

Disaster Recovery and Build Back Better
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Lecture – 18
The Role of Social Networks in Disaster Preparedness

Hello everyone, welcome to the lecture series on disaster recovery and build back better, I was talking about disaster preparedness and recovery and role of informations in previous lecture. In this lecture, I will focus on what is the role of social networks to collect information that is necessary for disaster preparedness. So, what is the role of social networks to collect, to obtain critical information for making disaster preparedness decisions that would be our focus.

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For that, I would depend little on the previous lecture in order to get the case study idea, I hope you remember the Bangladesh one, so in Bangladesh we said that this is a beautiful country, they are battling with drinking water risk. The reason is that they cannot drink arsenic water, groundwater because it is arsenic contaminated, on the other hand, they have a problem of water salinity that is surface water they cannot drink.

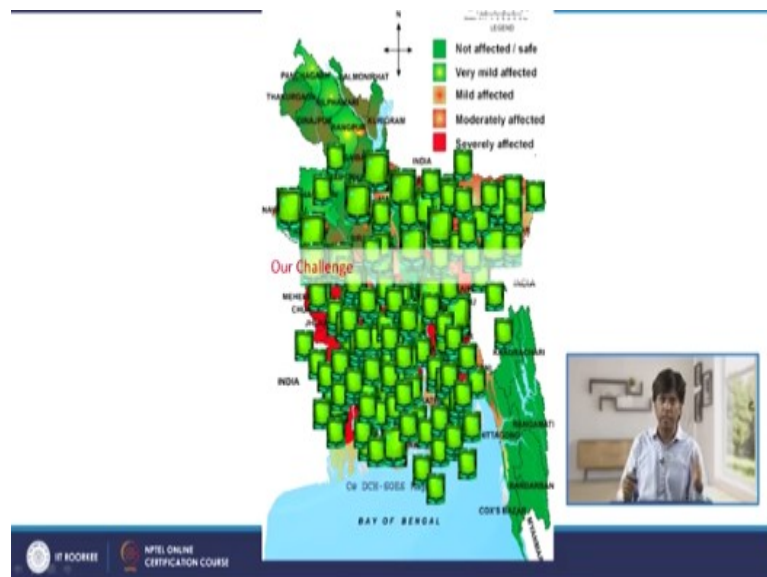
Because they are salty, they get waterborne health diseases, dysentery, diarrhoea, cholera and many other problems so, they have plenty of water in the coastal areas of Bangladesh, they do not have any problem of water but problem is that they cannot drink, it is not a portable

water, okay and so our challenge one way is to collect one possible potential idea, technology, innovation is that we can collect rainwater.

We can collect the rainwater at the domestic level at the household level and that from the rooftop and that and preserve it in a tank and that tank of 5000 litre can easily provide a family of 5 members drinking water for 6 months dry season okay, so small innovative idea but that we need to promote in Bangladesh that is our challenge as a planner as a disaster manager as the authority.

So, what we should do; we need to promote this one not only 1, not only 3 but a huge number; enormous number okay, gigantic, one after one other.

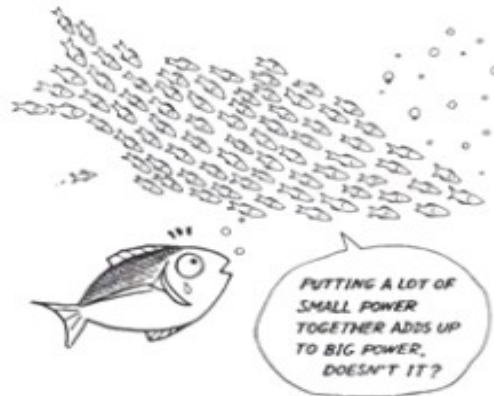
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So, millions of people; thousands and thousands of people should use; should install this rainwater tank that is our challenge that we already discussed about.

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Diffusion of Innovation is inevitable for sustainable climate change adaptation



So, putting a lot of small power together adds that the big power that is our motivation.

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Research Problem

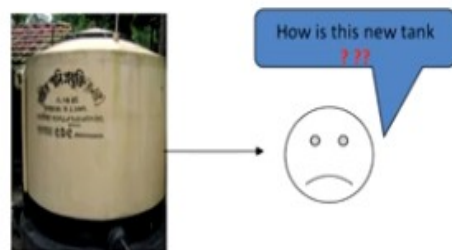
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Innovation (Disaster Preventive Technology) is new / innovative to the community, so it is risky to make decision.



