

**Sociology and Resource Management**  
**Prof. Archana Patnaik**  
**Department of Humanities and Social Sciences**  
**Indian Institute of Technology, Kharagpur**  
**Module - 01**  
**Natural Resource Management and Different Theoretical Approaches**  
**Lecture - 03**  
**Tragedy of Commons**

A warm welcome to all. Today we will be discussing the theory of the Tragedy of the Commons.

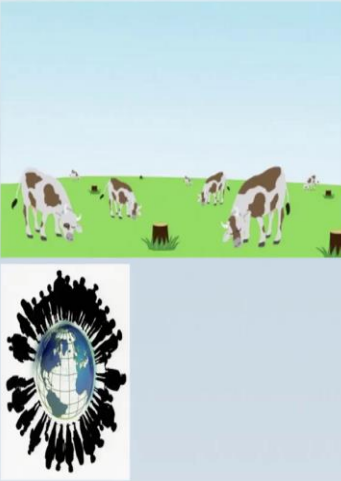
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**Introduction to the tragedy of the commons**

- Introduced by Economist W.F. Lloyd in 1833
- Revived by American Ecologist Garrett James Hardin in 1968, in his seminal article 'the tragedy of the commons', in the journal 'Science'.

**Content to be covered:**

- Hardin's propositions
- Examples and derivatives from different countries
- Types of tragedies of commons
- Tragedy of the anticommons




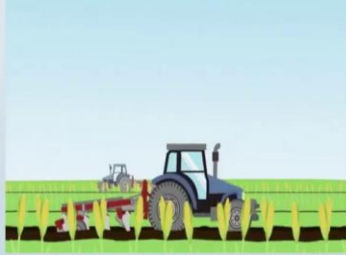
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## Introduction to the tragedy of the commons

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The idea was initially developed by economist W. F. Lloyd in 1833. This was later revived by the popular American Ecologist Garrett James Hardin in 1968, in his seminal article the tragedy of the commons which was published in the Science journal. In this module we will try to understand and analyse Hardin's proposition and also look at the theory of the commons or the tragedy of the commons taking various examples and derivatives from different countries including India, so, that you will be able to grasp the theory in the real-world scenario.

We will also focus on different types of common that occur giving examples. After reflecting on the theory of the commons we will also discuss the concept of anticommons and the tragedy of the anticommons. This will give you a comprehensive picture about the tragedy of the commons and anticommons.

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When I tell you about the tragedy of the commons you would have guessed that it has to do something with a tragic end. Of course, you are right. We are going to discuss a theory that began with Hardin's proposition or proposal to overcome the population problem or overpopulation problem, but it had so many interrelated aspects and issues in the theory that it is widely used to understand why resources degrade or degenerate over a period of time. Hardin's theory of the tragedy of the commons dealt with the idea of over exploitation.

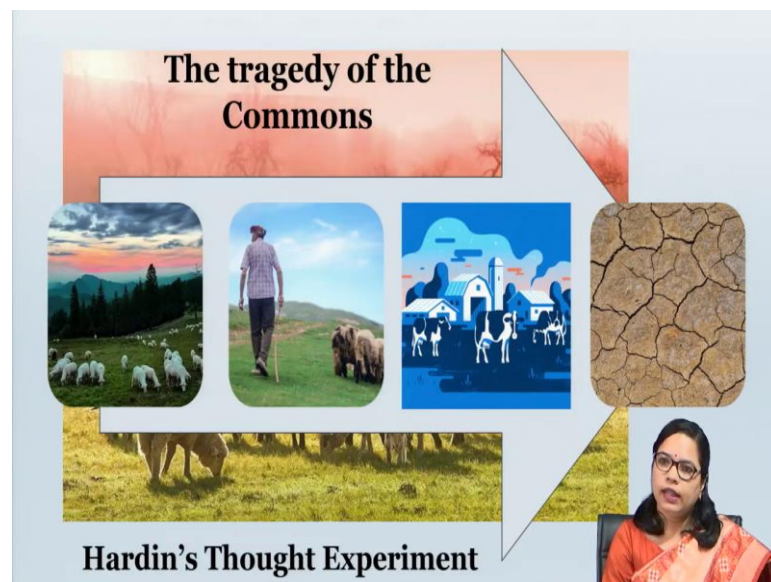
Over exploitation in the context of resources means drawing more than the required from a resource. But why would anyone draw more than what is required and how is it possible that one can keep on drawing from a resource. Let me ask you one question. When you visit an office and you see that there is a chocolate jar which is placed in front of the front in front of you in the front desk. Then and it is also free for the visitors to have the chocolates.

So, some of you might think that I should eat one because I am the only person who is visiting the office and some of you might on the contrary think that since its free let me also take one for my brother sister family members or my friends. So, in that case I would ask you that would you stop at taking one chocolate from the jar or would you keep on drawing more from the jar?

Thus you know I am sure some of you might say that I would stop at one, but I am sure other participants of the course might think of their family and friends when they are getting some free chocolates. Thus, things that are kept in common for individuals to use have a high chance of getting overexploited.

Considering the scenario now let us discuss how Hardin would have imagined the management of common resources like the forest, land, fisheries, groundwater, grazing lands, and wildlife. And the management would be discussed from the perspective of the tragedy of the commons.

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Hardin explained the theory with the help of a thought experiment. He considered a section of herd men from a small village who would use a common grazing land to take their sheep and for grazing. He assumed that these herdsmen being rational men would function in a way that would maximize their own profit and such profit maximization is done by rational herdsmen by increasing their share of cattle like keep on adding one more to the herd.

