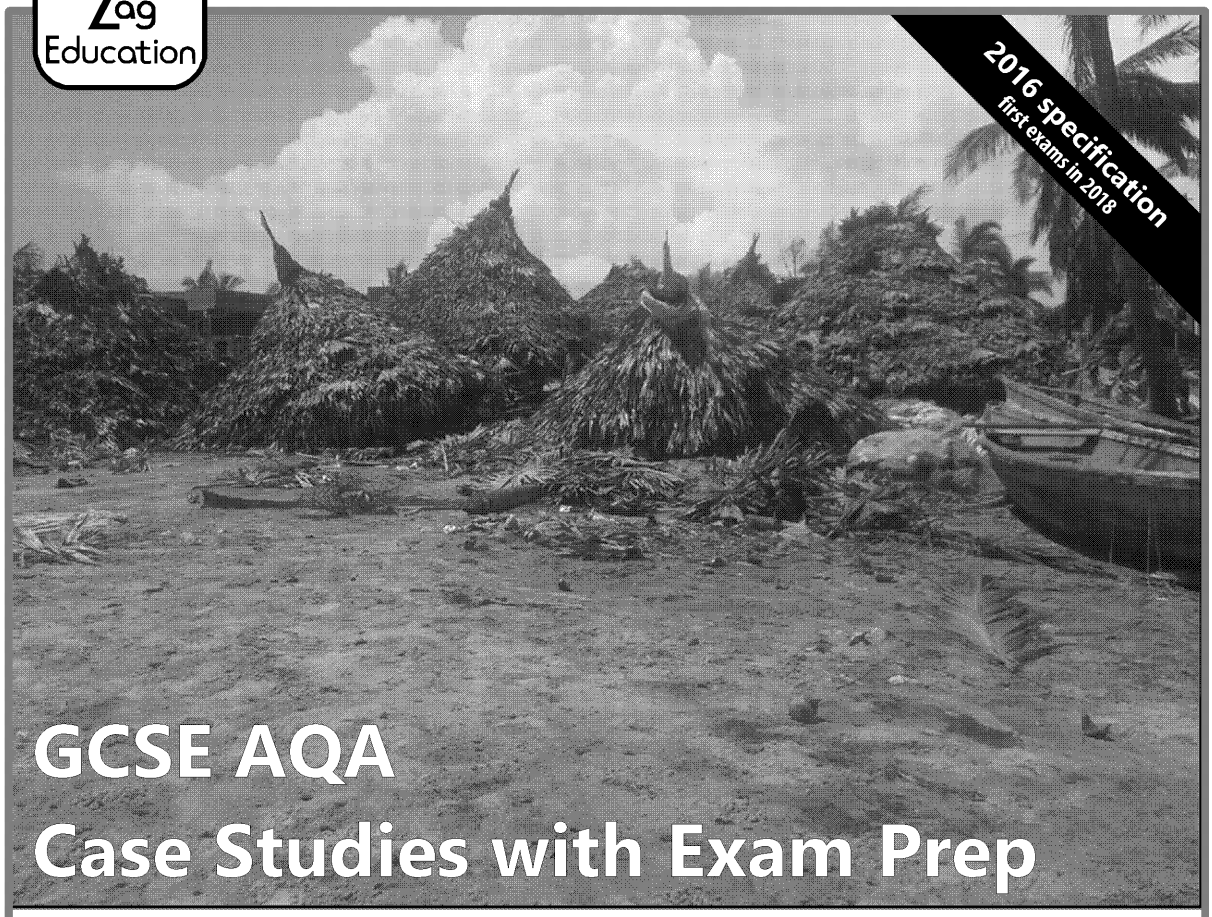
Zig Zag Education

Geography

GCSE (9–1)| AQA | 8035



GCSE AQA
Case Studies with Exam Prep

The Challenge of Natural Hazards: Weather Hazards

Cyclone Hudhud in India and Nepal: October 2014

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POD 8785

Contents

Teacher's Introduction

This resource has been developed to provide case studies and exam preparation material to support the GCSE AQA specification (8035) **Section A: The challenge of natural hazards; Theme 3.1.1.3 – Weather Hazards**.

This detailed case study is on **Cyclone Hudhud, India and Nepal (2014)** representing a **low income country** based on World Bank classifications.