Now, we discussed already also that our research problem is that if when we are asking people to adopt, install this kind of small innovative idea like rainwater tank.

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The idea in the new message contains **Uncertainty**

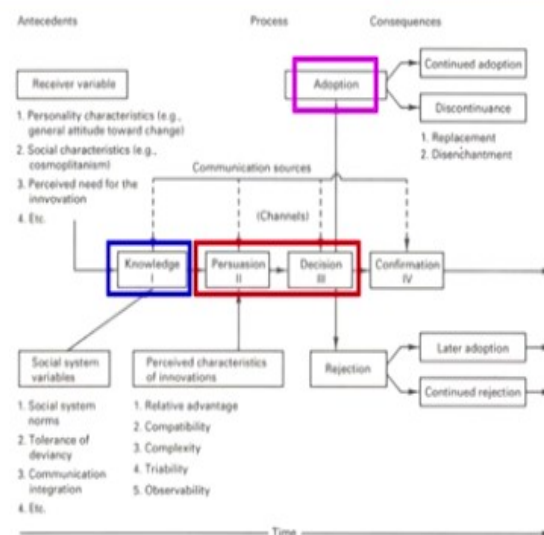
individuals always tries to overcome these risks or uncertainties by collecting and gaining **KNOWLEDGE** about the innovation.

People do not want to make decisions because they do not know about this one, this is an innovative idea, this is the new, so people want to get information about this one.

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What kind of Information , Do I need ??

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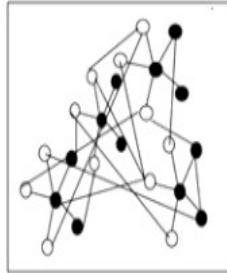


They need 3 kind of informations, one to develop their own knowledge, hardware and software knowledge from hearing and observation, another one is the discussions knowledge, someone's subjective knowledge that we already discussed that what one's subjective opinion, personal opinion about this kind of innovations so, they also need this one.

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Types of Information and Social Network

- Hearing
- Observation
- Discussion



So, 3 kind of information, activities they can involve, one is hearing that is hearing about the tank or innovations and to collect its software knowledge like it's function, it's utilities, it's effectiveness, another one is observations activity like collecting hardware information, what is the shape, size and structure of that tank. So, hearing an observation will give this knowledge to the person.

But as I said that it cannot lead to the adoption, people also want to know the subjective perspective, personal interpretations of the data, of the situation of the context so, how this tank would help them, they also need to know some discussions with their fellow partners, so this is we called discussions informations, type of informations and network.

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What do I do ?

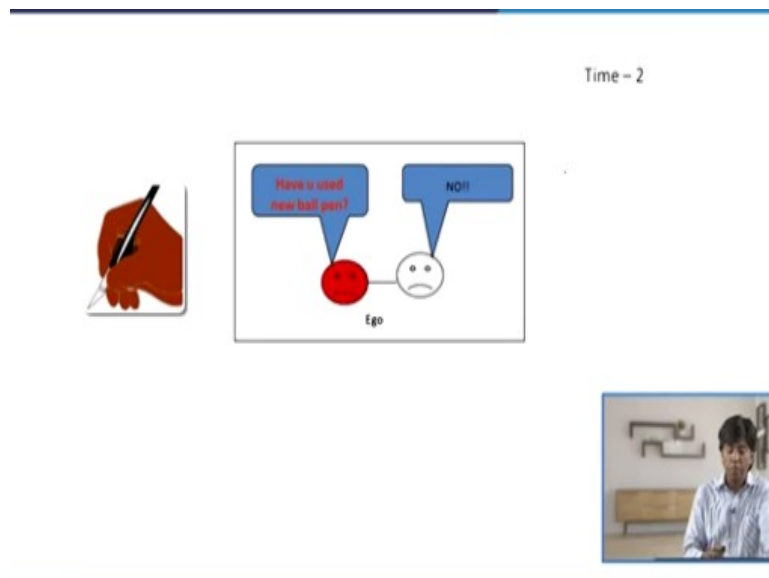
Now, what do they do, how they would collect these informations, and why do they need social networks?

