Wildlife Conservation
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Lecture – 37
Crisis and Learnings -- The Sariska case-study

[FL]. In this course we had a look at a number of situations. And number of those situations are Crisis situations. So, for instance if you have a protected area to manage and if there is an oil spill it is a situation of crisis. If there is a disease outbreak it is a situation of crisis. If because of climate change, we have a situation drought or floods into our protected areas, they also become situations of crisis.

If there is a heavy poaching in our area that is a crisis situation. If there is a forest fire into area, that is also a crisis situation. So, there are a number of crisis situations that have to be dealt on a day to day basis when we are managing a protected area for the conservation of wildlife.

Now, in this lecture we will have a look at one such crisis situation that occurred in the Sariska tiger reserve. Now Sariska tiger reserve is a tiger reserve in the state of Rajasthan. And in the year 2004 it turned out that there were no tigers left in the tiger reserve because of a number of factors. There were quite a number of tigers that were poached away, there was some tigers that were not born because of excessive disturbance into these areas, because of which the tigers did not have cubs in the area and so on.

Now, why did we reach a situation of this crisis? So, for instance if this tiger reserve had say 20 tigers and when this number came down to 10, why was this not taken as a symptom of alarm? Why did we reach a situation in which we had absolutely no tigers left? So, there was a very concrete level crisis that was there in the area which had to be handled. And then how did we handle this situation.

So, we will take this Sariska tiger reserve as a case study. To understand how a crisis comes, how it unfolds and then how it is brought back into control and then what are the consequences that happen. So, let us begin crisis and learning the Sariska case study.

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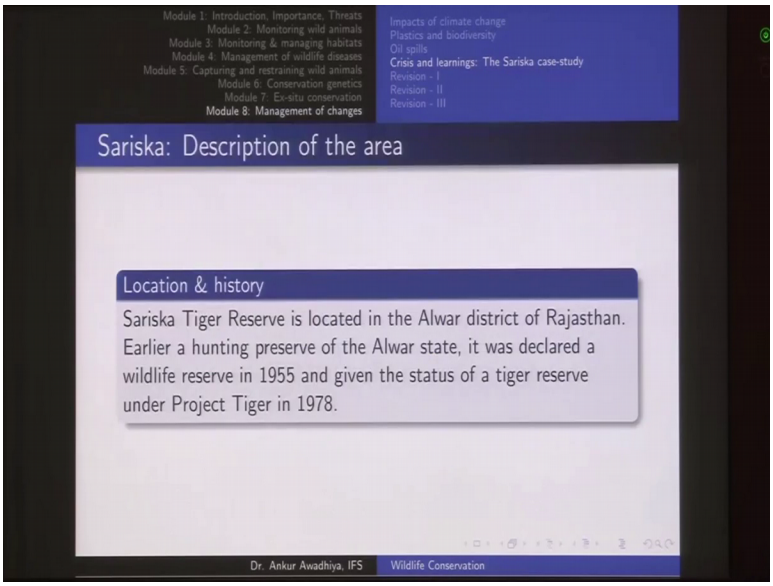

Let us begin with a brief description of Sariska. So, Sariska tiger reserve is located in the Alwar district of Rajasthan. It was earlier a hunting preserve of the Alwar state and later on it was declared as a wild life reserve. In 1978 it became a tiger reserve. So, this was one of the early tiger reserves of the country.

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So, where it is located? It is here so, this is our state of Rajasthan and here is our Sariska tiger reserve.

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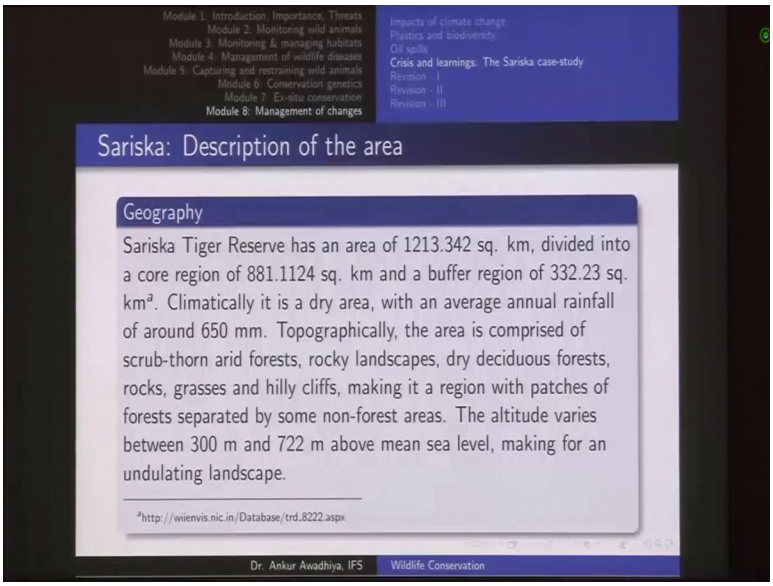

Now, if we look at its geography it has a very large area there is 1213.342 square kilometers which is divided into core of 881 square kilometers in a buffer region of 332 square kilometers. It is a dry area, it is in Rajasthan, so it is a dry area. The average annual rainfall is around 650 millimeters.

Topographically the area is comprised of scrub thorn arid forest, rocky landscapes, dry deciduous forests, rocks grasses, hilly cliffs making it a region with patches of forest separated by some non forest areas. So, essentially what we are looking at here is an island within an island.

So, in this protected area we have some patches of forest and then there are some areas which have which do not have forest, but mostly they are rocky landscapes. The altitude varies between 372 meters above the sea level making for an undulating landscapes. So, it is not a level area.

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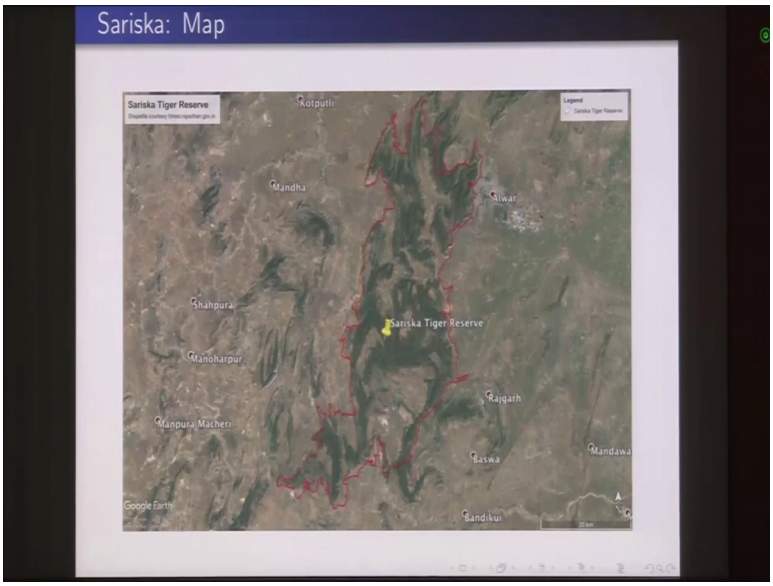

So, this is how it looks from when we look at a satellite image. So, as you can obverse all this so this red area is the Sariska tiger reserve, everything around it is practically barren, it does not have a lot of forest. And, even inside this tiger reserve we have these patches of dense forest and we have these patches where we do not have much of trees left.

