water Crisis. The New York Times. February 17.
8. Hayley McCord. 2021. A Sinking Thirsty City: The Water Crisis in Mexico City. Latin America Reports. September 11.
9. Elinor Ostrom. 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press: Cambridge, United Kingdom.
10. Elinor Ostrom, Joanna Burger, Christopher B. Field, Richard B. Norgaard and David Policansky. 1999. Revisiting the Commons: Local Lessons, Global Challenges. Science. 284: 278-282.
11. Benjamin Russell. 2019. In Mexico City, a Black Market for Life's Most Basic Commodity. Americas Quarterly. October 11.
12. Ashutosh Sarker and William Blomquist. 2019. Addressing Misperceptions of Governing the Commons Article. Journal of Institutional Economics 15:2. 281-301.
13. Peter A. Stanwick and Sarah D. Stanwick. 2016. Understanding Business Ethics. Third Edition. Sage Publications: Thousand Oaks, CA.
14. Jonathan Watt. 2015. Mexico City's Water Crisis-From Source to Sewer. The Guardian. November 12.