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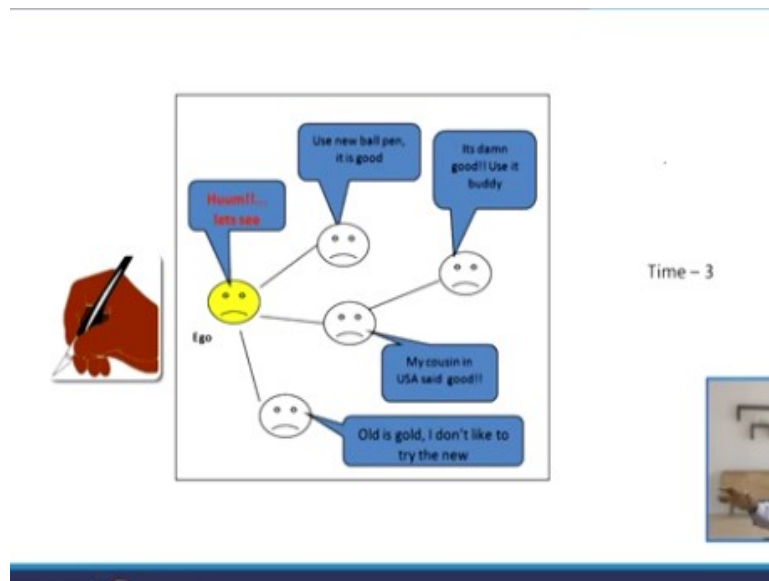
Now, imagine then I ask you to buy a ball pen okay, I ask you to buy a ball pen but you do not know about this ball pen, what do you do, how do you make a decision about this ball pen, is it difficult; it is very difficult to make a decision about this ball pen because I really do not know.

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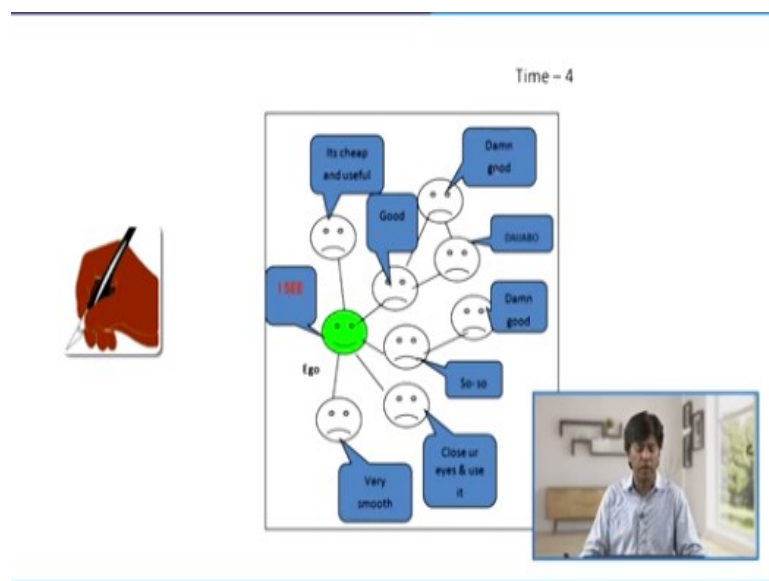
So, maybe in time 2, I asked one of my friend, hey, do you know about this ball pen, any idea, have you ever used this ball pen. Because this is a new came from America or somewhere else, this is not available in my place. He said hey, I have no idea man, I do not know.

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Then in time 3, he expanded his network okay, he asked somebody they said use new ball pen, it is really good, then someone is saying that okay, it is damn good use it buddy, other one is saying my cousin in USA said good so, please, another one is old is gold, I do not like to try the new so, it is now discouraging okay.

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So, in time 4, maybe he has more and more and more networks, more and more informations, asking more and more people so, he then collecting more informations either good or bad about this so, in this case, most of the people give a better review, a positive review, okay. They are very smooth, close your eyes and use it, so some say damn good, some says it is damn good, good and it is cheap and useful.

So, many people actually encouraging so, with these informations; what are their colour, how they look like, how it works.

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The degree of uncertainty can be reduced by an individual by obtaining information.

He is getting informations to his network that really helped him to adapt and buy this one so, he reduces his degree of uncertainty through using it, through collecting informations and now he is using it so, he really reduced uncertainty whether this will work or not, the social networks can help this way. As a result, when we promote this kind of innovative ideas, technologies to reduce disasters, we call these preventive technologies, risk preventive measures, countermeasures.

People share informations with each other either through hearing, either through watching, either through discussions, either through phone calls, either through mass media, giving dialogue or speech so, innovation; the diffusion of innovation, dissemination of technologies is therefore is called information seeking and information processing development or activity, information processing and information-seeking development or activity, okay.

