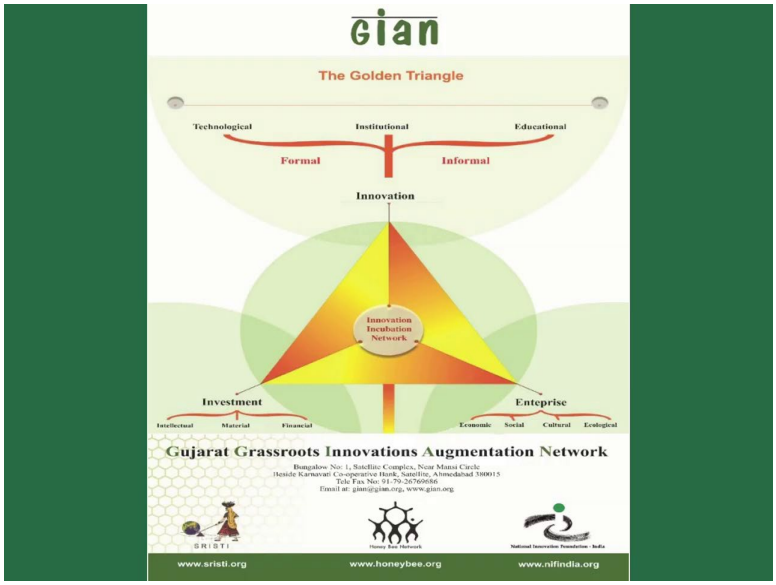
Design, Technology and Innovation
Prof. Anil Gupta
Founder Honey Bee Network
SRISTI, GIAN and NIF, CSIR
Bhatnagar

Lecture-16
Learning's from Grassroots Innovation

You know what was your last week's upload to download ratio? Anybody whose ratio of upload to download was more than 1? Please raise your hand. Did you follow what I am saying? Anybody here who's upload to download ratio was more than 1? What kind of destiny this attitude is bringing, is breeding? I mean when my download is so high and upload is so little, What am I trying to tell the world? I am a consumer of knowledge but I am not a producer of knowledge, correct? Is that what our society should be all about? Is that why we are here?

(Refer Slide Time: 00:57)



So, when we set up Shrishti in 93, Gian in 97. Gian was the first incubator in the world. Innovation, investment, enterprise, this triangle. We were trying to connect and reduce the transition cost of the investor, of the entrepreneur. Such a triangle did not exist, at least not in the context of the Grass Root Innovation. And then we created NIF in 2000. National Innovation Foundation. Such a foundation did not exist anywhere. Not in this country, not anywhere else.

And we got a district innovations fund of 2 crores, every single district. 13th Finance Commission, Dr. *Kelkar* was chairman of the Commission, I told him, 'Sir, cannot we do this much? You allocate 10's of 1000's of crores to different states and everybody, sir I'm asking for only 600 districts, 1200 crores **(FL: 01:38)** '*Kya badi baat hai sir*' (What is the big deal sir)'. And it became a policy, so it continues, every collector has 2 crores, now maybe 4, 5 crores to spend on all in the district innovation fund.

But the fact is that it happened. So I was not only talking about innovations becoming product, which of course we were doing. But we were also creating an ecosystem which will make innovations of anybody and everybody go up. 10 innovators stayed as the guest of the President of India, because he wanted to give a message: This country cares.

(Refer Slide Time: 02:10)

Area where we are is not so good is this one. Sensing the unmet need. There was a student group in one of his classes which is something of my very favorite project. When you go to an auto rickshaw, you have used an auto rickshaw. When you climb the height of the step is all right or is it too much or too little. Now what do you do when you put the luggage in the auto rickshaw, what happens next? If you have to enter the auto rickshaw, you have to sit on the seat, what do you do? You put the luggage. Then what do you do?

You push the luggage. Is it easy or difficult? So what should be done to make it easier? What this group did now think of it, and these are students like you. I am not talking about somebody from another part of the world or another planet. Similar course last year.

(Video Start Time: 03:02)

(Video End Time: 03:33)

And I happened to be there in the jury of that course and I like this idea so much that I cannot explain to you and the reason I am picking it up is it is beautiful because it shows that complex problems within our society have learned to live for such a long time, can be solved with such little effort. So, they put a small channel on this surface. So, the area of contact between the suitcase and the ground of the, of the base of the auto has been reduced, less friction, more easy to move. Simple principle is it not?

