

Sustainable Architecture
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Lecture – 02
Buildings, Needs and Sustainability

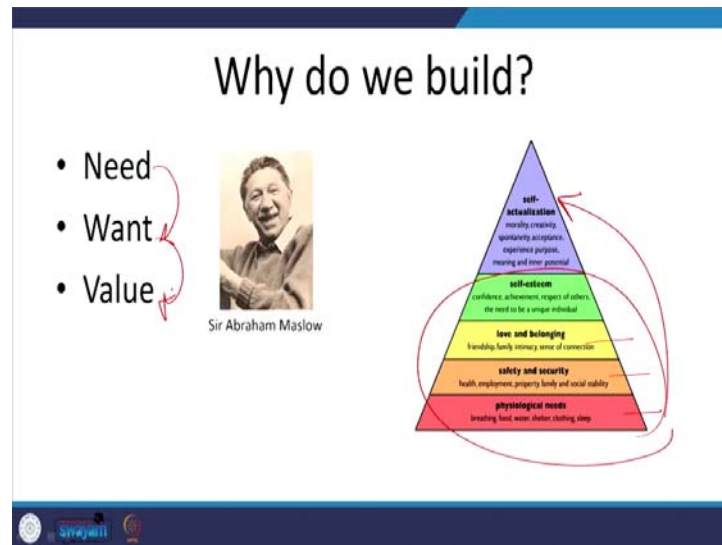
Good morning. I am Dr. Avlokita Agrawal, Assistant Prof. at Department of Architecture and Planning, IIT Roorkee. Today, I am going to start the second lecture in the course on Sustainable Architecture. In the previous lecture we discussed about the problems, the issues why are we discussing about sustainable architecture or sustainability at large. And, towards the end of the previous lecture we saw what are the problems that we are facing today.

Now, as we move on we will gradually be focusing more on the architecture and how architecture can be made sustainable, what are the ways to it. But, before we really do that we have to identify what are the problems with architecture or building activity. And, before we even do that we have to understand what is happening around us, why are we building and when we are building we are making these buildings; what are the issues, what are the problems.

So, through this lecture second lecture we would try to answer some of these questions. The first and the most pertinent one is why at all do we build? Why are we making these buildings, all these different kinds of buildings which are there why do we build them? The next how buildings cater to our different needs. So, when the answer why do we build? We build for our needs and how these buildings are catering to our needs, different needs; it might seem a very simple question and seemingly simple answer, but it is really not.

So, let us look into why are we building and how these buildings are catering to our needs and then are our needs changing with the change changing requirement, changing environment, context as I say. So, if the change in context is there, is there a change in our response which is needed to. So, let us try to answer these questions through this lecture.

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So, the first and foremost question is why do we build? We build for our needs and if we look at the Maslow's hierarchy, where Sir Abraham Maslow proposed our needs we categorized in a hierarchical manner, in a pyramid where at the bottom of it we have the physiological needs, followed by the needs for safety and security, love and belonging, self esteem and the final one is the need for self actualization. So, these are basic needs, the basic needs being the physiological needs without the fulfillment of physiological needs we cannot move ahead. We cannot move up to fulfill our needs of self esteem and self actualization.

However, many have argued that often to reach the need of self actualization people have renounced the world and skipped all these needs, these basic needs and directly jumped from the basic needs to the needs of self actualization. However, that does not happen when these needs have never been fulfilled. It often happens when these needs have been fulfilled and then the person renounces them, renounces those needs and leads himself to the need of self actualization. Now, when I write here the need, want and value there is a purpose to it. So, we have a physiological need, physiological need of protecting ourselves from the environmental adversities; the rain, the harsh weather, the animals around us.

So, these this is the physiological need, we need to sleep, we need to keep ourselves comfortable. And, then the need was safety, security, love and belonging where we want

a family or community to stay together with us. We have the need for ourself as esteem and then gradually that need transforms itself into a want. What I mean by it is I want a residence for myself, I want a home for myself, any individual because that is my physiological need.

But, instead of just wanting a home which is sufficient enough to fulfill the basic physiological need of mine, I want a 2 BHK house and then I want a 3 BHK house and then I want a bungalow and I want this and I want that. So, my wants are arising out of the need, but they are not the basic needs as we understand. And, gradually the needs which have transformed themselves into wants, the wants will then transform this themselves into a value; value which is a collective value of a society, a cultural value.