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### A choice for the economic herdsman



The herdsmen were posed with two questions:

- Either to get a positive increment by the utility that adding another grazing animal creates or
- Incur a negative increment created by the overgrazing of one additional animal.

So, adding more sheep here to the herd is free for him because he can add the sheep and then take them to the land for grazing, and the grazing land which adds to, which acts as food for his cattle is free for his access, he does not have to pay anything. So, he does not pay anything for taking his herd of sheep and grazing them there. Like the chocolate example, we were discussing earlier. You were not paying anything to have the chocolate and it was free and you could take as many as you wished. So however, if we look at the entire example like taking the chocolate can or the grazing of the cattle or the sheep in a free or open access land.

Then we would find that the overuse or is something that might be possible or the entire process of overuse of freely accessible grazing land is something that can only benefit few and with each new addition of the sheep which we were discussing about the herdsmen, then the use of the grasses from the grazing land would be depleted and would become less and less and less over a period of time. Similar with the jar of chocolate. If you keep on drawing one and another one and another one for your family and friends, then you might find that the chocolate jar is emptied at the end of the day.

So, Hardin believed that the herdsmen, while utilizing the resources will be posed with two questions. Number one; that is either to get a positive increment by the utility that adding another grazing animal creates or to incur a negative increment created by the over grazing of one additional animal. According to Hardin all herdsmen being rational

will decide to maximize their profit and the idea of profit maximization will contribute to the degradation of the resource since it is limited in nature.

The rational herdsman will always select the easier method of incurring profit that is, without spending anything getting or deriving more from the resources. So, here adding on one animal or extra animal to his herd without contributing anything for or without managing the common resource, that is the land.

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**Commons work until social stability is attained**



- Commons systems were possible with frequent wars, poor medical development and or rampant poaching was rampant in the case of animals.
- With social stability and accepted rules, the tragedy of commons increased.
- "Freedom in a commons brings ruin to all" (Hardin, 1968, p.1244).

So, this attitude is replicated by most rational herdsmen and which tend to further lead to the degradation of the resources and according to Hardin further creates the tragedy of the commons. And over a period of time the degraded resource here - the grazing land - will not be available for anyone or any herdsmen need.

So, Hardin explained that the idea of using any natural resources as commons could work successfully only under certain circumstances. Like when the population is under control or under check and when the animal counts could be kept under check. According to him, it was possible when you know there were frequent wars when science and medicine was not that advanced. So, we as human race faced lot of diseases and the spread of diseases led to the decrease in the population or when poaching was rampant which also kept the check on the animal count.



But with the establishment of social stability and the commonly acceptable rules, the threat landed over the resources hence lies what Hardin explains as the tragedy of the commons. The freedom to graze a herd of sheep without contributing or without having any rules and regulations to follow according to him creates or explains. He explains how that freedom in a commons brings ruins to all.

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Some of the examples of tragedy of the commons and resources in the present context are visible in form of deforestation. Here over exploitation of the earth's resources or forests had enormous consequences on the environment. As a result, the lack of resource management our forest have disappeared at a rapid rate and over the last few century.

Animal extinction similarly if we see then here overfishing and over hunting are examples of resources being depleted by human beings or individuals because they act for their own self-interest. They kill animals for their horns, for their skin, for their leather, and over you know fishing or overhunting actually leads to the animal extension.

When we look at the climate change for example, which I am sure all of you must have heard and must have read then the global warming is on some level a result of the tragedy of the commons. As government, corporates, the nongovernmental organization, and individuals fail to consider the cumulative effect their action could have on the environment. While giving the example of the herdsmen and the herd of sheep we

discussed how over consumption and drawing from the resources lead to the tragedy of the commons.

But interestingly when we analyse we can find that a not only overdrawing, but also over dumping into the resources can lead to the tragedy of the commons.

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**Giving it back: Pollution**

- Pollution occurs in the form of impure chemical products and sewage waste, car fumes, and radioactive wastes.
- Wastes are dumped to maximize profits.
- Such form of input into the commons like, land, sea, or air in the form of pollution occurs mainly due to the higher costs of purifying the waste before their release into the commons.

The slide features several illustrations: a green pipe pouring dark liquid into a body of water with a duck; a yellow car emitting a cloud of grey smoke; three brown barrels with red 'X' symbols leaking green liquid into a blue pool; and a black industrial tank with a crane lifting a globe of the Earth.

A woman in an orange saree is visible in the bottom right corner of the slide, likely the presenter.

According to Hardin the tragedy of the commons also occur when in place of taking in we start dumping into or adding on to the commons. This can be understood with the example of pollution. For example, when there are unpurified chemical products and sewage waste that are pumped into the water bodies or car fumes or radioactive waste that are dumped into the air and let out waste into the natural commons, the result of pollution of these commons becomes very evident. You might then think that how is it affecting the resources.


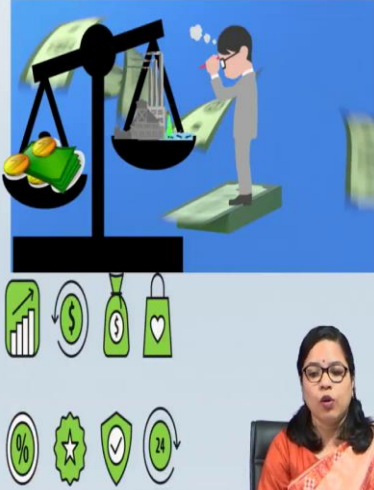
It is by reaching its carrying capacity and degrading its value and productivity as a resource. So, why we dump this waste into the resource is something that others might be also wondering. Again the answer is to maximize the profit. Such form of input into the commons like the land-sea air in form of pollution occurs mainly due to the high cost of purifying the waste before its disposal. Thus profit-maximizing individuals or groups prefer to dump the waste into the commons- then treat them, and then release it into the commons.



