

CII

**Sagarmoy Phukan**

***Q: So, thank you so much for joining, I will be recording you right now. I've given you a brief about my study. And if you have any questions, you can ask me at the end of the conversation as well. So, coming to the first question, I would like to understand your role within the project, what is your project, and how your organization has taken up citizen science to be a part of your study.***

CII

A: So yeah, so we, at this organization, I'm working in my capacity as a program manager for the evolution project. And they don't have, you know, citizen science is you know, it's something which is integrated in some of the projects, across projects. But it's not like they have a dedicated project and citizen science process. But definitely, we understand that when you want to solve the evolution and such large environmental and social challenges, you need to involve some people at the grassroots, I think that you know, very much is the focus across the projects, like say, for instance, when we are working with farmers and growers to management, we, you know, do this very, in a very participatory manner involved in from the right from the beginning, in the planning stage itself. And the same is true for, you know when we are working in the cities, and we are engaging with the communities at the world level, to also take into account their perspective on what they think. Other major bottlenecks are, that some of them may be emerging solutions, and a lot of times solutions come from these people the most practical, meaningful solutions.

**Sagarmoy Phukan**

***Q: So, from here, I want to know, how do you reach these people like how have you recruited them within your project?***

CII

A: So, the way we do it is when we do our mechanizing surveys in the in the geographies that we intervene. The first thing that we do is organize meetings in local meetings in communities. So definitely, we take support from the local NGOs, who are active in those regions. For the rural areas, it could be cooperative societies, which are, you know, our touch points, basically for to gain access to and to connect with the people there. It could be, you know, an NGO working in a city on issues like this management. Because honestly, you won't find many NGOs working on evolution. So, we use those connections, existing connections, NGOs, and others and we're even working with the Institute of Social Science,

**Sagarmoy Phukan**

***Q: and how much importance Do you feel like, you know, grassroots organizations have grassroots NGOs within your work?***

CII

A: I think they having worked at the grassroots levels, are quite well aware that, you know, involving citizens, is quite crucial for the success of the program. That I think is quite I see pleasing the grassroots NGOs, quite well understood.

**Q: So, what do you feel has worked? So well till now? And what hasn't? So, what do you feel like, you could have done more along the lines of getting people more involved?**

CII

A: So, I think what more we would need, I think, is those people who have scientific understanding, and can, you know, participate in our programs can, you know, help us make positive change in the ground. I think that part is working completely fine. But I think what more is needed, I think, more awareness, and more scientific thinking. Amongst citizens, I think that's, that's what leads the country.

**Q: So, it also lacks science communication to be a part of that project. So that to create more awareness among people.**

CII

A: Yeah, I think I think that a lot, many agencies were doing awareness, but many times, it's just so some point on awareness, but not really very, you know, scientifically crafted. I think that is something that is needed, and I think this is the responsibility of those agencies and NGOs who are working on this kind of awareness campaign. They also, you know, make the science understandable to people on the ground.

**Q: Did you feel that in some way you have been able to impact the scientific thinking within the people within your participants over some time? And what outputs have you seen in the, like, on the field from after you have done the project?**

CII

A: Definitely. And that, I think, definitely takes time than you working in a new area, entering a new geography. First of all, people who know we need to build trust with those people. That is true for anybody I mean, but I have to say something they know, something they have seen, say, for instance, this is coming from our experience on property management, farmers trust their peers more than scientists. So, this is also a major challenge that you know, those people who are working in the scientific fields, they're probably not doing a very good job at communicating solutions scientifically. So, there is a lack of goodness be as applied researchers, we have to come into the picture. And we have to, you know, act as a bridge between the scientific community and the people on the ground?

**Q: do you see yourself as a potential, you know, you have a very potential role in this case while bridging that gap, so?**

CII

A: Definitely, not just us for the kind of, say, through our programs, the kind of support systems or support structures or that we create on the ground. And that, of course, is not one man's job, we have to bring in NGOs, we have to bring good volunteers on the field, who can have all this, you know you know, comes together with the local participation. So, the participation of some of the local leaders, and progressive citizens is very, very important. But then they also need to

be their understanding need to be brought to some, you know, we've seen Latvia that also is required.

**Q: So, in terms of funding, have you faced any kind of, you know, barriers to it? Or, like, has there been a very big demand for your funding or do you feel that if there had been more funding, you could have done better? And you can also talk about it**

CII

A: well definitely, like it, like we discussed, so definitely. These few of the things are there. aspects of this, you know, participatory. Planning and, you know, all there in our, you know, projects, but we don't have a dedicated project, from citizen science, and from air pollution is an area where there's a lot of real roles that citizen scientists can play a huge role in. I don't think that is, you know, well understood.

**Q: Can you elaborate on it? Because it's quite interesting.**

CII

A: When you ask, we don't have, say, dedicated projects with citizen science, per se right? Now, I don't think we are the also the, maybe the right agency to do it. Maybe they're doing quite diverse projects. But as such, there is no what I'm saying is that within the community of donors, who are providing funds for this kind of project, I don't see much appetite for this kind of project. The citizen science projects.

**Q: do you feel like if you could have outsourced it to a smaller organization, but while you can be a facilitator, within this ecosystem you can be**

CII

A: that's essentially how we work. Okay. So, you're involved, like I mentioned to you earlier, local, NGOs, local leaders, to build that ecosystem for positive change.

**Q: So how do you believe that you can increase, you know, the thought process of your donors towards a citizen science project? Like, will they have to build up their appetite for them?**

CII

A: I think that that that requires, you know, demonstrating that this reading can help us bring positivity and change, and then they will. I think everybody will come forward to support this. So, I don't think many demonstrations of that have taken place and I'm saying from the perspective of air pollution, definitely in other areas might be but in the area of air pollution will play a huge role. I don't see this playing a big role. So far. I mean, some people have sensors, air quality sensors placed in their homes and they are, you know, maybe tweeting about the high level of quality in their rooms. But you know, they also need to I don't think they're that many of these people also have a good scientific understanding of how it works. Maybe the quality spike is because of the incense stick which is in the room. We also need to understand the technology better And

**Q: the concept of indoor air pollution and outdoor air pollution is also there. So, what do you like while working with your participants? Did you use low-cost sensors? Or did you have like a bigger machine to be there**

**CII**

A: we are using in one of our projects, low costs, so to say low cost, but they're not low cost because if you look at the lifecycle costs, you have to replace these and you have to maintain these you have to have field teams to supervise data, data analyst is to look at the data and make sure that there is no drift because they're all electronic based devices. So, there are multiple challenges, but we are trying to make this work for the sensors at least for quality management and planning to be able to do that with the very granular local-level data. But the challenge again and we do face challenge there you know, say when we were when we were seeking interest from the citizens and the institutions, whether can you install the sensors at your place? I mean, some people will even be hesitant saying that oh this May this will constantly be plugged into some parcels, and in May because you know consume a lot of our electricity those other concerns are also there. And yes, some citizens also came forward and they supported us by taking ownership and installing their premises

**Q: and where did you get your like their sensors from? Is it like making made in India or from**

**CII**

**CII**

A: they were made in India by an Indian Agency from an Indian startup that started in one of the cities

**Q: Okay, that's a very great news to have you know, were Indian**

**CII**

A: but they are mostly assembling the very core part of it, which is the sensor is still being imported from China. So, because we don't have essentially, we don't have the manufacturing capabilities in the country for daily manufacturing some of these sensors.

Thank you. I think this is the end of our interview, there is just one just activity. Just save this we are done with it.

BBC\_ABMN

Sagarmoy Phukan

So, if you have any questions during this time, you can ask me, and in case if you do not want to answer any of the questions, you may prefer not to do so. I would like to get your consent to start recording.

BBC\_ABMN

It's fine. We can start.

Sagarmoy Phukan

Thank you. So, the first question is about your role. What is your role in the projects and the organization that you belong to especially and how you are involved within the project?

How is the organization involved in your Citizen Science project? I would like to know about your project's name as well within that.

BBC\_ABMN

So, we run this informal group currently, Assam Bird Monitoring Network and it is still an informal group because it's not yet registered. But it's another process of getting registered.

So, this is an informal group we have launched Bihu Bird Count and it is the daily activity that we do during all the 3 seasons of Bihu to count the number of birds, the number of birds species, basically to monitor the diversity of every fauna in Assam. So, it was launched in January 2020 during the Magh Bihu, the same year we could not do all the 3 bird counts, because of the pandemic. But 2021 onwards able to successfully conduct all the bird counts. So, the whole purpose of doing this bird count is so that the Magh Bihu coincides perfectly with the migration of birds from the northern hemisphere. And followed by the Bihu in April, where we get to see several resident species, and so they sound set off some are migrants, and then, during October, we have Kati Bihu where we can again see passage migrants. So that is for example: In Guwahati, you get to see the presence of "?" so in this case, the three Bihu, are extremely important where we get to understand the diversity of the fauna from different perspectives from different seasons.

Yeah, that's how we try to document every fauna at all the different places, you know some like a different time. So, it's what's special and temporal a monitoring of the fauna and that's how we have been working from 2020 onwards. In 2021 and 2022, we have done all the 3. This year 2023, we're about to start this Magh Bihu, starting from 13th January. Yeah.

Sagarmoy Phukan

So, your organization is more like a scientific organization right now, which is about to register itself. And you're collecting data on the temporal and special aspects of the biodiversity of birds in Assam.

BBC\_ABMN

Yes, we do science. We do our whole. One of the primary objectives is to develop science. To develop enough data to analyse, which would give us a way forward for conservation basically; by understanding the migration pattern – one and two - by understanding the lots of being of diversity in specific pockets, which is usually not explored. For example, we encourage patch birding, where not just any national park or a wildlife century. We also take our members, or whoever wants to join us to certain fields or certain backyards. So, we try to understand what would be the diversity of this particular area. and because we feel that every

habitat is equally important, we try to explore those and try to understand them. Oh, I will just give an example. So, the last week we went for birding. And we like explored a patch, just behind the Deepor Beel, which does not fall under the Ramsar site or part of the program. But it's an equally important habitat. So, we saw the presence of black-throated thrush. So, it is a rare bird now and it's difficult to find in this kind of habitat. But we've just found that bird in that particular location which is just behind the AEC which is mostly under construction right now. But having the presence of that particular bird in that habitat is still **exciting** or it supports that particular species.

Sagarmoy Phukan

What made you take up this process? What I'm looking into is like, I find, citizen science as a process to get data, and you know, create more awareness. So why, citizen science, what motivated your bird network to take up citizen science as a process of getting data? because, like even scientists can normally go and take this data as well. But why citizen science in that case?

BBC\_ABMN

So, it's something very personal. When I started birding initially around 2016, I started late from different people. I started learning from different guidebooks, and then slowly slowly I developed the knowledge of birding.

Now, after a point I and a couple of my friends realized that this is something that gives us enormous joy at the same time, it uses enormous knowledge of the habitat around us, enormous knowledge of different things. So, we're able to value the environment around us much better than what we did earlier, because bird watching is just like we're watching the bird and getting the pictures but it is also understanding the habitat, its dynamics, its behaviour, and all. So that's how the idea gets started that why not we start something where we could like, invite more people. And you know we could do a bird walk together. At that time, I was not aware that, there are already existing citizen science programs. But what happened is I got to know about campus bird count. So, the campus bird count was something that kept happening.

During a campus bird count at IIT Guwahati, we organized the campus bird count for the very first time and we liked whatever knowledge, and skill set we had we did a bird walk which happened to be successful with people. And also, I've got to know that there are more fellow, birders, who like watching birds. And they may not be that, though well equipped with certain resources or with the skills. But they were interested. That's when we got the idea that there are enough people who would like to watch nature from a different perspective.

And that's how we're here. We started doing this campus bird call from IIT Guwahati and one of the major motivations we got was from Dr. Narayan Sarma from Cotton University he has been conducting campus bird counts since its inception. So that's also one way we got motivated. We all started with campus bird counts in Cotton University.

So, we got a lot of ideas and he guided us on how to go about it. How to pick it up. He uses a keyboard in particular. which has been extremely helpful in recording the data like understanding the species availability around the locality. So that's how we started with the campus bird count.

Sagarmoy Phukan

In your case, I find you know it's quite different because I would say that you also started as a citizen scientist rather than a professional in this field.

And then you have created a platform where people can come together you know, share this birding experience which they have. So usually what I see for a project is mostly like, you know, academicians or research organizations trying to create a platform for which they can get data. But this is more about sharing the experience of watching nature, being in nature, and looking into nature from a different perspective.

So, I would say, this is from a motivation point of view, like your organization, is kind of a platform that has not been before. Like for fellow citizens like in terms of Assam what I'm saying, where you know fellow citizens, scientists have created a platform.

So do you feel that you have been able to make impacts in that respect through the works that you are doing or have you been able to, you know, make changes like policies, changes or like it can be? The index can be different ways like what index have you seen through like from the last 3 years that you have been pursuing this project.

BBC\_ABMN

Okay. so yes, First of all. It is true. I did not start as a citizen scientist because I was a novice. I did not know about the citizen science. What is a citizen scientist and what does the citizen scientist do? I took it up because I thought it's something very important and there should be a platform to interact with each other and share the experience which later turned out to be a citizen science platform where I learned about citizen science. But when I handled the data myself, when I understood the importance of data, that's exactly what we evolved to be a citizen science group where my co-founder joined and with their experience, I was able to understand better you know to look into the citizen science in a better way.

Oh, yes, and currently, what we are pursuing is a largely citizen science but the motivation remains the same. The whole idea is that we watch nature not just because of the data but because it is a holistic approach to looking at nature, we focus on the well-being of the mind, we focus on the well-being of nature, and we focus on the interaction of the person with nature. We focus on the celebration of the festival, Bihu itself, which has its connectivity to nature.

So, we do not like it. We do not like to divert from our roots with what we started. Keeping the citizen science concept along with it - So that's one, Secondly, you to talk about the impact. first of all, we are at the very early stages. We are still growing for the whole state. But last year we had a conference called "". so we had a conference with several birders who came to Guwahati.

he conference was held at the cotton University. So, during the conference, we had people from academia and people from different scientific communities. We have people from different government agencies, as well as birders, the passionate birders students. That was the first conference where different people came to a single point to interact about how to take it up, how to go to the next level of birding, bird watching, and with the help of citizen science in Assam. Bird Count India helped us. We asked for help from Bird Count India and we were able to do like so through several TV, and several discussions which gave us a lot of insights about how to proceed further in terms of bird watching in Assam.

So, during that conference, one thing we understood was that people were interested. People did take an interest in birding, not just birding, but also you know getting a step further. For example, government agencies, show their interest in creating certain kinds of publications. For, say that come up with this, we are ready to help you. The data previously documented is like, maybe, you know, not correctly documented. These are the narratives that came up. I'm saying, like. Why, don't you visit this site? Monitor it. Your team could do a better survey.

So, these are the points that came up with some kind of trust and belief, I don't think we have developed within the people that some kind of birding activity happens that you know people are aware of.

Sagarmoy Phukan

I was just trying to, you know, put in a way that. So, this whole exercise has started a dialogue outside, not only a dialogue, but a thought process for people to start looking into birding and like an awareness thing that people have been doing, and also creating a platform where everybody can come together.

I would say that if people from all over Assam have come for that conference it means that it provides a platform for everyone to contribute similarly to Assam.

So again, you say that there was a lot of help that you received. Can you name the organizations that helped you over different parts, like over the period, like you have taken help from? But like you've taken help from E-bird, I guess you have taken E-bird's checklist, Bird Count India has also helped. So are there any other options that have helped you in different ways, or maybe show you the way to do something correctly, or have made you meet other people who can help you?

BBC\_ABMN

So, it was not the organization's help, but the individuals. Bird Count India is like they are the mentors, we are even partnering with them. Everything, so far, we have done and what we will be doing also, we'll be in partnership with Bird Count India. That's one thing, other than

that there have been certain individuals from different organizations who have helped us. For example, Dr Narayan Sarma himself, from Cotton University. I will not say that Cotton University helped us, but Dr Sarma has been a mentor. He has helped us enormously. And like Dr. Suhel Qadar, he works with NCF. So again, I'll not name NCF apparently, but Suhel did help us. Praveen J has helped us that way. Ashwin Viswanathan, Mittal Gala. Professor Dhruva Jyoti Saikia is a well-known Astro-physicist also ex-vice-chancellor of Cotton University. He is a birder, and he did guide us in the initial part of whatever we were doing.

Sagarmoy Phukan

Here I wanted to ask the question currently the whole ecosystem whether in India or Asia like, how do you feel? Is it more individual-driven? Rather than, like an organization trying to put forward more of your projects? Or is it like individual people helping each other to get connected and work around it?

BBC\_ABMN

So, you know like answering that will be, you know, if I answer that may not be very correct, because we also did not approach the organizations that way. I mean we should have also approached the organizations for them to help us. Right so, our whole idea was to do whatever resources we had, we started. Because we started very slow, our idea was not to grow initially. You know this large, I mean, of course, we didn't think about it, but the whole idea was that we just do birding, and we have people and on this, we go for a bird walk. That's it. That was the initial idea.

ut then, right now it's like, before every bird count, we have like people ready, for birding our coordinators ready. There is this whole ecosystem. I mean, there's a lot of work.

Sagarmoy Phukan

So, what is your ecosystem for reaching the participants? How do you reach the participants? What platforms do we use both electronic or online, or like, maybe offline as well?

BBC\_ABMN

And that communication process is through WhatsApp.

Sagarmoy Phukan

Okay, and you do not have any other platforms to outrange this, besides WhatsApp? And do you feel that it has worked quite well, or do you feel that you can, you know, get more people if you, you know, use another platform?

BBC\_ABMN

So, for any kind of media post, any kind of publication we use social media. Okay for like publishing our poster we use Facebook, Instagram, and Twitter. Okay, we do tweet now and then about our events or whatever is happening okay? Even the same with Facebook. Instagram, we use very frequently. So, we do use social media, and people are connected to it. One thing. Secondly, we take the help of print media, and like the English newspapers, all the vernacular newspapers we try our best to communicate. So, we have been doing that.

Sagarmoy Phukan

How do you communicate over the print media? Is it through advertisement, or do you publish articles and all to communicate about it?

BBC\_ABMN

Oh, we don't do any advertisement, because it's completely a non-profit group, and whatever expenses we have to get is from our pocket. Okay. so also let me tell you. There are 3 of us, 3 co-founders, myself, Dr. Jaydev Mandal, and Dr. Leons Abraham, so it's three of us. We started basically, but of course, right now we are a much bigger group. So, whatever our expenses we have to pay, it's from our pocket. So, we don't put anything into advertisements. We write articles, we try to connect with the journalists if we request them. If they are ready to publish like our article. Our article is not there in the editorial, but about if you can get the column to them that way. So yes, it has been working so far. This time of course, like we're not waiting for any print media investments. There are certain reasons for them. And your social media publications, of course, will be. We are going with that. Yes.