So, then culturally some things start getting valued. If you look at developed countries, now everyone will have a certain standard of living, a lifestyle which is what becomes the value. So, here in India in rural communities we might be valuing sustainability more or traditionally that is what some of the native tribes across the world might have been doing; valuing the environmental resource more than the kind of lifestyle we are looking at. So, the need giving rise to wants has created a certain value system.

Now, when we go on to understand what is it that we need and whether it is sustainable or not; we often confuse ourselves between the need, the want and the values of the society. And, we often weigh our requirements, the requirement for a building based upon the cultural value of that community and the context. So, it has to be very clearly understood and then examined whether what we are really wanting, looking for is a need or it is a transformed value based requirement.

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Why do we build?

- Needs extend to become wants
- Want
- Value

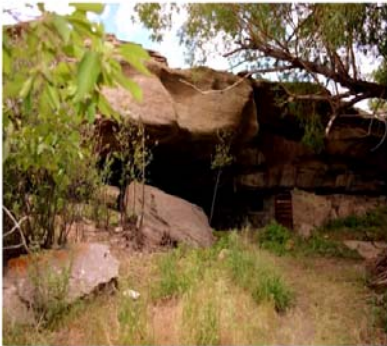


swajati

So, here we the physiological needs will help us to survive, the safety and security needs will help us to progress. The love and belonging, the needs at this level help us to socialize because you know, we are social people. And, then the need for self esteem helps us to achieve and self actualization is the top most where we create, we become creative something new.

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Physiological and safety needs



Can we sustain?
Yes

Why?
No environmental resource required.
No economic resource required.
No man power required.

However, there is a limit to how many such accommodations may be made available.


swajati

Let us look at how buildings have been providing for these needs. Now, this is one of the most primitive kind of homes that human beings have sheltered themselves in. Now, this

was naturally available; man did not create, but he occupied a space like that. And it fulfilled the very basic fundamental needs, the physiological needs and part of the safety needs not security, safety. Safety from animals, safety from all other enemies of sorts.

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Physiological and safety needs



Can we sustain?
Yes


Why?
Limited environmental resource required.
No economic resource required.
Limited man power required.

anjali

This is what it was, gradually it is transformed to a group of these buildings which catered to the physiological needs as well as the safety needs. Because, humans realized that staying together in groups and forming a community helped them stay safer; because they are not the strongest of the people if they are alone, strongest of the species living being. So, they are stronger when they stay together. So, they started staying together in groups and they formed these groups of houses, moved on to more introvert planning like that very similar to the previous one.

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Physiological and safety needs



Can we sustain?
Yes


Why?
Limited environmental resource required.
No economic resource required.
Man power required.

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But instead of linear group of buildings, they moved into an enclosed group of building where a community was staying together, fulfilling their physiological needs and safety needs at this level as well. Along with that they were able to fulfill their needs for belongingness, love because they were staying together; human beings would often do that.

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Physiological, safety and security needs



Can we sustain?
May be.

Why?
Significant environmental resource required.
Significant economic resource required.
High amount of man power required.

A Haveli converted into museum in Ludhiana

swajati


Then we see more permanent structures like this one Haveli which has been converted into a museum in Ludhiana which was actually a haveli, a residential building a large

one of course, and of more permanent nature. And, moving from a temporary a hut kind of building to a permanent building like this that we see on the screen. Here it fulfills the physiological needs, most definitely; safety and security needs. Now, here the kind of response that we see there are very less of openings, it is a courtyard building, it has a jali, parapet on the top of the building where from outside people cannot actually see them using the terrace of their house.

And, it was because of the socio-political context of that place and those times where probably a lot of invasions were happening; so, this was the response to that. Now, if you compare, if we compare the previous building; the slide which I just shown this one to this one. We can very clearly see that it is quite resource intensive, but it is out and out a contextual response. So, whenever we are examining the buildings, the responses we have to very clearly look at look in context to which each building or solution has responded to. We will come to that gradually, let us look at couple of more examples here.

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Physiological, safety and security, belongingness needs



Can we sustain?
May be.

Why?


- Some environmental resource required.
- Some economic resource required.
- Significant man power required.

