Environment Risk and Vulnerability

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Introduction

- **Global climate change will increase the probability of extreme weather events, including heatwaves, drought, wildfire, cyclones, and heavy precipitation that could cause floods and landslides. Such events create significant unexpected humanitarian needs such as : Food security, shelter, crop recovery, public health needs etc. that can exceed local capacity to respond, resulting in excess morbidity or mortality and in the declaration of disasters.**
- **Human vulnerability to any disaster is a complex phenomenon with social, economic, health, and cultural dimensions. Vulnerability to natural disasters has two sides: the degree of exposure to dangerous hazards (susceptibility) and the capacity to cope with or recover from disaster consequences (resilience). Vulnerability reduction programs reduce susceptibility and increase resilience. Susceptibility to disasters is reduced largely by prevention and mitigation of emergencies. Emergency preparedness and response and recovery activities—including those that address climate change—increase disaster resilience.**
- **Because adaptation must occur at the community level, local Humanitarian response Agencies are uniquely placed to build human resilience to climate-related disasters.**
- **This module will take us through a reflexion on the role ofthe humanitarian NGO in reducing vulnerability through a strategic approach in community organisation which includes vulnerability reduction in extreme environments, and mainstreaming adaptation into sustainable development. We will also discuss reducing human vulnerability to climate change within the context of selected examples for emergency preparedness and response.**

Definition of concepts

- **How do we understand extreme Environments**

  An **extreme environment** is one where a natural course of life is disrupted abruptly by a sudden change in the environment due to extreme events either man-made or due to extreme climatic conditions (Cold waves, heat waves, monsoon precipitations etc) or unexpected natural events (tsunami, tornado earthquakes) or periodic climatic changes (floods due to the monsoon, droughts during summer, crop failure due to droughts, food security etc.) which affect the normal life conditions, creating Hazards.

  The result of such extreme environment is loss of life, food insecurity, health conditions are at risk, loss of shelter, psychosocial traumatism et above all displacement of population, leading to an humanitarian crisis that affect the most **vulnerable** strata of the population and often demanding huge means to deal with them.

  The most vulnerable are subject to “Covariate” shocks, which are events that lead to the unexpected loss of income, consumption or assets of a large group people in a given place as a result of a single cause—the classic example being drought, flooding, conflict or displacement.

  A quick analysis of the extreme environments : Tsunami in Sri Lanka, the recent floods in Pakistan

  Vulnerability is understood as the difficulty for a given group of people to cope up with their living environment when extreme changes in their environment .It is the extent to which the community can be affected when the extreme environments lead to disasters.

  Vulnerability is the susceptibility of individuals, households or communities to become poor, or poorer as a result of events or processes that affect them

  It can be defined as the probability of an acute decline in capcity to cope up with the the changing environment due to the exposure to the risk factors such as drought, landslides, floods, tsunami, and also of underlying socio-economic process which reduce the capacity of people’s ability to cope .

  Recurrent natural disasters weaken people's ability to cope when, along the process of recovery, another hazard impacts the community again, putting strain on already very limited resources.

The Extent of vulnerability depends on many factors :

1. its natural relation with its socio-economic environment before the events
2. The social capital of the victims
3. The magnitude of the disaster.

Put in the form of a simple equation, Vulnerability (V) is the combination of Exposure to risk and the inability to cope with it : **V= Exposure to Risk + inability to Cope with it**.

The extent of the extreme environment and the vulnerability of the community helps us to determine the risk that are potentially at stake. The risk, perceived as a negative outcome is high when the changes are high and the vulnerability is high.

Risk as an outcome of the extreme events can be defined as the function of the Hazard (that created the shock) combined with the vulnerability of the given group.

R = f (H. V)

A community or a group of people is considered to be at high risk when the magnitude of the Hazard is high and the vulnerability is also high. High risk often lead to covariate shocks within the community and require humanitarian action that would respond to these shocks in order to make the community resilient.

Global warming and climatic changes or conflicts result in extreme environments Which results in Human vulnerability which is the exposure to risk and the inabiltity to cope with it.The risks are high when the magnitude of the hazard is high and the vulnerability of the population is also high, leading to high risk and complex Humanitarian response to the victims.
Illustration of these concepts through the different major experiences in Asia.

Influence of Extreme environment on the most vulnerable population

Hazard description	Impact	Influence on the MVG	Observations
Floods in Pakistan	High precipitation, 1/3of the territory under water, Crop and power failure, national economy affected	Loss of shelter, loss of livelihood means, health conditions are at high risk, food insecurity, Children and women in high risk. The poorest and the working class are the most affected	Government mechanism not ready, NGO Cannot intervene freely, army controls IDP Consequence : Lack of Food, Shelter, IDP are almost 20 millions Health problems, infant mortality etc
Tsunami –Sri Lanka 24/12/2004 and the program ends in 2010	2/3of the coastal areal is affected, houses are destroyed, fishing industry put out, crop failure, tourist industry iat risk? Massive loss of life and property, infrastructure Psychosocial trauma	The most vulnerable are the victims of War in the north and east ; in the sout the fishermen, the poor maritime dwellers living from the tourism industry and the coastal dwellers working in the citiy. There are also coastal agricultural farmer. A huge number of IDP	Situation of war, state of emergency and stringent security rules, movements are limited. Consequences : Massive shelter problems, lack of food, IDP, difficulty to have access to the affected areas,

The main climate change impacts in the region are as follows: increased frequency of droughts and floods negatively affecting local production; sea-level rise exposing coasts to increasing risks, including coastal erosion and growing human-induced pressures on coastal areas; and glacier melt in the Himalayas with more flooding and rock avalanches. [...] Within South Asia, Bangladesh is the most vulnerable country because of its regional connectivity through geo-physical and hydrological features and its livelihood reliance on trade

