

**Course Name: I Think Biology**

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W12L61\_Biology and Society - Case study on Stray Dogs

Hello everyone and welcome back to NPTEL course I Think Biology. My name is Prachi Gupta and in this week we are discussing biology, society and the environment and what would be a better example to understand this concept than stray dogs in urban areas. With rapid urbanization, a huge chunk of population now call city their home. And amidst this hustle and bustle of the cities, one of the common sight that we see is dogs. These creatures, they are a good example to understand the interplay between society and biology. There is important questions about coexistence, public health and ethical responsibility.

So within our society, we see a spectrum of emotions towards these dogs. It ranges from affection to aversion. You might have seen maybe you or maybe someone in your neighborhood, they love dogs, they feed them, they like to pet those stray dogs. There might be some people who do not want stray dogs in their neighborhood. Meanwhile, these dogs, they also play a major role as scavengers in urban ecosystems. So in today's lecture, we will be discussing the complex interactions between humans, urban ecosystems and the growing population of stray dogs in Indian cities.

So for this discussion, joining me today is Dr. Jayanti Mukherjee, who will shed light on this issue of stray dogs in urban ecosystem. So welcome, Dr. Jayanti. Thanks Prachi. Thanks. So to begin with, you have written this chapter, Urbanscapes in I think Biology book. So I would like to ask you, why did you choose a case study about stray dogs in particular?

Yeah. So when we were actually conceptualizing this chapter, and we were thinking about having some case studies related to urbanscapes, one thing came definitely to my mind was this Canine conundrum. So I will talk in a bit about why this name is relevant. So we looked at a set of case studies and what could be most appropriate, you know, in this urban landscape concept context. You will also agree with me Prachi that every other day when we open our newspapers, we see, you know, a child has been mauled by dogs, someone has been mauled and even it has turned to be fatal. So these concerns are growing and actually these days, these news have

become very frequent.

There could be of course, two reasons for this. One is over reporting of these incidents, but another could be serious concern, which is because of increase of urban population, like we already know that by 2050, people are predicting that 50% of people will move to these urban landscapes and with this growing population, there is a growing attraction of stray dogs to these landscapes. And so this, I thought that this would be very relevant topic to address, hence, because it directly relates to the human-animal relationship, human-animal conflict and some major concern about public health for that matter. And actually another point I would like to mention because stray dogs and human-animal conflict may not be very important issue in the developed countries because of their society and system and it is very well managed. But in most of the developing countries, this is a serious concern.

In the urban neighborhoods and around stray dogs, there have been a lot of cases of dog bites and dog maul issues. So I think that that based on these angles, I thought that it would be a interesting study case study to address in this context. Yeah, this is a very relevant example, given the increasing stray dog population, increasing in our urban ecosystems, we should be aware about this. So can you tell us about the main issue about stray dogs that you are highlighting? Yeah. So Prachi, in this chapter, we are actually highlighting issue about how stray dogs are attracted to human population and how are providing a very good habitat for stray dog flourishing and increasing in population.

So I in, previously I already told you that, you know, urbanscapes are becoming hub of development now, more and more people are moving towards the cities. And this is actually creating a very, you know, plethora of resources and resource availability in these landscapes. So now what do I mean by that? Let's take an example. We are in Bangalore, right? In Bangalore, if you just go out, you will see every day, particularly actually you will see this in a peri-urban or suburban context. Okay? And I will give you a comparison with the actual urban context also.

So when you go out in most mostly the peri-urban or the buffer region of the urban systems, you will see that these regions are the ones that are developing very fast these days. Bangalore is one of the, I think, if I'm not wrong, it's like fourth fastest developing cities. And so you can see this urban, peri-urban regions are developing very fast. And what is happening here is the population here is very unregulated. Every other day you will see, you know, bakery or a meat shop or something opening up, which is actually providing enormous amount of food resources, which is attracting these stray dogs as they are acting as hubs to attract these stray dogs.