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Now, this is Jodhpur city, now here I am looking at a settlement and we are looking at fulfillment of physiological needs, safety and security needs. The needs for belongingness as a community or bigger community which also provides them the self esteem because they have created an identity for themselves which we see happening almost all over the world in different settlements.

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Physiological, safety and security, belongingness needs



Can we sustain?
Yes.

Why?

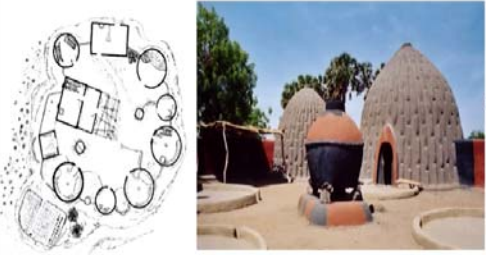
- Least environmental resource required.
- Least economic resource required.
- Significant man power required.

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This is Bungas of Rajasthan where along with the basic, physiological, safety and security and belongingness needs, they are creating an identity for themselves. And, this identity is fulfilling the need for self esteem for them.

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Physiological, safety and security, belongingness needs



Can we sustain?
Yes.

Why?

- Least environmental resource required.
- Least economic resource required.
- Significant man power required.

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Looking at the huts of Cameroon; so, this physiological response if you look at this Bunga in Rajasthan to this hut in Cameroon both these places have similar kind of a climatic requirement, a very harsh climate. So, a very similar design response, the community requirement and the sense, the need for belongingness, the need for

community to be staying together is similar. So, the response is also similar, but because of the resources which are available the responses are varying slightly.

So, here again we would see the physiological, safety and security, belongingness and the need to create an identity which is the need for self esteem. So, buildings have been fulfilling all those needs, people have been creating identity, self esteem through the kind of responses, through the kind of buildings they have been creating.

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Physiological, safety and security, belongingness, self esteem needs



Can we sustain?
No.

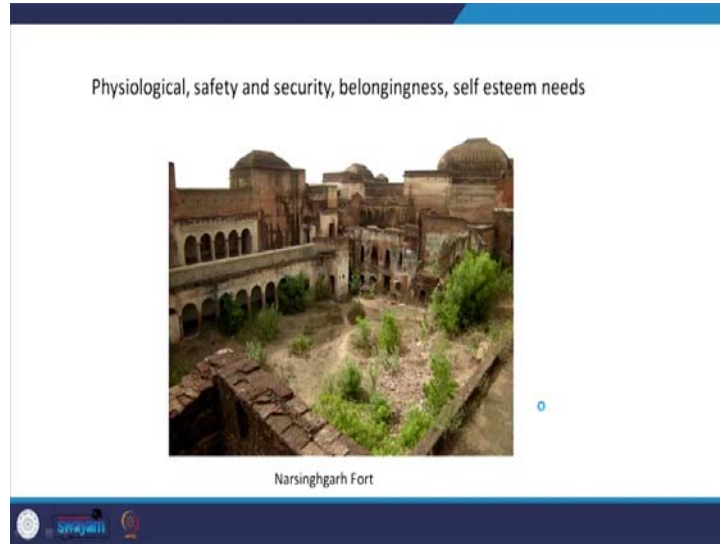
Why?
Huge environmental resource required.
Huge economic resource required.
Huge man power required.

Mahava Fort

The slide features a photograph of Mahava Fort, a large stone structure built on a hillside. The text on the slide discusses the sustainability of such structures, highlighting the significant environmental, economic, and human resources required for their construction and maintenance.

We move on to bigger buildings say a fort. So, this is Mahava fort, now it fulfils physiological needs, safety and security needs. So, the security concerns in the times when these forts were constructed, the feudal age where there were a lot of wars, a lot of a conflicts happening politically and this fort responds to that. So, the need for belongingness of a larger community, a state, a Riyasat (meaning fort) for example. So, the this sense of belongingness was for a larger community. And, then the self esteem so, this fort was a symbolism, a symbol of self esteem for the people of this entire state.