Is it not a nice idea? And a retractable step. They made a retrofitting step. These were the two things that they did. What they did not do and what some of you might like to do is to go and get it installed in. Is it exciting to take somebody else's idea forward or only or we should take our ideas forward? Tell me. This course is about that. You are only bringing people who have made their ideas go to the people.

So that is the crux of it. This question is the crux of this course. None of you would like to take their ideas forward, correct? That is the problem. You know, not everybody can be good in everything. Some of you may be good in ideating and that is fine, and some may be good in implementation. And you should realize that and you should accept it. What is wrong with that? This world would not have so many production services accessible to us if somebody did not scale them up and transport and make it available to us. Isn't it?

Are these not useful people? But the point is if somebody else finds a solution I can innovate in delivering it to the people. That is also an innovation, a service delivery innovation. Isn't it? We do not need only product innovations, we also need service delivery innovations. We also need financing innovations. We also need after-sales service innovation. We need a whole ecosystem of innovations, to make this country go forward or any society go forward. Should it not be? And

we have to solve this problem and we have to solve it now and here. So, think about it. How can we do that?

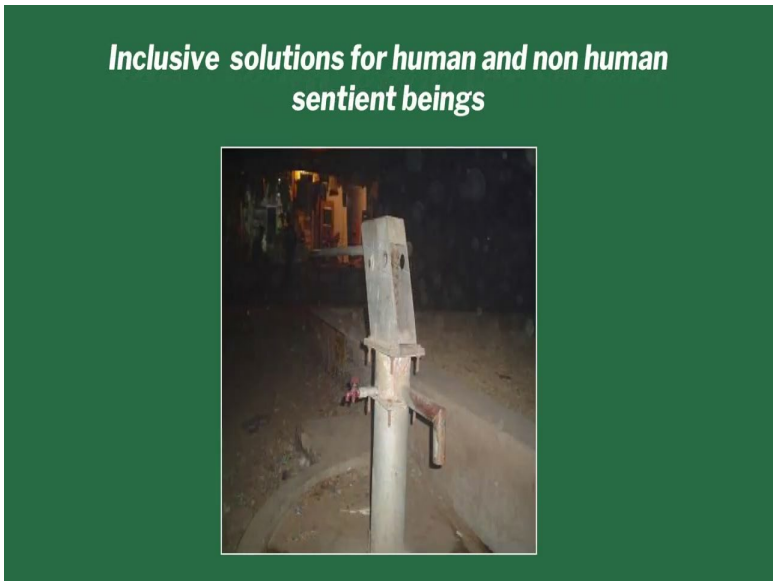
(Refer Slide Time: 05:43)

So, we learn from teacher within, teacher around, teacher in nature, teacher among common people.

(Refer Slide Time: 05:50)

And let us look at a case study. So, this is a hand pump and it is in Rajasthan where water is very, very scarce. So, what is the problem here, water is spilling over, so we must find a solution.

(Refer Slide Time: 06:01)



This is the solution. Two grassroots innovators, *Vishwakarma* and one more person, a small pipe for drinking water, bigger one for filling the bucket and it costs only 100 rupees. Retrofitting. **(FL: 06:16)** '*Ek upar ka cylinder nikala aur dusra laga dia*' (They took out one cylinder and put another)

But this is not complete, if some water still spills over, it is inclusive, not just for human beings but also non human sanction. When you design solutions think about birds, squirrels, ants and animals. They enrich our life, they enrich this nature. So, they must be part of our solutions.

(Refer Slide Time: 06:46)

So, in Purulia I noticed this. When you have this socket and you pump it every day, what will happen? It will strike against that base, doesn't it? So, this will get worn out after some time because

of the handle. So, this community what they did they have tied a wooden piece here which also has worn out after sometimes, you can see the groove here. Temporary solution **(FL: 07:12)** *hai ye* (this is). This is the mindset, not a very appreciable mindset, of providing temporary solutions.

(Refer Slide Time: 07:22)

Now let us go to *Bastar*. We went there for *Shod Yathra*.

(Refer Slide Time: 07:26)

So, this is one solution, so this will not allow the handle to go further down. **(FL: 7:32)** *Toh* damage *nahi hoga woh section* (then that section will not get damaged). But it will strike and hurt a little bit **(FL: 7:36)** *Theek hai na* (All right?). Every time, it will still hurt.