Sagarmoy Phukan

And what is the reception from government agencies, you know, like from the forestry department, or from, you know, municipality, or anyone like? Have you been helped, or have they talked with you regarding this?

BBC\_ABMN

So, from the municipality, we have not never really received any feedback, or we didn't approach them. The forest department is well aware of our project and the forest department is also ready to help us, even if not financially. But maybe it's so kind. For example. providing access to areas for birding. Access in the sense not in the restricted areas or anything. But, for example, say. if you wish to visit Darbhanga ideally you are supposed to take permission. So, we do take that permission we like. I at least will be happy to help that way.

So that way, the Forest Department has been helpful. But yes, again it can get better. You can get better in the way from both sides, not just from the forest government, but also from our side.

Sagarmoy Phukan

So, you have already told me that no Government agencies have helped you in funding till now.

BBC\_ABMN

No, we have not received any funding from any government agencies for any of our projects, nor have we received any funding from any private agencies.

Sagarmoy Phukan

So, have you thought about approaching, private agencies, like businesses and industries, so that they can fund you through their CSR? Like corporate social responsibility funding.

BBC\_ABMN

Yes, this is exactly the reason, we need to be registered. Because until and unless we are registered, we can't take any funds, unfortunately. That will not be the right approach. So, first, get registered, have a proper bank account with registered organizations and then we can receive funds legally and formally.

Sagarmoy Phukan

But you see, there is a potential for them to reach. They receive money in terms of this activity.

BBC\_ABMN

It is. I mean, I think, that there are organizations who will be willing to help.

Sagarmoy Phukan

Yes, and What do you see about the potential of crowdfunding this project? like a do you think that people would be happy to fund a few? like some amount of money to, you know, promote the activity.

BBC\_ABMN

Yes absolutely. I will tell you, during the Avicon 2022 conference, without funding. Whatever money was invested partly from our pocket and partly from crowd-funding where we took money from small start-ups, like someone who has opened a restaurant and wants to advertise it. We gave them space, like digital space where their logo could be on our posters and they gave us a small amount. And that was helpful for us because we didn't have any budget. One, the **infrastructure** we got from Cotton University, we partnered with Cotton University and

Got the entire set-up, the hall, the physical system, and the food. The food was sponsored by another hotel. So that way we approached several sponsors, and they were able to that sort of help us with several things. So, that was what I say a real hope for us where we believe that people believe in us, and to crowdfunding, it was possible to do certain activities. But honestly, we feel that crowdfunding may not be sustainable in the long term. Because bird watching, the baseline of bird watching is developing data for a particular location to do the same activity again and again, over and over the years. So that's one thing which is very important, very crucial, but everyone may not be the one who is sponsoring and not understand that. So, the company is fine, but we would want to take it to the next level where we can get proper funding from any agencies or any organizations and work on the project and focus and target on, you know making like all of like making all those activities.

Sagarmoy Phukan

Okay. Do you have any recommendations for anyone who is trying to, you know, start a new project, a Citizen science project, or from your experience? Like from your experience do you have any recommendations for people? Would you know, like to start a new citizen

science project, not in terms of birding, but as a whole, like you know from your experience what difficulties you had to face, and what difficulties you think you are still facing, and you know some solutions for the difficulties that you're faced?

BBC\_ABMN

So, it's one of the biggest difficulties we faced was that all the 3 co-founders like we all had our work, our job. So, we are not able to give a full time to ABMN. and because ABMN is not for profit, we don't draw anything from it. And we also don't plan to make it something you know where we can draw from it, and as of now, at least. Oh, so that's one thing. When our time gets divided where we are not able to, you know give like 100% to the work which it deserves currently, honestly speaking, because people are willing to do the work. People are willing to watch nature from that perspective. But I think it should get more time there.

Sagarmoy Phukan

So, you feel that there should be a dedicated team for the whole project, which is continuous for the whole year.

BBC\_ABMN

Yeah, at least, during the bird counts. I think it's right. So, we can leap and make it into something that requires full-time attention. And that is fine, but we will not be able to do it unless we have funds. So, because we have to pay our employees, we'll have to pay our team and that is mandatory, and it's a lot of work. If you convert it into something full-time, then it's a lot of work. So right now, we are other than the 2 co-founders, and other than the mentors we're still we still have a team of 13 people where we have a content writer, where we have translator, where we have data analysts. So, we work with each and everything, to get our work done and we started this in November 2021. Before that, it was only 3 of us handling it. And it was like we were going back. We are not able to do, just like so much of work, so much of data. We will just give our entire month to do it. still not be able to get done with it. But once we distributed our work, we found our fellow friends who had been willing to help. Yeah. So right now, things are much simpler because responsibility has been divided. And we did the whole recruitment drive, to recruit the volunteers, they are not employees because we don't pay anything to them, no incentive, nothing. They do it, absolutely out of their wish. and because they, I don't believe in the initiative. That's the whole idea. So, they have been working since 2001. And yeah, that's it.

Sagarmoy Phukan

So, from you I have heard that you have, you know, tried to publish in the vernacular language, and then you have a press letter as well. So, what do you feel about the implications of having communication in the vernacular language? Do you feel that you have been able to attract more people, or do you feel that you have been able to include more diverse socioeconomic groups since you started using vernacular language within your project?

Or do you feel there is only one section of people who come and attend your birding?

BBC\_ABMN

So, that's the whole idea that we wish to include more people from diverse socio-economic backgrounds from different places, not just from the city. Okay

Sagarmoy Phukan

And what is the current condition right now? In that respect.

BBC\_ABMN

I will not be able to tell you exactly in terms of the social and economic background. Okay. But if I give you an overall background, our target groups initially started with students. So, students are from diverse backgrounds, OK? So, bird watching was not just limited to a particular community or particular group of people. It started mostly with students because colleges were just places to reach. and to explain about the birding, and it's about the and if it was zoology, or botany, or any life science student we could convey better in because they could understand the language of it. So, we could use those initially. That was the very beginning of it. Of course, right now we can see it's not even people from different societies they take participate. We have the youngest birder who is in 10th standard. So, it has become diverse that way. But let me tell you very honestly that reaching out to different socio-economic backgrounds is going to take much more time. It would be wrong if I told you that you know we are being great in terms of it. No, we have to work a lot more. We know we are yet to reach religion.

And it's also bird watching in a way socially it's a privilege, I think. If you look at the social diaspora if you look at the demography of this, where does birding is? Where someone has to earn their livelihood compared to someone just to go and watch birds- Where does it fit? Okay, it's not being in the top 10 priority of that person. So, in that way, I feel no, that not everyone takes a deep interest in watching birds, which is understood.

Okay, and that's why we don't force anyone to bird, we just I just motivate them. You know, try to join us, you know, if you feel like please come with us, we'll be happy to help you. We will make you it will give you a different perspective of looking at things because we go that way that you know it's a mode of creation. It's a mode where you can. I don't know. Talk about your mental well-being. We do take those things very seriously. Of course, data is important. It can give us a lot of things. It was finally going to. It can drive the whole policy process. We know that we can understand that well. But at the same time, the participation of citizens is equally important or else any scientific community will do it. But why this, citizens? We want people to experience things that are natural whatever nature has to offer, and bird it is one way to do it. And yeah, if anyone is going to watch a butterfly. If anyone wants to watch that we, you know, encourage.

I participate in to like walking, damp campaigns, or something that we try to understand. trees. Because I don't know much about trees. So that's the whole idea. But the socio-economical inclusiveness is low enough now. But maybe with time, we'll be able to do it. That is the whole idea. We should be able to. You know the societies. Even homemakers should be able to watch birds, even, you know, school-going kids should be able to watch birds.

Sagarmoy Phukan

thank you for joining me today. Thank you so much for all your answers.

So there is this last activity that we are left to do. I'll share the link. If you're not able to do it. I can still help you with that. Here's a link to the Jambo now.

BBC\_ABMN

right so once you open out, be happy to you know.

## CitSci India

Sagarmoy Phukan

Thank you for joining me. So, before I start, I would like to give you a brief about my project. What I'm doing and how? What is the framework that we are going to go for today?

So, I'm Sagarmoy Phukan, and I'm a Ph.D. research scholar at the Stockholm Environment Institute at York University for my project, which is a part of my doctoral thesis, I'm trying to understand the motivations of various institutional characters who are the stakeholders who are associated with citizen science projects and as well to know about the barriers and challenges that the stakeholders have faced especially in terms of funding and outreach and enabling projects.

So, my whole interview would take not more than 45 min and you can ask me questions at any time, and you can also prefer not to. You know, Answer any of the questions that I'm asking.

CitSci India

sure, Yes.

Sagarmoy Phukan

So my first question is about the role that you have. especially in terms of CitSciIndia and the work that CitSciIndia does. This is my first question.

CitSci India

Yes. you know it's partly because I've been involved with the starting several citizen science projects over the last 15 years. I've been very interested in seeing how one can kind of spread the idea of citizen science, and encourage more people to think in this framework.

And so CitSciIndia was the immediate despair was a proposal to the government. The national mission on biodiversity has many components, but one component is about citizen science and while the ideas were being developed for this proposed national mission, my colleagues who worked on this particular component, that is, Shannon Olson from NCBS, and Akhata Padhan, who was working as a coordinator. We thought that it would be good to put together a conference and online conferences during COVID-19 on citizen Science for biodiversity.

So that was the genesis of the conference, the actually, the platform CitSciIndia. The immediate activity was this conference. which I think started in. 2020 was the first one. and we put together an organizing group of a couples of others from other institutions.

And so, the conference showed us that you know there was a lot of interest. There were a lot more citizen science projects that people were undertaking that we didn't know about. because they hadn't come up in the news, or in having a conversation, and so on. And so, it seemed like the community of people who are interested in citizen science as an approach was larger than we thought, and there was a lot of excitement and a lot of interaction.

And so, I think we decided 2 things. One is to continue that conference on an annual basis, and the third conference happened last year. but also, to see if we could make this website more of a platform for other things than only the conference, so that work has been going slowly. I mean we in between, put together a directory of Citizen Science projects, and invited people to contribute their projects as well to this directory.

And oh, also, I think you know, we had a couple of working groups, one of which produced an output on best practices with data and citizen science. Thus the website kind of is also an access repository of some important information. So that's the genesis, and that's how we've been thinking about it so far.

Sagarmoy Phukan

So can you tell me about how you approach the government, and what was the relationship with the government like?

How they came into funding through the national biodiversity mission. And why did they start doing this? And what was the idea behind having them? Is the thing special about it in science? Because I wanted to know about the role of the Government as well.

CitSci India

Yes, of course, the national mission is a much larger idea, composed of many different teams. 11, I think, different themes too with the ecosystem services and livelihoods and health, and you know a bunch of things like that and put together by something called a biodiversity collaborative, which is a group of government and non-government institutions, government institutions, like, for example, in NCBS and non-governing situations like an Atree and NCF and a few others.

Sagarmoy Phukan

I would also like you to, you know, elaborate on by biodiversity collaborative as well, like later on, if you can.

So yeah. yeah, I mean I see it as an important collaborative centre of biodiversity in India, and it is also promoting citizen science.

CitSci India

Yeah, yeah, there is Not much to say. The collaborative initially came together to put together this proposal for the mission with the different people in these different institutions, having different interests and expertise for taking up different ownership over different themes in the Mission. Like I said, 10-11 number of themes. and the ideation and you know, activities to develop the proposal have come from the collaborative. But of course, I've involved the discussions involving many people outside this small group of institutions and or involving people all across the country on consultations and things like that.

I was interested in this specifically, from the point of view of 3 things that are in the theme in which I was involved, I'm. Involved, which is outreach to the general public, capacity building of various kinds of stakeholders in biodiversity-related matters which includes both the you know researchers, but also other people whose professional lives involved biodiversity, forest officers, industry, you know, with their sustainability goals, and so on. and potentially the general public. so sorry, that was outreach to the general public, capacity building for professionals involved in biodiversity, and the third component of that was citizen science. And I think it's very important that all the people we spoke to were also felt It was important because it was a citizen science as a way to involve the larger public in matters of biodiversity, in an integral way, in an actual, productive integral way. Not just that there are some experts somewhere proclaiming something, and the public just consumes that information.

That was the idea in citizen science is to be an active part of both, discovering new knowledge, as well as being part of solutions, or discovering solutions so. And there's been broad acceptance throughout. I mean all our partners are very keen about it. So, Shannon Olson, as I said, Akshata and I took forward this particular team, and so the initial seed grant for some of this work, for the entire preparation for the mission came from the office of the Principal Scientific Adviser to the Government of India. and at that time the PSA was Prof Vijay Raghavan who was very supportive and provided through his office some budget for various themes including our theme and within our theme including citizen science. And of course, we didn't need much money because the website is not very expensive, a simple website, and we just needed somebody's time.

So, if you are interested in Government support, particularly right now, you know, after the first 2 years of support from the Government, from the principal scientific adviser for the preparation for the mission, basically that was the end of it. and we've been waiting for the Government to announce the mission and launch the mission, in which case. you know, funds presumably would be allocated for different themes in the mission. But after the first 2 years of this preparatory funding that has not happened.

And in general, the Government I don't know if there is much awareness or interest in citizen science. I know that Prof Vijay Raghavan is very interested and he has known about our work for many years, but it's not clear to me whether other branches of the Government are as enthusiastic or interested in this.

Sagarmoy Phukan

So, I've been trying to reach out to DST because I have been here in Delhi right now. But I have not gotten any kind of response from them, because, like I didn't ask for stakeholder analysis like social network analysis, and try to find out like what kind of who are the main organizers, and like not organizations, and like in terms of government agencies and academic. So, I found DST to be one of the core stakeholders, in terms of citizen science and given that they route a lot of funds in there. And again, in terms of like. they have funded a few, you know. projects which are not just for conservation, but also for water, quality. and noise pollution. So, I thought like they would be important stakeholders, but have to go for any kind of response from them yet.

CitSci India

I was going to say, I think, in the biodiversity parts of citizen science. I'm not aware of any projects that have been funded by them. and Gita may have told you that a project that she had sent was unsuccessful at DST.

Have you spoken there? Some people in this IASC, I think there's a DST Centre for Policy Research, or something like that in the Indian Institute of Science in Bangalore. They organized a workshop a month ago, or six months ago. A half-day workshop on Citizen Science in various aspects. So, I think that's a DST-funded centre. Although that's you know,

DST in Delhi is different from the DST in institutions around.

If I could email you some contact information they came out with, in fact, a summary of a policy document almost on citizen science in India. Are you aware of that?

Sagarmoy Phukan

I think I must have come across. But right now. I don't remember.

CitSci India

I can send it anyway. Yeah, yeah.

Sagarmoy Phukan

Thank you so much. Yeah. Next, I would like to know about the impacts that you have been able to create through CitSciIndia in terms of bringing out new projects, and or, like you know, giving a platform to new projects, or what impacts have you seen through in the last 3 years that you have conducted through the CitSciIndia conference?

CitSci India

I don't know. I mean I don't think we had very great ambitions in terms of larger impact. We just wanted to get people who work on these related issues and projects to come together and get to know each other and have a platform for communication which, frankly speaking, the communication happens. A lot of interaction happens a lot during the one or 2 days of the conference. But hasn't continued much beyond.

So, I mean the idea. Yeah, it's just to create a small interactive group. But we Haven't pushed that outside the days of the conference. The conference is the main time when people get together. you know, you have to ask the participants. I don't know if you know people have got new ideas or new ideas for collaborations or other people as something we haven't been tracking. Certainly, one way. Useful output has been this document on best practices and data, various aspects of data through citizen science, so that has also been published as a paper and is also there as a kind of a working document on our website.

Yeah, we didn't. I Don't think there are any specific grand impacts to show you.

Sagarmoy Phukan

Have you thought of expanding it from biodiversity to other disciplines, like water, quality, air, pollution, or no explanation? Have you thought of taking CitSciIndia to other domains?

CitSci India

So, the genesis of it was in this context of the essay, the National Biodiversity Mission, so very firmly rooted in biodiversity and my interest is really within that domain, my general interest.

So, I haven't thought of expanding it. I can see the potential advantage, but I also think it's good to have a focus. so that the people, you know there is some common, strong, common purpose that that binds the people together. the DST consultation, or the workshop that I had mentioned earlier. That was about any kind of citizen science. So, people are doing, you know, rainwater, monitoring, and water, quality, and noise, and I think things like that.

But personally, I Haven't, and it's not come up yet. Possibly Shannon, now one of the Co-organizers, who is the director of something called the Echo Network, which has a much larger ambit to do with environment and sustainability. But we Haven't discussed, expanding it so far beyond.

Sagarmoy Phukan

so over these years, you have been involved with citizen science, and I've heard from a lot of people whom I have interviewed, that you have helped them to establish their projects as well or show them the path. So, I wanted to ask you the question.

What are the different motivations have you seen from this project? Organizers over these years there have been, I think a lot of different types of project proponents who wanted to start the project. So, can we elaborate on the different motivations they had to start with the projects?

CitSci India

Yeah, I think as probably 2 different sorts of motivations. So, we can also distinguish, maybe, between those who have come more from the science background. So, people who are researchers who have started projects. and the more grassroots type of projects, where you know, people on the ground have been interested. So, from the research-motivated projects, you know, some of them are kind of a little more in the academic side of things.

So yeah, you know in colleges most of the ones in India have slightly applied components, but you know they are not immediately, about conservation or something like that, like, for example, SeasonWatch is really that I understand how changing climate might change the tree seasonality.

Of course, I once said that there is also an education goal which is to, through this citizen science, activity, get the participants also more involved with matters with nature and climate in their case, mostly children. so many, actually many citizen science projects, and all of them perhaps, have this dual goal of both, you know, generating new knowledge, but also of seeing engagement and involvement of public as a good thing in itself. as a way in which you know to bring the public closer to these. These kinds of issues in this, for SeasonWatch its children. Some others are a little more, I think, explicitly Conservation focus. Perhaps the wild canids are very keen on understanding the status and change of canids, and the work that they do in the publications, and so on, are very much in line with that so much more applied kind of thing.