Hazard Vulnerability Analysis
South Asia Region

Hazard	Country	Frequency	Population affected	Related Disasters
Tropical cyclones and storms	India, Bangladesh, Sri Lanka, Vietnam	Yearly or twice a year	Coastal communities, inland farmers	
Monsoon precipitations	India, Pakistan, Sri Lanka, Bangladesh	Twice a year	Region wise, often affects the agricultural sector: Crop damage	Crop damage, IDP, shelterlessness.
Major Floods	Pakistan, India, Bangladesh, Vietnam, Cambodia	Significant events quite common	Agricultural farmers, coastal	Crop damage, food insecurity unemployment, shelterlessness
Minor floods	India, Pakistan, Bangladesh, Cambodia	Almost every year	Agricultural farmers,	Crop damage
Tidal waves	India, Bangladesh	Once in three or four years	Coastal fisher folks are severely affected	Fish farming
Cold waves	India, Bangladesh, Pakistan and Nepal	Significant events quite common	The population living in the large periphery of the Himalayan range.	None
Heat waves	Inida, Pakistan, Bangladesh	Every year		
Drought	India, Pakistan Sri Lanka	Quite significant event	Agricultural farmers, inland fishers	Crop failure, food insecurity.

Earthquakes	Pakistan, India, Indonesia and Philippines	Often in Indonesia.	Both rural and urban	Tsunami, floods
Armed conflict	Pakistan, Sri Lanka, India, Bangladesh, Nepal	Man made disaster very common in south asia. They are either armed military conflicts, civil riots, between factions or with radical groups.	The civilians are all affected by such conflicts and the collateral damages are often high	
Civil riots	Pakistan, Sri Lanka, India, Bangladesh, Nepal.	Very common in south Asia	Affects often rural and urban civil populations	

Identification of Risk in Extreme Environment

- Risk in extreme environment is understood as the function of the Hazards and the vulnerability of the community. We have also defined vulnerability as result of exposure to risk and the inability to cope with it.
- Consequently we can define Risk in extreme environment in the following manner:

R = fn (Exposure to Hazards + the risks and the inability to cope with it).

- **From the above we can infer the following**:

1. Risk is high when the Hazards are frequent or of high intensity (Ex.the recent floods in Pakistan or tsunami)
- 2. A population becomes highly vulnerable when the risk is high.
- 3. The ability to cope with the risk factor reduces the vulnerability of the population.
- This brings us to define in a systematic way the Risk and their impact on the community concerned.

Risk identification is an essential part of the humanitarian response from three angles :

1. The immediate releif operations
2. Planning out the emergency mid-term and long-term operations
3. Introducing disaster mitigation and prevention in the future.

This is all the more important when it is a question of extreme environment and the frequency is predictably high (Example of Bangladesh)

Recurrent natural disasters weaken people's ability to cope when, along the process of recovery, another hazard impacts the community again, putting strain on already very limited resources

Hazard and Risk Analysis Table

Pakistan

Hazard Description	Major Floods in july 2010, historically high levels of water, almost 1/3 of the country is under water rendering 20millions homeless, houses are destroyed, health, educational and other infrastructure are destroyed, massive destruction of livestock. People are living in the camps which are under the military control.
Frequency of the event	The floods are frequent, but such major sudden flooding which is continuing for many day sis rare and this is an historical disaster and the predictions are that it may happen in the future.
Population affected	The population affected are in majority rural agricultural worker. But there are also non-agricultural worker (Bricklin coolies, scavangers,etc.) The semi-urban areas are inhabited by administratif staff working in the local or near by government infrastructures. The feodal landlords notbeing ableto cultivate their lands have sent away the agricultural worker aggravating the situation still further.
Vulnerability	-Unemployment of the unqualified workers. -Lack of shelters -Dire Health conditions and no structure to give them the basic health care. -Women and children are the most affected -Majority of the victims are from the lower class of the population and subject to continued exploitation from the landlords. -Traditional livelihood activities are difficult at once leading to lack of earning.
Risks	-The disaster situation is a characterized high risk : Shelter, crop recovery and employment ; health care, studies for the children, Permanent housing will be a major risk factor due to the political and socio-cultural conditions. Food insecurity will be a major risk in the coming months. -The outbreak of epidemics or other diseases both waterborne and skin are highly probable. -This situation is made worse by the government policy which is not yet clearly elaborated, the Talibans who are influencing the humanitarian response and refusing the intervention of the INGO and the Army who is as usual highly involved in the camps, raising once again the issue of “Military and Humanitarian Response”. The major risk is the crop recovery which will take more than six months