(Refer Slide Time: 07:40)

How about this one. Conceptually, think about it conceptually, do not think or look at it only artefactually. It has, as we were saying, rebound, would not hurt, would not damage, correct? smooth solution? But the design of the hand pump has learned nothing from it. UNICEF has not learnt anything from it. Now the challenge is how do we bring about change in these designs everywhere so that as a society we become more efficient.

So, we have to overcome 6 kinds of exclusion. Exclusion over space, mountains, flood prone areas, drought, deserts. Exclusion over sector so for example, this handloom sector, the kadhi sector is very neglected. Hardly any innovation has taken place for the weavers and for the spinners of the yarn.

(Refer Slide Time: 08:34)

Seasons, currently in Bihar, in parts of the country the whole region is flooded. How do we deliver milk and medicines to the people who are living in the settlements which are marooned? How many amphibious vehicles do we have in this country? Isn't it obvious that we need it? The exclusion takes place in certain months of the year. We have been in Spiti, we went there for Shod Yathra after Rohtang pass was closed in October and November. For 4 months it is cut off and we do not have helicopter service.

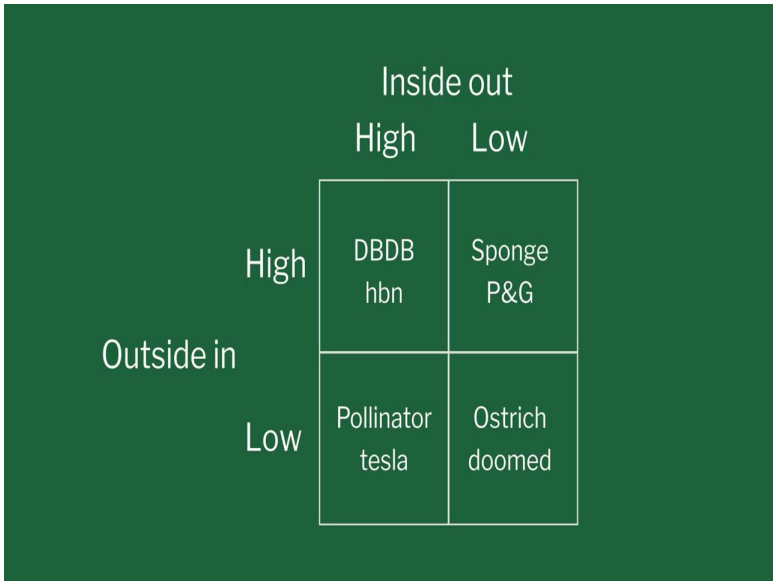
So it is excluded. Certain social segments are excluded: Dalits. Sometimes even women are excluded from the designs. Skills of certain kinds get excluded. And the structure of governance, structure of governance means the norms by which you design exclusion. So, let us say you have one health worker per 1000 people. Now one health worker per 1000 people in an area where population density is 1000 persons per square kilometer versus where it is 50% per square kilometer does not make sense. It is a designed exclusion.

By design. As a designer your job is not just to design a product and services. You have to also design policies, the processes, the system, the institutions which will make sure that the value of that desired solution that you have desired reaches the people who it is meant for, isn’t it? So, this was the triangle which we developed in 1997 GIAN, for converting these three together. Economic enterprise, Social enterprise, Cultural, Ecological, Investment of time, Energy and Finance.

Not just money, connections. He can open more gates for many of you or I can open more gates for any of you than probably another person because we know so many people. That is investment of our social capital in your learning, in your growth. The kind of people you are bringing, they are all part of your social network. Remember you will have to serve with the social capital. Tomorrow whether you invest it in someone who deserves it but cannot desire it is, it is your decision.

Someone who deserves it but cannot desire it. In the previous batch in this class if they had not looked at the problem of the auto rickshaw driver, the autorickshaw driver cannot come to you and ask for the problem to be resolved. They cannot hire a faculty of IIT, IDC as a consultant. But they need their problems to be solved.

(Refer Slide Time: 10:54)



Look at this, you have an innovation playground. Inside out, high low, means outside in, high low. If both are low that means you do not want to learn from outside and you don't want to share with outside. You are an ostrich, doomed. Many companies dissolved, disappeared, they did not learn enough, they did not share enough. You want to learn a lot from ‘outside’, ‘inside out’ is ‘low’, ‘outside in’ is ‘high’. You want to get ‘in’ function from ‘outside’, crowdsourcing.