So, but the question is; I need 3 kind of things, activities to be involved to collect information; one is hearing, observation and discussions. Now, who will be my source of information, where should I go for collecting informations? My neighbour, my co-workers, my relatives, my friends, those I do not know, my competitors, whom should I go., if I want to buy this ball pen; simple ball pen, whom should I rely?

My friends; here is a look generally, like Valentin is saying that it is the direct and the personal relationships like friends, I have face to face interaction with them, my relationship is direct personally connected or maybe like neighbours, they are also my personal connector, people depends on them for collecting informations, according to his finding.

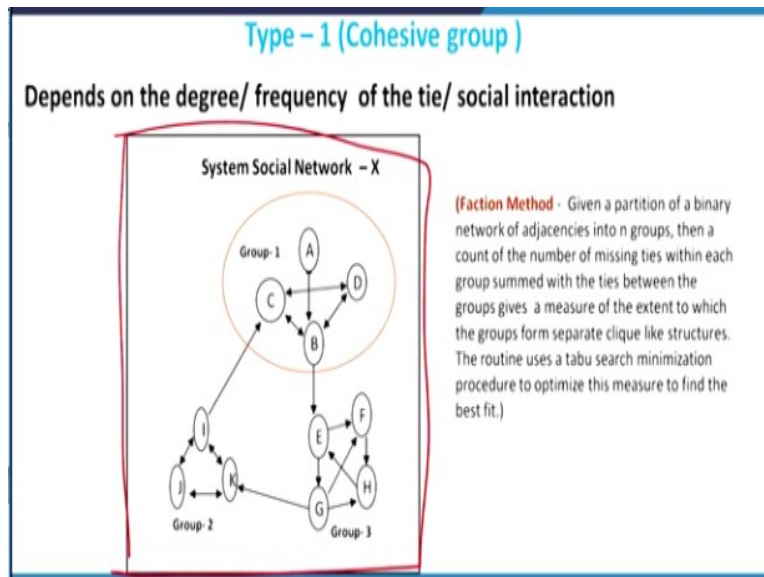
Granovetter; he is saying no actually, a direct networks they do not really work much, this actually give you redundant informations, same informations again and again because you are not expanding your networks, unless you expand your networks how you can get new ideas, new evaluation, new reviews because you are always in the same one so, you need to actually collect, use your weak networks, indirect networks.

You do not know your friends, friends, friends, friend maybe, you are at IIT Roorkee and you are collecting informations from IIT Madras that is more useful than only collecting informations from IIT Roorkee, right? so, which informations I should get and from where so, either it is personal, it could be indirect.

Another one is the Bard; he is saying that similar position in structure that means co-workers and co-students. That means it is not necessarily to be direct relationship, but people generally collect information with whom they have competitions, they have a same kind of positions you know, they tally, the check; cross-check this is okay, oh he did not have this iPhone, I should have this iPhone, he did not have this disaster preventive technology, I should have to raise my status or a kind of competition so, I watch him.

Or the spatial dimensions like neighbourhood, this is also important, if someone is at my close to me especially, it can help.

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Here, we consider 3 kind of group or the source of information for people, one is the cohesive groups that depends on the degree and frequency of the tie or interactions okay so given, so how do you decide the cohesive groups; it is just a matter of that how frequently the individuals within a group is connecting. Let us imagine that this is a community okay, this is a society, this in entirely a one community.

People living here and they have different networks now, if we look into here, we can see that ABCD they have direct and reciprocal interconnections between each other, the arrows are ties okay and then so, this is a group one because they are most densely so, C belongs to ABD because he has more network here although, he has some indirect or one way direction connections with I but he does not belong to there.

Like the same way, we can have group 2 and group 3 because they within their own circle is more connected than other.

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Role of Cohesive Group -

- Opportunities and social obligation

(Ibarra and Andrews, 1993; Shaw, 1998)

- Faster information sharing

(Ibarra and Andrew, 1993; Levine and Moreland, 1990)

- Prohibits new ideas , provides only redundant information

(Granovetter, 1983)

So, what is the role of cohesive networks, with whom I have direct connections, every day I am meeting, talking face to face personal relationship like my friends, some are saying that it provides you the opportunity and social obligation, it is kind of, it also help you to collect that if I know something from outside or from any from televisions or mass media, I immediately pass the informations to my direct network partners like my friends, my neighbours, my co-workers with whom I am very intimate, it is cohesive.