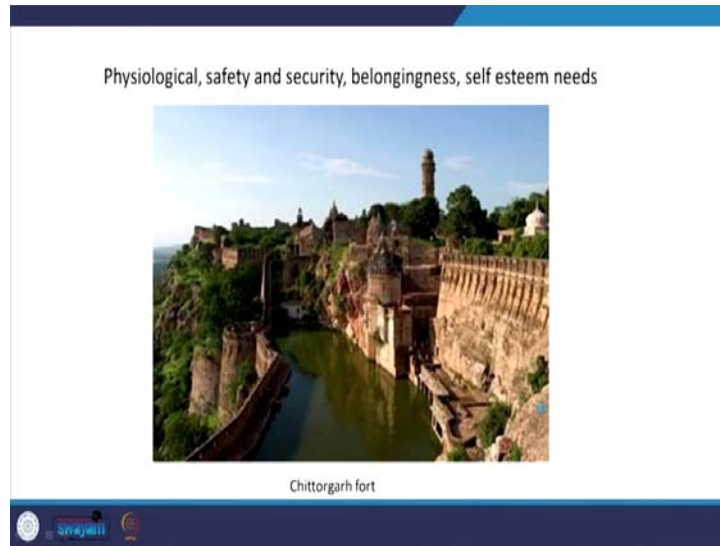
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Other forts, Narsingharh fort; now physiological, safety, security, belongingness, self esteem all these needs and in the process when all these means were being fulfilled people were becoming more and more creative. We can see a lot of creativity coming into architecture which is actually fulfilling the last ladder, the tip of the needs which is for self actualization.

Now, self actualization is not always spiritual, the creativity all pursuits, all different forms of art are actually taking us towards self actualization because we are becoming more and more creative. We are creating, we are not just responding to the needs, we are becoming more and more creative; buildings help us to fulfill that.

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All the forts Chittorgarh fort and this beautiful architecture, that we see is actually the response to man's self actualization needs which is what we see here. Now, it is not only in the robust huge, big buildings like forts; it is seen in the small residential buildings.

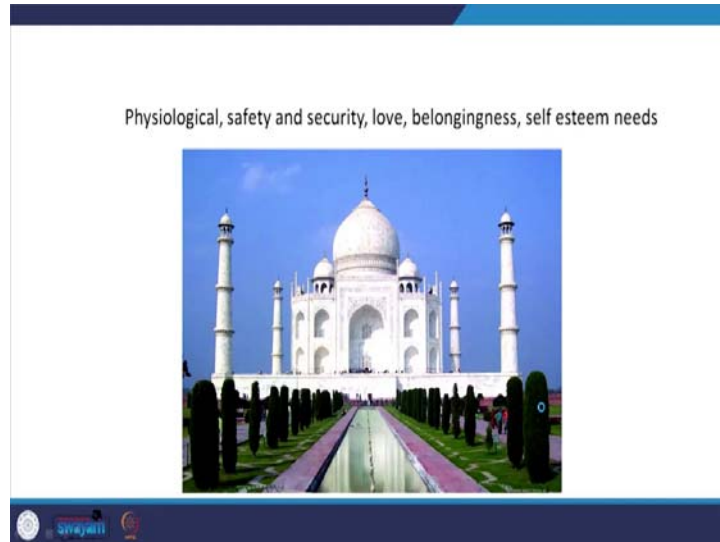
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For example this hut and the one and this hut being painted by Warli art. Now, this is using the most local, it is not permanent, it is temporary in nature. It is it gets painted and repainted over and over again. And, then people create identity which is actually catering

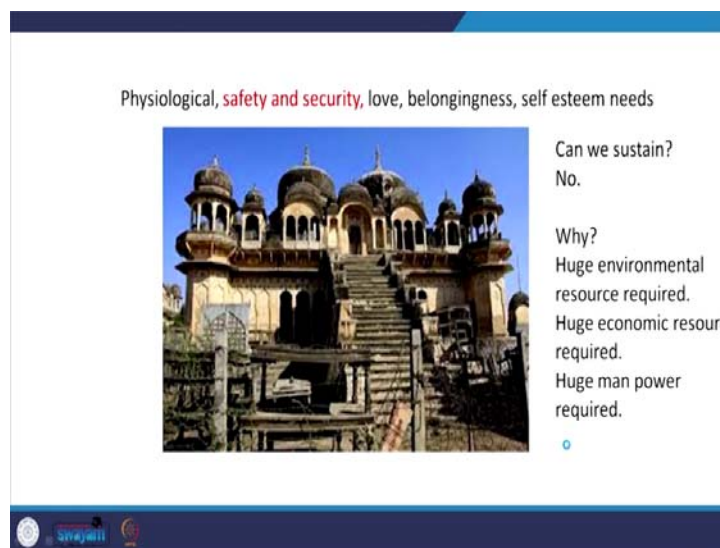
to their needs of self esteem and also self actualization through creation of this art form and that imparts them this identity and gives a sense of fulfillment through creativity.