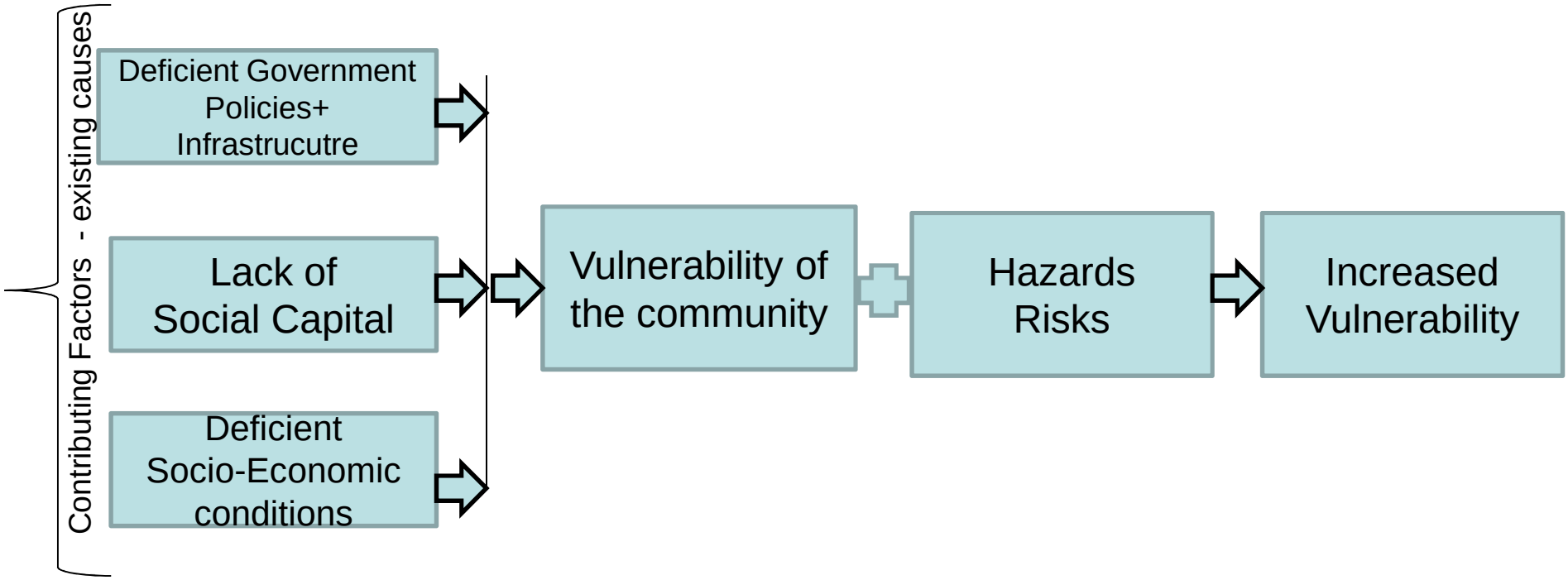
Sri Lanka

Hazard Description	In December 2004, a massive under the sea earthquake in Sumatra results in a massive tsunami with huge tidal waves that lashes the costs of South-east India, 2/3 of the coast of Sri Lanka, parts of Thailand and Bangladesh, and Andaman's islands. The death toll goes beyond 280000 in the region and in Sri lanka itself more than 80000 are feared to be dead , ten of thousands of houses have been washed away or reduced to rubble, Health and education infrastructures are destroyed, livelihood means, especially fishing is totally or partially lost. The tsunami events in Sri Lanka took place in a context of war.
Frequency of the event	This is a rare phenomena in South Asia but the risks of this hazards happening is always there.
Population affected	The coastal dwellers severely affected. The fishermen, agricultural workers lost all their means of livelihood and their homes were washed away. Homelessness is a major issue, followed by livelihood problems. Children are also severely affected and are unable to go to school.
Vulnerability	-The fishermen who have lost all means of livelihood. -Houselessness and landlessness of the most poor combine with the loss of documental proofs. -Agricultural failure to a lesser extent. -Tamil minority already victim of the LTTE occupation and not taken care of by te government are also now victims of tsunami. -Middle class semi urban dweller in the south are also highly affected by te tsunami
Risks	-Shelter and crop recovery are the major risk and for the fishermen, being able to go for fishing is a he humanitarian challenge. -Trauma pathology are prevalent and require immediate attention. -Education of children is getting to be major challenge. -Dispensing Livelihood activities is not so easy and is another challenge. -Given the magnitude and complexiity of the disaster, the Humanitarian response is quite complicated to carry out

Defining a conceptual framework for reducing vulnerability

- **Aim 1 Reducing vulnerability**
- To strengthen the ability of poor people through different means to cope with threats from natural disasters, environmental degradation and civil conflict, by:
- Strengthening the ways that people who live in fragile environments cope with the environmental degradation which threatens their livelihood opportunities
- Improving vulnerable communities' ability to prepare for, survive and rebuild homes and livelihoods after natural disasters
- Preventing and managing conflicts over scarce natural resources and competition for common property resources
- Rebuilding the livelihoods of people affected by civil war or conflict

Vulnerability Analysis Framework



Vulnerability is people's susceptibility to become poor or poorer because of unpredictable events, or shocks

Common characteristics of all vulnerable people are a lack of control and sense of powerlessness over the threats that face them.

Hazard Risk has a stronger impact on the Highly vulnerable groups making resilience difficult

Vulnerability Analysis gives information about peoples' powerlessness aggravated by Hazard Risks

Vulnerability Analysis Framework

Field of Analysis	Questions for analysis
Vulnerability and vulnerable groups Social Capital	Who are the vulnerable people and what are they vulnerable to? Are different groups of people vulnerable to different shocks? What assets & means of livelihood do they have? (physical, natural, financial, social, human) What access to institutions, processes and policies do they have? Are there different groups within this, with different levels of assets and power? (eg. social class, occupation, gender, ethnicity) How do they perceive the risks facing them? What are their current response and coping strategies? What are their perceived needs to improve coping strategies? Individual and collective. Are the peoples organised into communities prior to the hazard ?
Hazards	How predictable and controllable is the hazard? Is it of natural or man-made origin or both? Are its causes external to the local community? Is it related to trends in natural resource use and management? Is it affected by policies, regulations or other institutional controls?
Policies and infrastructures	What stakeholders are involved in institutions, policies and processes that affect vulnerable people's lives? What are their agendas and how do these impact on people's livelihoods? What policies and processes affect people's access to livelihood assets and their livelihood options? What policies and processes affect long term trends and the risks of hazards occurring? What organisations represent poor people's needs? What say do poor people have at local, regional & national levels?
Socio-Economic conditions	What long term trends affect people's livelihood strategies? What long term trends affect the risks of hazards occurring? How do current livelihood strategies affect long term trends?