P and G, Johnson and Johnson, they asked for ideas, they gave some $10,000, $15,000 awards. They do not tell you how much they made out of that solution. Do not give me more money but at least tell me my idea was worth 200 million dollar. I do not mind not being paid extra, because

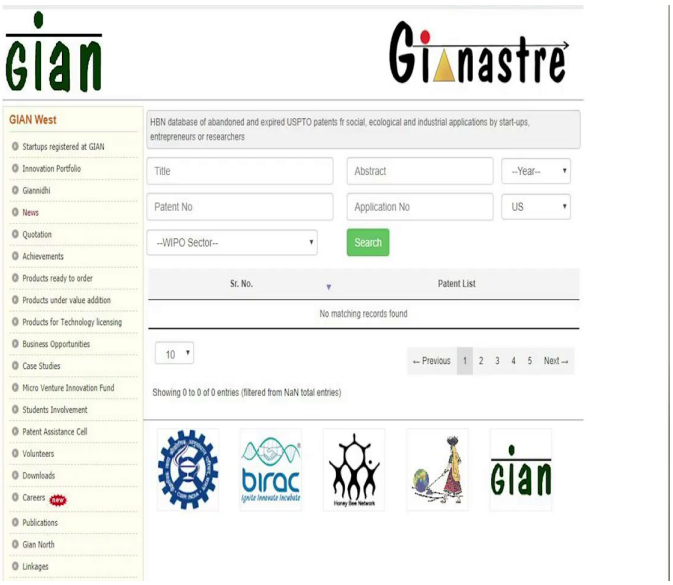
that is part of the context, but my worth, my self-esteem will go up if you told me that actually my idea helps you to make 200 million.

Here 'outside in' is low. They are so ahead of the curve they do not want to learn from you 'outside' they want to share. Tesla made all their patents open, **(FL: 11:59)** *Logon ne kaha 'kya kar raha hai yaar'* (people will say what are you doing).
Other people will compete with you. 'By the time they learn to make what I have already made, I will make something better'. Yeah, that is the confidence that is what innovators do, they remain ahead of the curve always.

They produce competition, they generate. By sharing he wanted more people to get into the battery charging business. Because if there is more competition I will be agile otherwise I will become complacent. If I have no pressure then I will not learn faster, I will not experiment, I will not learn. Innovators have to do it all the time. As the teacher I have to do that all the time. This is the one where both are high DB DB **(FL: 12:34)** *'Dil bada, dimag bada'* (Big heart, big brain). Only those who have big hearts and big minds can learn a lot and share a lot.

So we have a database called **techmedia.in**. It has information of 200,000 dream projects including chemical engineering by 550,000 students. Why did such a do it? Why did the Honey Bee network do it? Because we did not want any student of our country to do what has been done before and I cannot expect you to go to the website of 7500 colleges of this country to find out what has been done before. Even to expect you to go to all the IITs will take a lot of time.

Your time should be used in developing those solutions and then we have made another database with the help of two students who are going to come today to meet me, Jaigam and Devika.
(Refer Slide Time: 13:21)

