

# QSAND

## Quantifying Sustainability in the Aftermath of Natural Disasters

### Online E-learning Tutorial Workbook **ANSWERS**

This QSAND E-learning Tutorial Workbook should be used in conjunction with the QSAND E-learning Tutorial video available at [www.QSAND.org](http://www.QSAND.org). Also available at this website is the QSAND Guidance Manual and Assessment and Scoring Tool.

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## Introduction

This delegate workbook has been created by BRE Global as a learning aid for the Core Assessment tool (CAT) section of the QSAND online e-learning tutorial. Each exercise has been created to help delegates achieve the tutorials learning objectives. The learning objectives are designed to ensure delegates understand the CAT assessment process and, where relevant, can pass this learning on to others.

*Please note the answers to this exercise are based on mock scenarios. In general further information would be required from the field to determine the relevance of issues to the community through participatory approaches.*

## Part 1 - Relevance of Assessment Issues

In order to begin a CAT assessment the user must first determine which issues within the tool are of relevance to the programme and how these should be prioritised in terms of biggest positive impact and resource. This will mean the assessment will be focused on the issues that are of priority to the beneficiaries and their recovery.

This exercise is designed to get delegates thinking about the type of information they will need to define which issues should be applicable to an example programme.

### Exercise 1

**The following information is provided as a reference for the exercise:**

#### **Case Study: Reconstruction in the aftermath of a fictional cyclone**

- The construction of the 1,500 shelters began one year after the cyclone struck and took 12 months to complete.
- Water infrastructure is already of a good standard and was not damaged by the cyclone
- There is significant donor funding provided to develop the energy infrastructure for the affected community
- There are significant health and social issues arising from the disposal and burning of waste in the community
- The shelter design was based on a successful design used in the aftermath of a 1997 cyclone in the regional area.
- The shelters were more substantial than the ones they replaced, which will be more able to resist damage in future events. Shelter features:
  - Constructed in the same location as the original dwellings, negating the need to displace the population
  - Mud footing for protection against flooding
  - 5-foot deep concrete foundations
  - Bracing
  - Steel truss roof which was connected to the structure using rigid column connections
  - Roofing sheets were fixed with cyclone-resistant techniques
  - The shelters were designed with a timber ring beam two metres from the ground so that a mezzanine level could be built for emergency use
  - Walls were made from woven bamboo mats which were cost-effective and allowed families to repair them themselves
  - Built using local contractors, benefiting the local economy

Using Table 1 please determine whether each issue is not relevant (Relevance Factor (RF) 0), partially relevant (RF1) or very relevant (RF2) to the above case study. When determining the relevance of each issue refer to the aim and consider:

- The extent of the damage which has occurred as a result of the natural disaster
- The local community's priorities
- The sustainable use of resources to make the biggest positive impact
- Available funding

Where sufficient information is not provided to determine the relevance factor, please specify what further information/additional assessments should be carried out to set these factors.

## Relevance of Issues

Category	Issue Title	Issue Aim	Relevance Factor (0,1,2)	Justification
Shelter & Community	Privacy	To recognise and encourage shelter and layout design measures that respect and promote privacy within the disaster-affected community and where possible eliminates the risk of privacy invasion.	1 or 2	Not enough information provided as to whether this is an issue. However as construction of a large number of shelters is provided, it is likely this issue will be of some relevance.
	Internal Environment	To ensure that the internal environments of shelters are healthy and comfortable for the occupants.	1 or 2	Not enough information provided as to whether this is an issue. However as construction of a large number of shelters is provided, it is likely this issue will be of some relevance.
	Community Sensitive Design	To promote integration of community-sensitive shelter and settlement layout design features which support inclusivity and accessibility for community members.	2	As extensive construction is being carried out this issue is likely to be fully relevant.
	Construction Approach	To recognise and encourage the specification of construction methods that are environmentally sound and appropriate to the location and needs of the community.	2	As extensive construction is being carried out this issue is likely to be fully relevant.
Settlement	Site Selection	To ensure that the site selected for development or redevelopment is suitable for the affected community and other relevant parties, enabling long term sustainable development.	0	Constructed in the same location so the population did not need to be displaced.
	Security of Tenure	To recognise and support tenure arrangements relating to housing, land and property and provide transparency and accountability towards the community, to make them aware of what is being done to address and respond to security of tenure issues.	Unknown	It is unknown whether there are issues around tenure in the location. Further evaluation should be carried out to consider how important (and relevant) this is to the beneficiaries.
	Spatial Planning	To ensure that a settlements layout, amenities, other designated land uses and infrastructure sustainably support social, cultural and economic activities, providing	2	Likely to be fully relevant with construction of a large number of shelters.