Pakistan Floods-2010

Vulnerability Analysis Framework

Field of Analysis	Vulnerability Analysis	Refelxion on Risk Mitigation
The IDP of the recent floods in Pakistan. People are still living in the camps and dependant on external aid. Women and children are the most affected		
Continuous precipitations and the water outlet from the Northern range resulted in the overflooding of the Rivers		
Government policies, infrastrucutres and Disaster Response strategies		
Socio-Economic conditions of the IDP		

Sri Lanka Post conflict Disaster

Vulnerability Analysis Framework

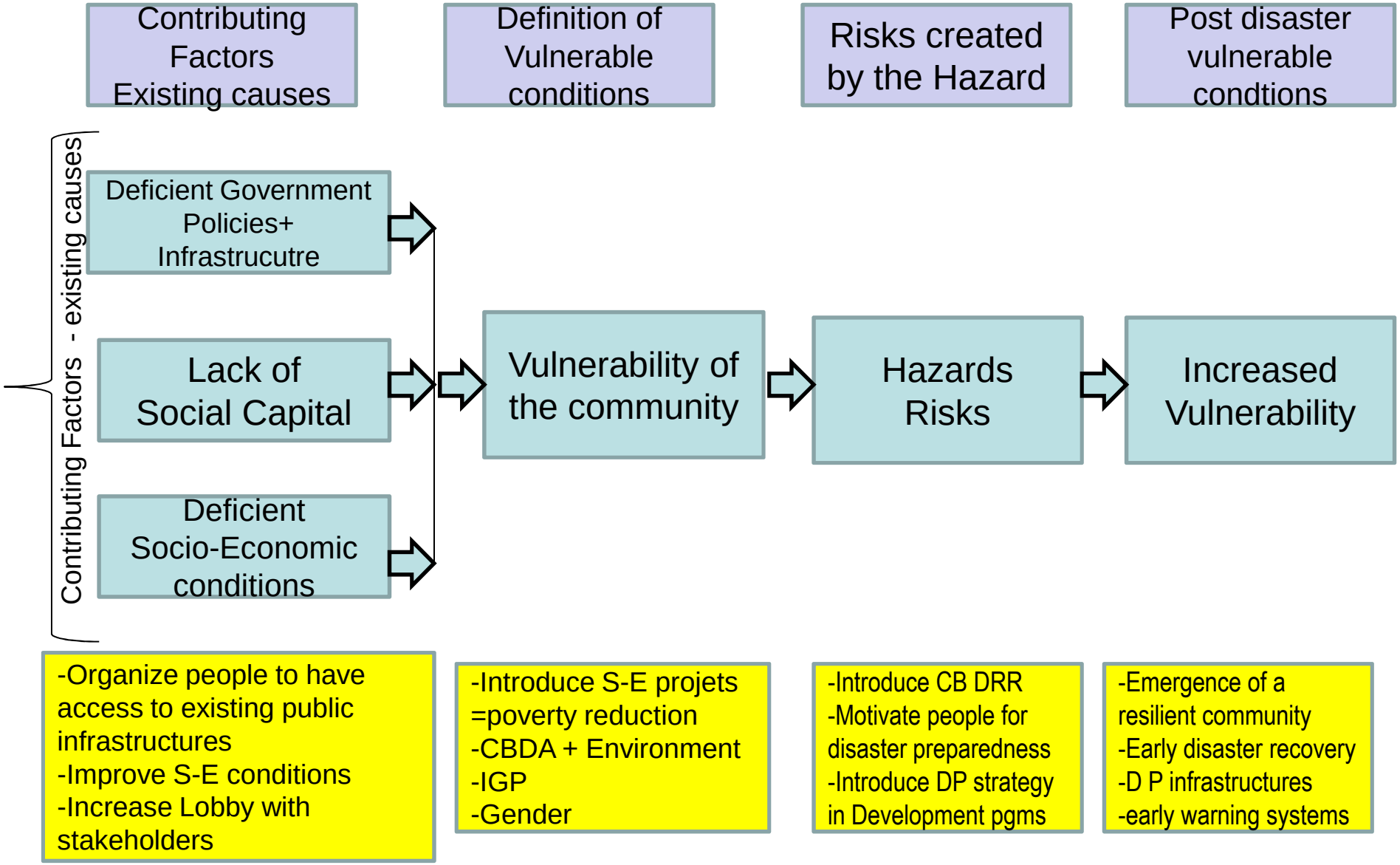
Field of Analysis	Vulnerability Analysis	Reflexion on Risk Mitigation
The IDP of the Post war situation in the north of Sri Lanka. Who they are and who are the most vulnerable, their living conditions etc.		
Lack of housing, psychosocial trauma, no documents, No schools. Rainy seasons are soon to come, health facilities are lacking, NGO are not allowed to work.		
Lack of government Rehab plan, no early recovery activities envisaged, High security zones and their impact on the people etc.		
The socio-economic conditions of the IDP,		

Strategies for reducing vulnerability

Global climate change will increase the probability of extreme weather events, including heat waves, drought, wildfire, cyclones, and heavy precipitation that could cause floods and landslides. Such events create significant needs (health, food security, shelter, child care, psycho-social trauma, livelihood loss etc.) that can exceed local capacity to respond, resulting in excess morbidity or mortality and in the declaration of disasters. Human vulnerability to any disaster is a complex phenomenon with social, economic, health, and cultural dimensions. Vulnerability to natural disasters has two sides: the degree of exposure to dangerous hazards (susceptibility) and the capacity to cope with or recover from disaster consequences (resilience). Vulnerability reduction programs reduce susceptibility and increase resilience. Susceptibility to disasters is reduced largely by prevention and mitigation of emergencies. Emergency preparedness and response and recovery activities—including those that address climate change—increase disaster resilience. Because adaptation must occur at the community level, NGOs and international agencies are uniquely placed to build human resilience to climate-related disasters.

Caritas Bangladesh disaster Response for the historical tidal waves of 1991 and the strategies used to mitigate risk and improve resilience.