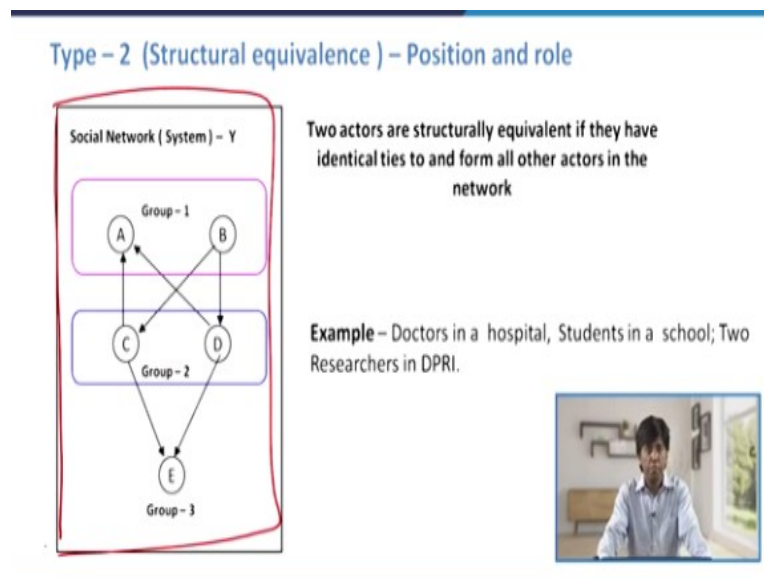
So, it actually helps to provide faster information, sharing not only that is not only working as the learning, social learning through passing the information very fast but also it provides a kind of obligations, pressure, social pressure, if 5 of my friends are using the rainwater harvesting tank or an earthquake-resistant building, it becomes my moral duty or social pressure I feel that I should have also the same.

Otherwise, I cannot be member of them, member of their group, I feel isolated not easy, so deviant behaviour it could be considered so, I should follow that one so, social obligation is very important in case of a social, a cohesive group case but it provides another constraint of this one that you cannot grab the new idea, it is the information is actually in the same group so, you have the same kind of gossip you know the same information is coming and going coming and going.

Because you have a very tight network and this network is closed, unless you open this network how come you get the informations of course, you can get through mass media or other sources but human network is not expanding so, somebody as saying that it provides

only unnecessary redundant informations and it prohibits to bring new ideas, new thoughts, new knowledge okay.

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Number 2; structural equivalents or position and role what is that? The 2 people they do not interact with each other or they may not know each other at all, but they belong to same position like in a hospital, 2 doctors, they may not meet to know each other, or they may not know actually, but they have a same position that they are a doctor in a same hospital, the hospital is very big so, they have same role and same positions.

Then people can also indirectly observe each other and compare each other and collect informations from them okay, in directly or maybe you can imagine that students in a school a researchers in IIT Roorkee, so being a they do not know each other but being in same institution in IIT Roorkee gives them a kind of same kind of socialization or training to groom up to get some kind of informations okay.

So, like here you can imagine that this is a community or society network total Y, there are five actors so, we can see the role here like A and B, they do not have direct relationship with each other, but they belong to one group why; because A and B have same interrelationship with C and D like both A; A has a relationship with C and D similarly, B has a relationship with C and D, they are not connected with any other actors in this network.

It is also true for C and D, they do not have any direct contact with each other, but they belong to one group like a doctor in a same hospital, students in the same school, researchers

in IIT Roorkee or any other Institute okay, or this group 3E, he is an isolated person because no one has this kind of network, okay.

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Role of Structural Equivalent Group -

- Social Competition

(Burt, 1933)

- Social Environment, Socialization process

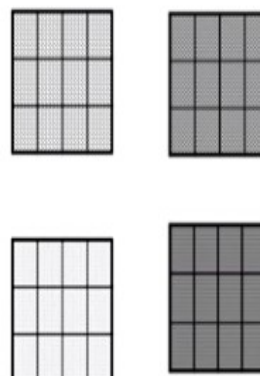
(Marsden and Friedkin, 1994)

The role of structural equivalence, it promotes competition, 2 colleagues, they are competing with each other or it kind of gives you some socialization process, you do not know your researchers in IIT Roorkee, does not matter, somebody in biology department, somebody in engineering department, somebody in a planning department but you have some kind of orientation, some kind of training, it does not matter if you do not know each other, your teachers grooming you.

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Spatial group -

- Individual's behavioral similarity can be identified on the basis of geographical proximity.



Another dimension is the spatial dimension; spatial groups, you like or not like, you need to interact with your neighbours and they influencing you, you are also influencing them so, you

need to you are interacting face to face, talking to them watching them so, direct and indirect influence always there, so people started to leave in one common place also, they have a similar kind of habit or attitude.