So this is one context we wanted to address and how, so looking at how this human facilitated interaction with stray dogs is counteracting again back in terms of public health, when we look at this stray dog population. That is the reason we also highlighted so Chandran and Aziz's paper,

which is Chandran and Aziz 2016. It's a kind of semi-scientific paper because it was published in Economic Weekly. But the paper is, I think, one of the important papers because it compares 10 different cities in India. Okay? And then they show that in an urban system, when human population is growing, solid waste is growing, right? It's a very clear cut correlation.

However, although because this study spans across 10 different cities, they were exactly not able to find the correlative association between increase in garbage and increase in dog population. But they were able to establish that garbage or solid waste is actually causing also correlated with increasing dog bites, okay? So this is one thing I wanted to highlight in this section, because this is one important way to generate awareness, right? How urban systems work, how unmanaged garbage or unmanaged resources can actually attract stray population.

However, here I would also like to mention another very latest study conducted by Dr. Abhi Tameem from Airtree, his lab. They did this study only in Bangalore. And they found, like as I was saying, that these bakeries and house feeding, and also garbage piles could be some of the best predictors which means now it is coming to a very causal relationship. So they are found to be the cause of increasing dog population. So this kind of establishes what I am saying that human population in causing increase in garbage causing increase in stray dog population. So there's a very significant relationship. And as a resident of the human population, we should know about these things. We should be aware of what are the, what consequences we have generated in these systems.

So for the first study, you talked about there is a correlation. And for the next study about stray dogs, you are talking about causation. What is the causation and correlation? Can you shed some light for us? So correlation is, you know, if something is positively associated or negatively associated. For example, I can tell you, if I find, I collected data on 100 people eating ice cream over one year and cause, I mean, increasing lung cancer. Say I found a very positive correlation, that eating ice cream is very positively, when it is growing, lung cancer is also growing. That's a correlation. But is that a causation? Will you buy it? So causation not only has to have a logic behind it, but also it has, you have to, so statistically you have to prove it, but it also has to come with the logic or to be established.

So in this case, Chandran and Aziz's paper were able to show that there were some correlation of aspects, but when you, they were not able to use it as a causation. So they did not actually do a study or experimental study to see this particular variable is causing this thing. So by comparing some different aspects, they were able to conclude that it might be caused by this. Okay. So it was not very definitive. So for establishing something definitive, you definitely need to have a causal angle to it.

So we are talking about correlation and causation. Isn't this for scientific research? I mean, we are talking about biology and society in this week. So why are we talking about the scientific causation and correlation here? Like, how is it important for the benefit of the society to

understand this? That's actually a very important question Prachi. So why is it important? Because as I, you know, previously I was saying that unless it is causation, we cannot definitively say that this something is causing a problem, okay. And so in order to address that problem, this causation is needed, right?

However, this aspect becomes very problematic, say in when we are doing science communication. For example, a lot of times we have seen that a correlational study is often interpreted as causation and put into the public domain as if this something is causing this. So when, when when it comes to biology and society, science communication is very important here. Right? The science, the correct science has to be correctly passed on to the public in order to understand the relevance. Yes. And if you say something which is correlational as causation, without proving its causation, yeah, then it becomes a problem right?

So it becomes a problem, it it can generate unwanted, you know, anxiety, it can generate chaos in the society, it can generate, you know unwanted management related conflicts. So all these things can happen just because of wrong or bad communication. So in when you talk about, So in this section, we also talk about science communication, right? And this is one particular aspect which is people have to remember when they are talking about science communication, not to interpret the result in a different way. So correlation causation, even though it is very scientific, it's important to keep in mind when we talk about biology, society and science communication right.

So now we know the main issue that you are highlighting. There is increase in garbage and it is increasing stray dog population in urban areas. So these stray dogs, are these stray dogs only causing issues in urban areas? Yeah, that is also an important thing point to talk about. So, you know, when we talk about urban areas, urban areas or urbanscapes can be divided into, you know, the core zone, which is already developed. And generally it is seen that the development starts from this core zone. So the city city starts development from this core area.