		the necessary basis for the community to develop and grow.		
	Infrastructure	To recognise and encourage provision of infrastructure systems that are well planned, resource efficient, environmentally friendly, secure, culturally sensitive and economically viable.	1 or 2	It is unknown what damage occurred to infrastructure (other than water infrastructure). Due to the cyclone causing substantial damage to shelter it is likely this issue will be at least partially relevant.
Materials & Waste	Post Disaster Waste Management	To promote the sustainable management of post disaster waste, by ensuring efficient use, removal and disposal.	2	As there is significant health and social issues arising from disposal of waste it would be appropriate that this issue is given a factor of 2.
	Construction Waste Management	To promote the sustainable management of waste generated on site during the construction process, by encouraging the efficient use, removal and where necessary disposal of waste.	2	As there is significant health and social issues arising from disposal of waste (and considerable reconstruction occurring) it would be appropriate that this issue is given a factor of 2.
	Operational Waste Management	To promote sustainable operational solid waste management throughout the disaster-affected community by proper and effective waste management, solid waste reduction and community education.	2	As there is significant health and social issues arising from disposal of waste it would be appropriate that this issue is given a factor of 2.
	Materials Properties & Selection	To encourage the use of construction materials of an appropriate quality and which consider climate, culture, durability, local supply and environmental impact.	1 or 2	This issue should appear in the assessment as significant reconstruction is occurring. Whether a factor of 1 or 2 is assigned should be considered based on beneficiary involvement and whether this can make a big positive impact to the sustainable reconstruction.
	Materials Sourcing	To encourage and promote procurement of construction materials based on quality, environmental, social and economic considerations.	1 or 2	This issue should appear in the assessment as significant reconstruction is occurring. Whether a factor of 1 or 2 is assigned should be considered based on beneficiary involvement and whether this can make a big positive impact to the sustainable reconstruction.
Energy	Energy Demand & Supply	To establish and optimise the energy demands of the community ensuring that these can be sustainably met in the future through the specification of reliable, affordable and sustainable energy supplies that meet needs of the community.	2	Based on donor funding to develop the energy infrastructure.

	Energy Consumption	To ensure that energy is consumed by the affected community in an efficient and sustainable way.	2	Based on donor funding to develop the energy infrastructure.
Water & Sanitation	Water Demand & Supply	To ensure that the water demand of the affected community is optimised and met for all needs, through a sustainable and secure water supply.	0	Water infrastructure of a good standard and not damaged by cyclone so not likely to be a key focus.
	Water Quality	To ensure that potable water is palatable, of sufficient quality to be consumed and ensures that communities health is not compromised by water resources.	0	Water infrastructure of a good standard and not damaged by cyclone so not likely to be a key focus.
	Sanitation	To ensure that adequate sanitation solutions and infrastructure are available for beneficiaries and the importance of hygiene is promoted.	Unknown	Not clear as the sanitation looks further than just water infrastructure. Further information is required.
Natural Environment	Human Relationship to Ecosystem Services	To recognise and communicate the potential benefits of existing ecosystem services and effectively manage human relationships with the natural environment.	1 or 2	It is not clear how the beneficiaries interact with the existing ecosystem services in the area. However, it is likely this issue would be of relevance where large scale reconstruction (and therefore sourcing of materials) is occurring.
	Ecological Protection	To protect the ecological value of the site during the re-settlement phase and support on-going ecological protection over the life of the development.	Unknown	It is not clear whether the area has a high ecological value or whether the new construction could damage the local ecology. Further investigation should be carried out to understand the potential implications of not addressing this issue.
	Ecological Rehabilitation & Restoration	To encourage the rehabilitation and restoration of the ecological value of the site during settlement or re-settlement and the operation of the site.	1 or 2	Although not enough information is provided, it is likely there has been ecological damage as a result of the cyclone. The extent of this should be investigated and community priorities established.