Then there are, from the point of view of the people on the ground. Whether it is. you know, Marine Life of Mumbai, I think, started by not a set of scientists, but people who are just very keen on marine life, and using the I-naturalist platform as a way to facilitate their project." Let's all get together, and let's better document the marine life." or the Kerala Bird Atlas which was a ground-up kind of effort, thought about by this group of bird watchers in Kerala, saying that, can we document the birds of our State was not the simulated by some kind of top-down, some

research in some university or institution, saying, you know this is what we should be doing. Let's all join together. So, they came up with it. and so, I think we see different motivations from both kinds of research. If I'm, if I'm to call it tack down that's the right phrasing, research side, and then the more the stakeholders side. And we also have. though you know, some of the work is more specifically about local people and their livelihoods and their requirements. For example, Dakshina's work with the fisheries in Lakshadweep where the fishermen themselves, you know, document their catch on data sheets, and the idea is to monitor their resources. How are the resources that they are using? They didn't rely on how those resources changed over time.

Yeah. So, I think this: it's not easy to categorize exactly. But there is this mix of possibilities. Yeah.

Sagarmoy Phukan

from Dakshina, I just remembered, like even during my scoping review, I found out the way they're helping in livelihood as well as in Arunachal Pradesh, West Kameng. I got in like how ecotourism has flourished after birds come there. So do you see a way that citizen science can also increase livelihood in people, this is something I have not read about a lot, or people have not talked about a lot. But do you think that citizen science in some way can increase the livelihood of people like people in grassroots areas by maintaining the resources?

CitSci India

Yeah, I mean, the one is the livelihood as we talked about where it is sufficient the actual things are being monitored. But directly the resource that is being extracted. and obviously to be able to manage one's resource, one has to know how it's. You know what the status is, and how it's doing so the results are declining. Then we, you know, there's a lot of people who have to worry about it. If it's stable or increasing. Then it may be okay. So that's one aspect, the other possible livelihood could come from these non-extractive benefits like, for example, eco-tourism, bird watching and things like that.

and I think that especially in the northeast. but perhaps also in parts of the western ghats and Western Himalayas. There is an increase in eco-tourism, you know, and that we could do a lot of bird-related tourism. and so not in. I don't know if it's in a very conscious way in many of these places where, because of you know, platforms like either I-naturalist, people are documenting. and then others get to know who there are. You know there's this diversity of birds there. They also, through these platforms, can get to know the guides, the people, and the Naturalists who are there. and I think naturalists have also been using the platforms to showcase the diversity of birds and to showcase their own. You know skills and abilities.

This is not a built-in purpose of the Citizen Science Project, but It has emerged, you know, just like, for most large efforts they may. They may be designed for some particular thing, but people use them for all kinds of things. you know. Facebook might have been designed for one thing, but we use Facebook in all kinds of different ways, or Twitter, or whatever it is so in in ways that the original, you know, people would not have anticipated. but having said that there are some, you know, unintended benefits. Having said that, I think again in the northeast, there are some dedicated efforts to specifically use citizen science and the citizen science platforms to document and highlight local diversity, in Nagaland for example, I know I'm forgetting the name

of the village, but one of my colleagues was involved in going in helping change some of the local youth, and to use either to document birds and then to be trained, as also naturalists, who can guide tourists, I think, in Dibang in our natural as well. There's a group related to NCF. And do it also, but then it's kind of the staff themselves are doing it local stuff.

So I don't know whether to call it citizen science or not.

Sagarmoy Phukan

Yeah, is it part of the Hornbill adaptation program?

itSci India

No, no. hornbill adoption program is in the western part. But in Dibang Valley there is a there is a group of people who work on various aspects, on community resource management, you know, biodiversity, conservation, and so on. But recognizing that bird tourism is a big thing.

I think they're increasingly they're realizing it's about exploring and documenting the diversity of birds. And then kind of showcase it to the outside world. So, I think this may be the intersection between citizen science and I don't know local community empowerment things like that in Chhattisgarh, also one of my colleagues was involved in going to some villages there at the invitation of the forest department.

They wanted the Bird tourism to take off, and some of the wetlands there.

So, they identified a bunch of local youths to be trained in better identification and documentation. So again, I think there was we had. He had gone and done this for a few weeks, and people at the local people are continuing to watch birds, upload them upload the sighting. So I think there are more examples of these places where local communities or stakeholders like departments are trying to use these opportunities to gain more visibility.

Sagarmoy Phukan

I'll just go to the next question because this has become interesting, but I think we can talk about this for a longer time, but to get more questions done. I wanted to know about the mechanism that you use to reach participants like you have been involved with several projects. So, what are different ways that you have, like your projects, tried to reach out to participants, over these years the outreach strategies might have changed. So, what ways have you gone through, and what challenges and barriers we have seen through these processes?

CitSci India

You know I think one thing first, you know, is to kind of divide our projects into a couple of different kinds. One is where you are trying to reach a set of already skilled and interested people. Let's say, bird watchers. so like Bird Count India or doesn't want to necessarily reach the general public. because the general public cannot directly participate in bird monitoring, because it requires some skill training and understanding. So, there are the audiences already kind of the set of bird watchers who are already involved in bird watching. And then you know, the challenge is how to reach them.

On the other hand, maybe let's say, SeasonWatch was trying to reach children, but not the children directly, but through the teachers and the schools. because the children themselves won't, participate. It is through the teachers and their nature clubs or whatever.

So, as you can imagine, you know, there are different strategies for each of these. For example, the bird counts India's strategy is a lot. I think, focused on social media where there are all the existing groups of bird watchers. because they are already organized into these groups, whether it's Facebook WhatsApp, or whatever else. Where is SeasonWatch that doesn't help so much. The season watch tries to find schools on networks of schools or other ways to reach great schools. So, through a local partner like in Kerala, you know, Matribhumi, the newspaper.

or whether it is sometimes a state level, education, departments, or other NGOs who work on work with schools, but not in this space necessarily. But they work with schools on education, reform, teacher training things like that.

So, the strategies are quite different. It's always nice to have articles in the mass media about the work, but I think we try and do that from time to time. But those don't necessarily. That's just for general public awareness that these things are going on not necessarily to be able to find the participants. because the general public, the number of people who would participate is very small. so usually the more targeted outreach is, is what is preferred. But having said that it's none of it is easy. It's all very difficult. People may know about their project, and you know, maybe have the skills and all, but still not, you know, come forward and participate.

Sagarmoy Phukan

Towards the last, I would like to know about the funding, so how much help there has been from the Government on different projects that you have seen till now.

And has there been like, in funding for businesses and industries? Or do you see there is a potential for businesses and industries to fund citizen science projects as well?

CitSci India

I don't think it's on the government's radar at all. and I think unless there is a dedicated allocation, a dedicated channel for citizen science. I don't think it's taken seriously. At least not in the science funders. I don't think DST. And DBT. CSIR is in this. The traditional Science fund in India. I don't think, have taken it seriously. Or maybe we'll take it seriously unless there is a specified channel for citizen science.

It's possible that the other agencies whose primary goal is not funding like MOUF. and so on. They may fund some of this as part of some larger work. But they are evaluating, you know, proposals not necessarily on for scientific. Whatever novelty alone. They would be thinking of other kinds of so far, I think the potential is great, and in other countries, we see that in the last, 15 years increasing number of governments have come on board and have encouraged. You know whether it's North America or the European Union, for example, as a very large effort towards so India has not yet there yet from the Government side that hopefully, you know, it will catch it. We need some champions on the inside of the Government to do that.

Most of the work that I know on this has been funded, either by individual philanthropy all by through CSR. And so I do think there is a role for industry through CSR. But of course, whenever it comes to environment or biodiversity, we have to be careful about our relationships with the corporations and industry because of conflict of interest, and because, you know, they may not

have the same things in at heart that we do. But if I think, keeping that in mind, there are, there are the companies I'm the wealthy individuals who are on the same wavelength and want to see this succeed

So far that's I what think, the main source of funding. and I think you also in your document talk about crowdfunding, so I have no problem if you find it differently. But my understanding is that crowdfunding for anything to do with nature or the biodiversity environment is very, very difficult in India. People seem to be successful at raising money, for, let's say medical expenses, or for public health or education-related projects, but in the environment, biodiversity doesn't seem to work. Not much, at least.

so, I don't see much of an opportunity there.

Sagarmoy Phukan

just like you have said about. I've been very dedicated to funding even, I think, because, like I felt like, you know not, as you have said, North America, or even European Citizens science associations. I think, around a 95-billion-euro package for the whole setup, I think, through the horizon 2020 funding. which I think, has helped them a lot, as has also helped them set up several projects as well as institutes, to look after citizen science.

So, I think we are almost done in terms of the interview. Thank you so much.

Do you have any other questions that you would like to ask regarding this?

CitSci India

No, I'm. I'm looking forward to seeing what your overall summary of this is.

## CCS\_KF

Sagarmoy Phukan

So, starting with, I would like to know about your organization, the projects where you used to have citizen science, or you still use citizen science, and your role within your organization as well.

CSS\_KF

So I work as a conservation educator. You know it means that I talk about and educate people about conversation, wildlife especially, you know. But I also used to work on a project called Climate Smart Schools, where we worked with the communities, especially because this is one organization that is situated in a very sensitive area. It's called Nilgiri Biosphere Reserve and within the biosphere reserve. You know it's India's first biosphere reserve, and there's like a lot of community members like indigenous communities along with a lot of wildlife and Flora and other things. So my job was to work with the community members to do something called community-based conservation.

So we talk to community people, and we educate them, and we follow curriculums that we have developed over time, you know, to do these outreach programs to build a pro-conservation attitude or a pro-conservation outlook on things. So we also work a lot with communities on human-wildlife

conflict, especially. These are some projects that I have been involved in since I joined this organization. Yeah, that's about it. Climate change and my life conservation.

Sagarmoy Phukan

So are the people directly involved with any, you know, data, collection or any scientific, you know, experimentation or developing research questions for your project or whatever you will get to work on?

CSS\_\_KF

Yes, so most of our projects are based on community-based conservation, which means right from the start to the end. That is the involvement of community members, you know, especially young people and women who we involve. There are a lot of people who are with us to develop these questions, to do the surveys to collect data, and to analyze them. And then, you know, to also be there to do all these education and outreach also.

So over time, doing all of the outreach to me, training other people, especially community members and the village representatives. To do this. You know, education and outreach and communication is a transition that I have taken off. So you know, throughout the project there is involvement of communities.

Sagarmoy Phukan

Okay. So you'd say, like us, see, citizen science is something like a. You know tool or a process that you use within your conservation-based activities. Just the part of it. It's nothing that you are mostly focused on, but rather a process that you use.

CSS\_\_KF

Hmm. We believe especially, you know it's not about the process or citizen science being a tool. It's more about ownership for us and responsibility because you know the community members, the people who are living in a fragile ecosystem and the people who are on the front lines of you know, people who are bearing climate change effects, and all of that. They should be responsible, and they should take up ownership of the kind of environment that they live in to do the research or to do implementation, or action research. So that is more like a thought process for us for the community members to be able to take responsibility and ownership for the environment that they live in.

Sagarmoy Phukan

So I would like to know about the impacts that you have made on your project

through, involving people actually like how they are aware, like the things that you have said you wanted to create ownership about people or their ownership above, around the ecosystem that is that they are in.

So have you been able to create any kind of impact, both in terms of you know, social impacts or environmental impacts? What things have you seen for your projects that have come out?

CSS\_\_KF

Yeah, so far none of these impacts are scientifically evaluated.

So you know, my answers wouldn't be as precise. But there's a change among children and adults, both alike in how they see their environment. You know a couple of examples where you know, when I was going to schools to teach these children about birds, and how to do birding, and you know how to use citizen science platforms like e-bird and all of that to monitor, and to, you know, register their observations. You know people have picked it up, and over time I have disassociated from these schools, while the children that have formed these groups, these groups of you know, friends of nature and friends of the environment, in terms of the bird and all they've named themselves different names, but you know they continue to use the e-bird especially. You know these are all government tribal residency schools, children who are not very used to using technology, children who are not used to seeing what is around them, and all of that while they live in a place that is filled with, you know, really pretty things, you know. colourful birds and all we you know, just to show them how to take some time and to observe all of this, and to register their observations has been a process. But also, while I have disassociated, they continue to, you know. Do all of this citizen science platform. You use all of the E-bird and all.

So they do it a couple of times. Send me some recordings and all of that of the license near the house they started monitoring, you know, observing how the behavior of a particular animal is. So all of this is something that they have done out of their interest. So there's an incline and interest to learn more about nature within the children and a couple of other incidences where, when we talked about bees all children have started to be there on Bee boxes and started to grow bees.

you know Api Culture and do Api Culture and all of that in their houses. So it's a progress. But since it's not scientifically evaluated, I don't know if my answers would be usable to you.

Sagarmoy Phukan

I just wanted to know, like if the changes that you have seen around so have also motivated you with certain, you know, to take up certain actions, or you know steps to do it. Take it farther.

Things that have motivated you from looking out from after, you know getting to know about how your participants are working.

CSS\_\_KF

I'm for sure. You know it's always delightful to see young children aged, you know 12-13. Come up and tell me, "Miss, look at this. This is something that I have recorded for the first time and it's a rare

species or something like that." And you know children coming up and telling me that they want to grow up and becoming it, you know, becoming. They want to grow up and become an ecologist, or, like you know, an environmental activist or a biologist, or something like that. It's always delightful to listen to them and to be able to see them. Do all of you know, implement, or take action for what they are learning?

It is delightful, but I think it's also about the sustainability of a citizen science project. You know, I don't think a single-person project can be run for a very long time, You know there's only so much that a single person can do or reach out to, or, you know, be able to mobilize people enough.

So I think while it is delightful to see children coming up to me and saying that they are interested in what I do and what I teach them, and what they do and what they've learned. I think it's also me analyzing things on how far as to I can take this project by myself.

Sagarmoy Phukan

So what kind of barriers have you? Have you come across like for developing the project like since you said there is like for one person, it's quite difficult to take on the project or make it a sustainable project.

So what other barriers have you seen?

You know things that you can say, okay, like against? If there were some funds. I could have done better, or if there was some kind of support from someone else, maybe a certain partner, or having a group of collaborative organizations around you would have done it better.

CSS\_KF

I think it would be. I think, the biggest barrier so far for me has been designing a curriculum that is relevant to the place that I'm working in. I have observed that you know that most of the material is based on you know citizen science material. You know, basic curriculum modules and all that are based on popular tiger reserves. Or, you know, popular cities where there is a lot of environmentalism and environmental activists and all of that. So if I'm going to be going to a remote village, I'm going to be teaching the children there about something that is happening in Bangalore or Chennai. It wouldn't make sense. So for me, developing the curriculum itself that was relevant to the place that I was going to was difficult.

Yeah, one is the curriculum, the other. I don't think it should be funded, but I think it is an important factor when you're doing a project especially. You know we did have a lot of funds when we were doing the Climate Small School Project and the Human Wildlife Conflict Project. We were able to buy binoculars. We were able to buy cameras, so that you know, to lure children into birding and photography.

Through boarding, through photography, they were able to see. You know what they want to protect. So I think funds were never a problem so far for us. But it should be something to consider going forward.

But yeah, curriculums especially, and I think manpower also was difficult, but also the language because we deal with different. It's like a tri-junction area where you have Karnataka, Kerala, and Tamil Nadu. So 3 States talking 3 different languages. It's different, or it's a little hard to convey your message properly to the person that you're talking to.

Sagarmoy Phukan

If I wanted to ask. Sorry to like, because you were talking about the language which I have seen has become an important part.

while you know, talking with just communicating with people, especially in terms of earlier years or in tribal areas. So in that case, have you tried to use the local language, or have your curriculum be translated to local languages?

CSS\_\_KF

Yeah. Most of our curriculum that we develop in-house is translated into the local languages, but you know it's also about the capacity of one person as to how much I can develop and translate. If there was existing material that I could use in the local language itself would be really, it would ease out my process.

So I could focus just more on using the material to teach children rather than, sitting. Making the content, researching, making the content, translating into multiple languages, and then going and teaching. So I think, developing more curriculum. One region-specific and 2 in the languages that are, you know, used in the region itself is important. I feel. But other than that, one of the challenges that I can think about is just the diversity of people. So I work on one side with the tribal children and one side with international children. So you know the kind of environment both the children grow up with or not only children adults as well as to how receptive they are to the information is also something that we should consider going forward.

What kind of material are you going to teach to which set of audience are you going to talk about? You know climate change and using less plastic to a tribal person? Or are you gonna talk about the same things to a person who goes to an international school with more resources to spend and more resources to use?

Sagarmoy Phukan

Yeah, I wanted to know about it.

How involved are you like, you know, at the local government around you, to grassroots organizations. and other organizations that maybe business or industrial houses?

How involved are they within your project, and later on now to also ask you to? You know, Mark how interested and how influenced they are, but I just wanted to know who are involved with you, and how are they involved with you currently?

CSS\_\_KF

So, when we started off this project called the Climate Smart School. It started as only us working in like 4 or 5 schools developing youth leadership.

But I think since we have approached our government, The Government has made it, you know, like a school curriculum as a part of the subjects that the children learn. So I see a lot of reception or acceptance from the Government, especially the Board of Education. where we've been given 2 slots a week, you know, like any regular classes, like music, class, or like Dt. Class.

we have been given slots in the week where we go, and where not we. We have climate educators, and these limit educators are then trained in House the community members who then go to these schools to teach the children.

So I feel like there is a good amount of reception and acceptance within the Government, especially the Education Department here for us to go and implement projects on climate change and wildlife conservation and other things like that.

Sagarmoy Phukan

So your project is okay, because, like previously, I read an article

which says that was like a decade back where the teachers were not more involved, like they, even the students were not involved. After all, this was not part of that curriculum. Now, it's great to know that the Government has taken an interest in this. made it a part of the curriculum. It's like an extracurricular thing. Is it right now?

CSS\_\_KF

It's more of a co-curriculum thing rather than an extra-curriculum thing.

So children are. The children must sit through these classes in for the teachers to also participate. But I think with the teachers. It's also how much more work are they doing, how much more effort are they putting in with just the introduction of another class.

So I think while there is acceptance from the larger government, your Department of EducationEducation, and all of that, I think the teachers still need to be a little bit more interested and involved to do this curriculum within schools.

Sagarmoy Phukan

So, regarding the fund, do you think there can be an influx of funds from businesses in the industry? Are they taking up any interest in these projects?

And What is the potential for crowdfunding your project?

Is it possible? it may not be possible. As well? I'm asking in a very general way.

CSS\_\_KF

No, we don't do crowdfunding. We've not done it so far, and I don't see us doing dates in the future also. Also, both the projects that we're doing within the climate change program.

They are CSR grants from 2 businesses. It's called synchronous technologies and a microland foundation.

So they're both computer and IT-based companies where we get CSR funds from.

Sagarmoy Phukan

Okay.

it's good to know because I was also wondering how you know businesses and industries can contribute.