Strategies for reducing Vulnerability - Framework



Vulnerability of the communities is reduced and better resilience achieved

Strategies for reducing Vulnerability
Tsunami Experience in Sri Lanka

December 2004 was the begining of an historical Disaster Reponse and humanitarian activities in Sri Lanka. Two thirds of the coastal area were affected with water entering almost from two to four Km (in some areas) into the land. More than 80000 are feared dead, tens of thousand houses are destroyed, fishing industry one of the main economic activity affected, public infrastructures are totally or partially destroyed, agriculture in some areas is affected. Psycho-social trauma is very important. Before such a massive damage in a war torn Sri Lanka, high economic and political crisis, it was important to introduce a vulnerability reduction strategy pour respond effectively and efficiently to the crisis.

A ten step strategy was introduced to mitigate the risk ad reduce the vulnerability of the victims.

I. Immediate disaster relief
II. Strengthen people's coping (shelter and psycho social activities) and livelihood protection strategies
III. Rebuilding destroyed livelihoods
IV. Build alliances and networks with multiple levels of stakeholders to increase the effectiveness in addressing risk management issues by promoting integration and consensus-building
V. Reduce the impact of the hazard –disaster preparedness
VI. Build up the capacity of CBOs and other local institutions to represent vulnerable people and to manage technologies for their benefit (Fishing activities, Food security etc)
VII. Promote sustainable use of natural resources
VIII. Conflict resolution and consensus building
IX. Build up an understanding of impacts of long term trends and ways to mitigate these at the local level to inform policies at local, national and international levels
X. Facilitate policy interventions where these would contribute to reducing vulnerability, particularly social protection policies.

I. Short **term immediate disaster relief**, a priority area that had to be responded to at once with regard to local communities who have lost everything. But major focus was given to give importance and put into value the local solidarity.

II. Bring the victims together in a **safer place**, analyse their situation through interviews and **identify their needs** and introduce adequate actions (Trauma counselling, family reunion, livelihood activities before the disaster et.) to improve resilience in the post post-disaster situation. Construction of semi-permanent shelters+ children education

III. Rebuilding livelihood was the next step to be introduced in order to ensure early recovery. The major focus was given on fishing (boats and nets) and agricultural tools to restart livelihood activities.

IV. Importance was given from the beginning itself to include people in the decison making ad negotiations with the local authorities, networking with the other NGO and the communities to come together to reflect on their future and also take up strategic collective actions.

V. Risk reduction strategies through Trainings, CBDP activities, the shelters were made to international standards, environment safeguard. DRR and CB Disaster Preparedness were mainstreamed into the different rehabilitation and development activities.

VI. The disaster response from the beginning itself gave prime importance to build communities and through them introduce the different activities. The Community based apporach was particularly important in the housing and livelihood programs

VII. The main area of intervention was in the field of fishing and fish conservation ; avoid massive sand recuperation from the sea side or from the river beds, utilisaiton of wood for construction, crop recovery etc.

VIII. Communal harmony was one of the important area of intervention in the war torn Sri Lanka. All the activiites had a peace component inbuilt into the program, in order to promote awareness on living together as one nation. DO No Harm principles guided the program all along.

IX. Since the beginning the long term trend was already planned. This was due to the nature of the disaster and the problems that were very important and demanded a systematic long term planning keeping in mind the complex political and administrative situation. This was done through negotiations with the government authorities, local administration, the army etc. Undertaken with the beneficiaries.

X. The facilitation role between the target population and the government authorities, LTTE or political leaders were systematically undertaken in the field of access to the affected areas, livelihood activities to be undertaken, construction of shelters and obtaining land for the construction of houses. Another major area was in the negotiations related to the construction policy.

Empowerment process to reduce vulnerablity

- **Vulnerability management** is emerging as a critical part of any sustainable development strategy. It focuses not only on conditions now, but also on likely conditions in the future. It
- examines risks of hazards, natural and acquired abilities to resist damage (natural resilience and acquired vulnerability), giving us the opportunity to balance strengths
- and weaknesses.
- **Vulnerability** is the tendency for an entity to be damaged.
- **Resilience** is the opposite of vulnerability and refers to the ability of an entity to resist or recover from damage.
- **Entities** can be physical (people, ecosystems, coastlines etc) or abstract concepts (societies, communities, economies, countries etc) that can be damaged (responders).
- **Vulnerability** and **resilience** are two sides of the same coin. Something is vulnerable to the extent that it is not resilient.

- The Empwerment process consists of identifying (communities and people) who are highly vulnerable and helping them to acquire resistance to the risks so that they can recover from the damage at the soonest and regain normal living conditions. As such the first step in the empowerment process is to build organize resilient communities which can take up their own development into their hands and thus become less vulnerable, especially at the time of Risk.

The Empowerment process to reduce vulnerability consists of :

- Increasing their income and broaden their asset base which are :

Financial Assets

- Financial assets are accumulated primarily through the IGP and other livelihood programs which gives them the means to put aside money through savings which will help at the time of need.

Physical Assets

- The communities have access to cumulate assets, in particular houses.

Human Assets

- Awareness building on social values, community togetherness, "socialisation" of members to social norms, integration or mainstreaming into the systems from which they are usually excluded.
- Gender based development activities wherein the capacity both social and cultural of the Women are enhanced and they are able to influence over the decision-making process as a result of their increased contributions to the household economic portfolio.
- Education of Children ; health is given importance

