Step 3: Vulnerability and capacity assessment

A disaster occurs when a hazard strikes a vulnerable community. Damage is done to various aspects of life, livelihoods, property and the environment. These are called 'elements at risk'.

In PADR, we need to document the impact of the hazard on these elements at risk, but also to ask the deeper question: Why was it possible for this hazard – the wind, earth tremor or flood water (etc) – to cause so much damage? The answer to this question will provide us with information about the vulnerabilities of the community.

In addition to vulnerabilities, a disaster-affected community will always possess capacities, at community, family or individual levels. This chapter is therefore also concerned with capacity assessment – determining the strengths and coping mechanisms of the community – in addition to assessing the vulnerabilities.

6.1 Impact and vulnerability

The relationship between impact and vulnerability can be illustrated by the following examples, the first for flash flooding, the second for drought.

Example 1
Hazard – flash flooding

ELEMENT AT RISK	IMPACT ON ELEMENT AT RISK	POSSIBLE VULNERABILITIES WHICH ALLOW THIS IMPACT
Houses	Damage to houses	Houses close to river Weak house design or weak foundations No protective wall, embankment or trees
Water supply	Contamination of wells	Wells close to river Wells not capped or protected from contamination
Livelihoods	Destruction of crops	Farm fields located on low land, close to river Growing season of crop coincides with flood No protective wall, embankment or trees
Natural resources	Destruction of natural resources	Climate or environmental change has brought more severe weather that will now damage previously resilient assets

Example 2
Hazard – drought

ELEMENT AT RISK	IMPACT ON ELEMENTS AT RISK	POSSIBLE VULNERABILITIES WHICH ALLOW THIS IMPACT
Health	Health problems	Lack of health knowledge Lack of pure drinking water sources
Livelihoods	Reduced or zero yield from field crops	Crops not resistant to drought Lack of irrigation systems Agricultural extension services not adequate
Livelihoods	Death of livestock	Some animals do not cope well with drought Some animals not in good health Herds are too large Veterinary services are absent
Natural resources	Reduced number of wild plants / wild animals	Even the wild plants / wild animals are not resistant to the extreme droughts now seen

Damage (impact) is usually easy to describe, because there is a visible effect of the hazard upon the community. Vulnerability may be harder to see, because it is often linked to something which is absent or not accessible to some members of the community.

Variations in vulnerability

Vulnerability can vary considerably from country to country. For example, the Caribbean island of Cuba is well prepared for hurricanes: vulnerability is low and few lives are lost. The neighbouring country of Haiti is much less well prepared, and consequently vulnerability is high. Hurricanes of equal strength in Haiti cause much damage and loss of life.

Even within one village, some families may be highly vulnerable to disaster – through poverty, location or type of housing, sickness in the family etc – while other families may be much less vulnerable. Some social, ethnic or religious groups may be more vulnerable than others, because they live in areas more affected by the hazard.

Within a family or household, vulnerability can vary. Women are often much more vulnerable than men. Children, the elderly and chronically sick people (including those with HIV) can also be highly vulnerable, because they are less able to escape or cope with bad conditions.

6.2 Capacities

As well as vulnerabilities, a community will possess capacities or strengths which help to reduce the impact of the hazard. Capacities may consist of knowledge or skills, including traditional ways of coping with hazards. They may also include alternative crops or livelihoods, or extended family support mechanisms.

Many capacities are hazard-specific, while others are useful against any hazard. For example, banana trees may be a capacity in a flood area, because their trunks can be tied together to

make a platform or a simple boat. However, banana trees will be of little use as a capacity against earthquake! Other elements, such as savings, a radio or jewellery to sell, will be a useful capacity to aid recovery from any disaster event.

It is also possible for one asset or activity to be both a vulnerability and a capacity, depending on which way it is viewed. For example, in times of drought, male or female migration in search of work is a common coping strategy, or economic capacity. Unfortunately, the separation of the family can also have negative consequences. Single-headed households result in increased pressure on children to undertake more labour or to miss school in order to help with household tasks.