And yours isn't like a very good example, where I can potentially see that businesses are also playing through their CSR funds to promote citizen science

like, is it like they know that they're

It's part-like. Do they know that their fund is being used for the participatory process? Or is it like they're funding you, and then you, you know go on your own and do a project?

CSS\_\_KF

No, no, they know that we're using participatory methods. We write the project with the methodologies, and you know possible outcomes and challenges and all of that. Then we submitted it to the CSR Companies.

and they go through the project, and only then they give us a fund. So, they very well know that it's you know, a participatory methodology that we're using.

Sagarmoy Phukan

Okay, and anything that you would like to add regarding, you know.

barriers to funding or what you have seen, or are there any other things that you would like to add, like, where funding can be, you know, taken from

CSS\_\_KF

Touchwood, I mean, we have not had a problem with funding. So far.

we've been able to write for projects, and continue our work, and our granting agencies are kind enough to support us if we want to continue our funding and continue our progress. So we've not had a problem or challenge with funding agencies as of yet. That's something that we should see in the future on how challenges come about since it's a very early project.

Sagarmoy Phukan

okay, great. I think we are almost done. Just the activity.

Is there anything that you would like to add on your own?

CSS\_\_KF

No.

Sagarmoy Phukan

you see something that can be a barrier or challenge. or any of your success Stories

CSS\_\_KF

As I said. You know. I'm. I'm not sure if we can call it a success story yet, because it's an ongoing process; and second is that we've not evaluated anything, you know, with proper methodologies. So, It cannot be called a success story Yet.

Sagarmoy Phukan

Okay.

So, would you be in like later on? Would you be interested too, you know?

like? Look into how the participants have their motivation changing, and

all that stuff.

CSS\_\_KF

Yeah, for sure, I think an evaluation. I mean, I keep talking about evaluation to you about how we've not done an evaluation. But an evaluation is important after citizen science programs because you know you wouldn't know about the outcomes of a project or The amount of effort and funding resources that you've put into a project, especially participatory. So you know, when you're doing when you're putting in so much resources and effort, I think it's important to conduct an evaluation, and we're looking forward to the next 6 months being solely contributed to evaluating all the projects that we're doing, and so far about the human-wildlife conflict Project especially, you know, just to evaluate. If people's perceptions have changed throughout, because of our major education programs,

we've done a lot of state plays. We've done a lot of theatre. We've done a lot of major education for children in the communities. So you know, the next 6 months should be focused on evaluation and see if people's perception towards wild animals has changed.

Really. So yeah, evaluation is necessary.

Sagarmoy Phukan

because I have thought of actually undertaking up an evaluation, through you know over different projects which are during India as a follow. Up to this project, which I'm currently doing, I'll be happy to, you know, get in contact with you again, and share, and, before that, I would love to share whatever process I'm doing with you and other people like other organizations with whom I had contact like a Atree or season watch and all.

So would you be happy to collaborate on that?

CSS\_\_KF

Yeah, for sure.

Yeah. The evaluation we, not we not? I see that you sent a link.

Sagarmoy Phukan

Yeah, this is the activity link. I will tell you how to go around this.

CSS\_\_KF

So for sure, I think collaborations are important, because, you know, exchanging skill sets. It's very useful for a small organization like ours. So yeah, we'd like we'd like to collaborate. I could talk to the extended team members, especially the person who's currently handling the project. you know. So I feel like collaborations could be seen in the future. Yeah, you can write to me, and we can see how we can take this forward.

Sagarmoy Phukan

Sure, Sure. Thank you so much.

**MIAP\_ATREE**

**Sagarmoy**

As I have already talked to you about my study. I would like to take a consent from you to record our interview.

**MIAP\_ATREE**

Sure. Please go ahead.

**Sagarmoy**

So at first I would like to know the role that you have in the project, the name of the project, and the organization you are technically with

**MIAP\_ATREE**

So the name of the project that we're involved with it's called Mapping Invasive Alien Plants and it, you know, so far we've just run it as a pilot and it as a collaboration between ATREE, which is my parent organization (Ashoka Trust for Research in Ecology and Environment) based out of Bangalore, India, and the Keystone Foundation which is an organization based in the Nilgiris in the Western Ghats.

And yeah you know my role has been, as the I guess I brought in the money for it, so that, you know, makes me the principal investigator. But it's been a very collaborative project, involving, you know other colleagues from a tree as well as colleagues from Keystone.

**Sagarmoy Phukan**

So how does your organization actually lead to citizen science? And how do you like... How you have become involved with it? What motivated you to take up this process of investigation into research then other pathways?

I would also like to know about how you build up this collaboration between different stakeholders. Right now. You've talked about Keystone Foundation and ATREE working together. So how do you find, like, how do you collaborate with such organizations and how the motivations between your organizations have helped to come together

**MIAP\_ATREE**

So I think, the first part of your question, which is, you know, how is it involved in citizen science? I think it's not necessarily ATREE itself. But you know, over the last 15 years or so there's been a growing interest in citizen science, at least in the conservation field, and I would credit for a lot of that to Suhel Quader. He was one of the first people to start citizen science projects in India. A lot of people have taken them up in different ways. As you know, also within ATREE I have other colleagues who are doing citizens science projects, whether it is working with communities who do fish counts at the Vembanad lake and the you know monitoring migratory up to population. So I think citizen science is in the air if you're like now.

But yeah, when it comes to how Keystone, and our organization started working together. I think we were already working in this particular landscape together of the Nilgiris. Several of us, and, you know, invasive species are a big issue in the Nilgiris but invasive species are not yet a very well known issue in India. Neither amongst the scientific community nor amongst forest managers and so they're only just now, Forest managers are only just waking up to the issue of invasive species. But you know, how do they prioritize management which invasive species should be prioritized, which habitats should be prioritized? There isn't enough information about all of this.

And we felt that citizen science was a good way to gather information because it acts as a as a multiplier. You know, citizen scientists can contribute to gathering data at scale which individual researchers, or even teams of researchers, can't. So that's how we got started with this.

### **Sagarmoy Phukan**

So have you been? I know your project is quite new in that respect, but have you've been able to make such a such successful impacts among the community, and also on the topics that you are working you can tell me from your previous experiences as well.

### **MIAP\_ATREE**

So you know, as far as our project goes. You're right. It's very new, and it started as a as a pilot, but I think the whole process of of going through this, you know, working with citizens even to come up with.

You know, when we first started we had certain ideas of how we would do this, but it has been an iterative process of learning for us also in terms of you know what would work with citizen volunteers what wouldn't.

So trying to device the sampling protocols trying to strike a balance between what would be meaningful data that could be useful to researchers or managers, but at the same time easy enough for citizens to to collect. It's all been a very sort of intense and learning experience for all of us.

And I think you know slowly, I mean, our project is literally 2 years old, and most of that time has been during the **lockdown**. So it's only in the last 6 months or so that we actually were able to get out and start meeting people in person and doing things. But even so, you know, there seems to have been interest from various different quarters about what we are doing, which has been very encouraging for us, and you know, gives us hope that we can now start to scale up beyond this pilot landscape where we were working.

### **Sagarmoy Phukan**

Do you feel supported by you know, other agencies like government agencies? And all while doing this, or like you have to work most of the time alone prove something, and then they will help you later.

### **MIAP\_ATREE**

So I think, you know we were lucky in that. We, you know the Spider Project was in Tamil Nadu in the Nilgiris. Tamil Nadu of all the different States, the Tamil Nadu Forest Department has been further ahead when it comes to thinking of invasive alien plans.

Because, you know, I think, Tamil Nadu has an active citizenry and is actually, you know, there's been several *public interest litigations* filed concerning invasive plans. So the Government has had to take note.

I think the Tamil Nadu Forest Department is the first State Forest Department to have come up with a policy on invasive plants and ecological restoration. They call it the **Tamil Nadu Piper Policy on Invasive Plants and Ecological Restoration**. So in that sense, I think, this relevant Government department was very receptive to what we were doing. It may not be the case in other States, we don't know yet. We'll find out.

But so you know, because we were working with college students and community members in the larger landscape. But for mapping invasive species in protected areas we had to work with the Forest Department, but they were very cooperative, and you know, sent their forest guards and watchers to our training programs.

### **Sagarmoy Phukan**

How do you reach out to the participants? What kind of...? Do you use social media or are there different types of mechanisms that exists? So I would like to know, like. I know that the mostly people it's easy to do for social media, but there are different pathways as well.

So how do you recruit and reach out to participants, and, you know. like communicate with them over the success of the project, or how the project is moving towards, like is there a regular communication with them?

### **MIAP\_ATREE**

So the thing is that, you know for a lot of people watching. You know birds, or even butterflies. It's something they they do as a hobby. Some people even go and spot trees as a hobby. There's the SeasonWatch which has been around for some time, and you know, there are a number of participants who take part in SeasonWatch and report phenology. 'Invasive plants' is something that is completely new to most people.

So it's in that sense this isn't something... So this is something we're also having to learn and figure out what is the best way of doing it. But it isn't as if you announce something, and then you take people out, and then they will continue to do it on their own. After that I think we are finding that you know, event to event, we are able to get participants, but

unless we create those occasions it's harder to get participants to voluntarily contribute information on invasive plants, because it's not something that they think about a lot.

But to answer your question about how we reach out to participants. We've tried various different things. We've Keystone Foundation because it is, you know, rooted in that landscape. They also run a radio, which is like a local radio station. So in the in the early days of this project we run a series of radio programs in the local language, just, you know, starting out by introducing people to water invasive species and gradually building up to the need to map them. So that was one way another way was, of course, through social media.

Then again, you know, because of Keystones, connections and networks we were able to reach out to various community groups, local community stewards who work with Keystone and local colleges in the landscape. Then people already had some connections with the Forest College through the Forest Department. Of course, guards and watchers for individual protected areas, again through the forest department. So it was very much a word of mouth thing more than more than social media. I would say, yeah.

### **Sagarmoy Phukan**

So you there, I have come to the questions from here: the use of local language. How important do you feel? And do you think there is a lack like while communicating with people?

### **MIAP\_ATREE**

I absolutely agree. I think a local language is very important when you know you can't assume that everyone will understand English. Even the app, you know. So we for our work we, because again it was a pilot, we initially thought we would create a customized app, and then realized, you know, that's quite expensive, and requires regular upkeep, and we didn't have the funds for that at this pilot state. So we decided to use **Google's open data kit** and *customize forms* for our purposes.

And one of the reasons for choosing that was because it also allows you. You know, we we came up with a list of priority in as it plant species that we wanted people to go out and

map and in addition to including thumbnail pictures of the individual species. It also allowed us to write the common names in Tamil because we were starting this pilot work in Tamil Nadu, and I think that was very useful, because for a number of participants, whether local community, stewards or the Forest Department guards and watchers not having, the names, in Tamil would have been a serious obstacle to their participation.

### **Sagarmoy Phukan**

So right now, are there any involvement which, like beside the Forest Department. Are there any involvement of other organizations within the project? Let's say, for funding, or for like you know. so like funding for some of the CSR activities or something like that.

### **MIAP\_ATREE**

So not CSR activities but you know, a couple of years ago there was a new initiative that was launched in India called the National Biodiversity Mission and the idea was that it would be like an umbrella organization, a network of organizations.

Then the Government, provided, you know, like the first phase of funds to set up the mission but then COVID happened, and the second phase of funds was held up. As a bridging effort, sort of like to create a a bridge between the first phase and the next phase of the National Biodiversity Mission, Professor Bawa who is the founder president of ATREE. He and several others together set up something called the Biodiversity Collaborative which you know, with an emphasis more on the public engagement and outreach aspects of the work that National Biodiversity Mission had taken on as it's one of the themes of the National Biodiversity Mission. Of course, the other themes, what I think, you know, is waiting till the next phase of funds come from the government.

But so, through Biodiversity, Collaborative, you know we were able to engage with them. And they collaborated with us to create individual information sheets for individual species that we were mapping so very nicely. Hand drawn things, very attractive, very accessible. And they were also interested in taking this Mapping Invasive Alien Plants Citizen Science project to some of the landscapes where they were working. So that's been one of the collaborations, or you know places from where interest has come.

Another is a Nature Conservation Foundation, their team in the western cards got to know about the work we're doing in the Nilgiris, and they have a base in Valparai, which is not far. So then they invited us to come and do a workshop. They're also with the Forest Department because they work very closely with them, so initial interest from different different organizations not funding but interest.

### **Sagarmoy Phukan**

Another thing which I wanted to ask was going back again like to the events. So I have seen that most of the time, events have to be created like, for example, Bihu Bird Count which we have in Assam and this way, like a number of events have been created.

Do you think that there is a possibility that there can be a continuous participation instead of having events? But right now it seems that events are one thing that draws people more, but that's like for a particular period of time, like, say, 3 or 4 days to maybe a week.

So do you think there will be a lack of data during the other period, or what you feel can be done to create a continuous participation by the participants?

### **MIAP\_ATREE**

I mean, I think it's inevitable that you know people will not have necessarily have constant interest in something like invasive at least, speaking from our perspective, you know, invasive species, for instance, it's. It's just not something that is on the radar of most people.

It's very different for birds. There's a large bird watching community in India. They people go out and watch birds, regardless of whether or not there's an event. you know there's like I i'm in Delhi right now, and you know i'm on a on a bird watches Whatsapp Group, and there's a constant influx of photographs every single day, because people are out there watching birds. i'm Sure, i'm sure there are other interest groups like that also people who are really passionate about maybe butterflies, or I don't know dragonflies, but I think invasive plants are much more obscure kind of topic.

But I think, you know, maybe the way to try and ensure a more continuous participation for something like invasive plants is to tie up with other interest groups like bird watchers, groups because they're out there watching birds all the time. Perhaps if one could reach out to that community, for example, they're spread out across the country. That may be one way to, you know, to try and make sure that there are data coming in more continuously and from a wider area.

### **Sagarmoy Phukan**

Another thing, the last question on the funding part which I want to ask about. So there are 3 questions to it:

- The first thing is, do you feel that businesses and industries they might, you know, fund these projects because we can see HSBC doing that.
- What is the potential from other industries as well?
- And is there a potential for crowd funding in India like? Will people pay up?

### **MIAP\_ATREE**

I so I don't know too much about crowdfunding, but you know, I've heard that people have been successful getting crowd funding for a specific specific kinds of activities. Again, you know, I think if we were talking about something that is better known, it's something that's more attractive to people they probably would be interested in crowdfunding of something like this.

In terms of you know other sources of funding like CSR and things, I think there are distinct possibilities, because you know, depending on the business house, for instance, you know, there are people who are quite aware of issues. And also, you know, the I think CSR funding is often very interested in having impact at large scale and something like citizen science, You know. I talked about the *multiplying effect* earlier. It's certainly one of those things that could potentially have an impact at scale. and also there's technology involved. You know, most citizen science projects rely on some sort of technology platform and things. So I think all of those things are attractive to CSR and donors. So I think there is potential yeah.

## **Sagarmoy Phukan**

In terms of technologies like, do you feel within the last decade, when there has been an internet explosion in our country where most people have been able to get some kind of Internet connection. Do you think that, the number of projects have started rising, or that number of participants have risen through this period... just because of the Internet coming into the scene.

## **MIAP\_ATREE**

So I mean, this is purely based on gut feeling. I haven't looked at the data, so I don't even know whether there has been an exponential rise in number of citizen science projects or not or whether it's just a you know, like a snowballing thing that initially, nobody had heard of citizen science. And now with more and more projects, other people, you know, and start doing things so, so I don't know what to attribute it to.

But I would certainly say that you know the you but ubiquitousness of smartphones plus you know the fact that people have access to the Internet so easily. I'm sure all of it has contributed but I can't attribute it causal relationship. Yeah.

## **Sagarmoy Phukan**

What recommendations would you, you know, give to people who are about to start new project from your experience of starting a new project? Just a few...

## **MIAP\_ATREE**

But I think from what the little that we've learned over the course of our work. I think it's important for people to to feel that it's it isn't just a one way.

It's not a one way street, you know they're contributing data, and somebody else is using the data. I think the fact that you know the data are readily available they can also go and

look at the data and say, okay, I contributed those points there and you know, they can download the data for whatever purposes they might want to.

I think there needs to be the sense of ownership that goes beyond just contributing data to somebody else's effort. *I think it it needs to.*

It's important for people to feel that they're part of something, and contributing to something that they are part of not just being used as data gatherers. Yeah.

I will just to go back to your previous question. Another point. I would like to add, I think also that sometimes citizen science projects at least someone just starting out trying to do something with citizen scientists; one might be a little ambitious in the kind of data one wants people to go out and get, or this kind of observations one wants people to go out and make, but at least it's been a learning for us that you know things that we, as researchers take for granted.

We cannot assume that that comes naturally to other people. So I think it. It requires some learning to come up with something that that is easy for volunteers to do so. It's not taxing, because if it's taxing, people are not going to do it, so it needs to be you know, simple enough for people to do and yet be something that still yields meaningful information.

### **Sagarmoy Phukan**

Do you feel it's like very important for the researcher to understand the psychology of the participants, like the motivations that might come with and may be it increases or go down from time to time.

Sometimes they are more concerned with the data rather than how the about the participants. So there needs to be a very good connection between what of the people on both sides?

**MIAP\_ATREE**

Yeah, I think so. I mean, if you're only concerned with the data, then you're using the participants just as data collectors, which is a different kind of citizen science, I guess. Whereas I think if you, if you want to involve people in in more meaningful or in ways that are more meaningful to them. At least, then I think one needs to have more of a two-way exchange.

### **Sagarmoy Phukan**

Thank you so much. I appreciate, for you know you giving me the time. So at last I have this activity...

### **NIAS**

### **Sagarmoy Phukan**

*So, I would like to know about your background in terms of what you're working on and the role that you had in your Citizen Science Project.*

### **NIAS**

Currently, I am an associate professor at the National Institute of Advanced Studies, and I lead the Science Communication program here. So basically, my basic training is in cognitive science, mainly the behavior of animals.

However, I was interested in education and science popularization from my Ph.D. Based on birds. So, I used to work for. I used to conduct programs for All India radio, and television channels. I used to write in the newspapers to make science popular. Currently, I have projects in the area of animal cognition and conservation. So, one of the major aims here we are trying to do is we are trying to study it. We are trying to study the mega fishes of India as well as subterranean fishes. and we are trying to develop behavior-based strategies for enhancing their survival.

So that is one line of major work going on. Second is my teamwork in the area of science communication. Mainly 4 lines of work are being conducted nowadays. One is understanding the science of science communication. where we try to understand how different stakeholders think about science communication, and how they want to see the system in the coming years.

The second line of work focuses on disaster risk and climate change communication where we are trying to understand how different stakeholders perceive climate change, and how the information dissemination happens at the time of disasters, especially cyclones.