So, now we have 3 kinds of groups; one is cohesive, one is structurally equivalents, there is same competition position and roles and the question of spatially distribution. Now, we have also need to collect 3 kinds of informations or informations through 3 kinds of activities; one is hearing, one is observations, one is discussions. The question is as an individual, from where I should go to collect which kind of informations?

For hearing, whom I should depend; to my cohesive partners or my neighbourhoods, for observations whom I should observe, whose activities I should observe for discussions, more intimate subjective interpretations about the innovations, whom should I depend on so, the question is to whom we should depend for acquiring information?

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This is Bangladesh, as I said is highly contaminated by arsenic especially, the coastal areas and also water salinity issue and we conducted the survey in a small area, city, suburban areas called Morrelganj; Morrelganj town and Morrelganj villages and this is the bazaar area of this small town, people are collecting water from water pond and also from tube wells sometimes.

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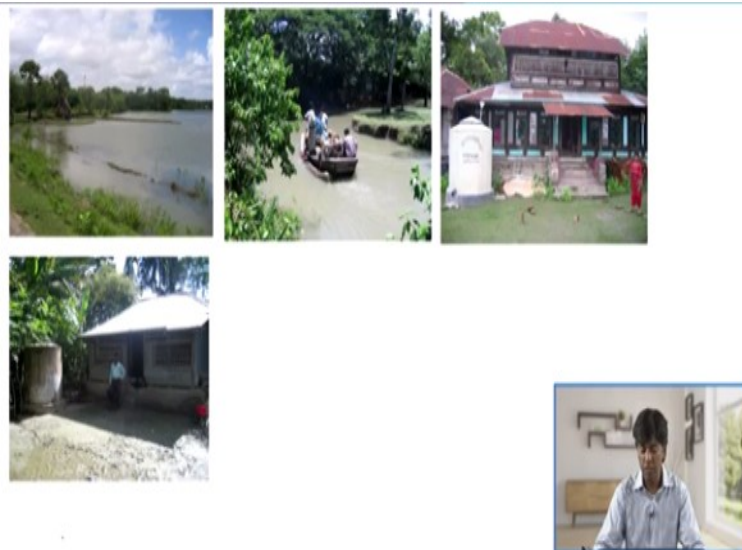
Rainwater Tank Installation at a Glance



Total Tank Installed	56
NGO workers installed Tank	5
General Tank Adopted	49
Tank Size	1500 liters, 3200 liters, 4400 liters
Tank Cost	10000 Taka ~ 14000 Taka (16000 Yen ~ 20000 Yen)
Total time of tanks installation	June, 2004 - August, 2009 = 39 months

But the people for rainwater one, Japan based NGO, they install this kind of tank in many places in the town they installed 56 such tanks in total they installed more than 250 tanks, okay.

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Now, these are some of the pictures of the area to get a glimpse; get an idea that how this area looks like, this is during high tide, and they have use canal for transportations mainly, many places the roads are disconnected and during the rainy season, so this is really to give you a glance of the area.

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Techniques Used

- Cohesive Group – Faction Methods (UCINET)
- Structural Equivalent Group – Burt Methods/ Definition (UCINET)
- Spatial Group: Neighborhood Affiliations



"Kindly name us three tank owners in Morrelaganj town with whom you often meet, talk or discuss in any issue in your daily life"

So, we use some kind of method to define cohesive networks, faction methods, another one is structural equivalent group by using Burt methods, definition in UCINET and also spatial group neighbourhood affiliations anyway, so this is not that important for these discussions but we need to collect the information through survey about people's social networks so, we asked the people that okay, kindly name as 3 persons; 3 tank owners in this area in Morrelganj area with whom you often meet, talk and discuss in any issues in your daily life.

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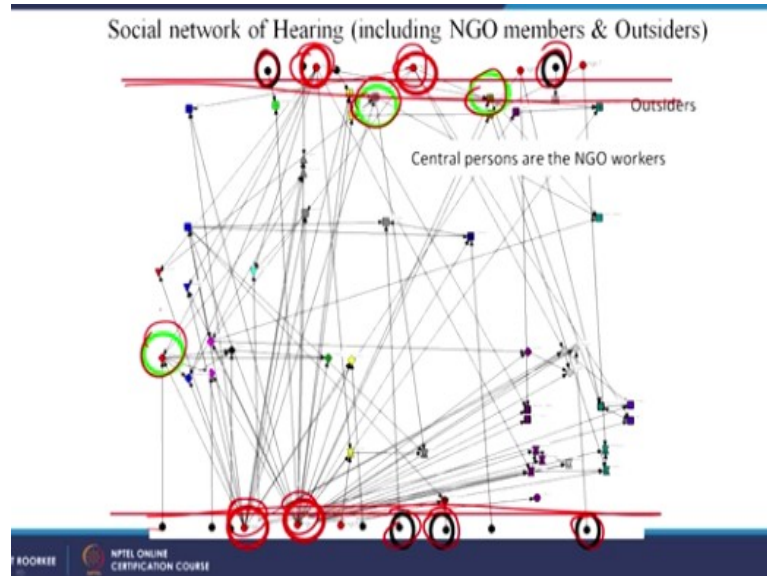
Hearing :