As a further example, many cultures would consider a large herd of cows to be a sign of wealth, an economic capacity. Unfortunately, in times of drought and scarce pasture, the presence of too many animals, their lack of drought resistance and people's dependency on a single livelihood can all contribute to making the population more vulnerable to the drought.

6.3 Assessing vulnerability and capacity

The first step of vulnerability and capacity assessment is to record the actual impact of the hazard on elements in the five categories (see pages 28-9). Different hazards will affect these categories in different ways. For example, a flood may have a very large impact on houses (physical) and livelihoods (economic), but perhaps a much smaller impact on the forest and fish (natural resources). On the other hand, a drought may have a big effect on the natural resources, but a very minor impact on physical infrastructure.

In the question sets (see Appendix A), the first question in each category is always to do with the impact of the hazard. A participatory tool (eg a map, seasonal calendar or timeline) will help to define the impact more clearly and to identify vulnerabilities and capacities. Remember that in the individual category, impact on men and women may not be the same.

When the impact on particular elements is high, the vulnerabilities which allow this impact must be identified. This is done by asking a number of 'why' questions.

If the impact on particular elements is low, these elements are likely to become the capacities which enable a family or community to withstand and recover from the hazard.

Individual (male/female) vulnerabilities and capacities

This step of the analysis must identify the most vulnerable individuals in the community. This often includes the women and children, and may also include people who are elderly, sick or physically or mentally less able. These groups' vulnerability can be due to the particular customs and cultures in place – for example, women may be less literate, may be restricted in their movements outside the home, or may be expected to feed their husbands and children first, ahead of themselves. Women are often excluded from decision-making and planning processes, yet carry out much of the work. When collecting information in this category, it is important that the data is disaggregated, ie male and female data is recorded separately.

People suffering from long-term illnesses such as those related to HIV may be particularly vulnerable (eg if unable to move quickly), but will also create vulnerability for their families (eg time and money consumed in care activities instead of farming).

Vulnerability may also be due to lack of knowledge about hazards and how to survive them. Those who are least literate or least able to understand a national language may be restricted in their access to written materials (posters, newspapers etc) or to information broadcast by radio.

People often draw on their individual assets to make the best use of assets in other categories. For example, people may have traditional knowledge of resistant crops or edible wild plants which helps them to make better use of the available natural resources. Another important skill is the ability to interpret the signs of nature which often precede a disaster event – such as buffalo running uphill before a tsunami arrives.

The following table shows some common individual vulnerabilities and capacities. When collecting information in this category, remember to record male and female data separately.

INDIVIDUAL vulnerabilities and capacities

VULNERABILITY	CAPACITY
Low literacy rates	High literacy rates
Little knowledge of hazards and how to cope with them; loss of historic experience	Good knowledge of hazards and how to cope with them, perhaps from ancestors
Lack of educational or skills training opportunities	Good opportunities for education and learning new (employment) skills
High prevalence of HIV or illnesses such as malaria	Good health status of the population
Women restricted in mobility or dress by the culture	Women empowered, their knowledge and resourcefulness respected
Lack of able-bodied men or women to farm or do other livelihood activities	Presence of able-bodied men and women, especially youth

Social vulnerabilities and capacities

Social vulnerability appears in a community if the ties and networks between individuals and between families are weak. If family members are dispersed – by the hazard itself or by migration – the support which members give to each other is removed. The hazard will have a more serious impact. Similarly, bad relationships in a community will hinder the ability of members to help each other in a crisis, and arguments or minor crime will increase.

In contrast, a community where the family ties are strong and relationships are good will have a much greater capacity to cope. Good leadership is another key factor – a well-led community is much better able to withstand and recover from disaster, and clear direction in a time of crisis will increase chances of survival.