How we could enhance the protective action decision-making using the tools of science communication.

So third area is called communicating science In the classroom. we try to develop modules, so that. differing from the conservative or traditional pedagogies how we can communicate the information which is scientific in the classroom more efficiently.

Parallely, another group is working on medical communication. That is mainly the vaccine acceptance which we discontinued immediately after Covid because we were working at that time, because that was a

Because my team is not that big. But since there was a demand for that, we want to know that as well as we are trying to understand public perception of artificial intelligence, and how they want to see how or how we should communicate the problems today as well as the positive elements related to artificial intelligence. So, you'll get more information from my website that I can share with you here. about these activities.

### **Sagarmoy Phukan**

*How did you link citizen science to your roles here? So do you use it just for data collection, or, as you have said, you have? You are working on such science communication as well. So, do you think that you are using citizen science as a mode of communication?*

### **NIAS**

See, I don't use citizen science as a data collection tool. but data is generated as a part of the training programs. So, the idea of citizen science. Currently, we have a citizen Science initiative which I started in 2009, called Student Scientist. So, we don't have a separate website, but on Facebook, we have a very active page called Student Scientist. So, the idea of citizen science. I joined a college immediately after my PhD, as a teacher for undergraduates.

So, what I found was that most of them were not very familiar with the tools of research or even the science section.

So, I found at that time that if we can go for a different mode that is breaking the existing compartments of the education system, we can make a beautiful system that can be useful for both researchers as well as students. So, what I did I found that most of the things these students are learning in their school curriculum generally go for rote learning. Generally, if you ask a child, what do they mean by a tetracycline or a euglena? You will get ready-made answers like you, euglena is nothing but a slipper-shaped molecule with a flagellum. You don't like that. But, as you know, being from a cognitive science background, we know that it is very difficult to think about something. If you don't have the cognitive precursors for that or a mental model for that. So, I started thinking about how I could bring this mental model. or make students who may join my college in the coming years how I can utilize the existing system at a very low cost for that purpose. Then I found that most of the things these students are learning by rote in the schools are available in their nearby college.

but we never opened that. So that was the beginning of my citizen Science initiative, which is a little bit different from the existing system.

What we did that keeping the college of that area. Since I am working in my college.

I had access to the management of the college keeping the college in the center. We try to connect or correct or make it a network of schools in that region. You will have seen this in

my chapter about that. That was if they used to visit it as a free editor. Then the second phase we got a lot of positive development. I will tell you about that also. and then we try to bring the school children to the college, and the college will run back to school.

and I came out with an idea is it possible to promote the basic ideas of science, like observation, or use whatever is available in their surroundings as a tool to learn science?

So, at that time we were keeping biodiversity as a major, for the management. then they, even the administrators of that area, and even the Ministry of Kerala State. While I was doing this got impressed with this idea. So, in India, citizen sciences were gaining momentum at that time, and I was lucky at that time one of the senior ministers in the Ministry of Kerala at that time came and inaugurated citizen science.

So, it was interesting because it was the next day of the Republic Day. They kept it on January 27, so he had to complete the process of the Republic Day celebration in Trivandrum, and he and his team drove to Malappuram, where I was doing this experiment, he inaugurated that, and they were very happy with that such kind of moments.

So, that was the beginning of the citizen Science initiative where students go collect that down, and that is this, and we are not going to use them as data connectors, but they learn the act of data collection in that process.

But, as you know, in my like, I have mentioned in my chapter

that didn't continue, because many times what happened that the system failed because this current coupling was not efficient.

Second thing, students were not very keen on observing the same thing for a long period.

because, you know, repetition is very rare. We teach children in the science classrooms because they feel the idea you see something, you learn something, you'll leave something there so that should not be the way a program will work, you should have to ignite the thinking process. and they should understand that repetition is the tool of science, but that rarely comes into the science classrooms.

So then, what happened? That and the second element came. There was. Students were not keen on studying mammals, because after some time the other students started making fun of them calling the names of the animals, and they were focusing. like One student told me that I don't want to be called a squirrel. The animal which I'm observing, because my Peers Make fun of me by calling a school. So, people leave in that.

So then, what happened that this citizen science initiative, which started with 18 schools and one. 3 colleges, our colleges the unit, and at that time National Institute of Advance Studies, the Institute in which I am now working supported maybe the scientific information. So from the initial phase, 2 of their faculty visited May my college and they found time to train the children to interact with the selected children from the schools and all that. So I moved to Bangalore. Then I wrote a project for DST, and I got the second grant for making citizen science a little bit more any more elaborate there,

we did the same thing in Kerala and Karnataka's different places, and this time what we found was that last time we learned a big lesson that sometime, if the topic when you go for something comfortable to you.

may not be giving you a positive element, because, you know, sometimes unexpected things can creep in. So, we found that the topic is appreciated by college students as well as school children as well as the public. That was water.

because you know about water. Everybody has something to say, and somebody feels. Everybody feels that I have something, some connection with water.

Sagarmoy Phukan

so currently are you into like water project?

NIAS

I'm telling you that thing. So that project we implemented in these 2 places, Kerala and Karnataka. But we had 2 modes at that time. The first mode followed what I said The networking of schools with colleges where school children will be guided by the research team through college children, because there should be somebody to maintain this networking correctly. So, the studies that focus on networking.

So we are not currently focusing on water. in that project for around 2 years, we worked on what, keeping water as the theme.

And what we did that, you know. Yeah, I was talking about that. So they just to. So we found that we cannot. It is not easy to build such a kind of network where school children and college children work together at every place.

So we came out with 2 modes where children just do an observation of their environment, water issues, and all that. Then they reported to the schools. Then they sent the report to us.

So that was one more, the second mode was this one. Again, in Kerala 2 places, in one place, we were able to establish this model perfectly, where college children started working with school children.

and we found that if you can get the support of teachers in schools and the school college children, who are alumni of the school and are now studying in this college is ready to go back. We can bring changes.

So that was the tools which we used so in both States we use different strategies to bring the people to this.

So, like I said in the beginning, it was not like completely a citizen science initiative, where citizens generate data and put it on a website here. This was more of a long-term plan.

They, the system gets established. ultimately my target is for us to evolve the schools in the rural region as a hub for the knowledge of that village.

So that was the ultimate target of that project. So, with Covid, what happened that most of these activities came to an end. Around 3 years we were out of the radar. We were not able to do anything because children work, and start doing their study from from home, and it was

difficult for them to go out and all that. So now everything is coming back. Now, I have a project to develop.

So here, now this, this the third we which we which I call shouldn't, sign this 3. The theme is climate change and natural disasters. So mainly this project is focusing on the coastal regions of Kerala and Karnataka this time

where we are trying to understand how the network of children can be used as a mechanism to generate the micro level data of the impact of climate change because coastal regions are going to be going to face the impact of climate change immediately and train them as the communicators of natural disasters with their community.

It has, you know, like every stage, it is getting complex this time. 2 elements are working as it led to it. You can say data collector and interpreter, as well as a communicator working with society

Sagarmoy Phukan

from here, I would like to know, like over the previous projects which you have started, the other 2 projects. So, have you seen any, you know, impact in society, or because from the first one, I read part of the project? So, I read parts about it so I have a few ideas about it. But over these years have you seen any impacts that you have been able to create from the few points that you wanted, like, you know, creating more knowledge among the children, getting them more interested in science? So, have you been? Have you seen any kind of impact that you have done?

NIAS

So, one of the major impacts I saw is children thinking about taking a career in the field of research.

So, my student scientist one, which award you might have read was launched in a village region of Kerala, which is highly dominated by a Muslim community where girls rarely go out for higher studies.

Okay, because it's like it is. So, it's what of the Malabar region.

After Being part of the student scientists, Many of them got the idea of where to go, where to apply, what to do, and all that. Many times we get the Need. We had to discuss with their family the importance of becoming a researcher.

So we get. So last year I offered an online event to resonate with student scientists. 3 of my students who were the part of student scientists in 2009 3 girls are researchers now.

So they said in that meeting that in rural regions there is an issue. I'm also coming from a global region of Kerala. Now it is changing, and scenarios changing because of the Internet and all that. Even with that, generally, what happens in school-based citizen science projects? It works as a window to the information on higher studies many times, because if I want to do something.

See in our generation what we did that we did. BSc. Then we went for an MSc. Then we went for a PhD. Because very rarely do we know that the other things. There are Other opportunities. that kind of thing very rarely percolates to that layer of society. So, this kind of initiative, one thing we were able to generate a question amongst the Parent Teachers Association meetings that there are doctors. There are engineers. There are what filling film celebrities from your village.

But why we don't have scientists from our village?

So that was one of the questions we were propagating across our training programs, and also scientific activities. scientists are human beings like you and me. They are not from Mars or Venus.

You also can become a scientist, and some people can guide you if you want to become a scientist, which for village children it's a big achievement.

The second thing is that the funding agencies, the government agencies supporting our project show that it has an impact because they feel that it can bring changes at the ground level.

The reason is, even though we talk about the talk a lot about social change reaching social change at the grassroots level is not possible without the support of the people from that ecosystem.

So what I found is that students are a separate group. I have mentioned in that chapter that they are a separate group because, with their identity card, they can come and visit you in your Institute. They can ask you for support in your refer, or even to your director.

correct because student identity supports them. They are familiar. If you go for the students of 18 or 19 years, they are already adults. They are familiar with the dynamics of the society, and if properly channeled, they can bring changes in the society.

so it's one of the major impacts. Our student scientist initiative brought on the on making students think that they also can become researchers. And second thing was that by seeing our citizen's science initiative you,

We had a collaboration with Tata Institute of Social Science and Massachusetts Institute of Technology Media Lab.

We came out with the module for their project on biology education.

which I decided to keep this experience because it gives lots of information. You learned a lot about science teaching., so that was beneficial for us also to come out with the module which was highly accepted by the students of Chhattisgarh, Telangana, Rajasthan, and Mizoram.

Sagarmoy Phukan

I've also understood that there is some kind of involvement of the Government agencies. So, who has, who has helped you?

that through the project, so can you elaborate on their actions for which they help you with a refund and their outlook towards citizen science?

And what I've understood from you is that your experience with the Government is quite different from the other stakeholders whom I have interviewed. So, I think Kerala must have a different angle towards citizen science.

NIAS

So, no. My first funding was from Kerala and my second support was from the Government of India.

so, both student scientist 2, and student scientist 3 are being funded by a National Council for Science Technology communication. So, it's not only the Kerala government from where we go to support. The third, parallelly the student module on biology education learning, mainly a college education which came from MIT, and this that also like in other non-government agency which funded by my work.

So one element of the finding is that citizen science like people say.

you know. There I was recently, attending a meeting on Citizen Science. This department, the IASC came out with the Yeah. So I was also a member of. I was also a member of the S0 One of the thing is in India, mainly the citizen Science works as a data collection model. Correct mainly what happened that you that you train people. They collect data. They dumped that to somebody, and they also disappeared. Then, later the project also will be disappearing, keeping only some remnants in the digital world.

That is a trend happening with many of the citizen science or many of the tracks started by citizens science.

So, one element here is, that you have a so in the system. Citizen Science, literature, you may know it is called brain soul cheers. So, you get people to do something and leave.

So, what if you have a long-term plan? There's a very high chance that it can bring an impact and if you have it, a multidisciplinary plan. As you know, there is an educational component. There is a data generation component, and there is a big goal to achieve. I said. You know I want to convert the village school into a hub for knowledge, for the local people. See that they, if you go to the village region. It's very difficult for somebody to even go to an agricultural office.

but they trust the school teachers. They don't have any issues that you call a meeting in school. Many of them come. I'm not telling everybody.

And then the Pts. Is that so? I can tell you in the beginning. When I started my student scientist, our focal group was 9 standard and 9 standard students only. So slowly people started getting started Understanding this benefit of being part of such kind of initiative in

India, you know, because of the Board Examination. Very rarely do you get 10 standard students for any activities.

So, I have letters from the PTS Presidents requesting to include 10 standard students also in the 6-instance initiative. because they say that yeah, we don't want our children to lose the chats. So if somebody is making a citizen science initiative it should not be a data collection initiative at all.

it should have a long-term impact. You need to keep that impact in mind when you design an initiative. If that initiative, so that impact can contribute, and it can be translated at least in 5 to 6 years, there is a very high chance that other competencies also come forward and funding agencies may not have many issues in funding that.

The problem is that People say that I want to start a Citizen Science project. I want to collect this data. The funding agency people will be asking the question.

What will be the benefit of that? Generally, people will be saying that the benefit will be for biology. The benefit will be for science and all that see, this as a science-society interface.

where you cannot say that I am doing it only for the scientific benefit.

So, I always get a question when I talk about student scientists 3, we get a lot of appreciation from the project evaluation committee itself

So we get a lot of questions like what benefit you are going to give the children who are participating in the citizen side. We never gave any award to our student scientist for this initiative.

Okay, the only time we gave it we made a competition was. We conducted something called. I forgot the name of that. It is on the summer it was on summer observation.

We connected a competition. We suggested our system scientists observe the changes happening in the social and environmental factors of their surroundings.

Yeah, it's called. The competition was called Surviving the Fury of Summer.

Okay. So then you have to come out with you as an individual. It is a student scientist, you what you have to do that you have to keep a diary. and competition starts on March 1st, when summer starts in India officially, especially in the southern region, where they observe what the changes have happening in their village, and all that. Then they have to write a 1,000-word article, or write to rather on that, and submit to us.

So you can see that competition. Some of the selected things are on our Facebook page. If you go dig into the initial, the initial posters. We shared all of that.

so we got a lot of responses and we got around 300 entries like that in Kanada, Hindi, and Malayalam and we get see. The thing is that when we design something when you are going for a student. If we, go for a science-society interface, you need to cancel both elements. You need to integrate that in such a way that all the stakeholders should feel that we are moving one step ahead. So the moment one component becomes over, The problem is that it often ends up in conflict.

Others will say that, See, everybody wants to show that whatever we are doing is best correct. Nobody wants to say that I'm doing bad research so you need to consider it.

So when you design something like that, there should be an ultimate task that you may be achieving in 15 years or even 20 years. As I said I want to develop schools into the hub for knowledge in the village, which may happen or may not happen. but it's a long-term goal which we are working on. So then, other things are arranged.

So, society is happy. One is the importance of that. Science is also happy because you are generating micro-level data which is not possible with scientists. So, when I defended my first project, I still remember I told them that if you want to generate micro-level data which is useful for Panchayats may not be useful for the Government of India.

You can easily generate it within one day because if you just plot the positions from where the children come to one school, you cover the entire village that can be converted into it. So, instead of saying that I am going to develop a citizen science initiative that has a dominant component, maybe science or society.

In my opinion, it won't leave it won't, sustain. As a citizen science initiative. So, society will ask what benefit I am getting so obviously, then the funding agencies also will be easily understood. It has an impact on the society. and scientists also will get this information ground-level information.

So, I had another citizen science. I was associated with another activity. I can share that link also with you. There was a print article that came recently. We developed a network of people to report. Whenever they get a subterranean fish I will share that paper with you. Available on the website.

So, they got an article on our intervention. Now, my collaborators working on that area because it was some subterranean fish which is which live underground. They are generally obtained When somebody makes a new well somebody cleans the well or when they fetch the water for kitchen purposes. By collaborating people were able to come out with 4 new species through this network.

Sagarmoy Phukan

Okay, that that's quite nice. So you mentioned about Panchayats and all.

So, how many different types of actors or stakeholders are involved within your project, like you, you have all. From one thing I can already understand. The schools and the colleges are already involved. Then GOI is involved. Are there any grassroots organizations or civil society involved?

NIAS

one element I found, if you are going to do any intervention in this is a newspaper article. I'm. Sharing it. You can see me standing with the housewives training them to report whenever there is a it was funded by Rafael Grant, UK.

So, it was started as a fish project. This also came. Now I won't continue with this project because my task is over building the network and all that. Now you can see that this, this, this group published a third fish, a new species in that line, so they thought they should involve me also in that because I built in the network there for them. So now, last week they went to another new species through the same network, and they named that fish.

As for our land is opoly means it is even by the public.

Yeah, that's why people gave them people. So because you can see this information here about that project. That was a component of its

project which tried to do something but gave the contribution to this kind of citizen environment and research also.

So, I always say if you are going to intervene in a new system whenever you build a citizen science initiative or any other initiative, or any other innovation activities. One of the factors which decide the survival of the system is trust, you know. People should be trusting you to send their children to your work, or they should be trusting you to come and collect a snake for you, whatever it may be. So, what I found in most of my works in this student scientist is 2, I found that local NGOs can play a lot.

because they know the dynamics of the society in which you are going to do the intervention.

So it this to the scientist too. You can see the posters on my Facebook page again. If you go to the students and this Facebook page, you can see some other organizations hosting the initial events.

So that helps us a lot, because when you are going between the school and say that tomorrow onwards you collect the data of water for us or you or it maybe nobody cares.

But if somebody familiar to them also come with you and say that we can support you. I'm Here people trust you more.

So local organizations supported me a lot. NGO supported me a lot so and another thing many times what happened that you will have to make people understand like this.

because, you know many times they are not familiar with this kind of system. When, whenever we go to a place saying that. Why, don't you start something like this?

Because it's not normal for them. So you would need to be very patient when you are going to do such interventions.

Sagarmoy Phukan

Another question that I had, but it's from a funding point of view because it's just come to mine and wanted to ask, have you ever been to any businesses or industries to ask CRS fund to fund one of your projects, or the funding that you have just now suffices.

NIAS

I haven't tried any CSR funding for citizen science yet.

because my funding mainly came from government agencies

In the next phase you know when we want to expand, we may go to CSR agencies. But currently, I don't have any CSR funding.

and I didn't go for any CSR funding interviews for this kind of work, so not much information on that.

Sagarmoy Phukan

and as part of the policy viewpoint. So, you must already know about this scientist's social responsibility policy.

So do you think that that policy would help in promoting more citizen science in India?

NIAS

So in the IISc meeting, I was the one who brought the idea. Suggesting citizen science as a tool for scientist social responsibility. That point was added by me during that meeting and all that. So because, you know, there is a component.

But there is a negative side to that also. Because I did. I forgot to tell you one of my Ph.D. students is working on the dynamics of citizen science in India.

So if this is his own, if not the same topic but a similar topic. mainly working on information, dissemination, and evaluation of citizen science, because you know what it is. One of the area. So she comes from an educational background, where

you say something, but multiple people with multiple backgrounds. So they decode the information in different ways. More of a cognitive science, second She wants to develop a tool for evaluating a citizen science initiative or a public participation native, which is specific to India. That is her target so I can put you in touch with you. You can talk to her also.