And over the years, these areas are more regulated, management is well, municipality works very efficiently here and resources are well managed in this area. Okay. Comes when the city is expanding, right? When the peri-urban zone or sub-urbans are actually starting the development in those areas. And when these development is ongoing, what happens as I said before, resources become very unregulated, lot of incoming resources attract the dogs in these regions. So in these regions, generally you will also see that management influence or management is little bit weaker than it is in the core areas. And hence the regulation of resources or resource availability for dogs, it becomes a bit unmanaged. And that is the reason there is even splurge of dog population in this peri-urban zone, which is generally seen.

And what happens is, this is not only is restricted to the urban areas, but studies have shown studies by none other than Dr. Abi Tamim, they have shown that in their paper Canine

conundrum that, you know, these dogs, not only stray dogs, stray dogs are definitely the reason, but domestic dogs also can go outside, into the buffer regions and attract or get in touch with wildlife population or other wildlife present in those areas, which actually cause threats to them. So their study even highlight that dogs, while worldwide domestic dogs have caused extinction of almost 11 other species, spotted red species. So which is kind of very alarming for that matter.

And how do they do that is actually different ways. So we also highlight one of those ways in our urbanscape chapter, which is how dogs are actually having conflict or actually they are, you know, predated on native wildlife, right? So if you see this graph, you will see that the dogs have serious impact, these are even domestic dogs that are actually having serious impact on these various different mammal species, different birds, as well as reptiles. So this is one scale of disturbance that dogs have on other species. Secondly, when they are actually interacting with the wildlife of those regions, they are also causing transmission of lot of vector only.

Maybe some other part of virus or other viruses, ticks, tick-borne diseases, so very prevalent in them, and particularly, so domestic dog can transfer these diseases. And you can understand stray dogs are even more vulnerable, like more prone to transfer of these kinds of diseases because they themselves sometimes don't have the shots against these. So if they come in contact with these wildlife, the transmission of these diseases actually increases. So I think it's, as citizens, it is very crucial for us to be aware of these things, aware of these unregulated population, aware of these unregulated resources, how we are, you know, helping in increasing these resources, and what are we doing, on the other hand, attracting dogs and creating this whole ecosystem. So it's very important to keep all the aspects in mind when we talk about human and dog. I won't exactly say conflict because it's not always conflict, right? But this interaction, it becomes very important for us to understand all these aspects.

Okay, so we have talked about this increasing stray dog population, human-stray dog conflict, and even conflict of stray dogs with other animals. There are dog bites, there are, they cause many diseases to as well as other animals. So this means like a lot of negative relationship with stray dogs in our vicinity. But is there any positive aspect of having stray dogs in urban ecosystem? Can you shed some light on that? That's a very, very good question Prachi, very close to my heart, because even I am culprit of loving stray dogs. I love them.

One of the very, that's the reason I'm highlighting this because one of the very positive things which often citizens agree with is that you know you love to have these animals around you. Yes. right? You love to feed them, you love to hang around with them, it gives you mental satisfaction and it it helps in a lot of poor people who cannot afford you know pets or domestic animals for that matter, they can get this satisfaction from having a stray dog around them and kind of interacting with them. But the conflict often becomes when these dogs are becoming aggressive or any other transmitting diseases. So the problem now you see, it's very clear from what I'm saying is the problem is not in the human part, problem is not in the dog part, problem is in the

interaction part and how we actually manage that interaction. So management aspect is very important here because stray dogs not only have this, you know, psychological well-being aspect of positiveness, but it also acts as a very important scavenger in an urban ecosystem.