The case study includes a main content section which can be used as part of a lesson plan or distributed to students for self-guided research; a selection of ICT interactive links to further students' research around each topic and a set of Springboard Images and discussion questions (also available as a PPT file accessible by digital download) which makes a fantastic starter activity.

*A webpage containing all the links listed in this resource is conveniently provided on ZigZag Education's website at **zzed.uk/8785***

You may find this helpful for accessing the websites rather than typing in each URL.

The exam preparation section which follows the case study contains a summary table, bringing together all of the key facts and figures relating to the case study; rapid-fire revision questions (with answers) to help recall and retention of the main points; and an exam-style question and mark scheme, written in the style of the AQA sample material, so that students can practice answering questions relating to case studies and applying relevant knowledge in their answers.

The resource may be used as a source of reference for the required case studies for individual study, or for group work leading to discussion or debate. Subheadings in the information sections are designed to enable tabulated comparisons of social, economic and environmental impacts.

Other case study resources are available for this topic area which can be used to compare and contrast between storms at locations across the world's equatorial oceans:

- Hurricane Sandy, USA (2012)
- Typhoon Haiyan, Philippines (2013)

A PowerPoint presentation containing the Springboard Images starter activity to accompany this resource is available as a free digital download. Just register for free updates using the link below to download all available content for your school or purchasing site.

November 2018

Part 1 – Case Study

Acronyms and Useful Terms

IMD –	India Meteorological Department
JTWC –	Joint Typhoon Warning Centre
NDRF –	National Disaster Response Force
RSMC –	Indian Regional Specialized Meteorological Centre

Content

Introduction and Overview

Cyclone Hudhud affected east India and Nepal in October 2014 and reached Category 4 on the Saffir–Simpson Hurricane Wind Scale. On the local IMD scale (India Meteorological Department), it was labelled an extremely severe cyclonic storm, as shown on the table below.

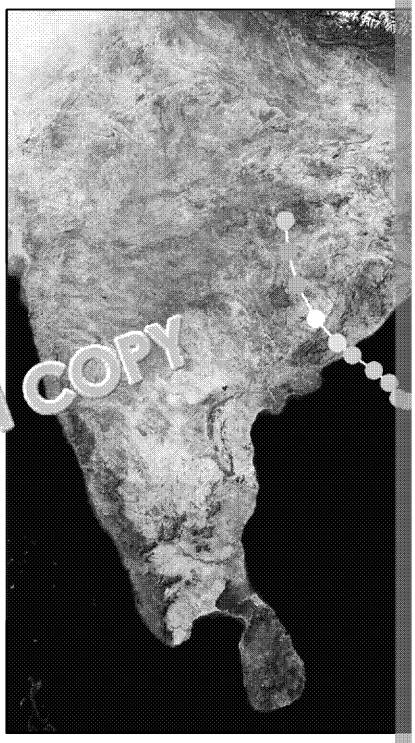


Figure 1: Cyclone Hu

Hudhud formed in the Bay of Bengal on 7th October 2014 and quickly gained strength, and made landfall in east India on 12th October, heavily affecting the states of Andhra Pradesh and Odisha, and Nepal. As the storm produced deep snowfall (also in southwest China) as the warm, moist air ascended over the Himalayas. High winds and heavy rainfall were also associated with the cyclone, as expected. Over land, as much as 200–250 mm of rain fell, and up to 550 mm over the ocean.

Hudhud caused at least 125 deaths, including 81 in India (mainly in Andhr (e.g. through avalanches) and caused $3.4 billion in damage. In Andhra Pa cyclonic conditions lasted for six hours, and that affected 9.2 million people w

Timeline of Events:

6th October – high air circulation over the Andaman Sea.
7th October – began to form out at sea; alert of a tropical cyclone established.
8th October – classified as a severe cyclonic storm; advice issued by JTWC (Joint Typhoon Warning Centre).
9th October – classified as a very severe cyclonic storm; an alert set up by the JTWC.
10th October – classified as a Category 1 tropical cyclone, followed by an upgrade to Category 2 the same day.
11th October – the eye was seen for the first time and the peak wind speeds were 115 mph (sustained for three minutes).
12th October (Sunday) – made landfall at approximately midday at Visakhapatnam, in Andhra Pradesh. The cyclone moved north to Nepal, passing through Uttar Pradesh.
14th October – Cyclone Hudhud weakened over land and quickly dissipated over the Himalayas as an area of low pressure.