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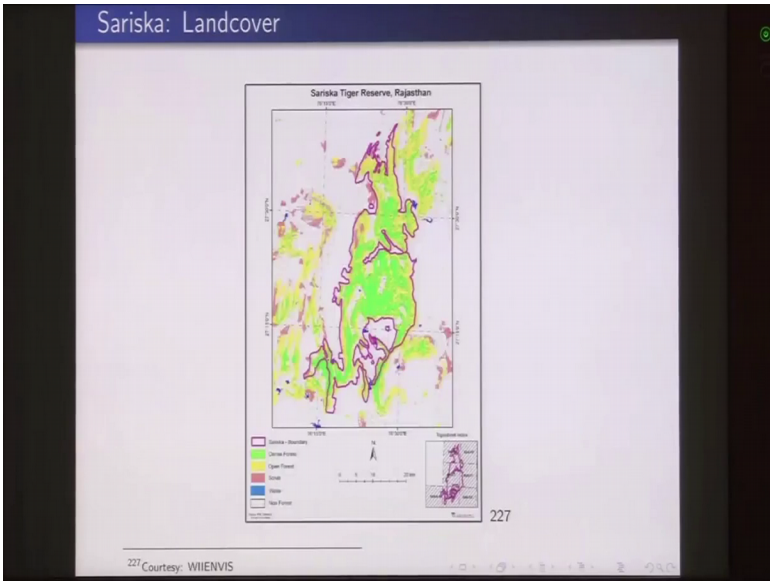

If we look at a land cover classification, we will get a very similar picture. So, here also the green color is representing the dense forest, the white color is representing non forest, the blue color is representing the sources of water, so we very few sources of water

inside. Then we have a scrubs in a represented by the pink area and open forest that are represented by the yellow areas.

Now open forests are those areas in which you have a very less tree density probably because, there is some amount of tree cutting going on or probably also because the land is not good enough to support a high density of trees.

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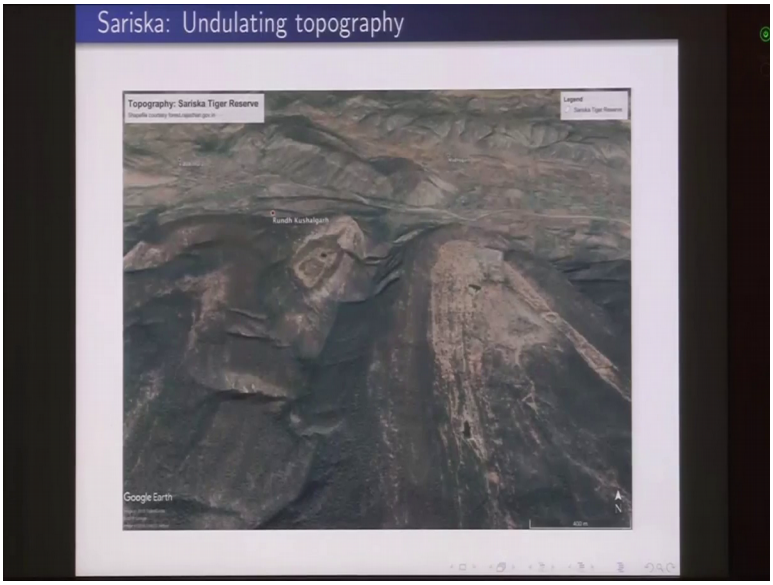

Now, if we look at a 3D model, we will see that there is quite an undulating topography. So, for instance if you have to move from this point to this point you will have to overcome all of these ups and downs hilly areas; it is a very undulating topography.

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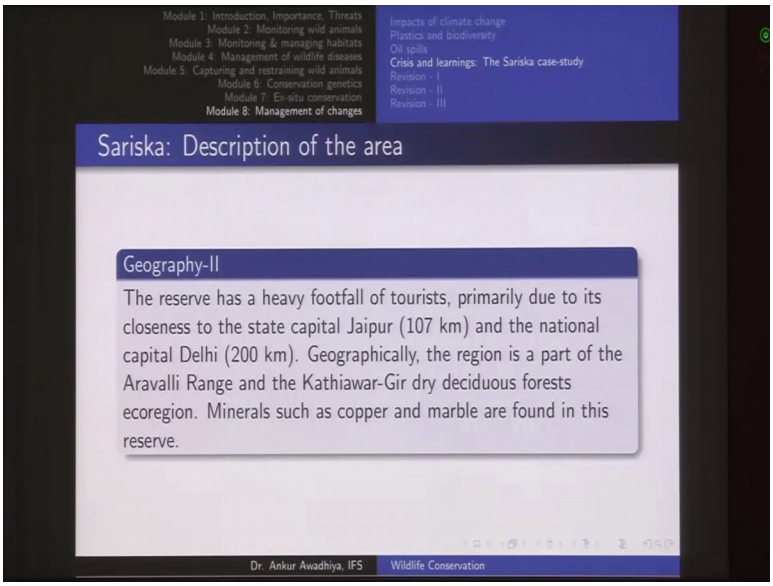

Now, this reserve has a very heavy footfall of tourist. So, this is very important reserve on the country, especially from the tourism point of view. Now, why do we see a very heavy footfall of tourist because of its closeness to Jaipur, which is the state capital and Delhi, which is the national capital. Now this is a part of the Aravalli range and the Kathiawar-Gir dry deciduous forests ecoregion and you also have a number of minerals in the that are found in this area. So, minerals include copper and marble and so there was quite a lot of illegitimate mining in the past.

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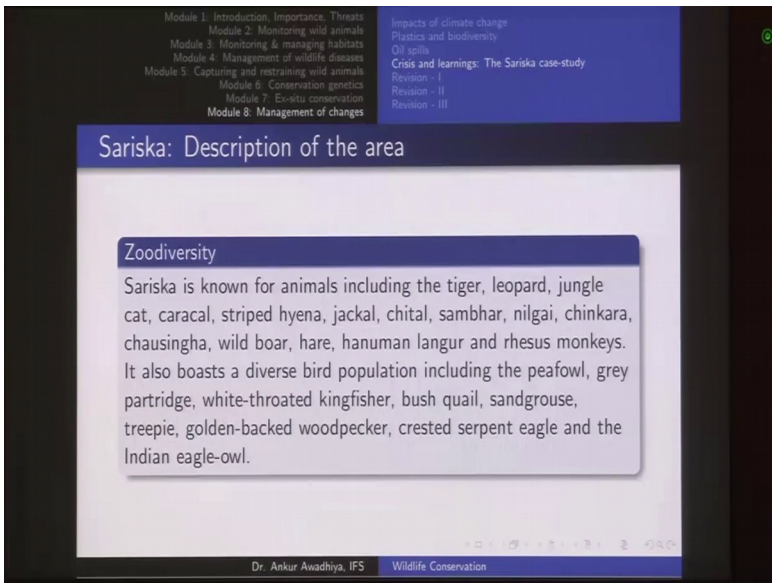

Now this area has a very large diversity of animals, including tiger leopard jungle cat caracal striped hyena and so on. You also have a number of bird species, so which also act as pull factors when we talk about tourist.

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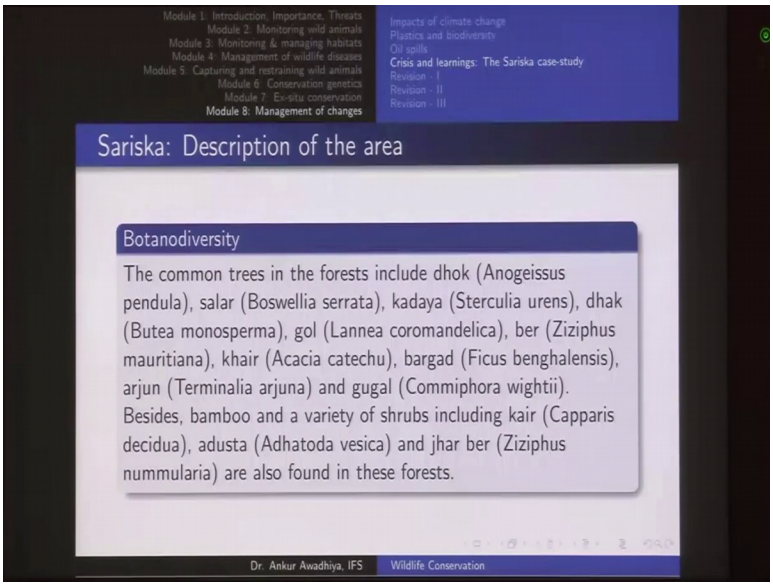

Also when we talk about the plant biodiversity this is also a very hugely diverse area.