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The culmination of this can be seen in a building like Taj Mahal. Here we are looking at fulfillment of physiological, safety, security. We will come to that again, we will come to all these examples again and see whether they are doing that belongingness of course, self esteem and the pinnacle of it the self actualization.


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If we look at some of the Chhatris. So, we looking at physiological, probably safety and security was not as much a concern or it has not been catered to; love, belongingness which was the sole purpose of creating a building like this or Chhatri like this; self esteem and self actualization through the creativity embedded. Now, in these two previous examples Taj Mahal and Chhatri and all other examples, where we see how people have been creative. We see how the need for self actualization has been fulfilled.

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Physiological, safety and security, love, belongingness, self esteem, self actualization needs



Can we sustain?
Yes.

Why?
Huge environmental resource required.
Huge economic resource required.
Huge man power required.

Yet utilitarian in nature.

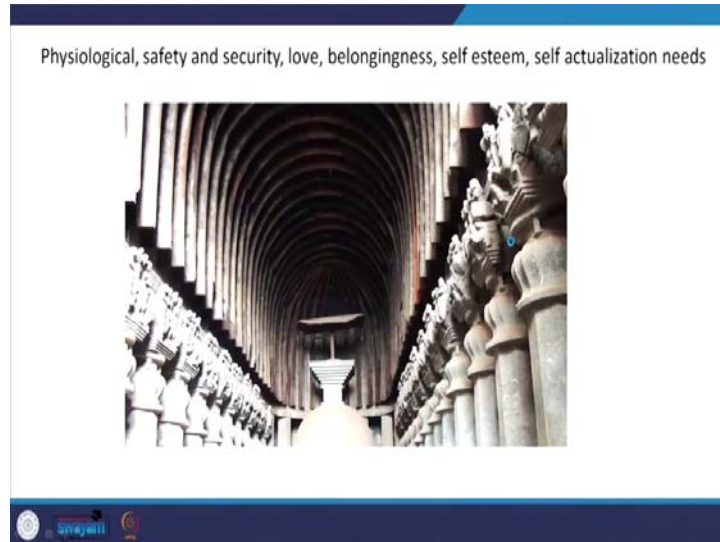
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While, in some of the buildings like this one, this is Takshila, University. The need for self actualization has been fulfilled through the purpose of the building or purpose of the built environment itself. So, the need for creation of a university, a place where people come, the community at large comes together and acquires knowledge itself is a purpose which takes us towards self actualization. So, it is not just by virtue of the beautiful architecture, we can still see a lot of motives and the kind of architecture which we are seeing here. So, not just by virtue of what has been created in the physical sense, but by virtue of its purpose itself.

And, then the pinnacle of it say in terms of Kandariya Mahadev, where religion has been depicted. Now, religion often has been a vehicle, a medium for people to for self actualization, fulfilling the need for self actualization. And, creation of a building like this strengthens, reinforces or helps us fulfill as a community the need for self

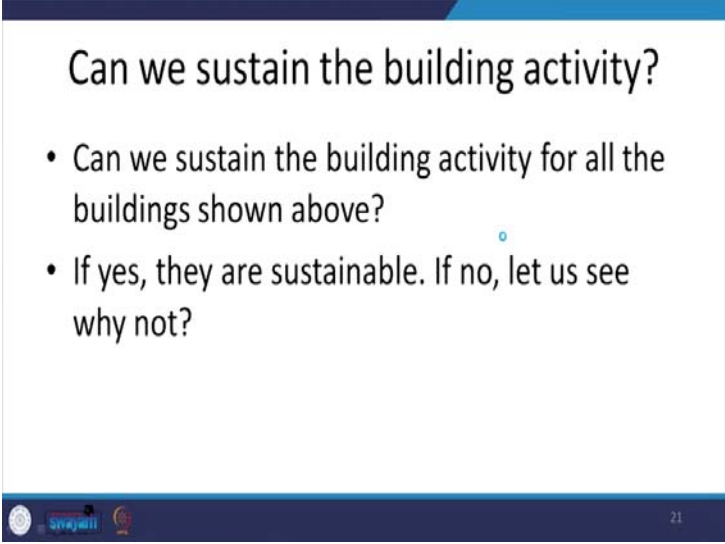
actualization. Again the need for safety and security have been overpowered by the need for belongingness, self esteem and self actualization here.