The presence or absence of other social groupings in a village will also affect its resilience to hazards. For example, a women's self-help group is a place where knowledge can be shared, and where members can support each other in a crisis; there might even be a savings or loans fund to aid recovery (which becomes an economic capacity). The absence of such groups, or of male equivalents (eg farmers' clubs) will make the community more vulnerable to hazards.

Social dynamics and gender roles within a family may deny women any significant voice in the use or disposal of assets or in deciding the best time to evacuate in time of disaster. This lack of voice and failure to pass on information can greatly increase the vulnerability of women.

The following table shows some common social vulnerabilities and capacities.

SOCIAL vulnerabilities and capacities

VULNERABILITY	CAPACITY
Family relationships are weak, possibly because of men or women migrating for work	Family relationships are strong, including links with members outside the disaster zone
Relationships between different ethnic, religious, class or livelihood groups in the village are poor; no habit of helping each other	Relationships in the community between different sub-groups are good, with much mutual help and support
No one in the community gives clear and decisive leadership during times of crisis; disputes not settled quickly and/or fairly	Community has good and respected leadership, able to give wise advice and settle minor disputes
Community has few or no other social groups – ie an absence of cooperatives, clubs or self-help groups	Community possesses well-established groups for men and for women, whose members assist one another in a crisis
Religious groups absent or ineffective	Religious groups strong and active in helping their members and others
Government services do not reach members of the community	Government services well developed and responsive in an emergency
Social stereotyping, usually against women; others do not value their gifts, skills, abilities and experience	Capacities of both men and women recognised and used – gifts, skills, abilities and experience

Natural vulnerabilities and capacities

The natural category includes those resources of the community which are found as part of the environment around them, such as water, fish, trees or soil. These resources are often the basis of livelihoods or housing, and are usually essential for survival. During or after a disaster, those natural resources which remain unaffected will provide important coping capacities for the survivors (eg reeds and grasses for temporary roofs , bamboo poles for construction).

The table on the next page gives some examples of natural vulnerabilities and capacities.

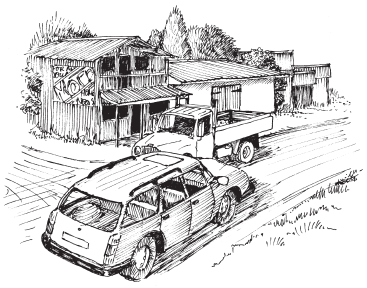
NATURAL vulnerabilities and capacities

VULNERABILITY	CAPACITY
Absence of trees, due to human activity or climatic factors	Presence of trees or bamboo for building, shelter or fuel
Surface water not consistently available throughout the year	Adequate surface water available for the whole year
Fish stocks reduced through over-fishing, siltation or pollution	Fish available to catch and sell from unrestricted waters
Soil impoverished, for example, through mono-cropping and/or erosion	Soils fertile and productive
Limited amounts of grazing land available	Adequate grazing land available for animal herds
No emergency flotation devices available	Emergency flotation aids available – eg coconuts, banana trees
No grasses or reeds	Plentiful grasses and reeds for emergency roofing
Emergency 'famine foods' in bush absent or inaccessible	'Famine foods' available in the bush – roots, berries etc

This table is not a complete list: each location will have its own combination of natural resources. Climate change and environmental degradation are having negative effects on the quality and availability of natural resources.

Conflict usually increases vulnerability by destroying or denying access to precious natural resources. For example, a community restricted to a very small area by violence or insecurity may have no access to firewood, grazing land, surface water points or the wild fruits, roots and leaves gathered during droughts when normal food is not available. When members of the community (usually women) attempt to access these restricted resources, they become more vulnerable to rape and violence.

Physical vulnerabilities and capacities



Physical assets are those which are constructed by people. They include roads and bridges, houses and public buildings, electric power supply and telephones, hand-pumps or water storage tanks. Tools and equipment are also considered to be physical assets.