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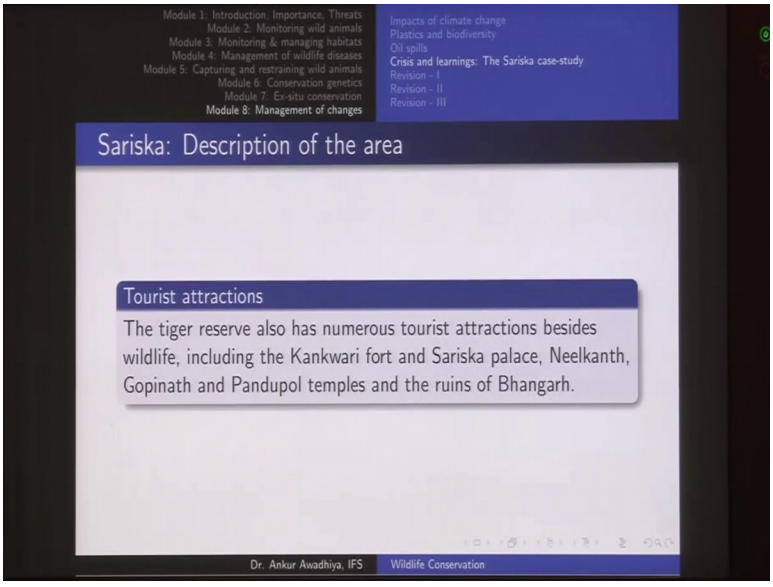

Now, tourist attractions it is not just the tiger reserve, that is attracting the tourist, but also the Kankwari fort now this is one fort that is inside the tiger reserve and the Sariska palace Neelkanth, Gopinath and Pandupol temples. Now Pandupol temple is one of the

most famous temples or one of the very famous temples of this area and also observes a very heavy religious tourist footfall and also the ruins of Bhangarh. So, this area is not only important from our conservation point of view, but also from the heritage point of view and also from the religious point of view.

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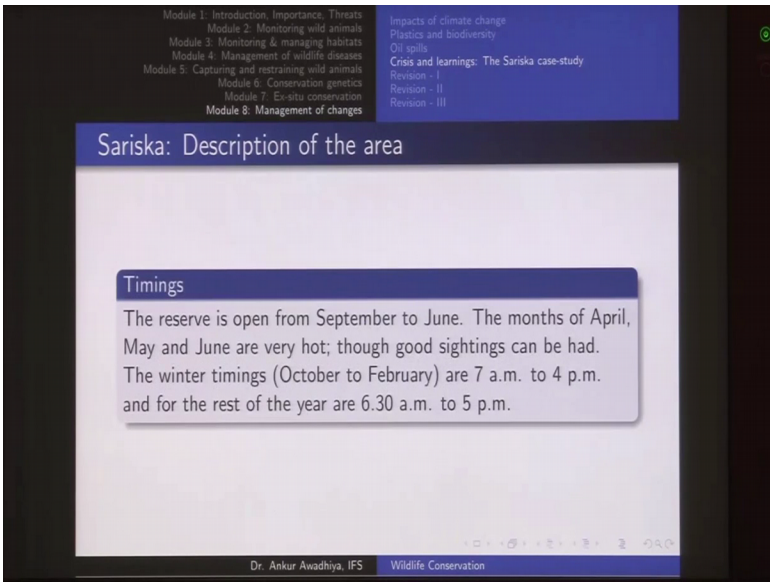

Now, timings so this reserve is open from September to June. In the months of July and August because that is the breeding season for a number of animals, so this reserve is kept close to tourist. The months of April, May and June are very hot though good sightings can be had. Now winter timings from October to February are 7 am to 4 pm and for the rest of the year are 6.30 am to 5 pm. Now, given that this area is one of the very important areas, given that, we see a very heavy tourist footfall. So, we could have utilized the data from tourist also for our management purposes.

So, for instance if there are tourist that are getting into our area and then they are coming out. We always ask them what did they see, what did they observe and also in every vehicle there is a guide who is a departmental person. So, that guide can also be interested with this responsibility that if there was any tiger sighting.

Now, every tiger can be can be identified using this stripes on its body. And most of the guides have very vernacular names for those tiger. So, they could call it as Munna or Raja or say Shehenshah and things like that.

Now when these guides are able to identify our tigers, we can use their information. So, whenever there was any tourist sighting of a tiger, the guide was also there. So, the guide also identifies that tiger and then we can ask the guide which all tigers did he or she observe. Now, that information can be used for management purposes.

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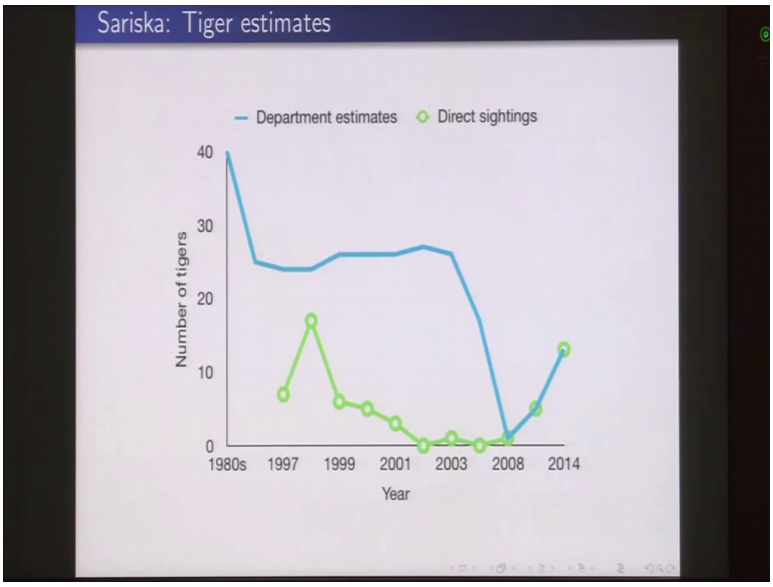

But as we can see from this graph, here we are seeing the direct sightings. So, this is what the tourist observed over the years. So, this curve is going from 1997 till 2014. Now, what we can see here is that here we have the number of tigers, this is the cutoff of 10. Now if we do not consider this point, so this could be an aberration, but overall what we can observe is that in the year 1997, we observed like 5 tigers.

Then later on this value here went down to 4 then 3 then 2 and then in the year 2002 there was no sighting of tigers what so ever. In 2003 we had reports of 1 tiger sightings, so that could be a tiger sighting or that could also be a false alarm. But then if you look at this trend, it is very clear that we are observing a declining trend and from this point onwards there was there were no tiger that were observed in this area. And 2004 is when the crisis unfolded.

Now, if we have a look at this graph these are the departmental estimates or what was estimated by the forest department. Now how do we estimate the numbers of tigers in an area? These days we go for a capture recapture method. So, in that case you install a

number of camera traps into your area, whenever a tiger comes in front of it, so the picture is taken.

From that picture and looking at the stripes you can see which was this tiger, you can identify the tiger and then as we had done our experiment on channas in this class, so we had taken some channa and then we had marked those and then we had left it in to the into box again and then we moved that jar and took all those channas again and just observed which all channas where there that were marked in then which were unmarked. Now, a very similar thing happens in the case of camera trap experiments as well. So, for every tiger you can make a list of days on which this tiger was observed.

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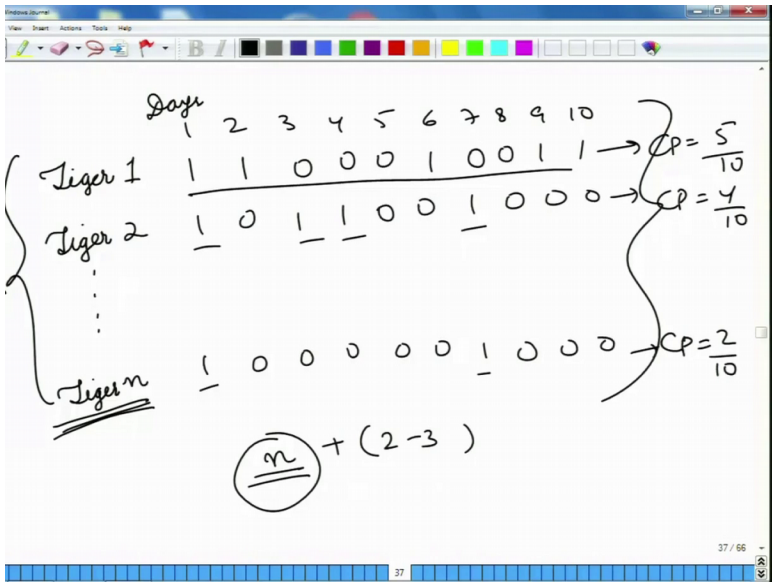

So, for instance this is how it would look. So, you have tiger 1. So, let us call it that this one is the ID of the tiger and then you have the days. So, day 1 2 3 4 5 6 7 8 9 10 suppose, this experiment was done for 10 days. Now this tiger was seen in first day, then on the second then it was not seen on these three days, then it was also observed on this day and then on these 2 days.