Social Assets

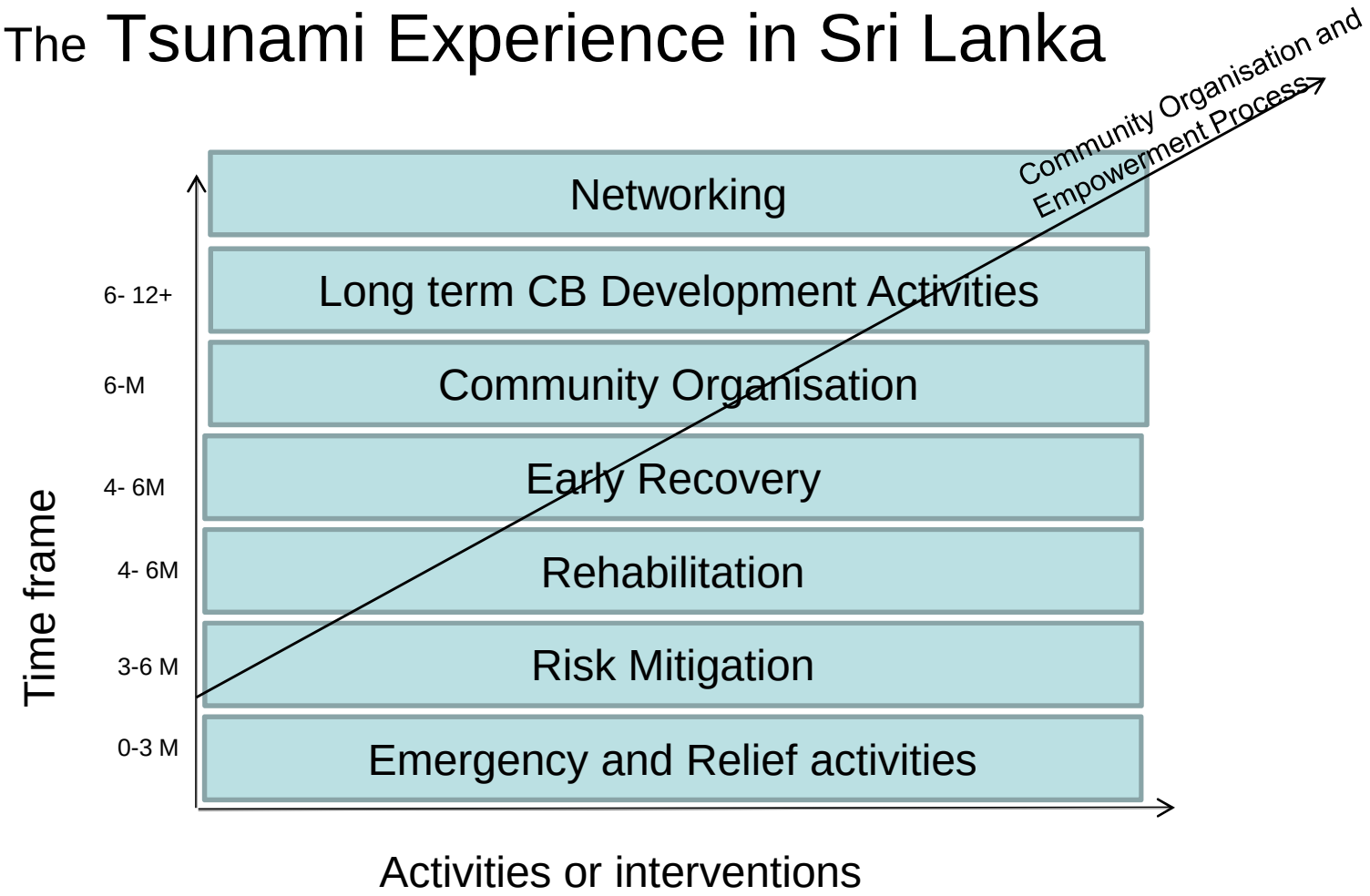
- Men and women are encouraged to learn from each other, gain leadership and public speaking skills and a remarkable level of group solidarity and mutual help. The groups also link the members to vital web of other existing networks that represent an important social asset.

Community participation

- The Members are empowered to a feeling of community, of a common cause, of
- meaningful relationships with one's neighbors, thus promoting another value systems based on common vision and a common culture. Their interests and activities are carried out for the common interest and they are socialized towards communal harmony and community harmony.

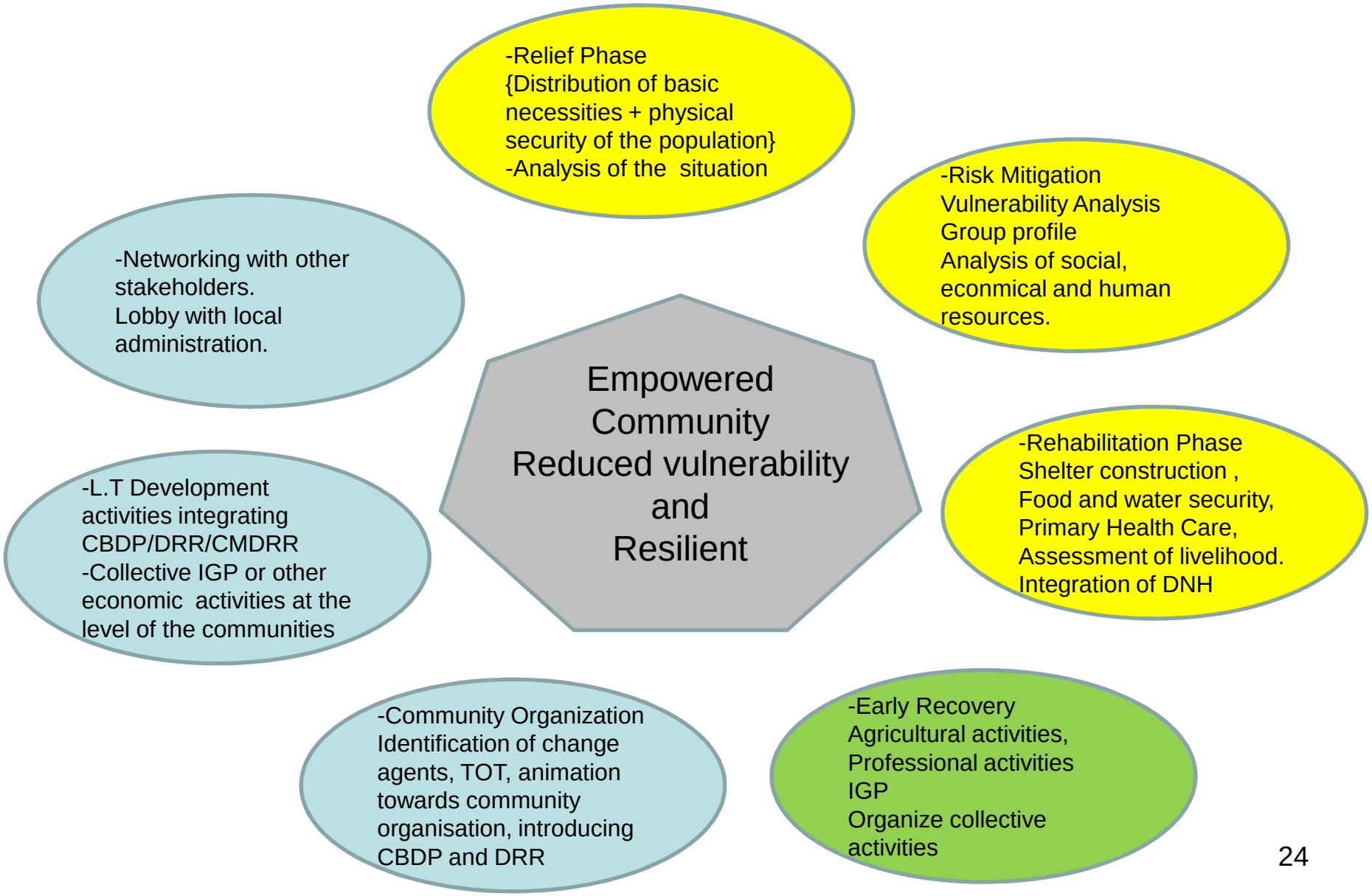
In the tsunami response in India and Sri Lanka, different methods were used to build communities. SHG in india, Village communities in Sri Lanka.