Physical vulnerability is caused by the absence of these things, weaknesses in their design or problems with their location. A brick building may appear to be a solid asset or capacity, but if it is badly built or situated in a vulnerable place, it could increase the risk to those taking shelter inside – especially during floods or earthquakes.

The following table shows some examples of physical vulnerabilities and capacities.

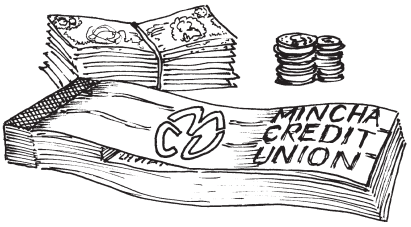
PHYSICAL vulnerabilities and capacities

VULNERABILITY	CAPACITY
Community has no strong public buildings	Community has one or more strongly built school, church or other community structure
Community has no purpose-built cyclone shelter	Community does have a purpose-built, regularly maintained cyclone shelter, with access to clean water and sanitation facilities
House design and structure not strong enough to resist common hazards	Many houses include cyclone- or earthquake-resistant design features
Roads and bridges not usable by motor vehicles for some months of the year	Road surface and bridges allow vehicles to pass for whole year, including disaster season
No landline telephone communication, and/or poor signal for mobile phones	Landline telephone and/or mobile phone communication good in all weather conditions
No protected wells or water hand-pumps	Hand-pumps elevated on platforms above potential flood water level; springs and wells have protective caps
Broken or non-existent irrigation system	Functioning irrigation system in place
Shortage of tools needed to maintain livelihoods or lack of protection for these items	Livelihood tools and equipment adequate and well protected from hazards

Physical vulnerabilities and capacities tend to be hazard-specific. For example, in areas affected by cyclones, secure attachment of roofing to buildings confers capacity, but if roofing is not attached securely it may create vulnerability. However, details concerning roofing would be of no importance for communities facing drought. Physical capacities for drought-affected areas would include such things as cross-dams, water storage tanks or irrigation channels.

In conflict situations, one party may attempt to destroy or disable the capacities of the other, eg by attacking water infrastructure, bridges or communications.

Economic vulnerabilities and capacities



'Economic' is defined here as anything to do with livelihoods, finances or the buying/selling abilities of an at-risk community. Vulnerabilities in the economic category are usually not hazard-specific: a poor family may experience economic distress whatever the hazard type.

Financial capacities are sometimes termed 'safety nets'. Examples include some form of savings scheme, or government grants or subsidies to compensate for loss or damage. Other capacities might include possession of saleable assets, such as a bicycle, radio, male animals or jewellery, or perhaps alternative forms of livelihoods, such as fetching and selling water or firewood. Wealthy relatives, and the remittances they send from the city or from overseas, are a powerful capacity in many situations and can assist a speedy recovery.

When one or more of these economic capacities is absent, individuals and communities are more vulnerable to disaster. Families may have no savings, no assets to sell, no access to credit,

few livelihood alternatives and no rich relatives. Government support may be very small, or perhaps inaccessible for the poorest families.

Examples of economic vulnerabilities and capacities are shown in this table.

ECONOMIC vulnerabilities and capacities

VULNERABILITY	CAPACITY
No easily saleable assets (eg bicycle, male animals, jewellery) or savings	Family does possess saleable assets or savings
Local credit from moneylenders only available at very high interest rates	Group savings and credit schemes; low-interest loans available
Very few job or work opportunities available	Opportunities for casual or skilled labourers to find work
No compensation, grants or subsidies available from government sources during crises	Government has financial safety net schemes for poorest at times of disaster
Community members have no richer relatives or remittances	Families have relatives in employment or overseas
Markets closed during floods	Markets open all year round
Lack of means to buy food, medicine and shelter material	Alternative livelihood options to create income, eg market gardens or handicrafts
Dependency on a single cash crop	Farmers grow several different crops with different planting and harvesting times

Conflict tends to increase economic vulnerability, by disrupting normal patterns of trade or denying people access to alternative livelihoods. Markets often close, or fewer people attend them, so opportunities to buy and sell are reduced.