Similarly, for tiger 2, we would have that it was observed on day 1, not one day 2 then 3 4 it was observed, then not on day 5 or 6, then on 7 it was observed and then not any further. So, similarly for each and every tiger, so till tiger n we can make this chart. So, probably this tiger was only observed on the first day and may be one other day.

Now, when we have this information, we can make two kinds of deductions; one because, these tigers were photographed in the area. So, the minimum number of tigers that that are there in the area is equal to this number n because, these are what we observed in our 10 days of observation. So, we have a minimum of minimum of n tigers. Now like for any other organism we will have a captured probability for these tigers.

Now, how do we compute a capture probability using this data?. So, when we have this data, we make this assumption that because, we captured this data for a very short period it was only 10 days, so there was no migration of the animals, so none of our tigers moved out, none of the tigers came into our system because, it was a very small time, so it was a literally a snapshot.

And then this is normally taken in those periods when these tigers have are not giving out cubs. So, essentially you do not have any new tiger that is being born into the area. And in this 10 days period we also take this assumption that no tiger would have died because, again it is a very small time frame, so it is literally a snapshot.

Now, in this case our tiger 1, it was present on all of these days, but then we detected it on only 1, 2, 3, 4, 5 days. So, we detected it for 5 days so the capture probability for this tiger would be 5 by 10. Similarly the capture probability for tiger 2 would be 1, 2, 3, 4 it is 4 by 10. And for this tiger it is only capture probability is 2 by 10.

So, similarly for every tiger we can come up with a capture probability. And then when we put all of this data in to our numerical models we can come up with a range of tigers that are there. So, we will say that there are n number of tigers because, n is a number that we have already observed. And then you can have plus a range of numbers, so say plus 2 to 3 more tigers that could be there depending on our capture probability. So, that is something that we have figured out using our computations, but n number of tigers are definitely there.

Now, this is something that we are using these days, so most of our tiger estimations these days are based on camera trapping method. Now in the earlier days, so when we are talking about Sariska, the earlier method was using pugmarks. Now what is a pug marks? So, when there is a tiger and that is moving in the forest, so whenever it puts its foot somewhere, so there is a mark if the if the soil underneath is soft it has dust. So, it will give out n impression. Now, this impression would be called a pugmark.

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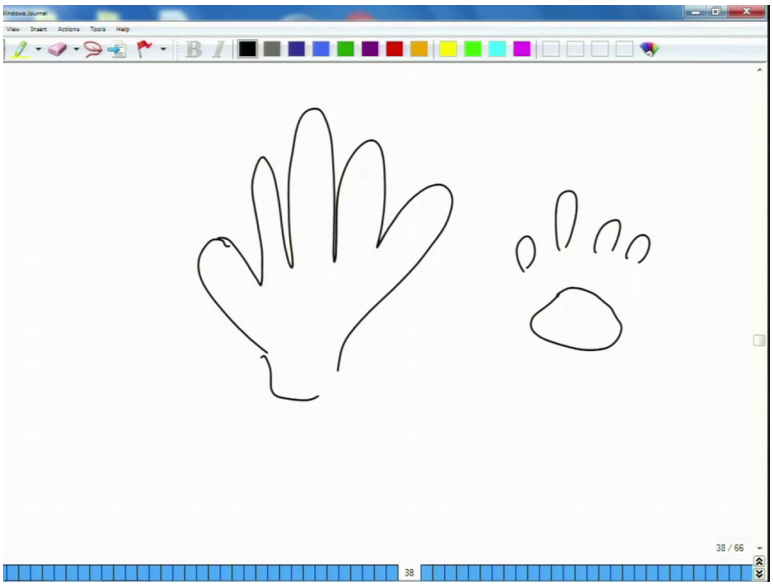

So, when we have so for instance, in the case of human beings we would observe this to be the pugmark for one of our feet or one of our hands. Now in the case of tigers, we would observe a pad region and also we would observe the toes.

Now, just like in our case, all of us have very different finger prints. So, just by looking at finger prints, we can identify the individual. We can at least identify that that there were two individuals or there were three individuals depending on whether for all our front foot prints or the hand prints where they all of them where same or where all of them different. So, we can at least make a reduction about the number of individuals that were there.

So, for instance, if this is a material I touched it and then somebody else came and that person also picked it up. So, there would be thumb impressions. And now we will be able to observe that these 2 thumb impressions are different. So, there are at least two persons that held this piece.

Now similarly in the case of tigers, we can make deductions using their pugmarks. But then just like the study of finger prints is a very intricate art, not everybody can observe that that these 2 finger prints are the same or different. Similarly, in the case of tigers as well, it is a very intricate art and it needs to be practiced a lot. Now if you do not practice it in enough, so what would happen is that, in the case of this example I picked it up say 4 times.

So, there are 4 thumb impressions, 4 finger prints of the thumb that are there on this item. Now there is a person who is not very adept at reading the finger prints, he or she might say oh these are 4 reserve thumb marks. So, there were 4 people that had picked up this item, whereas in a sense there was only one person.

So, similarly that is what happens when you use the pugmark method. So, pugmark method leads to a very gross over estimation of the numbers. So, for instance at this points, when we had say around 5 or say 4 tigers here in the park, the estimate was close to around 25 26. So, this was a very gross over estimation. At this same time if there is a trend (Refer Time: 16:17) so, if you observing that there are say 26, 26 tigers and they have been there for the past say 6 years. So, for the past 6 years, this trend has been 25 or 26.

Now, suddenly if somebody says no this number is not 25 26, this is actually 5. So, in that situation, there would be a very heavy amount of scrutiny regarding what actually happened. And then people would want to set up a responsibility that in whose tenure these tiger numbers came down. Why did they come down, was the protection level adequate or not and so on.

So, there are some people who want to avoid such sorts of situations because, they become embarrassing for the park. So, that could also be another reason why these numbers were not reevaluated. But then the primary reason was that, we did not have a method to actually see how many tigers are there in the park because, we because the state of the art method in those times was the pugmark method and that was not accurate.

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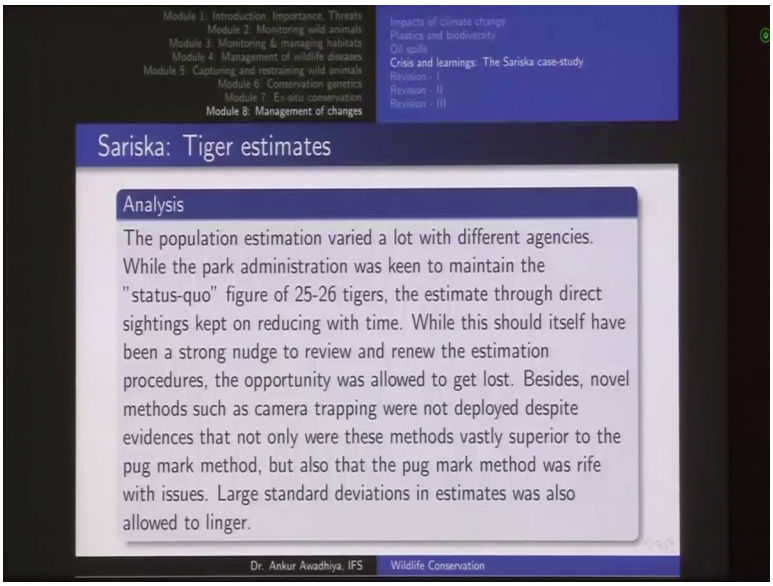

So, now if we look at the analysis of the situation we would observe that the population estimation varied a lot with different agencies. So, when we talked about the park administration, they were always maintaining this status quo figure of 25 to 26 tigers, but the estimate that was brought through direct sightings, it kept on reducing with time and after a while it came to 0.