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Or in one of the Chaitya halls, we again see that the need for self actualization has been fulfilled more than the need for safety and security. Of course, the need for safety and security was also fulfilled by virtue of the location of this building where it has been constructed, where it has been built, but other needs are more pronounced here. So, we build for different reasons, we build for different purposes and each of this reason and purpose actually defines, fulfills some of the need and defines the purpose of human existence itself.

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Can we sustain the building activity?

- Can we sustain the building activity for all the buildings shown above?
- If yes, they are sustainable. If no, let us see why not?

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Now, the question comes can we sustain the building activity? So, can we sustain the building activity for all the above buildings which I have shown above? If yes, they are sustainable and if no then probably they are not sustainable. And, if no then why not can we sustain them, let us go over each of these examples again and see if they are examples of sustainable buildings, can they be sustained in simple terms. Before even talking about the definition or the proper understanding of what a sustainable building or a sustainable architecture would be, we would try to see in very common layman terms whether this building can sustain or not.

Let us look at off each of this example: can we sustain this? Yes of course. Why? Simply because, there is no environmental resource which has been consumed, there is no economic resource which has been consumed, no manpower is required. However, in today's times if you question; can we start living in these caves? No, I do not say that because we have a certain lifestyle expectation; even if we were comfortable living in these caves we would not be able to live in these. Because, there is a limit to how many such accommodations may be made available because, it is naturally available.

Yes, we can sustain it from an environmental point of view, but from a societal point of view probably we may not be able to sustain that. It will not provide accommodation to billions and billions of people that we have around. Can this type of an accommodation or building be sustained? Yes, because it consumes very limited environmental resource,

it requires almost no economic resource, it requires limited manpower for which humans have developed the skill. So, this can be sustained, yes it is sustainable. This one yes again for the same reasons, we can sustain it, we can sustain it.

Can this one be sustained? Well, maybe when I was discussing about this example we talked about the context for which this kind of an architecture was developed. So, there were a lot of invasions happening, there were a lot of fights being taking place. So, yes it consumes significant environmental resource, it consumes significant economic resource and high amount of manpower is required. But, from socio cultural point of view, if we look at the utility of this building; so, each of this haveli was housing hundreds of people of a large extended family.

So, one large building was not for a small family, it was for a larger number of people. So, the utilitarian perspective comes in to picture here and for that context it was appropriate. In today's context it may still remain appropriate, contextual and hence it may sustain or if the socio-cultural context has totally changed then it may not sustain. Here, we are looking at a larger community like Jodhpur city part of it, can be sustained? Well, maybe because some environmental resources required, some economic resources also required, significant manpower is also required.

But, again the individual buildings utility is what governs defines whether this can sustain or not. So, each building has a smaller footprint or it has a larger utility for human beings. This one? Again, yes we can sustain provided we have the required skill which we need to make these buildings, because it has very less environmental resource consumption and less economic resource consumption. But, significant manpower is required along with the skill which is required to construct them, yet we can still sustain it, provided our socio cultural requirements allow that.

Same for these huts from Cameroon, the reasons are exactly the same. Now this one can be sustained? No, not at all; there is a huge environmental resource which is required, there is a huge economic resource which is required and huge manpower is required to construct this building. In those times it was socio-culturally, politically required and hence all these resources; environmental, economic and social resource were brought together. It was never easy on a kingdom to construct a fort and hence each kingdom, each king probably would have very few limited forts which were made.

And they doubled up or multiple purposes they served, they served as the palace; part of the fort was also the palace for the leader, the king. In terms in times of distress when there was a war being waged against the kingdom, the people were given protection in this fort which was the another purpose. At times the fort served as cities which were like world cities. So, suppose you look at the Jaisalmer fort, the fort itself is the entire city. So, in those times, in those contexts they were contextual and hence they were able to sustain.