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**Economic man's choice of profit maximization**

- The rational man chooses the lower cost of waste discharged directly into the streams or air and contributes to the process of pollution.
- As, the expansion of population causes an overload, leading to the negative outcomes of overpopulation in the form of pollution, it further adds to the tragedy of the commons.




So, here the rational man again chooses the lower cost of waste discharged directly into the streams or air and contributes to the process of pollution. For example, a factory owner with rights of the land discharges his factory waste or chemical waste to the nearby water bodies or river bank, in the process polluting the water commons as the cost of purifying this waste could be higher than discharging it directly into the water commons.

To add to Hardin's understanding we also find that even if it is not about profit it is about the extra effort to maintain and preserve the commons. Individuals are reluctant to do so in the present context. Because again it is not a property that they own, or it is not a private property it is a commons. For example, we have all heard of global warming and pollution at still at an individual level when it comes to controlling human desires we hesitate to do so.

Now, and prefer to affect the environment or the commons by, for example, buying vehicles for every member in the family then going carpooling, throwing garbage in the common land is something that we do often, and thus what where Hardin was proposing as a solution to the tragedy.

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### Hardin's suggestion to avoid the tragedy of the commons



1. Proper legislative forces that should comply in the process of managing the commons
2. Administrative laws for legislating temperance
3. Existence of a form of 'mutual coercion, mutually agreed upon'
4. It is for the collective good that individuals should abandon their individual liberty and accept the enclosure of the commons

Like the limited number of people who are polluting or providing natural biophysical processes to be active and cleansing themselves seems reasonable in this scenario. As the expansion of population causes an overload leading to the negative outcomes of the overpopulation in the form of pollution, further adds to what Hardin was suggesting the tragedy of the commons. Due to such consequences, Hardin considered the freedom to breed is not justified.

However, scholars have criticized Hardin on this as the population for them cannot be the only reason that the tragedy happens to a resource or to a commons. Hardin also came up with suggestions to avoid the tragedy. Let us examine them. To manage the commons Hardin believed that there need to be proper legislative forces that should comply in the process of managing the commons. Like some authority should be set up for controlling managerial powers.

Second thus to legislate temperance administrative laws according to Hardin must be put in place. Additionally, to manage the common Hardin states that there needs to be the existence of a form of mutual cohesion mutually agreed upon, and where people directly decide on bringing in collective or coercive power to check the activities of each individual and especially the lawbreakers.

For example, some resources according to Hardin must be brought under authority. So, there is a check on its use. Let us take an example like a jewellery store if we take this

then we all consider now jewellery shop to be a private or a public store. But if we consider the jewellery store as a commons then the act of robbing the resources or the jewellery that are stored in the jewellery store would not be considered illegal.

As the jewellery store would then be treated as an open resource and anybody is free to come in and take from that resource without any social control or social arrangements like the chocolate jar we were discussing or the pasture where the herdsmen were taking their sheep or cattle. Thus, there need to be laws set up by the government to govern its use and rules that should be mutually agreed upon by all.

And if violated there are sanctions or punishment for the same. Thus it is agreed that the jewellery stored in the jewellery shops is not common and robbing them would bring in punishment for the offenders. Hardin also proposed believing in the system of taxing individuals or groups for consuming more than what is desired. I am sure all of us know about the fine that we have to pay if we park our vehicles in a no-parking zone.


Here the use of the common road for parking is controlled by taxing the individual or curbing their desire by bringing in the taxing mechanism. Where one can use the parking space to park his or her own vehicle but has to pay a fine with the use of the space and this becomes a costly affair for the individual and is not free from consumption. Other examples could also include meter parking where you can park your vehicles at the designated areas, but at the same time, you have to pay a certain amount to use that space.

So, here contrary to what we have been discussing these resources are open to all, but here you have to pay a certain amount to use them. The malls for example, that we visit or the stores that we visit for buying goods often provide places to park the vehicles and it is also not prohibited to use the common parking space. But at the same time, individuals or groups are charged some amount of money for using those spaces.

The service is provided, but a limit is set in the form of cost that the user of the resource needs to bring in or bring us or bear. Here it directly indicates what Hardin was proposing that there are no free lunches.




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### Alternative to deal with the tragedy of commons



- Direct state management of resources (functioning through socialism).
- Resources should be converted into private property so the management lies with private authorities.

Hardin's inclination toward the creation of enclosures (Angelis & Harvie, 2014).



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So, the solution that Hardin was proposing led to the curtailment of individual freedom or giving up the freedom to use common resources. For example, agreeing not to rob the jewellery store might seem devoid of their individual liberty, or not being able to fish as much as they want from a river might seem some to curtail their liberty to use the river and the fishes.

So, why would anyone or any individual or group agree to such a proposal to curtail his or her individual rights? According to Hardin, it is for the collective good that the

individual should abandon their individual liberty and accept the enclosure of commons. He also justifies enclosure by stating that curtailing one's freedom does not mean that an individual is restricted rather by curtailing the individual freedom what Hardin believes is that the individual is made freer like bringing in rules to safeguard the resources will make every individual freer to enjoy the benefits from the resources without even thinking much about the over-exploitation aspect by the others.