Now, this difference between 25 26 tigers and 5 or 6 tigers should have been strong enough strong nudge to revive and renew the estimation procedures but then this opportunity was allowed to get lost but then this is also because we did not have much research into this area and so we did not have better methods.

And these novel method such as camera trapping were not deployed despite evidences that not only where these methods vastly superior to the pugmark method but also that the pugmark method was right for the issues. But another problem with the camera trapping method was that, in India we did not have much experience with these methods. So, most of our camera trapping devices even today are imported from abroad and so if we talk about our front line staff there are very few number of people that are very adept in using these camera traps.

But even then it can be argued now with the hindsight that if we had a normal method of camera trapping that was better than no matter what the cost we could have we could have given that amount of budget and then we could have deployed it in the (Refer Time:

18:44) Now, large standard deviations in the estimates were also allowed to linger. So, when we talk about these standard deviations, what we are talking about is the precision of the results.

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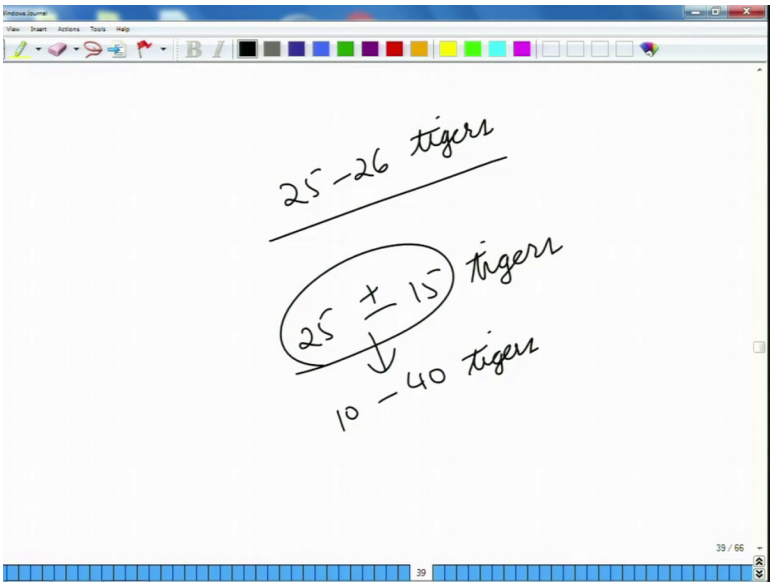

So, when we say that there were 25 to 26 tigers, now this is the midpoint but then what was the standard deviation. So, if we say that standard deviation was say 25 plus minus 15 tigers, so this estimation does not make any sense because, with this value I can say that there could be 10 tigers or there could be 40 tigers.

So, in that case if we have a very large standard deviation, it means that our results are not precise. And if our results are not precise then as people with statistics background we can say that we need to improve on our methods.

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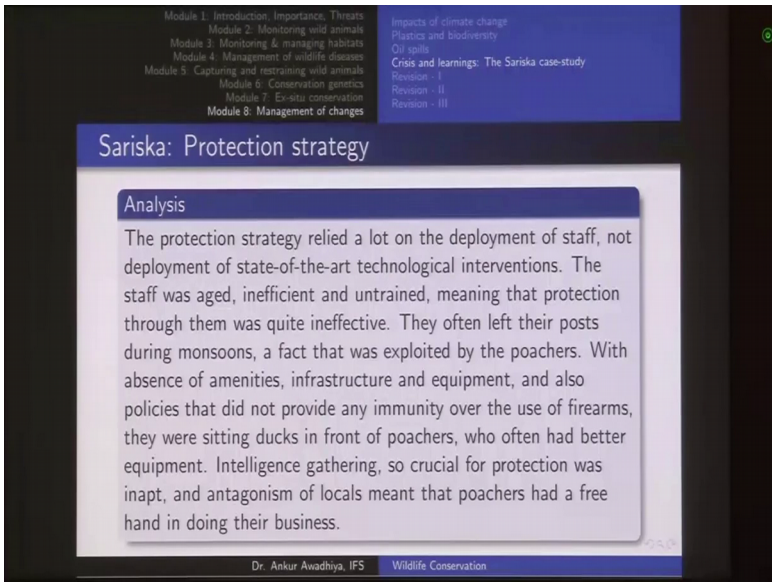

The analysis the protection strategy was reliant, was relying a lot on the deployment of staff but it did not have state of the our technological interventions. The staff was aged inefficient and untrained so protection was not that effective. They were also leaving their post during the monsoon season which was exploited by the poachers. And then in the absence of amenities, infrastructure and equipment and also polices that did not provide any immunity over the use of fire arms the there was hardly anything that this staff could do.

And also there was great amount of antagonism between the department and the locals because, these locals wanted to get into forest. Clear off lands, take up timber from the forest may be divert these lands for agriculture or grazing because, we saw in one of the earlier pictures the satellite image that, we have only this small Sariska tiger reserve and everywhere else there is hardly any forest left.

So, there was a huge pressure and because department was protecting the tiger reserve, so there was a huge amount of antagonism between the locals and the department. Because of which, if there was any poacher in the area these people also did not tell the department fellows. And in some cases, it also turned out that the villages actively cooperated with the poachers because, for instance if you are a villager who is taking say cows into the forest area, there could be a tiger that would come and poach your livestock.

Now, because I have (Refer Time: 21:05) show your act was wrong, in a tiger reserve you cannot go inside for grazing. So, then there cannot be any compensation that can be paid to you. So, the best thing that these villages thought was that let us get rid of these tigers, if there are no tigers my cattle are safe. So, that was the view point in those times.

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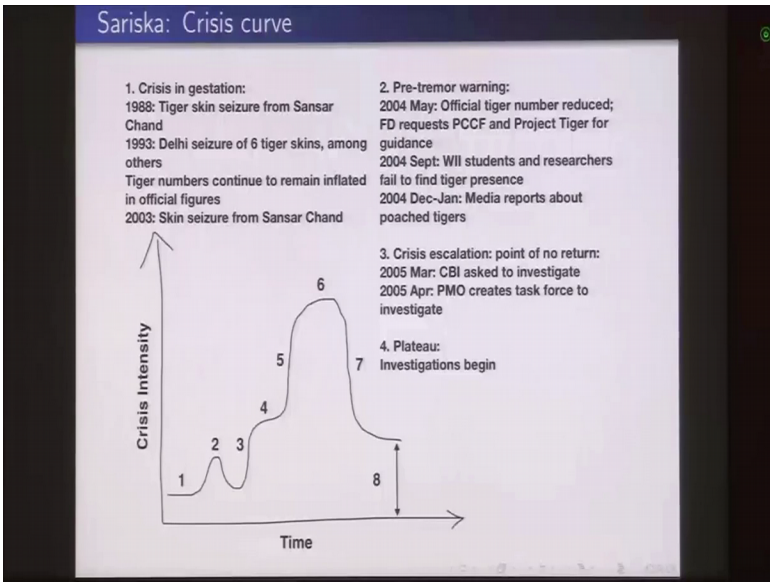

Now if you look at the crisis curve, how did this crisis unfold till the year 2004 and then what happened after the crisis. So, for any crisis we can have a curve such as this. So, on the y axis we have the crisis intensity and on the x axis we have the time period. So, what we observe here is that the first stage is crisis in gestation. So, the crisis has not unfolded so far but it is brewing inside. So, what were the events then? So, in 1988 there was a tiger skin seizure from Sansar Chand. The Sansar Chand happens to be one of the most notorious poachers that has ever existed in our country and we were seizing tiger skins right from 1988.

Now, these days if there is any seizure of tiger skin what we do is that, we take a picture of the skin and then we compare it with our database because, we are having camera trap database from all of our tiger reserves. So, now, we can do a one on one comparison between the skin that was seized to pin point where this tiger was located when it was poached.