**Table 1:** Relevance of issues



## Part 2 - Issue Assessment

The Core Assessment Tool is made up of 21 issues. Those that are relevant to the assessment need to be evaluated against the project/programme to determine the Performance Level that has been achieved.

The following exercises are designed to guide delegates through the assessment process of issues, to determine which performance level can be demonstrated to be achieved.

### Exercise 2

**The following information is provided as a reference for the exercise:**

A Shelter and Settlement project/programme is targeting Performance Level 2 of the Community Sensitive Design Issue. They have confirmed the following:

In order to determine appropriate shelter provision community insights are gathered through public kick-off meetings and community workshops. Particular efforts have been made to hold focus group discussions with women, elderly, disabled, young people and other minority groups. Throughout the design contact is maintained with these groups to include their opinions/requirements in the re-construction process

A community sensitive development plan is produced through facilitation of a working group that covers built environment issues. The plan covers key areas of relevance to the community including cultural traditions, gender requirements and age related needs. Discussions with individual householders have also been opened up to understand built environment needs.

As a result of the community sensitive development plan the shelter and settlement design incorporates considerations that are relevant to the community. Local knowledge is also integrated into the construction programmes being implemented.

International best practice community sensitive design guidance is adapted for the context (as local alternatives are not available) to support inclusivity and accessibility of the built environment. The design of shelters and the settlement reflect community preferences, although as not all features can be included justification is provided on the limitations of some design features.

### Questions

1. Has the baseline evaluation been achieved based on the information provided above? Please justify your answer.

Yes, assuming the participatory approaches used take place before final design decisions are made. Groups are established in the community through kick off meetings and workshops to include opinions/requirements in the design. Minority groups are focused on in this process.

2. Please provide some examples of community-sensitive design considerations that may be of relevance to the community (based on the information provided above)?

Cultural and traditional customs, religious practices and socioeconomic hierarchies

- Location of places of worship (temporary or permanent) accessible to religious demographic

- Design of facilities which take account of situations where women may not be allowed in public spaces frequented by men.<sup>3</sup>
- Distribution of support throughout social structures (such as caste systems) to ensure access to facilities is provided for all.
- Use of materials and aesthetical finishes that are culturally appropriate.

#### Gender requirements

- Communal shelters offer a measure of gender separation<sup>2</sup>
- Respect family bonds when allocating shelter.
- Consider gender sensitivities e.g. is it ok to mix men and women? Should guidance/permission be sought from women to determine where individuals are allocated shelter?
- Encourage women to be part of the participation and where relevant design process taking account of cultural sensitivities as appropriate

#### Age related needs (young and old)

- Ensure safe and easy access to and within the shelter, considering door widths, corridors and stairways.
  - Provide design features to improve safety where relevant such as handrails on ramps and grab bars within toilets
  - Light switches and electrical sockets should be at a height that everyone can reach.<sup>4</sup> (Please note the safety of young people should still be considered when positioning these items.)
  - Provision of child-friendly spaces for play and learning.
3. Which performance level would you award the programme (based on the information provided above)?

Performance level 1 – A community sensitive development plan has been developed covering key areas of relevance to the community. Local knowledge is incorporated in the construction process.

4. Is there any further information you would like to confirm in order to award performance level 2?

To understand whether information has been distributed amongst community members that raise awareness on community-sensitive design features for future adaptation, such as accessible or culturally appropriate features.

Other items under performance level 2 have been met, i.e. throughout the design contact is maintained with minority groups, discussions with individual householders have also been opened up and design of shelters and the settlement reflect community preferences.

## Exercise 3

### The following information is provided as a reference for the exercise:

A Shelter and Settlement project/programme is targeting Performance Level 1 of the Materials Properties/Specification Issue . They have confirmed the following:

An initial evaluation has been carried out to determine the material requirements and material availability for the reconstruction project. Opportunities for re-using demolition materials have been considered. Timber for the reconstruction project is being sourced from a sustainable forestry operation.

Debris material has been sorted and a significant amount of inert concrete/block waste has been identified for use as filling material. Many other materials can be re-used in new constructions.