Since he started with the problem of overpopulation he even proposed that individual must relinquish their freedom to breed as according to him there are no technical solutions to meet the demand of an overpopulated area. To avoid the tragedy Hardin did not stop here. He proposed an alternative to deal with the problem of degradation and depletion of the commons. He proposed that an alternative of rights of the commons should be put in place and replaced with either state management- like functioning through socialism or resources should be converted into private property.

So, the management lies with private enterprises. This perspective as pointed out by Massimo De Angelis and David Harvie in the chapter the commons highlight Hardin's inclination toward creating enclosures and seizing the common property when wherein the lack of execution of the two above ways of managing the common resource will lead to what he claims is the tragedy of the commons.

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### Resource excludability and subtractibility

- Chennai water crisis (2019)- 'Zero Day' reminds us of the overuse of the groundwater by the residents.
- Unsustainable extraction of groundwater resources in Tamil Nadu, Chhattisgarh, Goa, Odisha, and Rajasthan.
- Hunting animals, and birds leads to endangering and extinction, leading to resource subtractibility and rivalry in consumption.



However, in order to implement what Hardin was proposing it becomes essential to reflect on the characteristics that are shared by the common property resources. This will help us to analyse if his ideas can be imposed on every resource system. If we consider the physical nature of a particular resource, it sometimes makes the control of potential users very costly, or in certain cases impossible.

For example, imagine the migratory or mobile resources like the wildlife or the fishes or the birds. These types of resources are identified as difficult to exclude the potential users which pose problem with creation of some kind of regulation or rules regarding their access.

As they are not held in a fixed location it becomes literally impossible to create certain rules. Further large water bodies the global atmosphere as well as the radio frequency bands are more problematic in their control of access as they do not have any fixed boundary. Thus coming up with some mechanism to control who can access the common resources plays an important role in understanding if the resources can be brought under restrictions or rules as Hardin was proposing for its use.

Again, if we consider resource subtractibility which depicts the capability of each user to deplete the benefit of the other users by overconsumption. Hardin explains that such a form of subtractibility leads to the aspect of rivalry in resource access where the over usage by one leads to the rise in the cost of the collective. For example, if we come up with a rule that for every plant that is cut down, we have to plant another one with this deforestation occurs and replanting will not be an immediate solution or will not solve the issues that are encountered by deforestation.

Because again if you plant the trees, now it would take some time to become a full-grown tree and to acquire the size of a forest - each plant contributes to becoming a forest. Similarly, if one resource appropriator pumps more groundwater from an aquifer even after imposing a fine, the cost of pumping will rise and there will be lower availability of the groundwater as the recharge capacity begin to vary over time.

For example, the Chennai water crisis that took place on 19 June 2019. I am sure all of us know about it and it had also caught global attention and was declared a Zero day. This reminds us of the over usage of the groundwater by the residents. Similarly,



unsustainable extraction of the groundwater resources in Tamilnadu, Chhattisgarh, Goa and Rajasthan are causing a decline in the water levels.

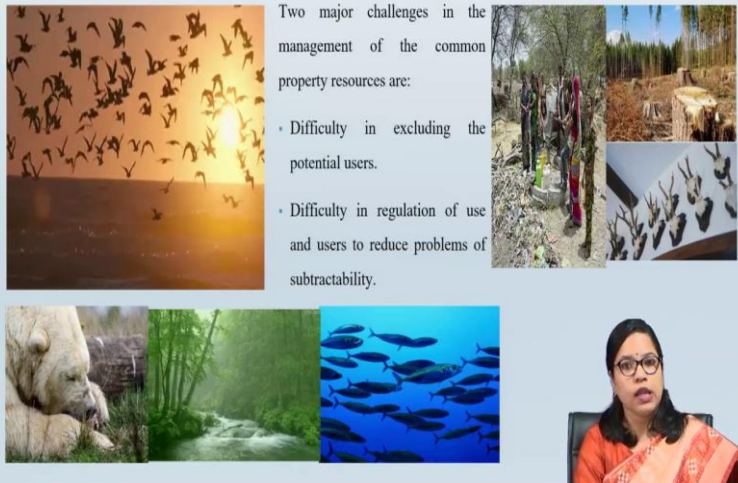
Hunting animals or killing birds for their horns or other products is leading to the creation of endangered species. Reduction in the forest stock leads to resource subtractibility and rivalry consumption. Thus, imposing restrictions in some cases might not work as was visualized by Hardin.

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### Resource excludability and subtractibility

Two major challenges in the management of the common property resources are:

- Difficulty in excluding the potential users.
- Difficulty in regulation of use and users to reduce problems of subtractibility.



David Feeny, Bonnie Mccay, and James Acheson 2014 access the literature that was based on the concept or the idea of the tragedy of the commons. And explain with certain evidence that the two major challenges in the management of the common property resources are difficulty in excluding the potential users and difficulty in the regulation of use and users to reduce the problem of subtractibility.

They find that excluding the potential users by bringing in some rules has been successful in some cases, but not in all.

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## Exclusion of potential users: successes



Countries part of the International Convention for the Regulation of Whaling

➤ Open access regime:

Open access seas depleted whale stock resource. The International Convention for the Regulation of Whaling was established in 1946.

➤ Communal property regime

The existence of exclusive legally recognized fishing rights within the Japanese coastal fishing communities lead to the successful management of the resources.



For example, when there were no proper rules for whale hunting in early 1900, there were many species of whale that were killed and whaling became unrestricted. The open access which governed the sea led to the depletion of the whale stock in the open ocean this concerning many countries, and the International Convention of the Regulation of Whaling was established in 1946.