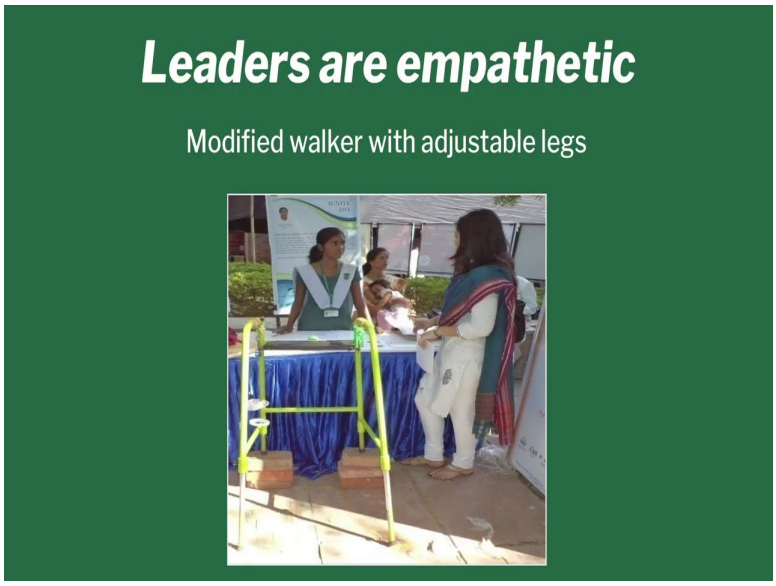


Now in the last 4 months, 5 months they have put together: **gian.org.patent.php**. It has 0.43 million abandoned US patents available for free of charge to anybody and everybody. Nobody else has, such a database does not exist in the world. These were all granted patents mind you, they had gone through the sieve. They were screened, they were granted and when the time came for renewal, the inventor could not pay the fees.

So they are valid, useful pieces of knowledge available to use in your projects and research without any restriction, only attribution is required. I want your projects to be high-value products, because each one of you is precious. Only one of your kind, and if you do not spend that precious life on something really precious, really valuable then we would not get more value out of you. As a teacher, as a part of the ecosystem, we are trying to innovate in creating an ecosystem, so that each one of you becomes more efficient, isn't it true?

So, we want to share a lot and this database is accessible to everybody in the world, not just Indian, not just IITian, anybody. Open access, no password required, no user id required, open access. So, this is a power of open knowledge. These are some examples, very simple examples.

(Refer Slide Time: 14:36)



All over the world the walkers that people use do not have adjustable legs. In the United States of America, in Japan, in Europe, nowhere. This girl sent an idea and the team of NIF designed this solution. It could be better, of course I can agree.

(Refer Slide Time: 14:53)

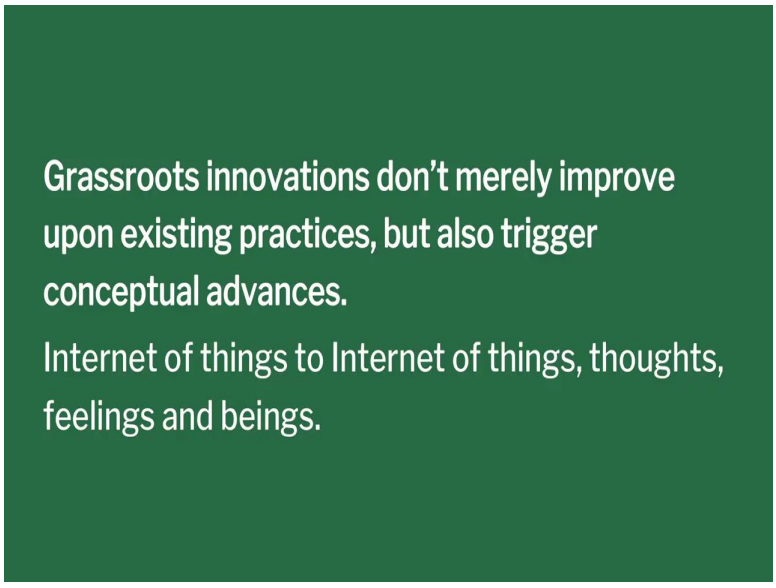
It is not as sleek as it should be. For example, one of the, when designing, our students did an audit in NID Gandhinagar campus. They found that, 'Look, we do not put pressure equal on both the hands, left and right, so the balancing should be taking care of that'. We had not taken care of that. Very simple problem. Where should I hold it, in the beginning of the bar, middle, end? What is best? We had not optimized it.

So, there were a lot of problems with this design. I am not saying it is an ideal design but it breaks the inertia. It makes it possible for us to think that yes walkers can be of this type, correct? That is the purpose it has served.

(Refer Slide Time: 15:31)

Look at this. A little girl sent an idea, 'Sir, my pets get stressed when I am busy with my exams', *Deva Sharma.* I said, 'Yes you are right, my parents also get stressed when I do not call them. My plants also get stressed when I do not spend time with them and I don't water them when I am traveling'. So, pets, plants and people, are these things? They are beings. so 'Internet of Things' is not the right phrase for capturing communication among these beings.

(Refer Slide Time: 16:31)



So, why don't we change the concept, ‘Internet of Things’ to ‘Internet of Things, Thoughts, Feelings and Beings’. If a concept does not capture the essence of my being, my consciousness, my responsibility to my children, my parents, my pets, my plants, then it is not a useful concept, I will change the concept rather than become indifferent to the needs of those people, correct? So, I will have to use the concept and technologies in a manner that I can also sense their tensions.