Vulnerability reduction oriented CO
The Tsunami Experience in Sri Lanka



The community is at the frontier of any kind of natural hazard and disaster. Empowering the community by internalizing the tools and methods of disaster risk reduction is a good way to deal with the future potential risks.

Relief to Empowerment – The Process



Mainstreaming adaptation into sustainable develoment process

The most vulnerable are the high risk population (the poorest) when disasters happen. They are the first affected ; low resilience to get back to normalcy. In this context it has proven to be very important to integrate disaster prevention and reduction of vulnerability by mainstreaming these activities into the normal development programs. This is done through a strategic approach which consists of:

1. Exploring linkages between poverty and vulnerability;
2. Suggest strategies to integrate poverty reduction programs and disaster reduction in the regular programs of poverty alleviation.

The vulnerability of our environmental, social and economic systems is made up of more than just the risk of disasters and good or bad management. It is not just about climate change, or globalisation, or trade agreements. It must also include an understanding of how well the environmental, social and economical factors within a context can cope with any hazards that may come its way and that might harm it. It would be impossible to work towards good quality of life and growth for the communities under a sustainable development model if no account were made of the damage that can occur from internal and outside influences. For development to be sustainable, we clearly need to learn to manage vulnerabilities. We need to be able to understand and/ or manage hazards, natural resilience and acquired resilience. This understanding for the first time opens up opportunities for improving our overall vulnerability because it forces us to examine the problem from all angles, instead of just focusing on the risk of disasters. Vulnerability management is emerging as a critical part of any sustainable development strategy.

By our own choices we can to a large extent determine our own quality of life, the condition of our lands and opportunities for future generations. *Vulnerability is a new way of looking at an age- old problem. Instead of focusing just on what has been going wrong in the past and the effects of hazards, vulnerability gives us the opportunity to focus on getting things right for the future. As a future- focused approach, vulnerability is a way of using strengths and strategically improving weaknesses*

This leads to the mainstreaming of DRR and Vulnerability reduction in the normal development Programs