As the global body managing commercial whaling the International Whaling Commission now manages the operation at the sea which has successfully managed to conserve the various species of whale and other fishes. India is also a member of IWC. Here we find bringing in regulations and sanctions helped in protecting the commons in the sea which were the whales.

Similarly, when we take the example of the communal property regime then there have been incidences of exclusive fishing rights within the Japanese coastal fishing communities. In this case, it has been witnessed that legally recognized exclusive fishing rights or communal fishing rights lead to the successful management of the resources.

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### Exclusion of potential users: failures

- Open access regimes:
  - Failed case of nationalizing communal forests in Nepal in 1957 into state property to reduce deforestation.
  - Elite favoring states add to the degradation of commons. Eg. Private company mining projects
  - Excessive overexploitation of the resources. Eg. The extinction of wildlife like the North American passenger pigeon and the bison.



Further, nationalizing of communal forest in Nepal in 1957 converted communal forests into state property for the purpose of reducing deforestation. However, this initiative rather led to the creation of open access forests and accelerated deforestation in places restricting the same. Additionally, there are also instances or issues of exclusion of the pre-existing communal users. Villagers who use the forest resource as a community were stripped of their rights and suffered due to the law capture. And finally, succumb to the creation of de facto open access.

Thus, bringing in exclusion was difficult. There are also cases where the state might favor the elite and further lead to exclusion of those not belonging to the well sections of the society and further leading to the degradation of the commons. Like granting a private company to go for mining in a resource-rich area. Where the private company not only clears the forest but also draws from the resource in a manner that might affect the environment as well as the people who were residing in the nearby areas.


These examples and evidence depict the challenge of implementing exclusion as Hardin was proposing showing how avoiding the tragedy of the commons is a very tricky situation when it comes to managing especially the resources by excluding individuals or communities that derive benefit from the resource or who are the stakeholders of a resource.

In the case of open access regimes, the problem of subtractability takes place due to excessive over-exploitation. Some examples of the same include the extinction of wildlife like the North American passenger pigeon and the bison.

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**Evidence on the regulation of use and users to reduce problems of subtractability.**

- › **Private property regimes**, the availability of the resource might get reflected in the price of the resource in the market.
- › **Communal property regimes**
  - Contrary to Hardin's perspectives, Feeny, Berks, McCay, and Acheson (2014) found that regulation of depletion of the resource could be done.
  - E.g. Turkey- management of the Turkish coastal fisheries (Alanya and Tasucu)



In the case of a private property regime, the availability of the resource might get reflected in the price of the resource in the market. Contrary to Hardin's perspective Feeny, Berks, Mccay, and Acheson found that regulation of depletion of the resource to communal property rights or regimes could be done and one such example can be that of the Turkish coastal fishery.


The successful management took place in locations like Alanya and Tasucu within 15 years. As the increasing users caused conflicts Alanya fishermen regulated the use by spacing out the fishing zone making internal agreements and rotations in accessing different fishing sites.

So, that all have access to the best fishing location. The lottery system was also evident and all these initiatives successfully helped in managing the fishery resource as common in this scenario.

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### Evidence on the regulation of use and users to reduce problems of subtractability.

- **Communal property regimes**  
E.g. Andhra Pradesh in India, where the fluctuating irrigation water supply problems were countered by the village water-users association with irrigators who managed the water allocations.
- **State property regime**, there have been issues of subtractability and poorly regulated usage, in an Indian case, where communally-held forests were nationalized before the centre had put in place a proper resource management system.






Andhra Pradesh in India where the fluctuating irrigation water supply problems were countered by their villagers water users association with irrigators who manage the water allocation further in case of state property regime there have been issues of subtractability and poor regulated usage. As exemplified in the Indian case, communally held forests were nationalized before the centre had put in place a proper resource management system.

The above analysis depicts that there is a lack of one-to-one relationship between the property rights, regime, and the outcome that was put forward by Hardin. Where the aspect of such institutional arrangements also needs to be understood in order to understand the exclusion and regulation of the use.

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### Nature of conflicts in the management of the tragedies of commons

- The stakeholders of the commons have their own set of resource management problems, which differs among different stakeholders, and as a result, there occur situations of conflict among them.
- They provide fuelwood crisis examples (the 1970s and 1980s), in Asia and sub-Saharan Africa.



Additionally, we also need to understand the nature of the conflict that arises when the management of this strategy of the commons is attempted. As explained by Adams, Brockington, Dyson, and Vira in 2014, the stakeholders of the commons have their own set of resource management problems which differs among different stakeholders. And as a result, there occurs a situation of conflict among them.

They provide fuelwood crisis examples to prove their point. In the 1970s and the 80s fuelwood crisis was perceived in Asia and sub-Saharan Africa. Social forestry projects were formulated to initiate tree planting to compensate for those shortages. However, research showed that the assumption of the fuelwood shortage was flawed. Thus, the identification of the problem which was considered to be fuelwood scarcity by the planners and the donors was indeed a situation where the farmers were trying to secure access to a sustainable livelihood and increase their land and labour resources.




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## Stakeholder variations in problem definitions for resource management

Different stakeholders identify varied problems in resources management as explained by Adams, Brockington, Dyson, and Vira (2014), which are influenced by the following:

- Local knowledge of local actors of the empirical context,
- Knowledge of laws and institutions and,
- Beliefs, myths, and ideas.