*"Kindly Name us three persons from whom you
have first time heard about the rainwater tank
"*

This will give us the idea of the social networks that prevails within the tank owners so, this is structural equivalent group and for the hearing, from where they collected depends the first time about the rainwater harvesting tank, we said to the people hey, please name us 3 persons from where you first time heard about rainwater harvesting tank for your drinking water purpose.

So, if you; then we generate this; here is an example of this one, if you look into here, the circles are the; this red circles are the NGO partners.

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So, this is actually the community boundary okay, community boundary. So, people here; the red one actually they are the central person, they receive a lot of people collecting informations from them, they are actually the NGO people those who are promoting this rainwater harvesting tank and also some outsiders, you can see some of the outsiders that is they do not belong to this Morrelganj area, we will also collect informations from them.

But also, there are some key players inside the community okay, they actually played a critical role to disseminate informations about the rainwater harvesting tank.

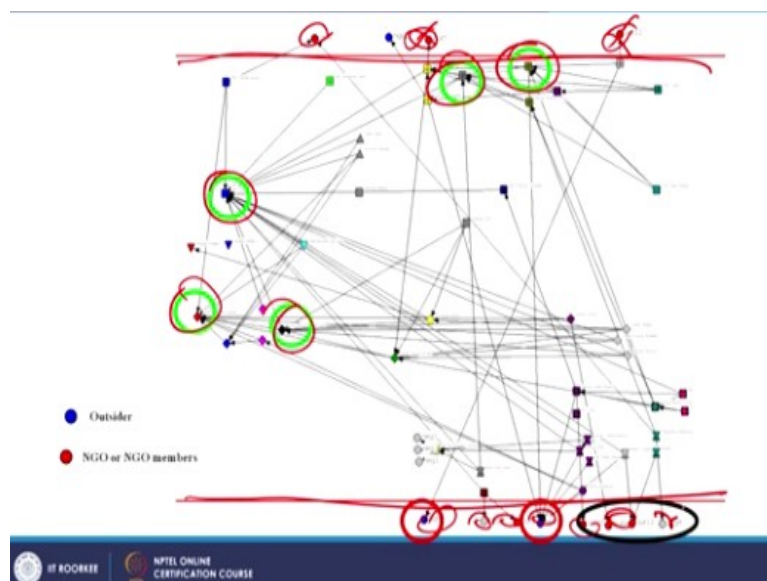
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Observation :

" Did you observe rainwater tank before your adoption? If Yes, Kindly name us three tank adopters or places where you have first time observed the rainwater tank "

Also the observations; for observation network, we ask people that who was the first three persons where you saw first time this rainwater tank and so here also basically, you can see that outsiders or NGO people are negligible, they did not.

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So, it is actually there, the inside the people, they are the key source of informations for that within the community boundaries all belong to within the community boundaries so, outsiders have very little; a little influence okay.

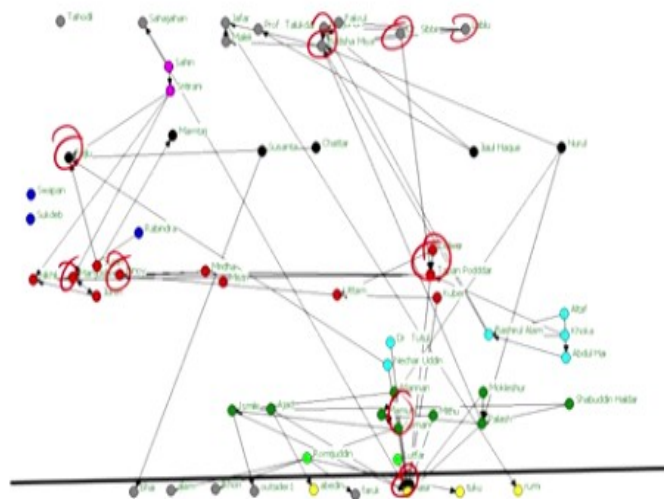
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Discussion

"Kindly name us three persons with whom you have discussed about the tank before making final decision of tank installation"

Now discussions; with, whom they discussed about before they decided to install, we asked them to name 3 persons.