So, if we say get to know that that this tiger was at Mudumalai, so that would mean that in the case of Mudumalai, we need to put in more amount of force to protect our tigers

from poaching. But in those days because, we did not have these data, so this sort of correlation could not be made. Now, 1993 there was seizure of 6 tiger skins and then we have observed that the tiger numbers continued to remain inflated in the official figures. In 2003, there was again a skin seizure from Sansar Chand. So, all that thing was going on before our 2004. Now in 2004, we got some warnings, so which is why this crisis intensity shows a peak.

So, in 2004 may the official tiger numbers were reduced. So, from say around 20 25 tigers we brought it down to around 15 10 15 tigers. And the field director requested the PCCF who is the head of the forest force in the state and the project tiger. So, in the pre anti ca days we were having the project tiger. So, the field director request requested both of them for guidance. By September, there where students and researchers from the wild life institute of India who failed to find any tiger there.

Now, this point is also important to note. So, we generally have some student some researches who are working in our tiger reserves from their own PhD's and also for their research publications. Now if there are any such researches out there in our forest and they are day in and day out, there are moving with her staff or may be even separately they can also be tapped as sources of information.

So, for instance if these people had pointed out that that this tiger numbers were going down, then that would have been heard But then even those people failed to report this or maybe they did not observe all this, but there these official figures had been brought down. WII students and researches also said that they could not find any tiger presence. By 2004 December to 2005 January, media started reporting about the pose tigers. So, now, this was the pre tremor. Then this prices was escalated when to a point of no written. So, they were two things that happened in 2005, March and April. The CBI was asked to investigate what is happening here and also the prime minister's office created a task force to investigate.

Now, all the results that we are using in this presentation are coming from the report of that task force. Now when these investigations were happening, we reached a plateau. Now in this investigation it could also be possible that this was a false alarm, may be our tigers had gone and were residing in some cave for instance. So, they were not observed.

So, in that case this crisis would have gone down back again, but then as we can observe from here the crisis was further escalated. So, this is the point we are talking 2004.

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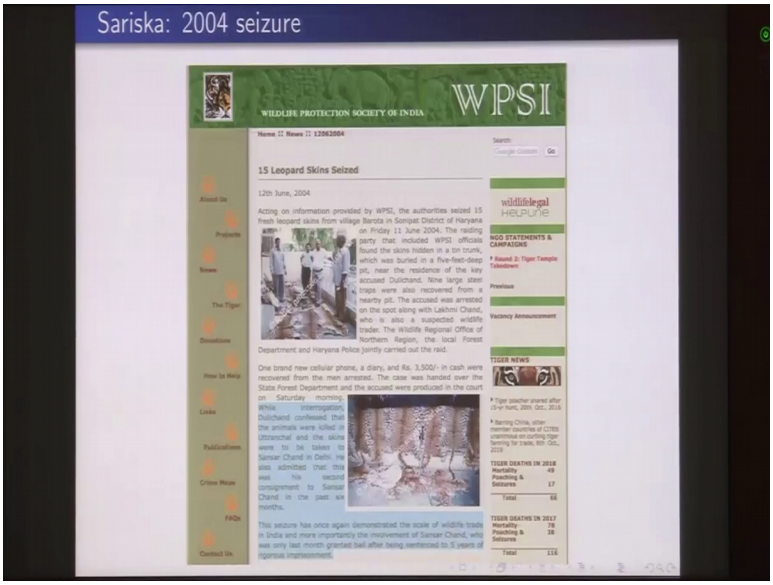

Now, in this period, so this is one newspaper report from a 12th of June 2004. So, again in 2004, there were seizures of a number of leopard skins and this poacher was again traced back to Sansar Chand, but all this information was not directly used to protect our tigers in the Sariska tiger reserve.

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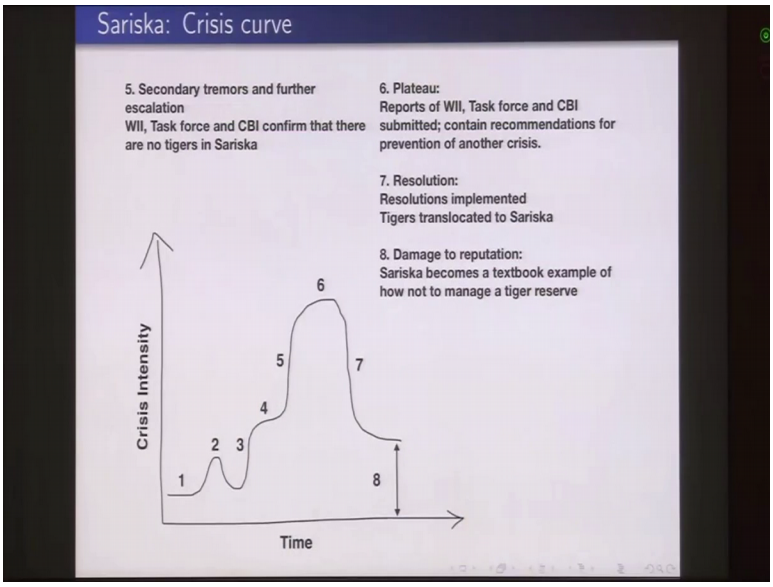

Now, this 5th stage is about secondary tremors and further escalation. So, all these reports from the wild life institute of India, the task force that was set up by the prime minister's office and the CBI all of them confirmed that there are no tigers in Sariska left what so ever. So, then it reached a plateau in which the reports were submitted and they also contained recommendations what needs to be done? Where did we go wrong? Because, whenever there is any crisis situation, we need to ask this question what went wrong, how could we have prevented it what are we going to do to restore the situation and also what are the learning's so that, such a crisis does not happen anywhere else.

Now, we can also say that Sariska crisis, it was not just a crisis but also a blessing in disguise. Because just because we lost all of these tigers we had such a huge amount of investigation that came up, that we came up with all these regulations, we came up with all these guidelines regarding what needs to be done. And since Sariska our tiger numbers are growing. So, this was also a blessing in disguise. But then after reaching this plateau, all these recommendations where then implemented and not only were they implemented, but we also translocated tigers to Sariska to restore that population.

So, tigers were reintroduced into area so that our tiger population comes up back again. Now that is the resolution phase, but then whenever a crisis occurs there is some damage to the reputation because, in this case Sariska became a text book example of how not to manage a tiger reserve. So, this is what happens in any of the crisis situations.

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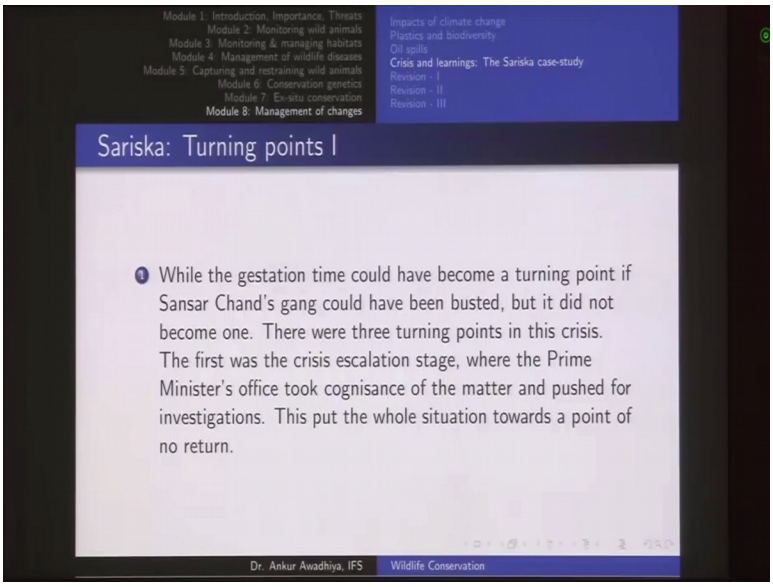

Now, in any crisis there are a number turning points. So, turning point are those situations where we take a course correction and where and most situations we take a step in through which, it is now possible to get to a very different outcome than was possible before. So, like in the case of the gestation period turning point could have been all these skins were poached from the Sansar Chands gang. If this gang was busted if Sansar Chand could be say put behind bars and may be if this network was disrupted then that could have played a role in not letting Sariska happen.