Studies have shown that they really control pests, like for example, rats and other marine species are, remain in check because of these stray dog population. For example, although this, I'm not sure it's a very good example, but in 1999, I think there was a plague in Surat, right. It was a bubonic plague and it killed actually infected a lot of human beings and as well as their fatalities. But what happened was people actually hypothesized that just before this plague, the city went ahead and, you know, did some reorganization on management of the stray dogs where lot of stray dogs from the vicinity were removed. This actually caused the increase in rats or the plague causing organism, right.

So I'm not sure how actually, how much evidentiary support available for this, but this is a definitely hypothesis that people have come up with that removal of these stray dogs from these urban systems could have led to the increase in pests which could have caused these this plague situation at that time. So I think rather than always looking at the negative aspects, one should also definitely consider the positive aspects and think about intermediate platform, for example, better manage these stray dogs. What can society do to come to an agreement where we can have these animals around us, but we also reduce the negative impact of these animals. So that that measurement has to be done, the balance has to come in the system.

Can you suggest to us any ways that how can we balance the presence of stray dogs and the need to control their population? We know we have this positive relationship with stray dogs, but also there are there sometimes there are conflicts that arise that keep on coming. So how do we need to have them in also their population? Yeah, so I will give you, let's talk about two different things. One is one natural you know example I will give you. In the urban ecosystems, normal urban ecosystems, stray dogs are a predator. Like after all, it's an animal and it's a predatory animal right? That's the reason I was saying it feeds on other pets species.

But in Mumbai, Mumbai is located next to Sanjay Gandhi National Park. And many of us already know that a lot of times leopards come in from this national park into the sea. Leopards are even higher predator of dogs, they actually feed on dogs, right? So there is a, what they are giving is they are giving natural control of the dog population in that area. And studies have actually shown that the areas where these leopard populations are high, the stray dog populations are controlled, not bites or rabies incidents are actually lower.

Fascinating, right? So this is the one way of looking at it as a natural way of, as we all know that every city cannot have leopards or tigers roaming around. So what is the other way? Here I will bring matter and my, we know, Shahjahan made Taj Mahal right, one of the icon of beauty and romance. But he made it and he, you know, he is no more, right? But we still go and

appreciate that beauty and appreciate that construction, the Taj mahal, that he constructed. Would it be Taj Mahal if we are not maintaining that structure? right? Would it restore or would it have that beauty if continuous maintaining and monitoring is not done? And Prachi, everything is similar. So this this goes into even urban management, even anything you talk about.

So in an urban system, you will see that all municipalities actually take the responsibility. They come and sterilize the dogs. They come and do this vaccination shots, drive, all these things happen in all these other states, municipalities takes responsibility. But one thing, continuous monitoring or keeping a log of how many individuals we are neutering, what are these individuals doing after they are released? You know, are these individuals still coming in contact with some diseases? So this monitoring part is busy. I understand, there is a lot of resource or manpower needs to be involved.

But for a better management, also need to include some monitoring aspect and maintenance aspect of this management. Otherwise, the management is actually who will go into well, right? So if you neuter some stray dog, and because it is a also a natural predator, what happens is another non-neuter male, which is now a very dominant male, so this is science terms in here, another non-neuter male from the neighbourhood which is dominant will come into the scene, will occupy that scene and will start mating with the females and again the same population will be. So which are the individuals we are neutering? How are they going into place? What is happening after that? All these things has to be monitored in the meantime. So the record should be maintained in a very scientific way, right? So scientific experts should be consulted, their decisions, I mean, their recommendations needs to be taken and followed up. So you should, one should keep in touch with the experts and always seek, go back to them and seek their assistance to while they are doing readings.

We are doing the sterilization drives and all, but this continuous monitoring is what is lacking. I think to maintain a healthy or balanced ecosystem where and while the animal can live in harmony with humans, we definitely need to strengthen our management strategies, how we face these problems and keep a record or maintain a record of all those things. Right. That is an important thing for us to do right now. Thank you for being here. Thank you Prachi for inviting me for this and I hope this chapter and our case study will generate more awareness and so that we can act as responsible citizens of these other states. Thank you very much.