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And we also found that they are depending on outsiders and also insiders okay, like here you can see a lot of networks, a lot of there.

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Results of Regression Analysis on Social Referents for hearing, observation and discussion				
Group Criteria		Hearing	Observation	Discussion
Cultural group	Religion	-0.002	0.020	0.002
Economic group	Income	0.001	0.001	-0.001
	Occupation	0.013	0.012	0.021
Spatial group	Neighbourhood	0.048	0.090*	0.061*
Social network group	Cohesive	0.080**	0.072**	0.081**
	Structurally equivalent	0.027	0.001	0.018
R-Square		0.084	0.070	0.088

** $p < 0.01$, * $p < 0.05$

We used Quadratic Assignment Procedure (QAP), a multi regression technique, provided by UCINET Social Network Software 6.0 Version 1.00 (Borgatti et al. 2002) to find out the actors' social referents for each kind of information-seeking activities. This approach is similar to ordinary multiple regression. However, it enables analysis of matrix data.

So, now look and we conducted a regression analysis so, we have three one, one is the hearing, observations and discussions okay, now we want to know that from where people collected, one is cultural group like religion, if they have asking it from religious, economic, spatial, social okay and if we see the hearing, we can see that people depends on their cohesive group partners that it means their friends.

Now, a little bit extends to their neighbour, no other are significant, in case of observations where they first time observed, it is the neighbourhood partners who played a big role that means, they watch in their neighbourhood but also the cohesive group partners like could be that some of the neighbours are there, cohesive group partners. In case of discussion that is the final decisions, they depend on again cohesive group partners, okay.

And also their neighbourhoods, so cohesive group partners and neighbours are the main source of informations.

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- Higher the degree/ frequency of ties, higher is the information sharing tendency.
- Neighborhoods member/ Spatial Group – Source of Observation

So, higher the degree and frequency of ties and network, higher is the information sharing tendency and neighbourhood members or a spatial group source of observations for most of the people.

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Policy Implications

- Planners or NGO workers might take advantage of satisfied tank owners to talk to individuals in close group meetings and workshops organized in a neighborhood.
- The success stories and personal opinion of existing tank adopters could be documented and distributed in brochures, newsletters, or video promotion for potential adopters to accelerate the social contagion of adoption.
- Potential adopters are affected by cohesive group partners under these groupings: religious, political, and cultural. These groups and organizations then should be involved in the dissemination process like promoting rainwater tanks during cultural and religious festivals and by direct communications with religious gurus and local leaders.
- Another strategy to convince potential tank adopters would have the satisfied tank adopters share their experiences adopting the innovation. Our results show that individuals share information among cohesive group partners. Therefore, if the tank owners are satisfied with the tank, penetration of the technology happens more smoothly.

Then, what is the policy implication of this, we can do one thing, the planners and NGO workers might take this advantage that who those who are satisfied with the users of this tank owners, they can come and talk, give a talk to the individuals who have not adopted yet and especially by conducting neighbourhood meeting or workshops in a particular neighbourhood.

The success stories; someone's adopted their personal opinion of the tank okay, adopters and could be documented, and distributed in a brochure to potential adopters and potential

adopters are affected by cohesive group partners, so under this like religious, political and cultural groups these are actually cohesive groups so, we can use these groups for dissemination.

Another strategy to convince potential tank adopters would have satisfied tank adopters to share their experience into other 3 members okay, they can also tell us that the 3 or 4 members they can promote.

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- A cohesive group helps the diffusion process only within the group and it sometimes produces redundant information and restricts new information and knowledge from entering the group. One way to overcome this bottleneck is to use NGO workers to find the opinion leaders in the promotional program.
- Observation is a method of learning closely linked with geographical proximity and popularity. Therefore, more model tank demonstrations are needed at various public and popular places including schools, religious centers, clubs, and markets.
- Moreover, door-to-door campaigns by NGO workers are recommended to accelerate the promotion of rainwater tank adoption.

So, these are some of the; also we can conduct some door to door campaign with this so, thank you very much for all listening this talk, I will continue in same on this and the role of pioneer adopters on promoting disaster preparedness and information sharing.

Thank you very much.