So, there were three turning point in this crisis; the first one was the crisis escalation stage. So, this is was the first turning point that did not happen, so what happened was the first was during the crisis stage when the prime minister's office took cognizance of the matter and pushed for investigations. So, this put the whole situation towards a point of no return. So, that was the first turning point. If the prime minister's office did not take cognizance then probably we could not have come up with these investigations.

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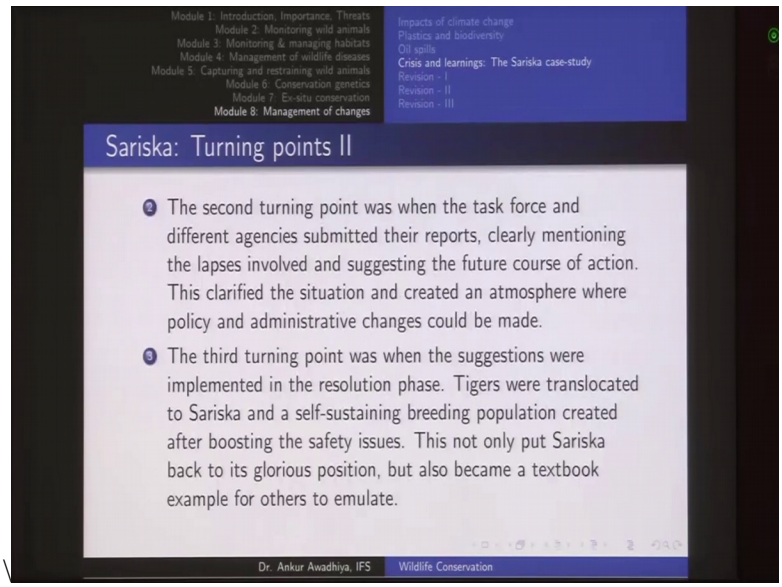

The second turning point was when the task force and the different agencies submitted their reports clearly mentioning the lapses involved and suggesting the future course of action. So, this clarified the situation and created an atmosphere, where policy and administrative changes could be made. So, this was our second turning point.

If our investigating agencies did not come up with a good report then probably Sariska would have continued to happen in different other tiger reserves. And the third turning

point was when the suggestions were implemented in the resolution phase. So, tigers were translocated and a self sustaining breeding population created after boosting the safety issues. So, this not only put back Sariska into its glorious position but also became a text book example for others to emulate. So, essentially when we talk about Sariska, it is not only a text book example of how not to do things because, they have a so many things that did not happen properly, but these days this is also sighted as an example of what to do when there is a crisis.

So, if there is any crisis and if you say put this crisis below a rug, if you do not give it any heed then it is possible that your crisis may further escalate. So, in place of losing your tigers after a while, you would have say lost a number of other animals, may be you would have lost all your forest and all and so on, but then because department was able to put its foot down and do all of these investigation, so this also became a text book example of how to tackle a situation when a crisis happens. You need to go for very clear and unbiased investigations, you need to go for a resolution phase and you need bring the situation back into control again.

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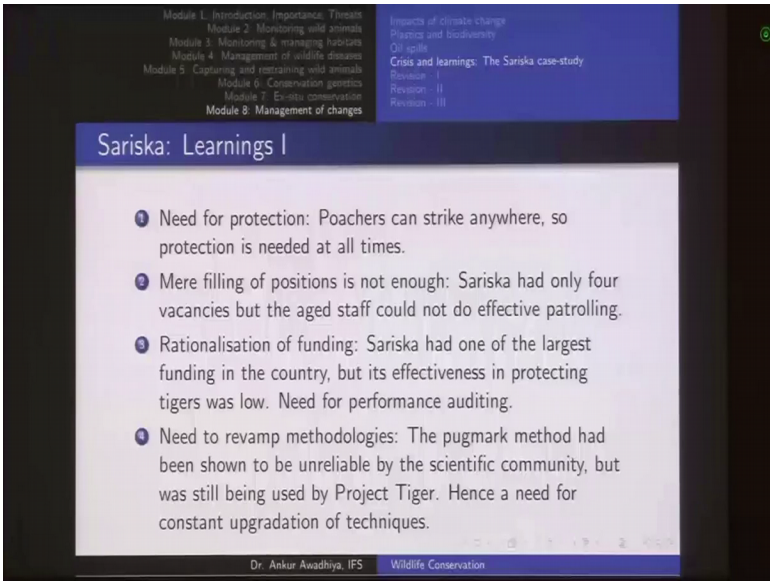

So, what are the learning's that we got from Sariska? So, these are the learnings that we are now putting in for all of our tiger reserves. So, the first is the need for protection, poachers can strike anywhere. So, protection is needed at all times. So, now, this is one learning because of which we are now putting more and more emphasis for protection.

Mere filling of positions is not enough. So, in the case of Sariska, we had 301 out of 305 weak positions that were filled. So, Sariska had only 4 vacancies, but the aged staff could not do effective patrolling.

So, now there is more and more emphasis on the abilities of the staff. So, there is more and more emphasis on the training of staff that is going on. Then rationalization of funding, so Sariska had one of the largest funding in the country but the effectiveness in protecting tigers was low. So, from that we came up with the performance auditing, so these days we have a report that is known as management effectiveness index for every tiger reserve.

So, this is a process that goes on a periodic basis to understand whether all the fundings that have been given to a tiger reserve, what is the outcome that is coming out of the use of all of that funding, is the protection good enough is the habitat good enough are tourist good enough, or are tourist satisfied is the amount of training sufficient and things like that are now looked into when we are talking about the management effective index. Then there is a need revamp technologies. So, the pugmark method was reliable. So, there was an up-gradation of technology and we shifted to the camera trapping method.

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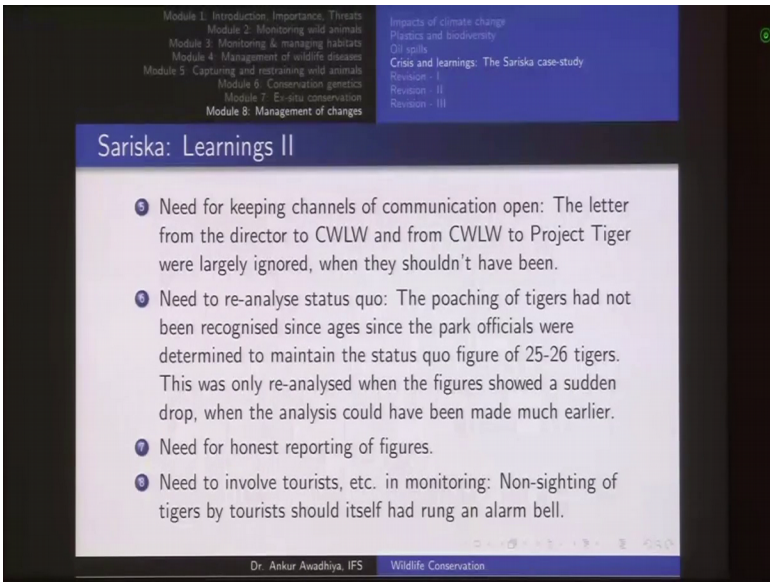

Then there is a need for keeping channels of communication open. So, the letter from director to chief wild warden and from the chief wild life warden to project tiger was largely ignored as told in the task force report and this should not have happened.

So, now when we talk about our NTCA, the which is the successor to the project tiger. These days we regularly have meetings directly with the field directors the, that this channel of communication is kept wide open at all times. Now there is always a need to analyze status quo. The poaching of tigers had not been recognized, since ages since the park officials were determined to maintain the status quo figure of 25 to 26 tigers.

This was only reanalyzed, when the figures showed a certain drop when the analysis could have been made much earlier. So, these days earlier our strategy was that, if there is any change in the status quo then there is a need to investigate. What is happening, but these days even if you are having a status quo, we go for sampling that is (Refer Time: 32:49) done by a third party agency to ensure that there are that we absolutely have correct figures.

Now, there is a need for honest reporting of figures and they need to involve tourist etcetera in monitoring. So, non sighting of tourist non sighting of tigers, by tourist should itself have rung in an alarm bell and these days we are making more and more use of our tourist and guides as well.