So that I can be responsible to them, concepts have to be transformed. My point is, ‘which cannot be just a consumer of categories of thought, that people will create in the world’. We will fill our aspirations and our design potential in those categories that people have created. Unless you challenge the concept, come out with a new category, a new way of classification, a new way of categorization of data, of information, of ideas. I am telling you in a very practical sense. We must create that expectation.

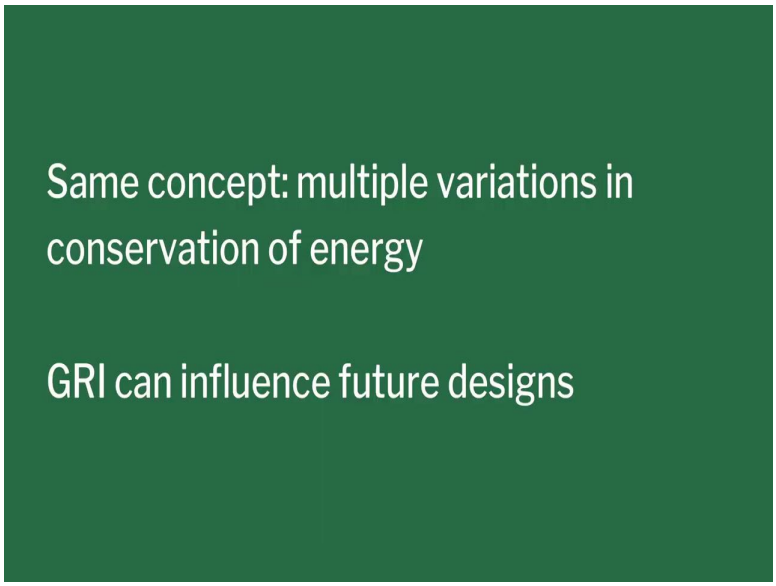
(Refer Slide Time: 17:09)

The essence of knowledge is exogamy, classification. These are ladies in Meghalaya, Mizoram. Cooking is the first layer of harnessing heat. These ropes which are used for trolleys that they build on mountains, these ropes become stronger when it is heated. The wood curing is taking place, you understand? Firewood because it is a high rainfall area, Cherrapunji. They are being dried, meat, cheese for preservation, is being dried.

(Refer Slide Time: 17:34)

And on the top there is a seed bag where seeds are preserved. So, what is happening now?

(Refer Slide Time: 17:40)



We know that there is a different temperature gradient as the smoke rises. Do I use this concept in my everyday life? I waste, dissipate so much heat. Last time I came here, I showed an example of a student who did a work on a refrigerator, where the compressor produces heat, correct? And the refrigerator is used for keeping things cool, that fellow put a heat chamber alongside the compressor. Took the heat, made a hot chamber.

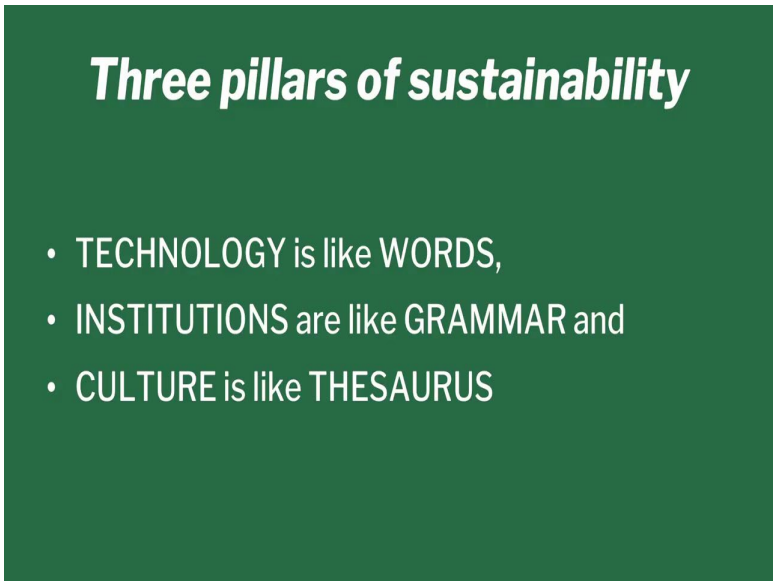
Now this compressor works less, uses less energy and delivers me two more utilities. Now I can keep food warm and I can keep food cool.