New construction materials have been selected following a cost analysis and taking into account contextual issues such as weather and potential hazards, local material sources, and the skills and abilities of the affected community. Training and up-skilling for those involved in the reconstruction of the settlement will be provided.

### Questions

1. Has the baseline evaluation been achieved based on the information provided above? Please justify your answer.

More information would be required to determine whether opportunities for improving project sustainability through material choice have been explored in sufficient detail.

1. Please provide some examples of material specification considerations that should be considered to ensure that construction materials are fit for purpose.

See Criterion point 7: buildability, quality, functionality

2. Which performance level would you award the programme (based on the information provided above)?

No performance level achieved.

3. What further information you would be required in order to award the next performance level?

Socio-cultural aspects (Criterion point 8) have not been considered (consultation, working conditions, familiarity and on-going maintenance).

4. Have the cross-cutting issue considerations<considerations or criteria? Or just 'issues'? been met? If any, what further activities/evidence is required?

No. Further activities/evidence required:

- Cultural participation/consultation
- Exploring livelihood-boosting opportunities
- Ensuring that health and safety is considered in material production/handling

## Exercise 4

### The following information is provided as a reference for the exercise:

A Shelter and Settlement project/programme is targeting Performance Level 1 of the Energy Consumption Issue. They have confirmed the following:

A detailed energy demand model has been produced for the affected community, which is met by the energy supply system. A significant proportion of the energy demand is met through a centralised grid for electricity.

The safety of the community has been considered, with appropriate access to and storage for necessary fuels. The electrical energy supply is maintained regularly by qualified individuals, who also undertake assessments for illegal tapping.

A community engagement programme addresses energy usage in order to promote safe and efficient usage of energy.

### Questions

1. Has the baseline evaluation been achieved based on the information provided above? Please justify your answer.

**Yes – demand model has been produced and the supply meets this demand**

2. Is the energy supply a *simple* or *complex* system as defined in the issue?

**Complex – uses a centralised electricity grid**

3. Which performance level would you award the programme (based on the information provided above)?

**PL1 – safety, maintenance and awareness have all been addressed. None of the PL2 or PL3 criteria points have been met**

4. What further information would be required in order to award the next performance level?

**PL2 – energy efficient equipment for cooking, controlling internal temperatures and lighting**

## Exercise 5

### The following information is provided as a reference for the exercise:

A Shelter and Settlement project/programme is targeting Performance Level 3 of the Security of Tenure Issue. They have confirmed the following:

The existing settlement site will be redeveloped. Prior to the natural disaster, the tenure arrangements relating to the settlement were well-defined and these records have been preserved. A damage assessment has been carried out, demonstrating any effects on land boundaries.

Tenure has been discussed with the affected community to communicate that previous tenure arrangements will be reinstated, with a clear plan to address related costs and disputes. The local land administration will receive assistance to develop their capabilities and to digitise relevant documentation, improving security and communication.

### Questions

1. Which performance level would you award the programme (based on the information provided above)? Please justify your answer.

PL3 – all criteria points appear to be achieved. Given that the starting point for the affected community is relatively strong, less effort is required to meet each level

2. What additional information would be beneficial to support the assessment?

More information around the awareness sessions and administration improvements would be useful.

## Exercise 6

### The following information is provided as a reference for the exercise:

A Shelter and Settlement project/programme is targeting Performance Level 1 of the Water Demand Issue. They have confirmed the following:

The water supply to the affected community has been interrupted by a natural disaster. A context-specific water strategy has been developed in consultation with the local community. The strategy estimates the water demand for the community, assessing individual requirements, communal needs and drawing upon recognised performance benchmarks. There is a significant water demand as a result of crop irrigation, but no other livelihood activities have been identified as having high water usage.

### Questions

1. Has the baseline evaluation been achieved based on the information provided above? Please justify your answer.

Yes – all criteria have been met. Some further information related to Participation would be beneficial

2. Which performance level would you award the programme (based on the information provided above)?

No PL achieved

3. What further information would be required in order to award the next performance level?

Information on longer-term considerations (criteria point 6) and mitigating the effects of climate change (criteria point 7)

4. Has the Economic Viability of the issue been addressed? If not, what further information is required?

Partially through addressing irrigation demands but there is limited information about ongoing costs.