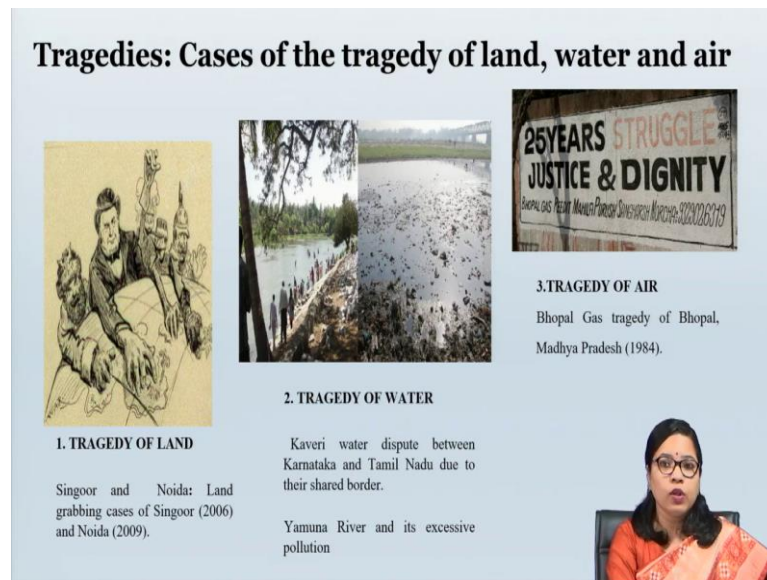


From these cases it becomes evident that scholars and policymakers should pay attention to the knowledge which helps different stakeholders to identify their problems. As explained by Adams, Brockington, Dyson, and Vira the knowledge of empirical context as perceived and obtained by the local actors the knowledge of law and institution, and belief myth and ideas also influence the nature of problem definition when comes to the management of common resources. All of these deeply influence the perspective of different stakeholders to decide on the problem definition of resource use.

In this context cognitive conflicts do occur, and policy dialogues need to be open to understand the plural perspective of different actors to provide solutions for the resource management problem. Otherwise, there occurs superficial policy formulations that might fail to target the actual audience or the actual problem at hand.

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**Tragedies: Cases of the tragedy of land, water and air**



**1. TRAGEDY OF LAND**

Singoor and Noida: Land grabbing cases of Singoor (2006) and Noida (2009).

**2. TRAGEDY OF WATER**

Kaveri water dispute between Karnataka and Tamil Nadu due to their shared border.

Yamuna River and its excessive pollution

**3. TRAGEDY OF AIR**

Bhopal Gas tragedy of Bhopal, Madhya Pradesh (1984).

Let us take a deeper look into some of the examples in form of tragedy of the land water and air. The first example comprises of the tragedy of the land commons dealing with the case of Singoor and Noida. Land grabbing cases of Singoor and Noida are evidence of the problem of the tragedy of the commons. In 2006 in Singoor West Bengal the state government gave away 1997 acres of land to the TATA group for setting up companies to manufacture the low budget cars.

According to research the land was forcefully acquired with further blame put upon the farmers for encroachment. A similar situation was witnessed in Noida in 2009 where the landowners of the adjacent villages were evacuated in the name of industrial growth. Then this was also according to the reports that around 2000 hectares of land were taken away at rupees 850 per square meter. And then they were sold at 10000 to 12000 per square meter by Greater Noida Industrial Development Authority to the real estate developers.

This highlight that where resources are under state or public property they might not avoid the tragedy of the commons from happening. Similarly, a tragedy of the water commons has been witnessed in the case of the Kaveri water dispute that happened between Karnataka and Tamil Nādu due to their shared border. Additionally, we can also include the case of the Yamuna River and its excessive pollution brought about by the industrial sewage that is emptied from the region of Delhi. Such issues of degradation of

water resource highlight the poor level of planning and lacking the collaboration among stakeholders to sustain the flow of the resources.

In case of tragedy of the air the Bhopal gas tragedy in Madhya Pradesh is an example that broke out in the year 1984. The pesticide-producing plant was a collaborative venture of the government of India and U.S. based corporation that is Union Carbide Corporation which produced savings and was a very popular pesticide during India's green revolution.

This was produced using methyl isocyanide introducing low-cost majors the union carbide corporation reduced the training of personnel had layoffs and reduced the maintenance of safety procedures which also included turning off the MIC refrigeration and switching off the warning sirens.

These all led to an uncontrollable gas leakage on the 2nd of December 1984 leading to the death of around 3000 to 8000 people and affecting millions across generations.

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**Challenges in governance of the commons**

- Lack of proper machinery to manage the negative environmental externalities.
- Lacking regulatory mechanisms to control the private parties, citizens, and governments.
- Understanding the limits of both socio-economic and biophysical attributes of the ecological systems for uniform governance.
- Formulations of legal frameworks to regulate commons depletion
- Transparency of social networks (Bodin & Crona, 2009).

The slide features a red circular icon with a dashed border containing a cartoon character holding a document. In the bottom right corner, there is a small video inset showing a woman with glasses speaking.

As we see it is thus essential to have proper governance in process of managing the commons. Let us look at different challenges that arise in the governing processes. One of the most common problems in managing the commons resource is the lack of proper machinery to manage the negative environmental externalities and there is the absence of

regulatory mechanism that can control the activities of the private parties, citizens, and government.

There are challenges in understanding the limits of both socio economic and biophysical attributes of the ecological system. So, that a uniform method of governance could be brought or applied over a large expanse. There also lies the necessity of formulating legal frameworks to regulate activities that lead to the degradation of common resources. Apart from the challenges of governing or governance that is faced by the state, there are also challenges that occur in relation to transparency of social networks that play an essential role in the access to commons.