Category	Sustained winds (3-min average)
Super Cyclonic Storm	≥222 km/h
Extremely Severe Cyclonic Storm	167–221 km/h
Very Severe Cyclonic Storm	118–166 km/h
Severe Cyclonic Storm	89–117 km/h
Cyclonic Storm	62–88 km/h
Deep Depression	[illegible]
Depression	[illegible]49 km/h

Preparation

- Alerts were raised by the government – for 16 districts in Odisha and nine in Andhra Pradesh.
- India's armed forces were on alert.
- India mobilised 35 National Disaster Response Force (NDRF) teams in Odisha and Andhra Pradesh, which were positioned on the coast.
- TV and radio stations, the government, task forces and the Indian Red Cross Society provided updates and the early warning system.
- Updates were provided by the Indian Regional Specialized Meteorological Centre (RSMC).
- Thousands of people were evacuated (as many as 500,000, some people were housed in relief camps by the government). It was reported that up to 350,000 people were evacuated as the storm made landfall.
- Shelters were set up with a three-day supply of goods, including water and milk. Medicines and medical personnel were also readied.
- Rescue equipment was provided, such as inflatable boats and generators.
- On 12th October, 38 trains were cancelled on the East Coast Railway, and other services were diverted.
- Flights were also cancelled.
- The national highway was closed in the affected region so that people wouldn't be endangered by flooding.
- Hoardings were removed from houses in case they blew off and caused injury.
- Ships were moved offshore.
- In Odisha, the government (under the 'Zero Casualty' initiative) warned people to stay away from beaches two days before the storm.

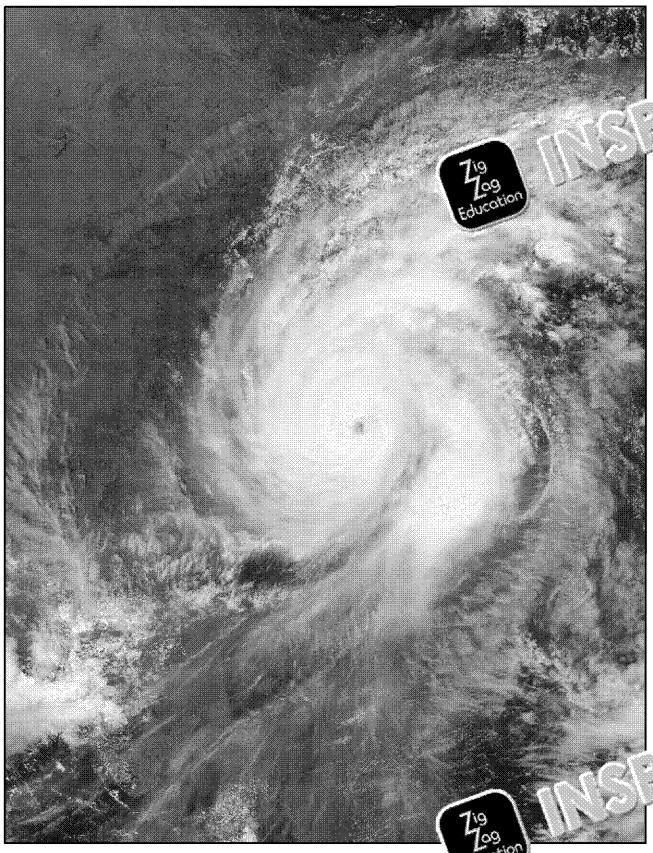


Figure 2: Cyclone Hudhud about to make [illegible] on India's eastern coast

Primary Effects

Social

- 125 deaths in total (both primary and secondary), including from the high winds and heavy rainfall – e.g. falling trees, masonry/wall collapse (the majority of deaths).
- Damage to 112,850 houses in the city and surroundings of Visakhapatnam – with a population of 1 million, Andhra Pradesh and Srikakulam also encountered damage. Thatched houses were sometimes completely destroyed.
- Travel was disrupted on roads, such as the Andaman Trunk Road (trees downed and also fallen debris). Coastal roads were destroyed in places.
- Vehicles were damaged.
- TV / satellite TV infrastructure was damaged.
- Power lines were damaged.
- Communication was difficult following the storm because phone lines 70% in the worst-affected regions.