5. What ongoing issues should be addressed/considered as part of the Water Demand issue?

Record of decisions taken, participation and management strategy, monitoring, study.

## Exercise 7

### The following information is provided as a reference for the exercise:

A Shelter and Settlement programme is targeting Performance Level 1 of the Human Relationship to Ecological Services Issue. They have confirmed the following:

Extensive consultation has been carried out with the affected community and local government to gain an understanding of the ecological situation and how the community interact with ecological services.

A Natural Environment Action Plan has been developed with ongoing community involvement, which acts upon how human relationships to surrounding ecological features have changed as a result of the disaster. The plan has been implemented by the local community, with ecology 'champions' being appointed to ensure the Plan is effectively being met.

### Questions

1. Has the baseline evaluation been achieved based on the information provided above? Please justify your answer.

Yes – extensive consultation has been carried out.

2. Which performance level would you award the programme (based on the information provided above)?

PL1

3. What further information would be required in order to award the next performance levels?

Ecological survey carried out by a suitably qualified ecologist

4. What Resources should be considered as sources of information to support the assessment of the issue?

See Considerations – maps and images, records, previous research, existing plans, internet resources

5. How is the term Ecosystem Services defined for this issue?

See Relevant Definitions – “The conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life...”

## Part 3 - Scoring and Rating

The way the scoring is calculated within the Core Assessment Tool (CAT) is based on the relevance of the issues and the achievement of the baseline evaluation and performance levels within issues.

This exercise is designed to guide delegates through the process of scoring and provide an understanding of how a programme is rated.

### Exercise 8

A project/programme has used the CAT to demonstrate the sustainability of the approach taken. The relevance factors of the selected CAT assessment issues were determined at the beginning of the programme and performance has been measured against these issues to determine the actual score for each issue.

Determine the actual and maximum relevance score for each issue and therefore calculate the final percentage score for the project.

Category	Issue Title	Relevance Factor (A)	Actual points achieved (B)	Maximum points achievable (C)	Actual score (A*B)=D	Maximum score (A*C)=E
Shelter & Community	Privacy	1	3	4	3	4
	Internal Environment	0	N/A	0	N/A	N/A
	Community Sensitive Design	2	2	4	4	8
	Construction Specification	2	1	4	2	8
Settlement	Site Selection	2	4	4	8	8
	Security of Tenure	2	1	4	2	8
	Spatial Planning	2	2	4	4	8
	Infrastructure	0	N/A	0	N/A	N/A
Materials & Waste	Post Disaster Waste Management	2	3	4	6	8
	Construction Waste Management	1	2	4	2	4
	Operational Waste Management	0	N/A	0	N/A	N/A
	Materials Properties & Selection	2	2	4	4	8
	Materials Sourcing	1	1	4	1	4
Energy	Energy Demand & Supply	1	2	4	2	4
	Energy Consumption	1	2	4	2	4
Water &	Water Demand &	2	2	4	4	8



Sanitation	Supply					
	Water Quality	2	2	4	4	8
	Sanitation	2	3	4	6	8
Natural Environment	Human Relationship to Ecosystem Services	1	2	4	2	4
	Ecological Protection	1	4	4	4	4
	Ecological Rehabilitation & Restoration	0	N/A	0	N/A	N/A
Totals:					60	108
Final Percentage Score:					55.6%	

**Table 2:** Programme score

## Exercise 9

Once the overall score has been established, this is associated with a 'Scoring band' to provide an easily recognisable measure of performance. The table below shows these banding levels:

CAT rating	Percentage of maximum score achieved
Excellent	90%
Very Good	65%
Good	45%
Minimum	30%

**Table 3:** CAT rating and associated % score

Determine the potential rating for the project/programme.

Good

Please explain why this scoring band cannot be achieved for this assessment, based on the relevance scores applied to each issue.

Construction specification, security of tenure and energy supply are all given a relevance factor of 2. However, only the baseline evaluation has been achieved for these issues. As all RF2 must ensure that at least performance level 1 has been achieved, no rating can be given.

Congratulations!

You have completed the CAT exercises associated with the QSAND Online E-learning Tutorial.

For further information, please visit [www.QSAND.org](http://www.QSAND.org)