As according to Bodin and Crona 2009; most of the legal frameworks derived their essence from societal parameters. The above discussion has highlighted the importance of the role the government plays in the management of the commons. In this context, Elinor Ostrom performed a large number of experiments to determine the nature of governance that best suits to the management of these commons or common property resources. In the following module, we will discuss the ways of governance that are most useful in coping and managing the tragedy of the commons according to Ostrom.

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**Theory of the anticommons**

Introduced by Michael Heller, to explain the economic situation of Moscow, Russia in the post – 1990s period.

- Shift from a socialist regime to decentralization and privatization occurring.
- Transitional pace caused fragmentation of property and chaos.
- The tragedy of the anticommons concept evolved from these poor experiences.

The slide features a diagram at the top right showing a transition from a single blue node to a network of three nodes (green, red, blue). Below this is a cartoon titled "TOWARD A FREE AND EQUAL SOCIETY" with the subtitle "WITH A NEW WORLD IN OUR HEARTS", depicting a chaotic scene of people and a large dollar sign. To the right of the cartoon is an image of two hands holding a large yellow dollar sign. A small video inset in the bottom right corner shows a woman with glasses speaking.

Now, let us understand the theory of the anticommons which came up as a parallel to the theory of the tragedy of the commons. The theory of anticommons has been introduced by Michael Heller to explain the economic situation of Moscow, Russia in the post 1990s

period. This was a time when the shift from a socialist regime was taking place with large degree of decentralization and privatization occurring. However, the transitional phase or pace was such that the fragmentation of property was leading to the chaos rather than bringing in solution for resource management.

Hence the tragedy of the anticommons idea, concept, evolved as a result of poor experiences of transition from a socialist to a market-based regime in Russia.

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**Theory of the anticommons**

- Multiple rights of exclusion, in addition to the idea of property ownership.
- Economic value gets wasted as a result of the under-utilization of the resource.
- It can be considered as a parallel theory to the tragedy of commons.

The tragedy of the commons (over-utilized parking lot)


The tragedy of the anticommons (under-utilized parking lot)

Here the basic idea that Heller was proposing was the multiple rights of exclusion in addition to the idea of property ownership. Heller explained that the concept of anticommons deals with the understanding of why and how economic values get wasted as a result of underutilization of the resources. It can be considered as a parallel theory to the tragedy of the commons when.


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## Theory of the anticommons


- Hardin promoted enclosures- Heller considered that enclosure would bring more ruin.
- The degeneration of resources occurs through over-usage in the context of the open-access or other forms of commons.
- If there are more rules and regulations for using the resources causes the resource to be underutilized.
- E.g. Cricket clubs and general parks for playing cricket.



Attock Cricket Club at Moseley School – Birmingham, England- hard to access cricket ground



Normal parks – open for anyone to access it.



Hardin was proposing to bring in enclosure, Heller was proposing that enclosures would bring more ruin. According to Heller, the degradation of the resources through over usage in the context of open access or other forms of common will also be possible if there are more rules and regulations for using the resources, thereby creating scenarios where the resource is underutilized. Now you must be wondering how the idea of anticommons can be understood in contrast to the theory of the tragedy of the commons.

Let us now understand this aspect. Imagine that you and your friend want to play cricket in a playground. But in order to use that ground, there are many rules and qualities that you and your friend must qualify.

Like you must have played in the game at the district or the state level having this qualification you must be a member of the club and then seek permission from the company that is managing the playground. Further you must look or book up book the slot for playing on it having all these rules and regulation makes this playground difficult to use in contrast to a playground where you can just go in with your friends and play anytime without meeting any criteria thus discouraging the use of the playground to its prospective users.

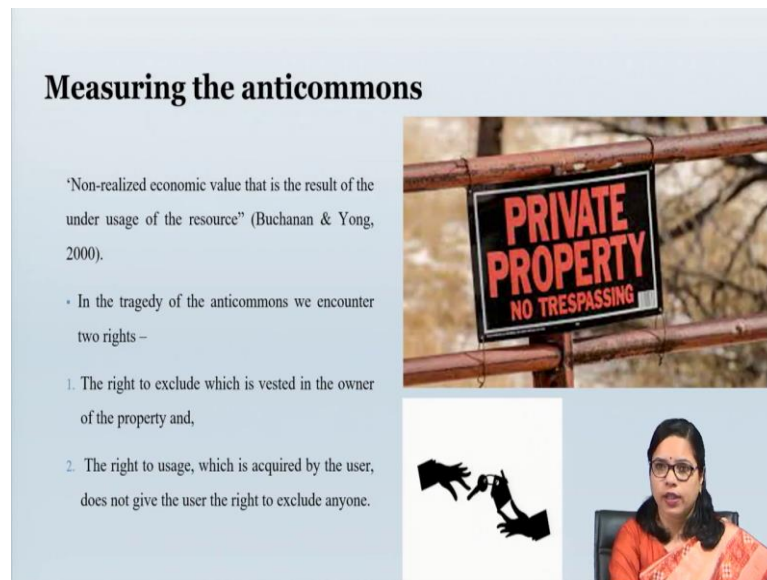


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### Measuring the anticommons

‘Non-realized economic value that is the result of the under usage of the resource’ (Buchanan & Yong, 2000).

- In the tragedy of the anticommons we encounter two rights –
  1. The right to exclude which is vested in the owner of the property and,
  2. The right to usage, which is acquired by the user, does not give the user the right to exclude anyone.