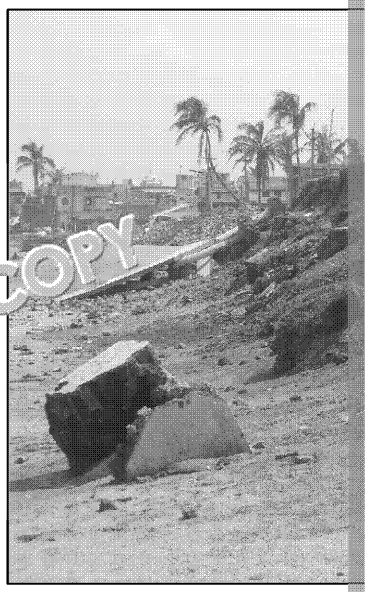


Figure 3: Damage

Economic

- In total, $3.4 billion worth of damage was caused.
- An important radar station was damaged – this made it harder to meas
- Crops hadn't been harvested prior to the storm and were damaged, inc peanuts.
- Destroyed a bridge in Visakhapatnam.
- Damaged the runway at Visakhapatnam airport. The terminal buildi
- Animals were killed.
- Fish farms were damaged.
- Overall, fishing was less productive – fewer fish were caught, and ma damaged.

Environmental

- Thousands of trees were downed.
- A 1–2 metre high storm surge inundated coastal areas with saline sea v
- Large waves eroded beaches.

Figure 4: Damaged trees completely block this road

Secondary

Social

Forty-three
by the 1.8 m
hours in the
districts, inc
Those who
region from
climbers an
caused by a
addition, 17
Nepal, and
Downed po
also hinder

Other dangers included landslides on Andaman Island (which also suffere
phone lines).

Economic

After the storm, it was suggested that there would be a spread of crop dise

After the storm, there were also 10 times more fish caught in the Brahmapu
away from the stormy waters of the Bay of Bengal. Whi this resulted in a
fishermen, the price dropped due to the surpl , an here was no cold sto
that the fish couldn't be stored.

Immediate Respons

- India' e inister promis ,000 crore to the state of Andhra Pradesh.
  (₹ 1,000 crore is ~ £125 million)
- ₹ 2,000 crore was requested.
- Forty-two teams consisting of 2,000 rescuers were deployed; 250 NDRF personnel deployed.
- The Indian Army (300 personnel) and Navy assisted with rescu relief.
- The In ir Force was on standby with communication devices.
- The police assisted with further evacuations.
- Personnel aboard naval ships were on standby for immediate deploym

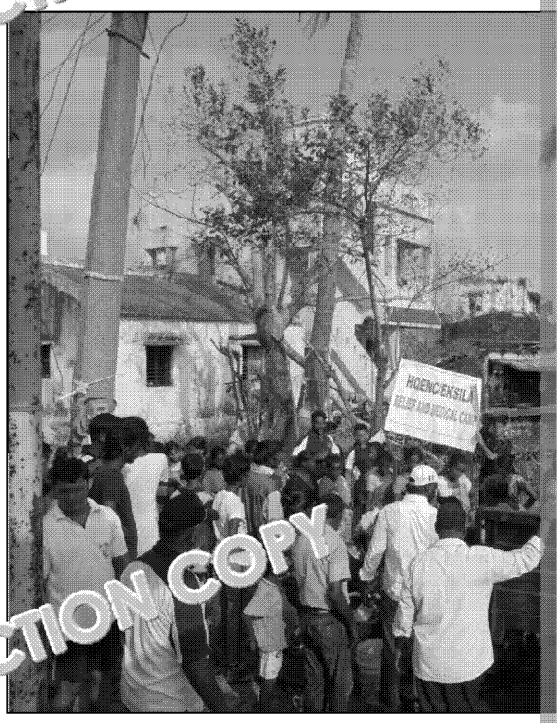


Figure 5: Just one of many temporary evacuation Navy

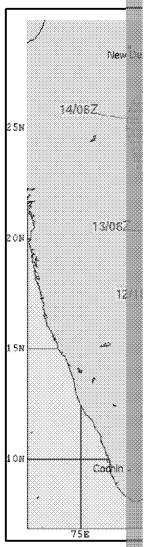
- The India Red Cross Society provided assistance such as early warning
evacuation shelters and provided resources, volunteers and medical su
- Most people returned home the following day; however, some people
months if their homes were damaged.
- Facebook, Twitter and WhatsApp accounts were created by the govern
communication.
- A close eye was kept on the Bansadhara Ri[illegible] further evacuations i
quickly.
- Remote sensing was empl[illegible]g satellites for disaster managemer
- Supplies of food a[illegible]portant commodities were quickly restored
- Power [illegible]
- Crowd[illegible]ng was explored to acquire funds.
- Most train services were restored within three days.
- In Nepal, people trapped by avalanches were rescued starting on 15th
October, 400 people had been rescued in Nepal.