(Refer Slide Time: 18:15)

This is an example of how the ecosystem is created. We came across this beautiful bridge of tree roots, my favorite example, in Meghalaya, Nongriat village. So, we asked them, 'Why did you make such a bridge?' Bridges can be made of wood, iron, steel, concrete, whatever ropes. 'Sir, we want to do something different'. Culture was the first culprit, culture creates questions. Culture of what culture you create in your class, in a department, in your institution. That is culture.

Culture creates questions. Let culture create discomfort, culture is about shared belief. If all of us agree that we have to do something different, something useful, something meaningful then we will do that. 'All right, then what did you do next?' 'Sir, then we saw these roots of the tree on both sides of the river. They look like ropes so we thought why do not we use them. But, sir it required collective action, so we needed cooperation of people, so you needed technology, you needed institutions, rules for collective behavior and you needed culture, which is Thesaurus'. It takes 50 years to make it last for 500 years.

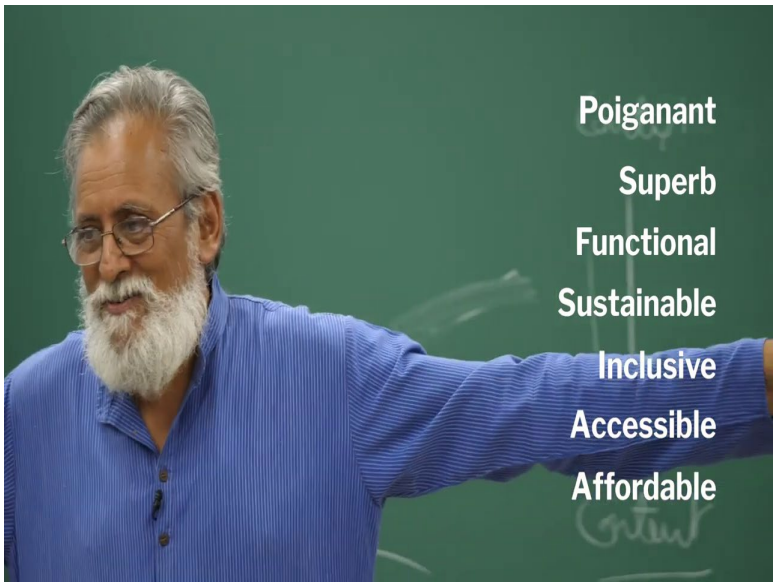
(Refer Slide Time: 19:08)



What kind of culture would be there where two generations make it, and 20 generations use it. It is practical. It is happening in our country just now. It is possible in this country to design for long term sustainability. **(FL: 19:38)** *Kuch bhi to waste nahi hai isme isme* entropy *hai.* (There is no waste in this, there is entropy).

The roots of the trees are weaving around the stones, **(FL: 19:44))** Stones *gir jayenge nadi me, utha lenge fir se*. (The stones will fall into the river, then we will pick it up). Extremely poignant example of sustainability.

(Refer Slide Time: 19:56)



A design which is superb, functional, sustainable, inclusive, accessible, affordable. **(FL: 20:00)** *Saari conditions puri ho rahi hai*. (Every condition is being fulfilled). It creates a benchmark. I am

not saying every design can fulfill this condition, but at least it makes it possible that you can think that way. It widens the horizon of thinking.

(Refer Slide Time: 20:12)

So we were walking in Purulia, we saw this beautiful terracotta horses under a tree. So we asked the people instead of the potters, ‘Why did you keep such beautiful terracotta horses? Somebody can break it, somebody can make it’, ‘Sir, we have not kept the beautiful ones, we have kept the best ones’. ‘Why did you keep the best one?’ ‘Sir, don't you see this is a path? Our children go by this path to school every day in the morning. They should know what the current standard of the best is. They must do better’.

This is the culture of this country, this creative culture, it springs from valleys of this kind, which challenge the young people that you must do better. What we could do is what we could do. This is what is the best we could do. Now please kids you take it forward. Thank you so much. That is the challenge to you all.

(Video Start Time: 21:00)

(Video End Time: 22:23)