The slide features three images: a 'PRIVATE PROPERTY NO TRESPASSING' sign on a wooden post, a silhouette of two hands shaking, and a woman in an orange sari speaking.

According to Buchanan and Yong, which they mentioned in the article symmetric tragedies commons and anticommons the measurement of the tragedy of the anticommons is done through the non realized economic value that is result of under usage of the resource.




Here we are encountering another form of dilemma which we face. If we follow Hardin what suggested bringing in private property regime into the commons further reduces the size of the opportunity in the case of the playground. The more the number of persons or firms assigned multiple rights to exclude others from using the playground the less the usage of the playground comes into the picture.

The tragedy of the anticommons - we encounter two rights; one is the right to exclude which is vested in the owner of the property and the right to usage which is acquired by the user does not give the user the right to exclude anyone.

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### Measuring the anticommons

- Anticommons deals with the exclusion side of the model
- A person/firm may reduce the users by bringing in a cost of usage.
- As there exist their rights to exclusion, a lack of usage, also leads to potential resource wastage as well.



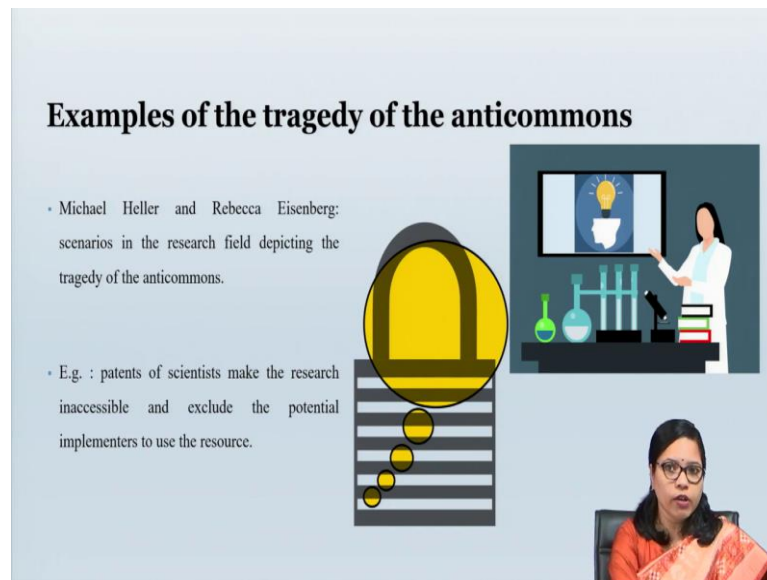
In this context, Buchanan and Yong explained that the tragedy of the commons deals with the usage side of the model where an additional unit of input by the user degrades the production or productivity of the other users of the commons. Like the whaling example which we were discussing.

In contrary to this the concept of anticommons deals with the exclusion side of the model where a person or a farm may reduce the uses by bringing in the cost of usage. Therefore, as there exists the right to exclude a lack of usage also leads to potential resource wastage as well.

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### Examples of the tragedy of the anticommons

- Michael Heller and Rebecca Eisenberg: scenarios in the research field depicting the tragedy of the anticommons.
- E.g. : patents of scientists make the research inaccessible and exclude the potential implementers to use the resource.

The slide contains a title at the top. Below it are two bullet points. To the right of the text is a graphic of a yellow dome on a staircase of grey steps, with three yellow circles on the steps. Further right is an illustration of a scientist in a white lab coat standing next to a desk with a microscope and test tubes, with a lightbulb icon above. In the bottom right corner, there is a small video inset showing a woman with glasses and a red sari speaking.

Michael Heller and Rebecca Eisenberg in their article published in Science titled can patents deter innovation the anti commons in biomedical research were discussing how in research field there can be scenarios of the tragedy of the anticommons. I am sure all of us have heard of patents copyrights intellectual properties. These all taken together can be equated to what Heller and Eisenberg were stating to be deterring innovation. For example, when a scientist files a patent, he or she gets the exclusive rights to use it or they use the innovation.

This example stated that licensing enables the researcher holding the patent to exclude also the other potential users or researcher's policy developers from making use of their findings, leading to the wastage of resource development as innovation is underutilized in this case. We will discuss in detail the cases in the upcoming weeks with the real-life scenario where you can identify how anticommon tragedy take place in the real-life scenario.

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**Conclusion**

We covered are two-fold regarding resource use.

1. The tragedy of the commons.
2. The tragedy of the anticommons.

So what should be our approach then to manage the resources in a sustainable way avoiding the tragedy of the and the anti-commons?

We will reflect on all these issues through cases in the upcoming weeks.



The slide contains three illustrations: 1. A farm scene with a horse and a cow in a green field. 2. A balance scale with a person standing next to it, holding a scale. 3. A cartoon illustration of a blue elephant and a blue person, with a banner that says 'EXTINCTION MIXERZ013'.

To summarize the broad ideas that we covered are two folded regarding the resource use. The first is that we dealt with the tragedy of the commons which focused on the over usage of the resources due to unrestricted access of the users. And second, we analysed how restricting access to the resources lead to their underuse from multiple exclusion rights causing the tragedy of the anti commons.

Hence, we are confronted with the problem as to what should be our approach then to manage the resources in a sustainable way avoiding the tragedy of the commons as well the tragedy of the anticommons from happening.

We will discuss about all the possible solutions and issues in the upcoming weeks with proper example and till then you know I will leave you with this idea and thinking about how we can manage and govern the resources.

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Thank you for listening and have a great day ahead.