Understanding Linkages between Povery, vulnerability and development

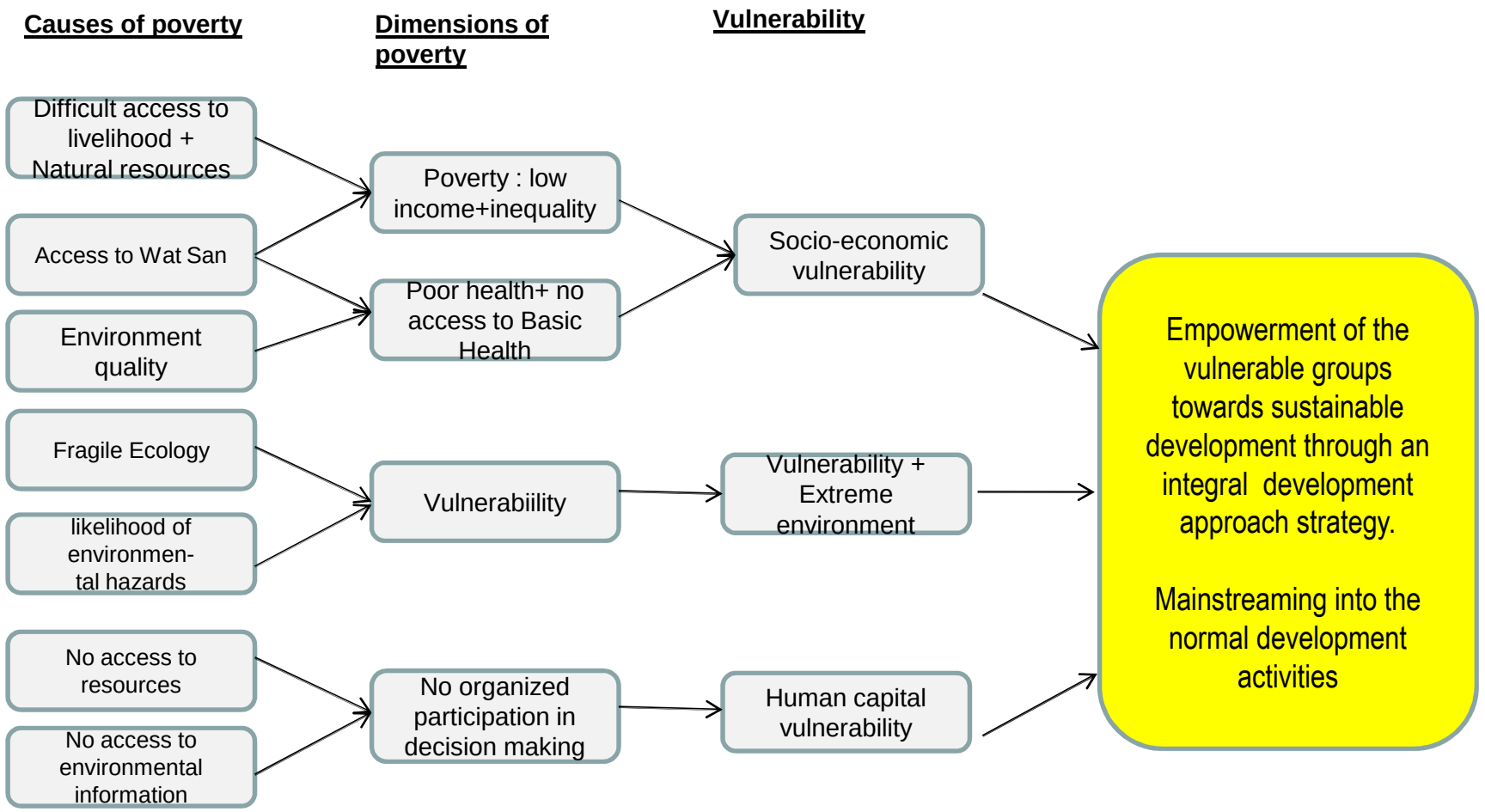
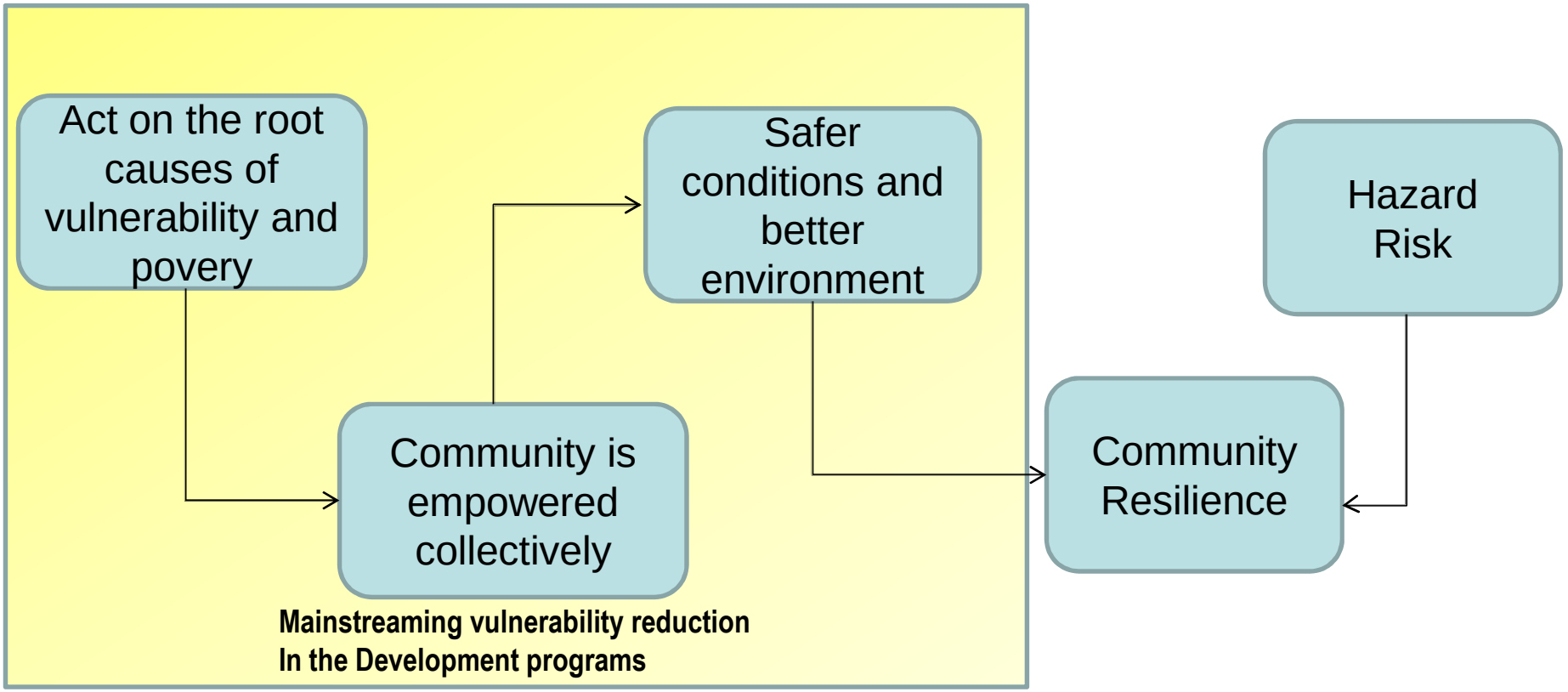


Illustration through examples from Bangladesh and India

Conclusion


Act on the root causes of vulnerability and povery
Safer conditions and better environment
Hazard Risk
Community is empowered collectively
Community Resilience
Mainstreaming vulnerability reduction
In the Development programs

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