Yeah. So the science, the social responsibility

developing citizen science as a tool for social science Responsibility can work only in certain areas. For a biologist. It may not be difficult to start a citizen science initiative that may contribute to his or her project. But that is not going to happen with the chemist.

Correct, because starting a lab itself is a difficult thing. We came out with a tool for our module we developed something to convert the classrooms into labs. So we replace all the people in your.

So that's if we can get to the iteration. So our MIT module is for children who are doing it. It's also in the classrooms.

So one of the policy issues making citizens science says social science as a response to so scientific social responsibility.

Some people can use it as a tool, and some people cannot use it as a tool, like a physicist or a chemist or molecular biologist, they feel it is difficult to services and science. so that may be possible for a biologist or an ecologist, especially a technologist or a social scientist working in that area.

if possible. Tap that. That's a good thing because you know.

and no system will go. If one component of that system will have to overcompensate correctly, I will. I will not be able to continue with my citizen science research and see if I am not getting the support

either the support should come to my research or funding.

so that there is a that kind of people will be able to generate citizen science. It's happening, you can see many of the researchers and institutions in India are starting to keep citizen science as a part of their work. People have seriously started thinking about citizen science, which was considered a waste when we were Ph.D. students at that time.

So. And second point connected with citizen science, making part of the scientific social responsibility which I see is.

See, projects are short-term funded after 3 years the project generally ends.

But citizen science projects cannot be a standard citizen. Science initiatives cannot be established or made sustainable in 3 years.

because first year you will be spending time on your project, which is, which is even written.

Then you have 2 years, and last year you would be mainly focusing on all of the things like winding up the project and all that

in between. If the Citizen Science initiative is not directly contributing to the system. there's a very high sense that the scientists may not continue with that.

So you need to think about the economic model also when you talk about the initiative. But I feel those who are interested, it's a good tool to keep scientific social responsibility in India.

But India's scientific, social, responsibility document, doesn't include the term citizen science. So that's why I suggested to at is that let us generate this element. Make it popular, that the next time when they go for revised policy. they may consider adding the term citizen science Also. the positive element is when something becomes a part of a policy in return written for people may think about that.

Okay? So then they may search and ask even others what benefit I can get, or whether there is any additional component which I can add to develop a citizen science also.

So Anthony recently completed a study on people who are on the faculty's perception of citizen science.

So within one or 2 months, you will be getting the pre-print

So that is my solution to that.

## **Sagarmoy Phukan**

Thank you so much. I'll be in touch with you because I think i'll be. I hope that i'll continue this as my future carrier as well. So you can. You're always welcome, because, as we are here we are now trying to stop. Now we have a India. We have a unit on science communication.

## **NIAS**

Okay, it was nice to meet you. Thank you so much.

## **PWX**

Sagarmoy Phukan

Yeah, it's recording then. Yeah. The first question is about the Citizen Science project in which you have been involved, the organization with which you conducted the Citizen Science Project and your capacity or role within the project.

PWX

Okay, I don't even consider my thing a citizen science. I say my project has been about people taking charge of their water and sewage and things, and if you are treating your sewage, can you use your review to monitor it? Right now.

In India, verification of any treatment is certified by a government agent, and the government agent is untrained in anything except how to get a bribe. They are not trained on checking. They are not trained in verifying. They are not trained even by the government. Bangalore, for example, passed the law that any apartment of more than 24 units has to be treated with sewage, there has to be a sewage treatment plan that had to be approved by the government. The Government has not, given any design to the Government saying, "I'm building this plant. and they will verify. They'll say, okay, design approval next." Then they claim they've checked it, a few months later, and now this the building is ready for occupancy, and then they'll check it after that. they don't know how to evaluate if your design is valid. So, everyone copies based on some good design. They don't know how you built it to the design, so you may say I'm building 10 KLD or 150 KLD sewage treatment plan. and to do that you have to have a certain dimension. You can build one and dimension, and they won't know that you've built a smaller one. Then the one new app they don't know if you've built to the spec, they don't know if you have, any membrane working or tested anything. So, my thing was that, listen. It's time to not expect the Government to verify, and then that verification to work.

You have to go and do, citizen, the doing their own here, monitoring, peer, review. and thing. Because if your neighbour comes to you and says, "Listen, I'm smelling your treatment." You're not going to stay, here's ₹500 or ₹1,000. Please go away. Okay, that bribery won't work if your

neighbour comes to you with the hostile thing. Yes, there's a problem. But if the neighbour comes to you saying, hey, "how can I help? It's our joint problem that your sewage is not being treated. Do you need a number of a plumber motor or some other treatment, or what is happening?" Some there's a block, or it's not enough. How can we work together so that everyone on this street treats the sewage? Because if anyone's sewage gets loose it affects everyone on the street. So, the idea of my work in Bangalore and urban water supply and water treatment was that the Government has made rules on these kinds of things, but it has no way to verify. People take the sewage and dump it out at 2 in the night in a truck and get, you know they dump it at the corner, or whatever they can. You know they have those things called honey suckers. I don't know why they're called honey suckers, but you might have heard of them. They're sewage trucks and they operate at night. No police, no government official nothing.

Okay, so. And citizens are using it to break the law to save their own thing. So, we are in a state where you know. How do you break out of it? Everyone knows sewage is bad for you. but everyone builds buildings without any sewage treatment. All of Delhi, all of Bombay, you know Bombay throws 2 billion liters of sewage into the sea every day, they don't treat anything in the whole city. Same with Delhi same with everywhere, you know. Kolkata is the only one that treats some of it, because of the old wetland. No other new cities have sewage treatment plans, not Chandigarh, not Guwahati. So, what can we do? I mean it is science is useless, citizen science is useless. No amount of data. People just saying how much Well, you know, people openly say, "Hey, to build a sewage treatment plant will cost this much. you know. 5 lakh or 8 lakh, to bribe that person is 20,000 if I have to drive every year for the next 20 years. I'm still ahead." Okay, that is the plant. They have that operating a sewage treatment plant is more expensive than driving the person. So that is the plant they have. Okay.

Sagarmoy Phukan

Do you think citizen science can bring accountability to this?

PWX

Not so. It's not possible. It doesn't matter. When the air quality has gone above any healthy limit, the government is showing no accountability, no compassion, nothing. Every Indian city today. Which city are you from Assam? how is that city in air quality?

Sagarmoy Phukan

Dibrugarh. Currently, it's nice, but I think in the next 10 years it is not going to have the same effect. In the city, we have green patches of tea gardens and forests I have heard about the plans of converting green areas into commercial land in the next 5 years.

PWX

Okay, fine. So, nothing has been done. no amount of data, and science is working. Do we have a problem? Hmm.

Sagarmoy Phukan

How do you believe the citizens can create an impact with the data that we have collected from the local authorities?

PWX

Everyone played the game. The Pollution Control Board, Bangalore appointed me as a citizen representative. because they said, oh, you have fantastic ideas. You can help us and do everything. They didn't want any to be held their whole revenue generation scheme would be threatened. They tried to get me out of the way. So, it is.

I don't know, you earlier said something about the culture and it is you, I think, have it done. I think that we are in a culture where we talk about science, and we create science. We create data. We talk about it. We talk about back, we talk about this, and then we don't have any parameter, on health, on life on our thing, you know, when I tell you that sleep is important. you know. And then you see everyone not sleeping enough. Yes, when exercise is important, people are not exercising enough. Pressure is important, connection with people and smiling and laughter and good time is important. No one is doing that everyone is on their screen alone.

So, we have data on everything about life, quality of water, quality of air. quality of food, organic. Within organic, refrigerated versus this, we have data on everything. I don't think there is one place where you don't have enough data or opinion or anything. and there's not one place. We are acting in a way that next year will be better than this year.

Sagarmoy Phukan

I can understand that. I can understand your concern, because I have the same questions, and I feel like I'll like, maybe talk with more people. So, citizen science, as you have said, you know, people are moving to the screens and all I thought like, because in obviously from a European interest to what I'm saying, like they. They have shown that there is a way that people can get connected while they are involved in certain activities together. It doesn't have to be just data collection. But you know, getting awareness through art, through other things. So, people get connected. So, maybe we are losing on that. Maybe we are not doing that. This is a certain thing.

So, till now I'm still trying to understand that part like what is missing in our sense.

PWX

Do you know what happened in Germany? You know what happened in Germany when they found out all the recycling in Germany had brilliant recycling bins of green glass and ground glass. Everything was going together to China.

Sagarmoy Phukan

Yes.

PWX

So, the most active, aware citizens were, those who are constantly separating glass in the category. So, I found out that everything was mixed and went to China. And so, even the European model breaking down. I don't know what to make of it.

Sagarmoy Phukan

So, it's maybe because of capitalism where the desire for profit is more than the actual work. So that's one thing I have thought about profit.

PWX

Making a profit that we know that is not new. The desire, you know people want to do it but they don't want to do the work. So if I can click on a campaign Sagarmoy as a campaign to save time today last rainforest, click on the and then I'll click on it, and then I'll go to watch the IPL game. You will get 10,000 signatures. You get 100,000 signatures from people who don't want to spend more than 5 seconds on their okay. and you will have collected signatures. Then you will go to the Government. You will do whatever it takes. and they know that it is a joke.

Yeah. So, they know it's a joke, you know it's a joke. because if you had 5,000 people standing in front of the forest when they came to sell it, or cut it down, or whatever that would stop them. But those 5,000 people have to be there every day for a year.

Sagarmoy Phukan

Yes. you, leading moments is a defining. Getting a leader is also important.

PWX

But who knows? Who knows? The model or leader or not? Yes, having a leader is not, is a lot, because then, so the leader can be compromised, and eliminated. Whatever the add-ups bring one because they didn't have a leader. We don't have a leader and all. We have 5,000 people. No leader. What are they going to do? How can they talk to anyone? Yes, they don't have a choice.

Sagarmoy Phukan

I wanted to know the impact that was there from your project on the community, Have you seen any kind of impact?

PWX

It was 0. I have a team project in villages, in the city. It is 0.

I mean it because, you know I can say I saved one thing. I saved one village. One

the toilet was working. One building did something good. Is the trend? Oh. any indicator was reversed. Until then I haven't done any good. I can do something so I can get it. I have not stopped asking for funding because you can show, and demonstrate some results. Everybody's in for doing a pilot. I live here attention, and they get money, and they do another pilot and do another 5 if you do pilots for 20 Or 30 40 years.

No one's doing any real work.

So, my, I'm sorry to say I have failed you. You are the next generation, in my generation. I have failed you. I apologize because my work has resulted in 0. Improving your life.

Sagarmoy Phukan

I must term it in that way because some of the ideas that you have taken up will help us later.

PWX

It doesn't matter. My work has 0. If you can take my ideas and do something positive with it. You have all my love, my blessing.

Sagarmoy Phukan

So do you think, like there was a lack of outreach to people in understanding which may have resulted in.

PWX

No. everyone's got enough outreach, that is no number of videos, no shortage of Ted Talk on every topic. Some health, to water, to trees, to birds, to anything wildlife, anything. You know that there is enough material. There is no lack of awareness, no lack of outreach.

Sagarmoy Phukan

What do you term as the involvement of you know, institution lacks like local government, password organizations, and other inventions within this, thinking about, you know, creating awareness or helping out with the project?

PWX

0. I mean everyone in government runs campaigns, school kids who run campaigns, women who have run campaigns. Nothing is happening.

Sagarmoy Phukan

So, what is the one term? One thing that comes to your mind when what could be a solution to this like. Is it just because of the lack of attitude towards this whole perspective, or can that be changed? So, one day we have to change it.

PWX

Did you read my writing on Auroville?

Sagarmoy Phukan

Sorry. No, unfortunately, I have not.

PWX

Okay. I'll send it to you.

You are asking someone. who was well stuck in rural space because it's like an urban space. I am wondering when people are going to wake up. I don't know.

I talk to people even in my office. Even you know people who know about what or something. They will print their emails out even now. because this is paper, it's only paper. Don't worry about paper like for what you know you. They manage to divide issues into different categories and don't worry about things.

So, yeah. you're asking questions, and I don't have answers. I don't know what you want me to get. That is not a lie. Yes, that is not a lie, I don't know what to tell you. I mean you're doing a PhD. You've done research. you tell me, come through that. I can hold on to it.

Sagarmoy Phukan

currently what I see is having steps and like having a roadmap to understanding the problem. Understanding how each of the stakeholders behaves, like behaviour is a different thing that might come up. Normally, we do not take account of the behaviours of the stakeholders. This is one thing I wanted to understand from my study, as well as how each of them behaves, what is their requirement, and what motivates them so what motivates them, may not be like a positive motivation. It can be a negative thing as well that they might be demotivated.

So, this is a whole thing that I'm trying to understand currently.

So still, this is. This was also part of the interview. The interview is a part of this whole understanding process as well.

PWX

So, there is a strong negative motivation right now, where activists if you're very good, you can be killed. you'd be put in jail. Some activists are trying to tell the truth. They are sidelined. If you're an activist with that like in Bangalore, many water experts said, "Oh, we just have to dig a 1 million well. you might have heard of the 1 million well campaign in Bangalore. If you do a 1 million well, there is no problem. We have no problem with that. And so, all the people are listening to them, saying someone, some expert is fixing all the water problems. I don't need to change any behaviour. The consumer is saying, some expert is fixing the problem. World Bankers fund the Kaveri project, or we fund another project, we fund another thing. We'll fund another power project to fund it.

So, all that is happening.

As long as some people will say, don't worry. I will give another filter. You know that RO filter we will give a double RO filter. There'll be a new membrane and nanotechnology some other things.

As long as they hear that they feel like they have no issues. for every message. there is a counter-message that says, "Don't worry". I want to drink this water; will I get cancer? Don't worry. We are developing a cure for cancer.

Sagarmoy Phukan

Yes. So, that hinders the lack of awareness as a whole in that.

PWX

No, no, no, it's not like over there. They will give you all the data, they are fully aware.

Sagarmoy Phukan

So, I think I have got most of the things from you in that scenario, because. like I wanted to know more, know more about your project. But so one thing which has led me to understand is that there is a reluctance from the citizen's side to understand and to get more awareness about the problem.

Do you feel that it is there for certain kinds of citizens like you know, from a certain social, social, economic background, or from you know, a certain educational background? or as such, like. Do you feel like people with higher education, qualifications would be more involved, or would do certain things?

PWX

Oh, it's the opposite. things the highest qualification. my friend did garbage segregation. and the people with Ph.Ds from IITs were throwing garbage outside the door, saying, "You segregate. I'm not doing it."

The more educated you are, the more jobs you have in the morning. you know you can push off things. So, there are smart people who have Ph.D.s and they have an argument you can look at. If I change my thing. If I use less water, how will it change the system? how are we going to change it? If I drive one less car, how are we going to change the air quality?

They're completely right. So, they are like, you know. So, the smarter you are, the more educated you are, the less you are going to do.

Sagarmoy Phukan

Yeah, do you feel it's more like an ego clash that they have regarding this thing?

PWX

Because when, when you say it like, go and all, you've stepped out the science.

Sagarmoy Phukan

Yes, because this is beyond the science that I'm doing this is more of us social and philosophical thing within citizen science because it has a lot of ethics as well.

That's Why, like my part. This part is very small, to which I've started with actually like very small part, which I've started with. Yeah, yeah.

And anyway, I wanted to do an activity that I've been doing to understand the influence of different stakeholders in citizen science projects or participatory projects so from different. I have talked with different stakeholders and from different projects. not only like project proponents, but you know people from other backgrounds like funders as well.

I have sent you the link in this chat box

PWX

what they do with the jam board.

## SeasonWatch

**Sagarmoy Phukan**

*Okay, then I will start with my questions. So, I would like to know about your organization, and the role that you do within this organization and how you link to citizen science with this project. Why have you done that as part of the organization?*

**SeseaonWatch-NCF**

Right. So, I had a citizen science project called Season Watch, which looks at how tree seasonality is changing over time. And that's an interesting thing to do because trees are a good indicator of how the overall climate is changing. and changes in precipitation and temperature can trigger patterns that are easily observable in trees. you know. Otherwise, the only link we have to climate change in formal education is through, you know, part of things, you know, like glaciers melting, polls warming up.

These are all far-off things. But if you want to observe climate change in your backyard, then you just need to look at trees. So that is the main motivation behind this project. SeasonWatch is based at the Nature Conservation Foundation, which is a NGO that's based in Mysore. And there's another office in Bangalore and NCF works across India in very diverse landscapes. from a high-altitude mountain to rainforests in the northeast and western ghats to marine habitats in the 2 seas.

So, it's a very diverse research group that has spread across India and SeasonWatch is specially housed under this program called Education and Public Engagement where there are the others. You know, citizen science projects like Bird Count India, where people go out and document the birds in their environment and another education program called Nature Classrooms.

So SeasonWatch, Nature Classrooms, and Bird Count India together from the education and public engagement program. and we contribute to NCF's larger vision of, you know, being responsible, doing responsible research, while you know, involving the community at large. Community of people at large.

So, it's conservation for people by people in a sense.

So, the citizen science projects fit in very well with the vision of the Institute.

**Sagarmoy Phukan**

*How many projects does NCF have in total if you know about it? If you can share?*

SeseaonWatch-NCF

So right now, there are 2 main 2 big citizen science projects housed at NCF. Bird Count India and Season Watch. But people participated in the types of citizen science projects like India Biodiversity Portal, and I-Naturalist. etc., or other biodiversity citizen science projects of their own accord, you know, out of their own choice.

**Sagarmoy Phukan**

*Yeah. So, one thing I've learned about that the Migrant Watch was also something similar, isn't it, and it got like right now? Has it become a part of Bird Count India or something like that?*

SeseaonWatch-NCF

No, it's discontinued now, it's not being continued anymore.

But if you want to know more about the migrant watch, I think, Doctor Suhail Kadar, would be a better person to talk to. He was leading that effort. But yeah, it's not there anymore. Even though the website might, you might still be able to access the website.

**Sagarmoy Phukan**

*And so, SeasonWatch, how long has it been going? I think it started around like 2007 or 2009, isn't it?*

SeseaonWatch-NCF

No, 2010. But people started contributing data in the next year 2011. So yeah, that's 12 years now.