In today's times as the socio-cultural context has changed, we cannot gather the environmental, economic and social resource which is required to create a building like that. All other forts for the same reason cannot be constructed and that is why we see that in today's times, we do not construct these forts. They are socially, culturally obsolete and they are so, resource intensive that we just cannot think of building that. However, this kind of a building where it is least resource consuming can still continue.

However, we still see that a lot of Warli art is not being done these days, though there are efforts towards revival of these art forms, these creative forms. But, yet because there is a significant manpower which is required, it is declining. Wherever there is a lot of resource consumption of either types, it is difficult to sustain that; unless there is a socio cultural context which keeps it going, provides it that impetus to go forward, to sustain itself. So, we see that yes ideally it should sustain, but just because it requires significant manpower and skill, it is difficult to sustain this activity.

Can we create another Taj Mahal? We cannot, it is not that we do not have the required skill or designers who can design a Taj Mahal, we are designing different types of buildings. But, yet we are not doing that, though we are doing the we making different types of buildings, but this is not example of a sustainable building at all. It requires huge environmental resource, it requires huge economic resource and huge manpower. We cannot make such buildings again and there is not much of utilitarian purpose. A Chhatri, again the same thing huge resources are required.

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Physiological, **safety and security**, **love**, belongingness, self esteem, self actualization needs



Can we sustain?
May be.

Why?
Huge environmental resource required.
Huge economic resource required.
Huge man power required.

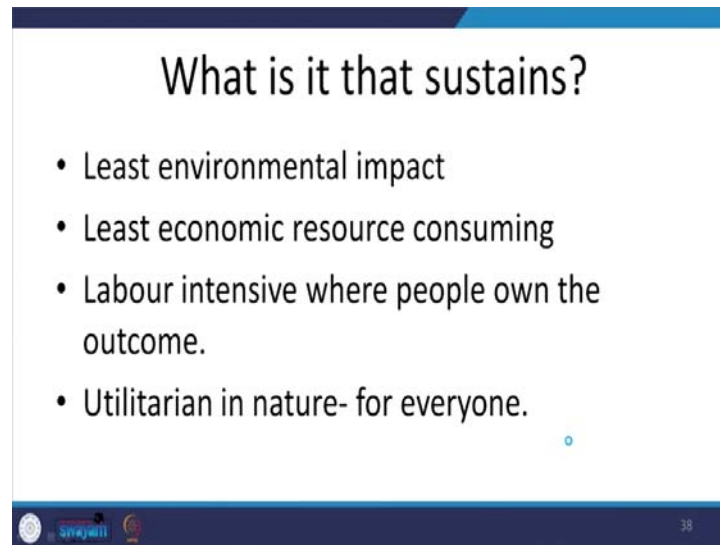
Not really utilitarian in nature.

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And, that is why we see that these buildings say Taj Mahal or these Chhatris or I am not talking about a structure like this, but Kandariya Mahadev. Now, these structures, these kinds of structures are not being constructed simply because they consume huge amount of resource and in turn in return they are not really utilitarian in nature. However, if you look at this example which is of a university, one of the greatest universities in recorded history; though it consumes huge environmental resource, it consumes huge economic resource and it also consumes huge manpower to construct it, to build it.

But, it has a large utilitarian purpose because of which this kind of a building by purpose as I mean, I am not saying by design are still sustaining. We are seeing more and more universities coming up. Why? Because, they are not for one person, they are not for a select audience, they are for a larger mass, they are utilitarian in nature. So, we have a couple of bottom lines.

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We come down to the answer to our question, what is it we are talking about architecture, what is it that sustains? What sustains? First, which has least environmental impact. Anything which has lesser environmental impact will sustain over a similar response which has larger environmental impact. Second, least resource consuming, something which consumes huge economic resource is not sustainable. Labor intensive where people own the outcome, here anything which is labor intensive if people own the outcome in terms of building or the purpose of the building may be sustained.