6.4 Community methodology – use of questions, tools and grids

The assessment of vulnerabilities and capacities is done with community focus groups, using participatory tools and question sets. Additional questions are addressed to key informants.

Focus group process

The group facilitator begins by welcoming the group, thanking them for coming, introducing his/her team and explaining the purpose of the meeting. Members of the group are invited to introduce themselves. All are encouraged to participate in the discussions. A little humour will help to lighten the atmosphere and establish a good relationship with the group.

The process starts by using the hazard assessment template (see Section 5.2) and one of the suggested participatory tools. This enables group members to share their experiences of

hazards/disasters in the past. The designated note-taker keeps records of the answers and makes a paper copy of any tool used, so that the original can be retained in the community.

Discussion then moves on to vulnerabilities and capacities, working through the five categories: individual (male/female), social, natural, physical and economic.

A typical recording grid is shown below. There should be a separate sheet for each of the five categories of asset and the answers to questions should be filled in directly onto the sheet. A full list of questions for each category can be found in Appendix A (p87-91).

Blank recording grid

Impact, vulnerability and capacity assessment	
Category	
Participatory tools used	

Impact question	Answer
Main impact of hazard upon this category of asset	

Question	Vulnerability	Capacity
Q1		
Q2		
Q3		
Q4		
Q5		

Explanation of terms in the recording grid

CATEGORY The relevant category is written in the box – individual, social, physical etc.

PARTICIPATORY TOOL The facilitator chooses an appropriate participatory tool (usually in advance of the meeting), and the focus group use the tool in preparation for answering the questions. The following tools are suggested for the five categories. However, some of the tools can be used for more than one category, so the facilitator should choose which tools to use.

- **Individual** Seasonal calendar (showing activities, migration, festivals etc)
- **Social** Venn diagram (showing social groups and influences)
- **Natural** Community map (showing rivers, ponds, forest, grazing etc)
- **Physical** Community map (showing buildings, bridges, roads, dams etc)
- **Economic** Seasonal calendar (showing livelihoods and hazard seasons)

MAIN IMPACT OF HAZARD UPON THIS CATEGORY OF ASSET This box is used to record the damage caused to this category of asset. Remember to include information gathered using the participatory tool or from secondary sources.

QUESTIONS (Q1, Q2, Q3, Q4 ETC) Questions to discover the vulnerabilities and capacities in each type of asset should be asked in the local language and answers filled directly onto the sheet.

The participatory tool should be used in answering the questions; for example, on the map, identify buildings or natural resources which are more or less affected by the hazard.

If the answer to a question indicates a weakness (or vulnerability) in the community, the note-taker should write this in the 'vulnerability' column. If the answer reveals a strength or capacity, the note-taker should use the 'capacity' column.

As an example, the following table gives the questions commonly used for the physical category and some possible answers.

Example of a recording grid with answers

Impact, vulnerability and capacity assessment	
Category	Physical
Participatory tool	Community map to be drawn

Impact question	**Answer**
Main impact of hazard upon this category of asset	Flood causes destruction and damage to houses, roads, bridges, power lines; disruption of communications

Question	**Vulnerability**	**Capacity**
Q1 Which buildings are most affected by the hazard, and why?	Those houses located on low land near the river. Affected because of location and construction materials (houses made of mud and bamboo only)	
Q2 Which buildings are least affected by the hazard and why?		School and a few houses on high ground, made of brick which can withstand flood water
Q3 What communication systems are still available during times of crisis? For example, mobile phones or radios	No telephone landline available; road and bridge usually broken	A few mobile phones are held by village people; about 50 households own battery radios
Q4 What means of transport are available and still useable during times of disaster? For example, boats, bicycles or other vehicles	No motor vehicle transport on the roads	Fishing boats, possibly rickshaws; one farmer has a tractor
Q5 How do people preserve their tools and household possessions during floods?	Most people have no particular methods; large losses of household items	A few people hang things high up inside roof or place them on high shelves to keep them dry
Q6 How are open wells and hand-pumps affected by the hazard? Why?	Open wells are regularly contaminated by flood water because they are on low-lying land and have no protective covers	One hand-pump always gives good water because it is located on higher land