**Sagarmoy Phukan**

*So, this is a project that, like till now, I have like topic projects which have been very new, like, be Bihu Bird Count and I've talked with **Dr. Ankila** about mapping in different spaces which are very*

*new projects. So, I wanted to also have to understand something from older projects which have that, like you know, longer experiences in the field.*

*But again, I wanted to understand, like you have already told so like your motivation, to associate citizen science for your research, what is the motivation like? Is it because you wanted to create more awareness among people, or the response? Or is it like responsible research? So, what are the best motivations that you have, and has it changed over this period of one decade now?*

#### **SeseaonWatch-NCF**

The program started in 2011 and was started by the Dr. Sohail Qudar. and at that time the main goal of the project for 2 goals, which is one contributing to science. This is because tree seasonality is not very well observed in tropical regions, especially places like India. We don't have much information about how tree seasonality changes. So, one was to build that big scientific gap from the tropics.

The second motivation is education and education, not only in terms of creating awareness in the sense that we don't just want people to know facts about the environment. But we also want to create a sense of wonder among children and adults. We want them to have the ability to go outdoors and interact with their environment regularly. And we know this because there is a lot of literature, saying that this kind of interaction with nature promotes wellbeing among humans.

So that is another big motivation. I came into season watch in 2018 and we have not changed any of these. The motivations remain the same. What we were a decade ago. We still are trying to plug in that scientific gap. The one thing that has changed is that we have advanced in that AIM, we now have data to do that plugging in that scientific Gap. And education, we can build on whatever educational goals we have and create a program for educators and students to take part in such that you know the awareness about their environment increases.

So, it's very short. I mean, interesting motivations are the same as before.

#### **Sagarmoy Phukan**

*Have there been any add on to that like? I've seen your video about motivation from your participants, so has there been any change that you have done to facilitate their motivation as well within the project, or, you have not had to make that change, has it been like their motivation, has always been along with yours.*

#### **SeseaonWatch-NCF**

No, we have to constantly assess what motivates the citizen scientists. So, the motivation for starting the project was science and education. However, the people participating in the project may have different motivations altogether. So, for instance, citizen scientists may be not just motivated by documenting their environment. They might be motivated by contributing positively to society and science. There's a lot of you know, quick rewards also from participating in season Watch, that we have these competitions and contests that people can participate in and they won prizes at the end of those competitions. So, there are also that quick reward kind of things. for educators, It's the possibility of involving children in meticulously documenting something, so learning the process of doing science on learning the process of meticulous documentation. That is a motivation among educators.

So, it depends on the and some non-educator type audience. let's say, people who depend on plants for their livelihoods. They want to track plants so that they can, you know, prepare for eventualities where you know the plant may behave differently from what they know. So, it depends on the person's contributing motivations.

### **Sagarmoy Phukan**

*So, over the last 10 to 12 years have you been successful in making impacts in terms of you know, policy or impacts in terms of social behaviour or awareness evidence? So, what impacts have you seen that your project has been able to put out into society as well as in terms of science and policy?*

### **SeseaonWatch-NCF**

Right? So only so because tree seasonality is such a slow thing. Ecologically. We need, you know, even 100 years of data is not enough. You can. We should be doing this forever. So, what little blocks of time, like 5 years or 2 years tell is that, you know, tree is different from one year to the next. But we need long-term information to be able to conclude something about the change in tree behaviour. So only now do we have that much information that we can put out in the form of scientific publications. So, we recently published in 2021. We published a descriptive paper about the project and right now. Yeah. We published a descriptive paper about the project and since then we have been analysing the data to also look at how the environment is correlated with the plant phenology. So that is expected to come out sometime. Maybe this year it will be published. So that is a contribution to science. till, now we haven't been able to make any changes at the policy level, because there's still a lot of variability in tree behaviour that we need to know. Well, before we can, you know, suggest policy-level changes in terms of, let's say climate, change, policy, or things like that.

However, the more immediate thing that we may be able to affect is maybe education policy in terms of how curriculums are made and maybe make an effort towards including citizen science, and that. we have made a small step towards that by putting like gathering a community of educators who are very

keen on doing these activity-based projects in their classrooms to teach about climate change. So, this started only, I mean, we had our first meeting in December last year. So, the idea of this group is to meet regularly and put together a resource, a pedagogy resource, or a learning, teaching, learning, resource. which people can use in their classrooms to talk to children about climate change, and these will include elements of citizen science, or seasonality or of trees, you know some of these things will be included.

So, this is our impact. Our educators also constantly say how behaviourally they know children who participate in citizen science. how the behaviour becomes more empathetic towards nature, more empathetic towards living things, more empathetic towards each other.

How focused changes and attention spans change so totally. We know that it's making a positive attitudinal impact on children who participate.

### **Sagarmoy Phukan**

*You've been talking a lot about how educators have been looking to citizen science. So, do you like over some time while talking to a lot of people? I found that children being in this of citizen science is a huge benefit for them as well as for us. So how strongly do you believe that? Formal educational institutions, like schools and colleges, play a role in the process, and how strongly can we look into it*

### **SeseaonWatch-NCF**

Our experience so to anyone who wants to look at trees can contribute information to SeasonWatch. But despite that, about 85% of our data comes from school children, especially from the State of Kerala.

So, the bulk of the information contributed to the project is actually by school children, and therefore we get to interact with educators quite a bit. We believe that if the teachers find value in including something like citizen science in the daily Pedagogy, or if they, if they find a value in doing that. It's a fantastic thing because like what our teachers report, they get to train children to do meticulous observations. and secondly, they also see this attitudinal change, positive attitude, and a change among children.

So, I think citizen science is a great way to start involving children in the process of doing science at the school level and I believe that schools should be involved although it's difficult. It's difficult for teachers to also take up this One more thing to do in their very extremely busy day.

So, they should find it valuable to include this in their lives, and if they do, it's a great thing.

### **Sagarmoy Phukan**

*I would like to understand, is how have you been reaching out to participants. How are you communicating with them? I know what way you have. You have been able to send them messages.*

### **SeasonWatch-NCF**

So, since then so, because in the past one-decade modes of communication have changed so dramatically. So, our outreach has also changed in the same way. To begin with, there was a lot of in. So, we work through partners. local or regional partners who have a wide network of schools or a wide network of individuals associated with them.

So, we train. We talk to those people, and they find value in doing the Citizen Science project, and then they take it to their audience. So that is the first way of outreach where we find partners, and we talk to them about season watch. and they take it further to their audiences earlier. This was done primarily through workshops and in-person workshops.

Lots of teachers used to come for regional workshops, and they were trained in season watch, and they went back and some of them took up season watch in Kerala. It's been especially successful because of a partnership with Matribhumi and they have these eco-club networks across Kerala SeasonWatch is one of the co-curricular activities that children can do in their schools. So, the outreach there is through the workshops that they do across thousands of schools every year. So that is another mode of outreach.

Then, during more recent times over the past 5 years or so. we have all this advancing, mobile technology. So, our communication has diversified over WhatsApp through regional and state groups where people you know can interact about plants and get things identified. Talk about the weird plant behaviour and so on.

The second is through social media, which is another thing that happened only recently when we found an audience on Facebook and Instagram who are willing to interact and talk about plants and climate change in these forums. We also communicate through large, you know, emailing groups. So, there's this very big group of ecologists called Young Ecologists Talk and Interact, YETI. It's a very large email group. That's another mode of outreach. We also have a website which has, you know, things like events, updates, publications. All of those things are available on the website, and people can also look at their data and play around with their data on our explore page.

So that is another mode of outreach. And very recently we also started doing things like tree walks. where we take out interest of people on tree walks and talk to them all at least.

### **Sagarmoy Phukan**

*Yeah. So, talking about your partners and collaborators. I would like to know more about them. So, what different kinds of partners and collaborators do you have? Are they like grassroots-level organizations? So, you have talked about Matribhumi, so is it like a grassroots organization, or is it like a bigger than that? And are there several partners with you? Can you describe them and their involvement in the project? How did they have been helping you with this?*

**SeseaonWatch-NCF**

Okay, I'll just share the full list of partners. It's on our website. Just give me a minute. I'll share the link. Matribhumi is a publishing group. They publish one the second largest daily that is circulated in. Okay, the largest or the second largest. I'm: not sure.

**Sagarmoy Phukan**

*So, it's like a private company which is like a business.*

**SeseaonWatch-NCF**

Yeah, yeah, it's a company. Yeah, yeah, it's for a profit. The publication company. Yeah. That's our biggest partner.

**Sagarmoy Phukan**

*So, I will be very happy if you can, you know, give me a contact of them, because I have seen that there is a big influence from businesses and industries to citizen science at least like in the Western countries. Here also some of them are green, so there is a huge potential. So, I would like to, you know, have any interaction with them as well.*

**SeseaonWatch-NCF**

I see. Okay, I can figure out somebody that you can talk to, and I'll share the contact.

**Sagarmoy Phukan**

*Yeah.*

**SeseaonWatch-NCF**

Yeah. So, I just shared an about Page with you, and all partners are listed there.

So, while Matribhumi is like a private company for-profit organization, their program is called SEED which is Student Empowerment for Environmental Development. That is the wing of Matribhumi that we are associated with because that's what goes into schools.

We have another partner called the State Council for Science, Scientific Technology, and Environment Meghalaya. So, this is a government wing for science and technology and through them we reach out to schools in Meghalaya. Then we are associated with several civil society organizations like a foundation for Ecological Security, the Eastern Foundation and it is at RRBCEA, Nature Conservation Society for Nashik. All of these are NGOs, and they have of what smaller audiences. and they don't work with schools. These NGOs mostly work with individuals. Adult stakeholders like you know, could be farmers and tribal communities. urban people, urban enthusiasts of trees and the environment.

So, these are the types of audiences that the other partners help reach out to.

**Sagarmoy Phukan**

*So, over these years has there been any influence from the Government like through funding or taking up your You know, whatever you have been publishing or your activities, so has there been any help from the Government in this regard? Or has it been alike? Mostly it has been in like NGOs and research, organization it's coming to get you.*

**SeseaonWatch-NCF**

So, I don't, I think. Only just now, citizen, science is emerging as a powerful tool for pedagogy. I think governments hopefully will take notice now from now on in India. But till now we have had support only from NGOs and the Education wing of the government like that. And funding we are supported entirely by the WIPRO CSR. Not entirely well. A large proportion comes from the WIPRO foundation. SeasonWatch is a partnership between NCF and Pro and the National Centre for Biological Sciences. So the 3 of these 3 institutions are partners in SeasonWatch.

**Sagarmoy Phukan**

*Can you expand on this collaboration like, I want to know more about it.*

**SeseaonWatch-NCF**

Right? So, WIPRO foundation, **in 2011 was part of schools**. So that was the wing of the WIPRO CSR that was associated with season watch. and They wanted to do the same thing that we, trying even now, which is incorporating citizen science as a pedagogy as a way of pedagogy, or as a way of education in

schools and therefore, they were involved in the initial ideation and setting up of the project as well. And now, they continue to be involved. And fund the project.

yeah. So, WIPRO foundation continues to be involved in the same way where you know so how we interact with them is that they have representatives, and we talk about and discuss ways in which we can incorporate citizen science in schools and try to make those things possible. and they are our primary partners as well.

**Sagarmoy Phukan**

*Is there any like crowdfunding? Or have you? Do you think that crowdfunding can be a potential source for the sustainability of the project?*

**SeseaonWatch-NCF**

No, we haven't tried crowdfunding because we usually typically approach funders, so season watch. As research, I mean, we approach it as a research project.

So, we also approach funders in that way. We haven't tried crowdfunding for season watch yet.

**Sagarmoy Phukan**

*As NCF is a registered organization, I think it's easier for you to get funding in that respect.*

**SeseaonWatch-NCF**

No. I have found it difficult to get, let's say, mainstream government funding mainstream scientific government funding for citizen science, so I've applied a couple of times to DST.

You know. and different wings of DST. But I have not received support from that. But other types of research funding like so, Aziz Premji University has research funding. Oh. has a research fund. So, we got that fund last year for doing. Yeah.

**Sagarmoy Phukan**

~~*So, DST has like I did a scoping review before this from that point only I have been able to, you know, identify organizations.*~~

~~*So, from there, I understood that DST plays a very crucial role in journalizing funds for citizen science, because in in a few instances they have funded a few citizen science projects in terms of water quality, but initially, their fund was actually from abroad, which was channelized*~~

~~*And have you heard about this like scientist social responsibility policy that has been like. It has been initiated in India, I think, in 2020, maybe. Have you heard about this policy?*~~

~~SeseaonWatch-NCF~~

~~Oh, not really.~~

~~Oh, no.~~

~~Sagarmoy Phukan~~

~~Okay. So, it's new.~~

~~Sorry. Yeah. So, the so this is a policy. But I don't think a lot of people have gone into it. It's a new thing that was. I found it on the DST's Website, actually along this line.~~

~~So, I was thinking of asking you about it, but we can look into that later. It's something that they have not publicized a lot.~~

~~SeseaonWatch-NCF~~

~~Yeah.~~

**Sagarmoy Phukan**

*So anyway, do you have any recommendations for any new projects, and like the challenges that they might face initially by starting? So, from your experiences, these are some kinds of challenges that they might face, and they can avoid it for your experience, or these are some of the things that they can do from your experiences. But whatever you have.*

**SeseaonWatch-NCF**

Yes, so for any citizen Science project starting in India like on a new project. the question should be absolutely clear. The research motivation for that project should be something that should be thought of right in the beginning. People should also think of what level of involvement they want from the citizen scientists. So, a citizen scientist should be involved during the process of devising the research question. then they should be careful and do that make facilitate that to whatever level possible.

The second thing in India is that is a huge problem. That is a huge problem for anyone who would be scaling. which means that something that starts something. If you want to think of something at the level of India. you have to think of how diverse the country is. and what works in one place in terms of outer region output will likely not work in another place.

So, you have to also think in terms of how people respond to what languages people speak. They, you know, communicating only in English, may not be enough for effective.

What are the local ecological contexts? What are their cultural contexts?

So those things are things that people should keep in mind. If it's a citizen science project, you are doing at the level of the country, more locally, it might be, you know, language and culture may not be such a big problem. but the larger you go. The more these things play into making a project a success. The other thing people should keep in mind is access to technology. which is again not universal, and only a few people have, may have access to technology, at whatever scale you are working on. So if your Citizen Science project is going to be heavily dependent on technology. Then you know It may be worth thinking about how to make it more inclusive.

**Sagarmoy Phukan**

*So how important do you think is vernacular language, you know, promoting and accurate people local languages. So, have you seen while using local languages, you have better responses?*

**SeseaonWatch-NCF**

Outreach. If outreach material is available in vernacular languages. people respond much better, of course. you know. So, for example, we constantly get requests for making our resources available in vernacular languages.

So sorry. You know others, I mean Indian languages. So, for example, we have this Pocket Guide for Trees of India, which is in English. and one of the most common things we get to here is, oh, is this thing available in? Let's say this language. or is this guide available for this region? you know so definitely language and local context, ecological context.

It's something very important. especially for season Watch, because we work with specific trees, 2 regions, and so on. But that said just making things available in a particular language may not be enough. People should also know how to get those resources right. So, the outreach strategy should be such that people can access those resources as well.

**Sagarmoy Phukan**

*Here, language is a barrier like if you look into a citizen science project, as well as yours. So this language has been a barrier to promotion since you have started already with local languages and other modern Indian languages.*

*But in some cases, some projects may not do that. They might still be, you know, only in terms of English. But do you think there can be less inclusivity within that respect because people from your middle class or upper class would mostly join, rather than people from the lower class, so lower economic groups? So, do you feel like this? There's some proof in my statement, or it can be in a like beyond that as well.*

**SeseaonWatch-NCF**

Yes, certainly. I mean language is a big barrier, I would say. for access to people. So, we have an app where people can upload observations. and often we get this question. Okay, this is an app, but it's an English. Can you make it available in Hindi or some other language, so that you know I can look? I can read the instructions, and I can, you know, upload my observations.

So yes, certainly. Language is a huge barrier. Language and access to technology are 2 big barriers.

**Sagarmoy Phukan**

*And is it like they are influenced by socioeconomic conditions as well?*

**SeseaonWatch-NCF**

Yes. yeah, unless there is a facilitator. or like a partner who can facilitate easy upload or something. Exactly so, for example, the foundation for ecological security helps people make their observations, and then upload them onto the SeasonWatch database and these may not be the people contributing may not be from very you know socioeconomically very well off.

**Sagarmoy Phukan**

Thank you so much. These were the questions that I had. So, there is once a small activity.

It's like something that you need to mark it's like a draft thing. I will share it right with you.

**Sagarmoy Phukan**

Thank you so much for joining me.

I'll start by giving a brief introduction to my study. So, I'm Sagarmoy Phukan, and I'm doing a Ph.D. on citizen science in India, and how we can promote more citizen science to other different domains. So now you can see that that citizen science is quite prevalent in conservation ecology. However, there are a lot of good practices that can be taken from this domain to other parts for environmental monitoring, such as water quality and air pollution. So, my idea is to get some good practices from here and then transfer those ideas to other domains. So, I would be asking about the motivations of why you were interested in the role

you play in the organization, how you're using citizen science, if there are any problems that you faced or challenges that you ever faced while conducting the project, and the overall interview is going to take around 45 to 60 minutes, including the activity. So, do you have any questions that you'd like to ask?

WC-No, no question so far. Thank you.

***Q: So, starting with that, I'd like to know about your organization, how you got involved with citizen science, why it took up citizen science to you know, get data or working conservation ecology, and the role that you play within the project.***

A: Okay, so. So, I'm guessing at this point, you are interested in knowing my role as, as a member of a group that is asking for citizen science data, right, which is collecting citizen science data, because I, you know, I don't just work with a group where we seek citizen science data, but I also, you know, an active contributor to a lot of citizen science groups, which I don't run, and I don't manage, but I actively contribute to those groups. So, I'm guessing this particular question of yours is focused on me as a member of an organization or, you know, a member of a group where we collect data and seek data from other citizen science contributors, right?

SP- Yes, yeah. Yeah.

A: Okay. So, in this case, the group that I'm associated with is called the Wild Canids, India project. And we realized that you know, one, we wanted to look at an entire guild of canids in India, and not just, you know, a particular species. And we realized that one way of going about collecting data on these animals was by asking people to contribute their sighting records. And, there were several reasons why we thought people would be able to contribute data to this one was, you know, as you may be aware, a lot of canids in India. So, by wild canids, I mean, you know, your jackal fox, wolf, dhole a lot of these species except the dhole, most of the species are found in areas outside of protected areas. So, we felt that, you know, it would be easy to or not easy, but, you know, there was a possibility of getting information from beyond the Protected Area Networks by involving citizens. And, also these are species which are found across the entire country, you know, their distributions at species level may vary, but, you know, this is a group which covers all of India. And, then we also felt that these are animals that generally catch your attention. So, if you see any of these animals, you would probably notice it, it would, you know, it's not something that you would miss out on, you know, like, maybe, if I were doing the same thing with butterflies, many people would not notice a butterfly, because, you know, they may not be interested in butterflies because it's something which may not catch their attention. But if you see any of these wild canids, you know if you see a jackal or a fox or a wolf or a hyena. So by the way, you know, I didn't mention this before, but we are also including hyenas in our group of canids. So, we know

hyenas are not canids, but because they have very similar ecological requirements as other candidates. So, we've included them in our project. So, for any of these species, if people see them they would notice them and usually, we are going by the assumption that most people are fairly correct with their abilities to identify these animals. So, one was, you know, just the fact that people could be seeing them outside of protected areas. And second, was, you know, most people would be able to identify them to at least some extent, and that this is a species that if you see, you would notice and you will not miss out on. So, and hence, we went out seeking citizen science inputs on this. And we also felt that we could give back, you know, this collective knowledge that we could then, you know, using this collective knowledge, we could build something.