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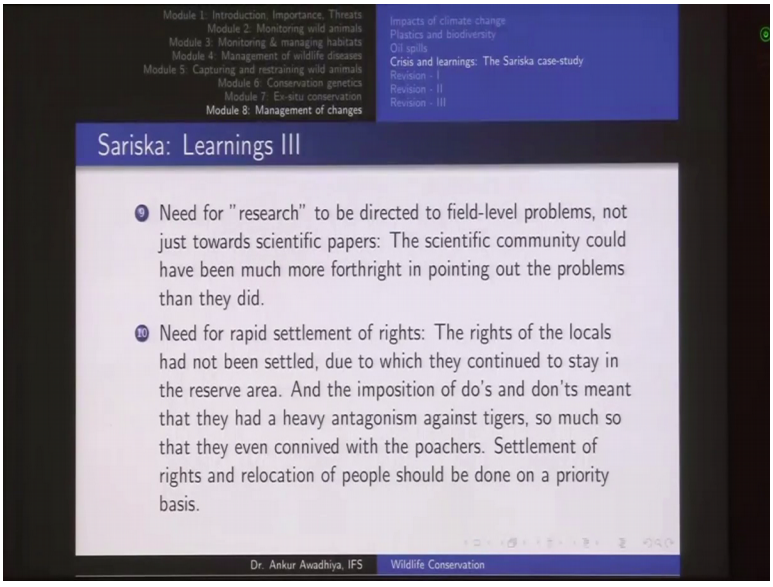

Then there is a need for research to be directed field level problems not just towards scientific papers. So, the scientific community could have been much more forthright in pointing out the problems than they did. Then there is a need for rapid settlement of rights in the case of any tiger reserve people the rights of the people are taken up by the

government they are compensated and then the rights are extinguished but in this case the rights of the locals had not been settled and in certain situations these rights are still in the process of being settled now when the rights have not been settled.

So, people continue to stay in the reserve area and then when people are already there and when you impose the these do's and don'ts then there is an antagonism that becomes directed towards the tigers or against the tigers. So, that they even connived with the poachers. So, settlements of rights and relocation of people is now being done on a much more priority basis then was in the pre Sariska days.

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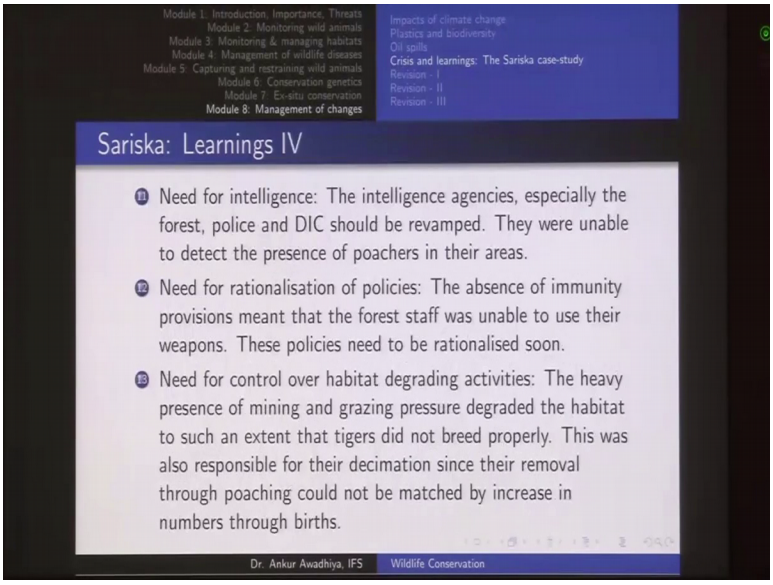

Then the need for intelligences, so intelligence has also been revamped need for rationalization of policies. So, in those with did not have immunity provisions for the use of fire arms now these days in some areas people have been explicitly given immunity for the use of fire arms and in certain other situations we are making use of police forces.

Now, need for control over habitat degrading activities, now the heavy presence of mining and grazing pressure degraded the habitat to such an extent, that tigers did not breed properly and this was also an important factor in their decimation because what happens is that if you have a breeding population of tigers and if there are four tigers poached away, but you also have an addition of 10 other tigers in the meantime.

So, in that case the population continues to survive but in this case we not only had poaching, but at the same time they were a number of habitat degrading activities because of which the tigers were not breeding.

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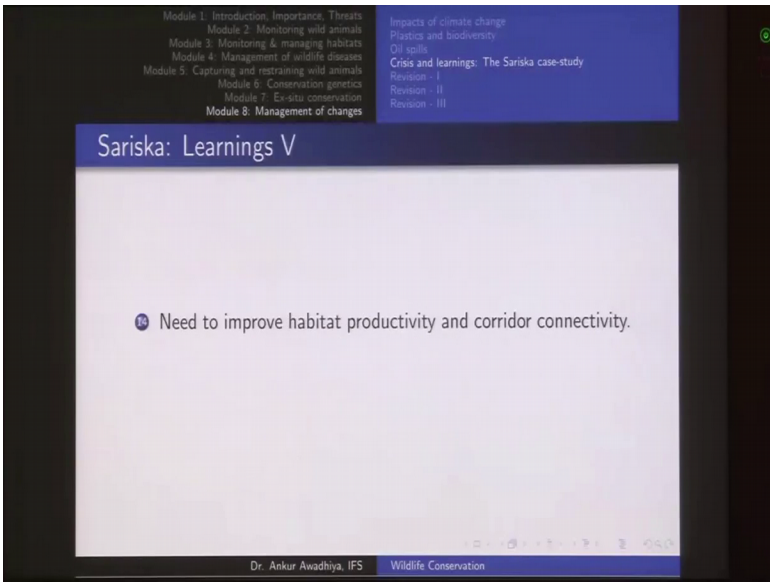

So, now we are putting more and more control over these and then there is also a need to improve habitat productivity and corridor connectivity because in the case of Sariska these tigers once they were decimated they were not able to come back from some other area we did not have a very good corridor connectivity. So, in that situation we had to translocate tigers from somewhere else mostly Ranthambore.

So, now these days we put a lot emphasis on maintenance of corridor connectivity and also on increasing the habitat productivity so that, our habitat is able to support a much larger population of tigers.

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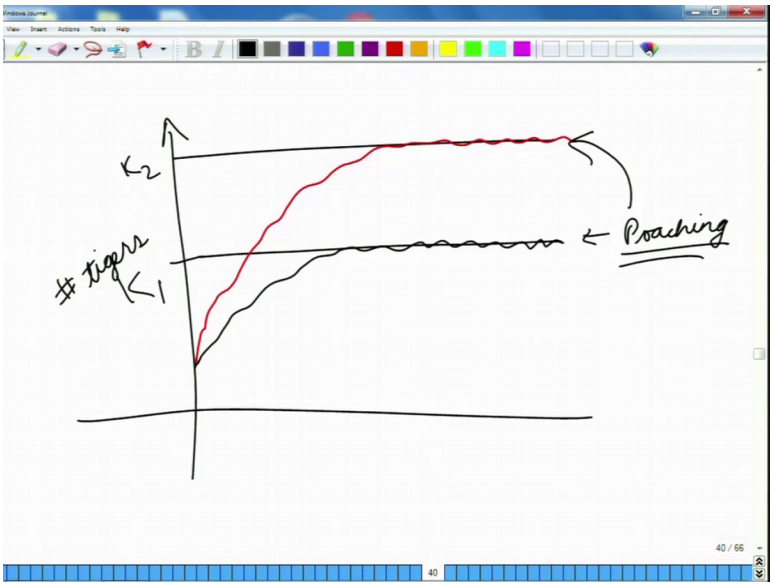

So, in this case, what we are referring to is that, if we look at the number of tigers and then there is a carrying capacity that is called K. Now, if this is the carrying capacity K 1, so what would happen is that after translocation new number of tigers would then start fluctuating around this figure. But then if you increase the habitat productivity so that, you reach to another level which is called K2, then in that situation your tiger population would hover something like this.

Now, if you have a small population, so poaching has a much greater impact on a smaller population than it can have on a larger population. So, in that case the improvement of habitat productivity is also now being taken up in a large manner. So, that is all we had to tell today about the crisis situation and then how it is handled. So, that is all for today.

Thank you for your attention. [FL].