Additional questions for other types of asset are in Appendix A. Questions might need a little explanation or adaptation, according to the level of understanding in the group and the particular hazards of the area. Always ask the questions in a commonly spoken language.

Some questions are worded to get a 'vulnerability only' answer, while others will be 'capacity only' questions. In such cases, one of the answer boxes is shaded to indicate that an answer for this box is very unlikely. Sometimes the tool (in this case the map) will provide answers to questions without the facilitator needing to ask them, or the questions may be asked while you are referring to the map.

6.5 Summarising the information collected

The final stage, usually completed back in the office, is to summarise the data on one or more flip chart sheets – either writing directly on the sheet or using moveable sticky notes or cards. The format is below. Answers in the 'impact' box on the question sheet go into the second column; vulnerabilities and capacities are drawn from the answers to the other questions and are added to columns 3 and 4. Note that in the individual category, the results should be separated into male and female lines. Differences may be apparent in the other categories also: these can be captured by writing results from male focus groups onto sticky notes of one colour and results from female groups on another colour, or by using marker pens of different colours.

Column 1	Column 2	Column 3	Column 4	Column 5
Category	**Impact of hazard**	**Vulnerabilities**	**Capacities**	**Suggested risk-reducing activities**
Individual (male)				
Individual (female)				
Social				
Natural				
Physical				
Economic				

The final column is available to allow the team space to consider some activities which might reduce the vulnerability or increase the capacity of the community. These ideas can be fed into the discussion during risk management planning – see Section 8.

Sometimes the interviews with key informants (see Section 7.3) also yield data on vulnerabilities and capacities. This data can be added to this table in the appropriate box.

The following table illustrates the possible outcome of a completed vulnerability and capacity assessment for a flood situation. Some suggested risk-reducing activities are in Column 5, which will help to reduce impact and address the vulnerabilities while making use of the capacities. Note that a capacity may come from any of the five categories.

Category	Impact of hazard	Vulnerabilities	Capacities	Suggested risk-reducing activities
Individual (male)	Small loss of life; increased health problems	No warning system; lack of health knowledge	Able-bodied youth; carpenters	Train youth as volunteers to raise alarm and assist evacuation
Individual (female)	High loss of life; increased health problems	No warning system; lack of health knowledge; low literacy rates; less ability to swim	Resourceful in times of crisis	Health education; swimming lessons for girls in school; train female volunteers
Social	Families split up; disruption of education	No evacuation plan; location of school; shortage of social groups, (eg self-help groups); poor government services	Health workers in community; government agricultural department; farmers' cooperative	Community evacuation plan; women's groups; strengthen cooperative; advocacy to improve and use government agricultural services
Natural	Destruction of smaller trees; deposition of sand on land	No protective embankment; erosion from upstream as result of tree felling	Bamboo and a few trees; forestry department nursery; available high land	Use bamboo to strengthen river bank; tree planting along bank and on slopes; advocacy to reduce tree cutting
Physical	Damage to houses, roads and bridges	Houses close to river; design of houses not strong	Some stronger houses; church building on higher land	Build stronger embankment; teach carpenters better house design; use church as evacuation centre in floods
Economic	Damage to crops; death of livestock	Fields near river; no embankment; growing season is during flood season; crop varieties not resistant; no warnings or evacuation plan for animals	Winter vegetable seed available; a few small livestock and chickens kept	Increase cultivation of winter vegetables; seek flood-resistant crops; evacuation plan to save cattle; expand alternative livelihoods (eg egg production)