And then we could give it back to these people, you know, to generally to everybody who was involved with this project, or not involved with this project, the idea was also to give back information about these canids. So that this group of animals, which is found outside pas, particularly, people have more knowledge and information about them.

***Q: So, how do you reach out to people like, both in terms of recruiting as well as, dissemination of information? Right now, we're talking about sharing the information around people. So how do you disseminate this information to people?***

A: So, we, okay, so we've been relying heavily on social media. So, we, advertise for so we, you know, we are looking at Twitter, we are looking at Instagram, Facebook, where we advertise that we are looking for data on these species. And we also rely a lot on newspapers. So any newspaper that wants to cover an article on our work, or, you know, our request for data, we, you know, we actively go out, help them write about our project. And, and we support journalists in every possible way, as one of the outreach mediums, and, we do some things. So all, you know, all our findings, we either publish them in scientific journals, we try and make sure that those journals are open source, so that, you know, people can access everybody can access them. And we also put up all our findings on our website. And that website, we advertise in every, you know, medium that we use. So whether it's social media, wherever we always put a link to our website, where people can go and see what our findings have been so far. And all our findings are built upon, you know, every observation that is contributed to us.

***Q: about advertisement or direct paid advertisement you do all this simply by sharing all sorts of Ltd directly without paying them.***

Q: So, do you pay for these advertisements? You can pay for it on Facebook. So, it's like,

A: No, we don't pay anybody for the data that they are contributing. And neither do we, you know, neither does anyone in our group get paid. So, this is a completely voluntary exercise, where a bunch of us came together and started collecting this data. We don't have any grant

any funding, and we've tried getting, you know, funding, because that would have allowed us to take this project to another level, but we haven't been able to get that funding yet. So, since we have no funding, it's just, you know, it's completely self-supported. And we managed to pay for our website charges, because since we have a website, basically every year, we split the cost of the website. And you know, pay for it out of our pockets.

***Q: In terms of funding, what kind of barriers are you looking through? So, you say that you have been you have tried for the funding? But is there a lack of funding, or like, there is a high competition and lack of funding in that sense, or people are not so much worried about funding for citizen science or in terms of conservation? What are the factors that might have been a barrier to your funding?***

A: So, I think, you know, I'm not sure why some, you know, funding agencies don't find this project exciting. But I think the reasons may be that you know, in some sense, it's believed that this is secondary data. This is not seen as primary data collection. So, it's not like you are going to feel like collecting data yourself, but you're asking other people to contribute their data to you. So, I think somewhere the reliability of the data becomes doubtful, at least in the funding agency's mind. And, secondly, you know, I still think that there is a, you know, I still think there's a lot more importance given to, you know, basically primary data collection when it comes to ecological studies.

***Q: Till now I was just wondering because like you said, like, since people collected new contributors, some people consider the secondary data. So I thought like over this so many years, it has been like, a decade since citizen science has started in India more than a decade, and like, almost 20 years. So, it hasn't, like the government or funding agencies, that psychology has changed towards these primary and secondary sources. Because in the end, people are involved and collecting data from the field. So, they will turn to this primary or secondary data. So, do you think there is a gap that, somebody can help you in covering?***

So, I think the government, or whether it's funding agencies, you know, they are pro citizen science at a certain level, I won't say they've completely ignored and shadowed citizen science as a medium to, you know, collect data.

But I think the problem with that is they will prefer supporting, you know, these either, you know, projects targeting very specific, highly endemic, endangered groups, or that they prefer supporting much larger aggregator platforms. So, you know, if you're talking about IBP, India biodiversity portal, or I naturalist, they would much rather support those over supporting a very species-specific or, you know, target group-specific, small citizen science platform. And, and I understand the apprehensions, you know, the apprehensions perhaps arise from the fact that, you know, this is a project led by, or handled by a small team of, you know, people and,

and so, and it's very, you know, species-specific, whereas, you know, if they were to put the same amount of, so what they can't understand is, why would you not route the same project through an IBP. Because if you, if you, you know, just, like expect just take data from India biodiversity portal, they are doing exactly what you are doing, but I think, you know, this is probably going to be a follow-up question of yours anyway answer it. So, but the thing is, when you have a targeted citizen science group, like ours, I feel, you know, we have been much more successful in, actually getting data from people through our very specific requirement for data on a certain group of species, you know, putting in our own showing our credibility as people who work with these animals, and, then actually pursuing people at individual levels to, you know, contribute data. So, which, so I, you know, like, a comparison would be, I think, the first round of data collection that we did, we did this data connection in 2018, where we, from October to December, we invited people to contribute, citing data, and, and we got about 916 entries from about 300 Plus participants. And, you know, this was from 27 states across India, but, you know, when you, if you go and look up IBP, or iNaturalist, you don't even have like, 20% of those many citing records in all the time that these case, these portals have been there for the same reasons. So, one was, I think, so, you know, when you have a project, which is, and I feel one of the reasons we could raise, or we could get this kind of data was because, one, you know, we were, we were working very hard in person, you know, pursuing people and requesting them to contribute data. And then second was, so there was a lot of time invested in it. Second, each one of us has had prior experience working with the species. So in some sense, you know, there was, I think there was a level of confidence in knowing that, you know, these people know what they are doing, and they have some idea of the species that you're talking about, and that they are people who have gone and collected data on the species. So it's not like, they're only relying on my data. So there was some level of, you know, understanding that, okay, you know, this person's putting an effort to collect this data by himself or herself also. And, third was, like I said, you know, just personal relations, where you know, that, you know, I've worked on hyenas in the past. So I know people who are working on hyenas, or who, you know, tend to, like, take photos of hyenas or who, you know, spend a lot of time of theirs in habitats that occupy hyenas. And so I contacted them personally and said, "Can you please make sure you contribute some data to us?" And so I think one was, you know, so all these factors And then, you know, eventually it is we, as per, you know, as part of our project, we had our own, you know, requirements for data, like what specific types of data we wanted to collect. So we could, you know, we could like, sort of have our, like, we could get the kind of data we were looking for, which would make sense, at a special scale and a temporal scale to our analysis. So it was a very specific tailor-made requirement for data collection, which we couldn't have met through say an IB, iNaturalist, however, most funding agencies would not give you that much time and a platform to even understand that your needs so specific, with require, you know, concerning citizen science data.

***Q: So, if you feel like being very specific, has also helped people, sometimes it has come across means that having very specific topics where people feel being a part of the topic or being interested in the topic helps in, like, recruiting, like, having a very specific topic helps in getting more interest from participants? Has that helped you?***

A: So, I mean, you know, with the wild canids India project, like I said, that, we also try to give back as much as we can. So you know, we are also sharing a lot of our outputs with people. And, so that does draw, you know, people specifically interested in those species, you know, to our portal, and then, you know, some of them just feel like contributing to it. And especially, I think, you know, I don't know if people feel this with wild canids India project, but like, you know, talking at attention, I contribute data, to say portals, and I'm a, you know, I watched moths as a hobby. And, and there are, you know, there are certain species of moths that I come across, and when I look up a Citizen Science portal, and I don't see my, you know, like, I don't see a certain species in a landscape where I know it exists, where I have seen it, but I don't see it on that map, I, you know, I make sure that I contribute my citing to, to ensure that species is now also known, you know, the distribution of it is also registered from that area. So I think there's also an eagerness that allows you to, you know, that pushes you into being a participant in this kind of work. Which is, you know, but I think that's very specific to naturalists and people who are genuinely interested in these species. I still think like, researchers kind of lack that, you know, desire or build to contribute data to sort of, you know, help build up somebody else's database. It's more this comes more from naturalists and, you know, just people who are interested in those species. So yeah, getting back to your question. Yes. People who are specifically interested in those species do get attracted to, you know, species-specific portals.

***Q: How have you been involved with, you know, local governments or grassroots organizations? How are they helping you? Or do you have any partnerships with them? Through your website, I've seen three partners, which you have. Can you elaborate on them as well as like, what kind of stakeholders they are within your project?***

A: So we don't have an active relationship with forest departments. Because one has, you know, a lot of our data is not coming through forest department, you know, covered areas, it's coming from, like, bland, privately owned, or, you know, like suburbs or wherever else. And, we have, so the organizations that are part of, you know, this technically no organization that's part of the wild canids India project, because like I said, you know, we are not getting funding from anyone, we are all self-supported. But yes, we have individuals who work with different organizations because and that's entirely in their capacity. I mean, that's to generate their salaries and you know, to continue doing their projects, and none of us none of us is completely you know, single-handedly working with wild canids, India project. So, this is just something we do more as an interest, rather than, you know, our soul project that keeps us going. It's in some sense, our way of showing that you know, a bunch of truly interested people can make a difference to our knowledge of a certain group of species without having to rely heavily on, you know, a funding agency or a forest department or an NGO, you know, to, like, support us through that. So, having said that, you know, there are people who were part of, let's say, you know, Arjun, who kind of, is one of the senior members of this group, he was part of the, he's part of wildlife conservation society, in WCS India. So, you know, he draws a salary from there, he works with them. So, WCS has had some, you know, involvement in the past, because when we use some of our ancillary data on jackals, to look at a trade in jackal parts, we then give or share that data with the WCS India's, you know,

animal trafficking team, and the wildlife trafficking team gave us inputs on, you know, how these parts were being used. And then they use this data to like in their talks, and, you know, their discussions with forest departments. So in some sense, you know, there's no direct involvement with any organization or, the forest department, but yes, we, our aim is that people use this data. So if we can find any way of getting an organization or, you know, a government body to use this data, we go out of our way to, you know, give them access to it, and get them to use it, because eventually, the idea is that people use this, we've tried to put in a lot of solid science into its statistics into it, you know, we're we put in a lot of time and effort collecting this data, you know, requesting people to contribute these records, then it would make no sense to have this data if we weren't to make you know, an eventual difference on ground with this data. So, whatever opportunity we get to like use this data, we try and find people who will use it, and NGOs and governments in that sense have you know, they can be they can help with policy inputs much more than we can or policy frameworks much more than we can. we can only give policy inputs, but they can you know, use them in their policy frameworks.

***Q: I would want to know about the impacts, particularly from whatever data that you have generated. So, what impacts have you seen on the ground till now?***

A: So, I think, so we, we've come up with, an occupant, I think our main paper was about looking at occupancy of these canid species. So, we generated maps for the distribution of these species. And these are, you know, the most reliable maps for any of these canid species or hyena species in India up to date. And, that data was used by the dhol working group of the IUCN, and the striped hyena in our working group of the IUCN. So they use that data to figure out maps for India for the distribution of body species. So I would say, in some sense, we have been able to ensure that, you know, these outdated maps which were being used by IUCN based on just, you know, conversations with people and people setting and saying, you know, a bunch of like five experts, you know, one from each of these distribution or range countries of the species sitting and saying, Yeah, I think the species may be found here, or there was a paper which said, you know, there's one record from here, instead of them just putting together and, you know, putting the dots in locations and then joining them. Here, we had like, a map created using excellent data, you know, using statistics, variables, which would influence the distribution of these species. So these reliable maps were used, at least by these two working groups. We are also hoping that the other working groups of the IUCN will use these maps. At the same time, we've been able to spread a lot of information about the jackal trade and Jackal bodyparts, again, through the ancillary data we received or we managed to collect through, you know, our effort in on these lines. So that was and that's been used by the Wildlife Crime Control Bureau. You know, it's been used in talks in presentations to the WCCB by WCS, India's team. So I think, in these two areas, we made a bit of a difference. Um, you know, to make a still larger difference, we'll have to keep working in this direction. I mean, I won't say that we've made some striking difference everywhere.

But I think we've started, you know, small, but we have been able to, like, pass this data into the right hands so far. And, I think, you know, now that we have all this information publicly available, if anyone's looking for, you know, any information on canids in India, they have one place, you know, a one-place platform to go to, and, and they have all these updated maps the kind of habitat requirements for these species, you know, we also do a conservation assessment for the species using input from experts, and then you know, we have a way of scoring those and, and getting a final score. So if you want to see, you know, what the trends are, and this is a dynamic table. So, if anyone wants to see trends of conservation, you know, for each of these species, they can look that up. So, yeah, I mean, that's what we've achieved so far.

***Q: I think this will be the last question because I wanted to ask about funding as well.***

***Because I wanted to know, like, what would you do if you have some funding? Like, what are the main points that you want to cover? And you have already said that you're much more interested in sharing the information. So I wanted to ask about, like, what issues do you see from businesses and industries in funding? But currently if you don't want to, you know, say anything's fine. So, yeah, and the potential of crowdfunding your project, so or is it like, it's not required from us in your case?***

A: so we haven't gone for crowdfunding so far. I think, mainly, because, you know, again, there's a lot of effort involved. And also, you know, I think we're still looking for just small grants, we don't want a big grant, because you don't want to take too much money, and, you know, not be able to see, we managed to achieve a lot with zero funding, you know, I would say that we have managed to do the kind of ecological assessments for these, for an entire guild of, you know, carnivores in this country, of at a country level, using like, very reliable, you know, up to date science. Without zero funding, which even, you know, your, you know, your Institutes, government, heavily government funded institutes don't do. So citing, in some sense, that reflects the power of citizen science, you know, that you can use a data source like that, and if you know, what you're doing with it, you know, you can, you can generate something so phenomenal, which, which beats, like, anything produced by any of those departments that get heavily funded, you know, people are getting paid huge salaries.

So, we've managed to do that, but, and so I don't think we are, you know, we are not looking for a huge grant. And, but we have been looking for small grants, because that would allow us, you know, give incentives to people, for instance, for contributing data, or, you know, at least we could send, you know, letters back or, you know, some kind of

a summary of what has happened to our contributors, or, you know, we could have like regional groups, and so we could improve the quality of data coming in, and we could plug in holes, wherever there are gaps for data, we could plug in those holes. And we could involve more of schools, you know, that's something we've been, like talking about a lot. But, as of now, you know, like I said, we've tried getting funding from a few sources, but it didn't work out. And, so we haven't been, you know, very sort of pushy about it, either. So we haven't

gone around, like applying for, you know, 20 grants a year or something. I'm sure if we did that, we'd probably get that kind of funding. business houses, I'm not sure. I mean, you know, first of all, we are not a registered organization, you know, we are just a group of people who have come together to collect information on a species that is of interest to us or a group that's of interest to us. So, you know, now with all the funding norms in India, even if you want to get money, you know, it would have to be routed through an organization. If we routed through an organization, we bring in an organization, which could be, you know, which could like sort of, then involve an NGO, and then it comes with its politics. So as of now, I think we are very happy being just individuals with similar interests doing this. And if we get grants like, as you know, as individuals it works or as a group, but which are not routed through an NGO or an institution. Because the moment is routed through an NGO or institution, we are labeled as part of that NGO or institution, which also discourages some of our participants from contributing data., because they may not want to contribute data to that organization because of whatever biases they have towards them. So we have tried to be as politics-free as we can and we could But eventually, I mean, if we want to scale up, either you know, the way things work in India currently, concerning funding, we'd either have to register ourselves as an organization which comes in with its own, you know, baggage, because then you need an accountant, which means you're paying an accountant a certain amount of money every year. So you're raising money and then routing it in all different directions. So all we have to bring in an organization, like I mentioned, which, you know, again, has its own. Yeah, so. So that's where we are right now.

***Q: What about you, like your participants? As far as I've understood, they are people with whom you have worked and, they know the ecology, but what about your socio-economic conditions? And their education? And are they schoolchildren? And so you wanted, you said that you wanted to know, get outreach to schools, children? So are they currently not dealing with your project? Or is it just like the overlap of differences?***

A: So as of now, you know, we've received contributions from individuals who are present on social media, mostly, because that's how they got to know of our project. And if they're present on social media, then they're about 18 years of age, right? By default, and so we haven't been able to tap into the children part of it. Now, the thing is, we are not expecting children to contribute data directly to us, but we still want to be able to use our outreach material from our results section to you know, sort of allow children in schools to access it, so that their knowledge of these species increases. And, so in some sense, and then they can have nature club groups or whatever contribute to a project, as you know, as individual schools or something like that. But, you know, we are like, as of now, I think the children part, and, you know, basically people below 18 is something we are missing out on, we haven't been able to get much participation from that group. Although we are hoping, you know, and we still hope that a lot of schoolchildren are using the wild canids, India Project website, as one of those portals to you know, work on the school projects, when they have to know right about any of these canid species, because it's still one of the top sites that comes up if you search for any of these species.

***Q: Have you used any search engine optimization, or search engine optimization protocols to make your project more visible, or like it just come up? Because people have been using it a lot.***

A: I think just because people have been using it we haven't, you know, I don't know. I don't even know how search engine optimization works. you know, if it's something that you have to pay for, we don't have the money to pay for we can just about we are just about floating by paying for, you know, our website, which also we split between, you know, four of us because two of our members are still young and they haven't started earning money. So, it's like, okay, the ones who are working and have a salary, you know, contribute. So it's a Very informal sort of a group in that sense.

***Q: And about the socio-economic background of your participants. I wanted to know about them.***

A: So I'm, you know that's something that we are currently in the process of analysing, we are looking at data of, you know, a contribute data that we received through CSI contributors. And it's something that we intend publishing, because, I mean, it's not going to be like some fancy great journal, but we just wanted to make sure that that data is out there. Specifically for people like you guys who may be, you know, doing deeper analytical studies on what kind of people are contributing data to this. So, you know, having said that I mean, just broadly, a lot of our data came from people who were interested in, wildlife and the outdoors, and people who were, you know, kind of naturalists or, you know, photographers, that are frequent people, you know, wildlife travellers. So a lot of that data essentially came from those people.

***Q: One can say the deer is from like, from a middle class, or upper middle class, kind of socio-economic group.***

A: Yeah, I think it would be middle class and upper middle class because, again, our main medium of data collection was through the internet, right? We didn't have any other medium of data collection and most people who can access the internet are you know, people who are middle or upper middle class.