However, if it is not owned by people, anything which is labor intensive may not sustain and the last utilitarian in nature for everyone. If we are looking at purpose of the building which is being constructed for a select few, very few people; a community, a class, type of people, it will not be sustaining. We will not see many of such buildings coming in, since it is not utilitarian in nature. So, if we look at this discussion, conclusion of this entire lecture discussion; we know what kind of buildings sustained in the longer run. Many of you might have questions on the types of buildings which are coming up, highly resource intensive buildings.

For example, say 5 star hotels which are highly resource consuming, but you see that they there are not many 5 star hotels which you would see. There are fewer of them, very few of them because they are catering to a select class of people, group of people. They are not utilitarian in nature, that is why it is not a very sustainable building and hence not

many are being constructed. However, on the other hand if you look at residents because it is fulfilling the most fundamental of the needs and it is more utilitarian, you would see that more and more residences in the time to come will be built; they will be required more and more. So, I will conclude this lecture by drawing the bottom line for sustainable development of which sustainable architecture is a subset.

So, we see that there is environment as a bottom line, anything that is an impeachment, not impeachment, but that is actually taking a larger portion of the environment is not sustainable. So, anything which consumes the less environmental resource will be sustainable, anything that is benefiting to the economy, where economy flourishes or it does not take a larger portion of the economy for a smaller purpose is sustainable.

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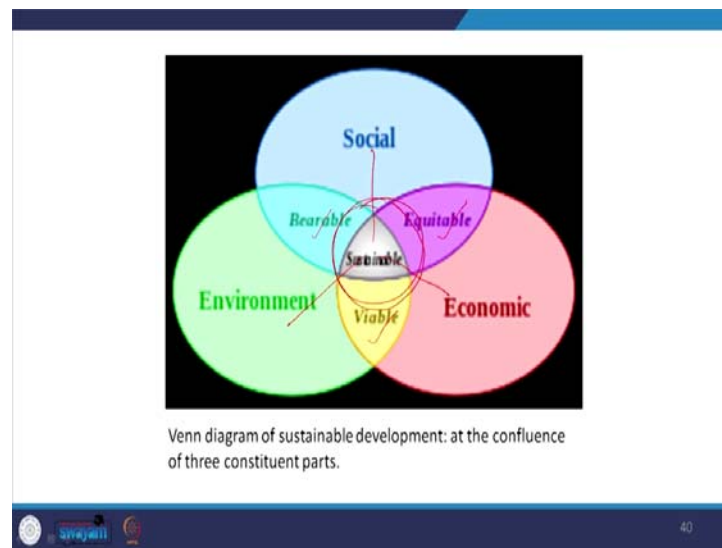


And, last it is useful for the society from its utility purpose and also from its cultural context. Anything that is contextual culturally and has a larger utilitarian purpose is what will sustain. Now, if you look at any example, any building now that is a point to ponder; if you look at any building and try to evaluate it from any of these purposes you would see whether that building would sustain or not sustain. If we look at some of the beautiful examples of huge havelis which were created in any part of the country Rajasthan or Kerala or Tamil Nadu or wherever.

Any building which has been abandoned say these havelis either of these three bottom lines may not be meeting, may not be fulfilled in those cases. We would very clearly see

one of these being violated, over the time either the context has changed, the socio cultural context has changed or the building is not serving any utility. It is not a utilitarian building or it is intensive on economy, resource economic resource or environmentally resource intensive either of these three would fail a building any development. On the other hand anything which fulfills this bottom line will be seen as sustaining.

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So, I will close the second lecture by leaving this last slide with you. And, we would start our next lecture from here itself where through a Venn diagram, this is the most generic definition of sustainable development which would we would find. Where, these three circles, intersecting circles each denoting environment, social bottom line and economic bottom line where these three come together, the confluence of that is sustainable development.

So, if any one of these three dimensions is not fulfilled, it is not going to be a sustainable solution. So, if it is not fulfilling the economic, it is only bearable; if it is not fulfilling the social requirement, it is viable. If it is not fulfilling the environmental bottom line it is equitable, but not sustainable. So, we would start our next lecture, lecture 3 from understanding what sustainability is, what are the different definitions of sustainability, how definitions of the sustainability have changed over years, over different ages,

periods. And, what have caused that change to happen, what has inflicted that change; this is what we will see in our next lecture.

Thank you very much for listening with patience, see you in lecture 3.

Thank you.