Long-term Responses

- There was a great need to rebuild houses, which was an expensive pro
slow to be processed. This was especially difficult for slum dwellers, w
may not have had identity or ration cards. City planners also saw the
rebuild with legal structures.
- The government set up a scheme of $51 million to build 9,000 permane
- In Nepal, it was proposed that climbers should be tracked using GPS,
climb in the region, pass through checkpoints and [illegible]ve registered guic
- NGOs (non-governmental organisations) [illegible]d assistance.

Effectiveness of Pre[illegible]

- India [illegible]rt[illegible]ly prepared for the storm. Its effective preparation – S
evacua[illegible]was successful in reducing the death toll – for example, as
set up in Odisha, and 156,000 people were evacuated to them.
- Evacuation in some areas was difficult due to the lack of solid-built ho
- India had learnt from large events in the past where there were thousands of deaths. However, some criticism was raised that lessons hadn't been fully learnt from Cyclone Phailin, only the previous year.
- Many people had followed warnings and didn't travel on roads. However, people ignored warnings to travel to the coast to watch the sea as some news reports underplayed the severity of the storm.
- In Nepal, criticism was levied at local authori[illegible]hat there wasn't enough warning to local[illegible]eople and climbers (the prime minister [illegible]d a better warning system afterwards) [illegible]others suggested that the climber[illegible]re [illegible]equipped.



Figu

Effectiveness of Responses

- The government was slow to provide the promised financial aid.
- The compensation of the boats for fishermen was also slow. In total, ar
- A rescue boat capsized on the Khola River; two people were missing a

The following are some of the recommendations made by the National Dis
following the storm:

- Improve the quality of shelters.
- Increase communication equipment and the number of generators pro
- Improve forecasting to include wind velocity and gusting.
- Prepare for worse 'worst case scenarios'.
- Develop smart cities.
- Bury powerlines underground.
- Improve the planning in h
- Improve the qual embankments to stop the risk of roads coll
- Increa ection and rapidly harvest crops prior to the arrival
- Increas pensation to homeowners.

Conclusion

Cyclone Hudhud was a major tropical revolving storm that affected millions
populated country of India. Preparation for the storm was effective – hundre
evacuated from their homes. In India, the effects were strong winds and heav
and parts of northern India, deep snowfall resulted from the uplift of the mo

Fact Table

Category:	4
Number of deaths:	125 reported (8
Number of houses damag m Visakhapatnam:	112,850
Rainfall:	200–250 mm
Snowfal	up to 1.8 metre
Cost of damage:	$3.4 billion
Number of people affected in Andhra Pradesh:	9.2 million
Number of NDRF teams delayed:	35
Number of people evacuated:	500,000
Number of trains cancelled on the East Coast Railway:	38
Percentage of communication infrastructure lost in some areas:	70%
Size of storm surge in some areas:	1–2 metres
Amount promised to the state of Andhra Pradesh by India's prime minister:	₹ 1,000 crore
Amount requested for assistanc	₹ 2,000 crore
Number of rescuers de d.	2,000
Number rs from the Indian Army:	300
Number ple rescued in Nepal:	400
Number of NDRF personnel deployed:	250

ICT Interactive Page

Rather than type out these w

Videos

BBC News:

- **https://www.youtube.com/watch?v=-hO…wo**

Car blown from a building:

- **https://www.y…com/watch?v=z8J7xTvZHB8**

Effects of t…m:

- **https://www.youtube.com/watch?v=dB0LxV4iIVE**

The storm in 30 images:

- **https://www.youtube.com/watch?v=qn7KHU5MCAI**

News Stories

NASA warning – 9th October

- **http://spaceref.com/earth/nasa-eyes-tropical-cyclone-hudhud-as-war… india.html**

Cyclone Hudhud makes landfall (with video) – 12th O…ber:

- **http://www.bbc.co.uk/news/world-asia-…581787**

Hudhud in Andhra Pradesh – *The Times of India*:

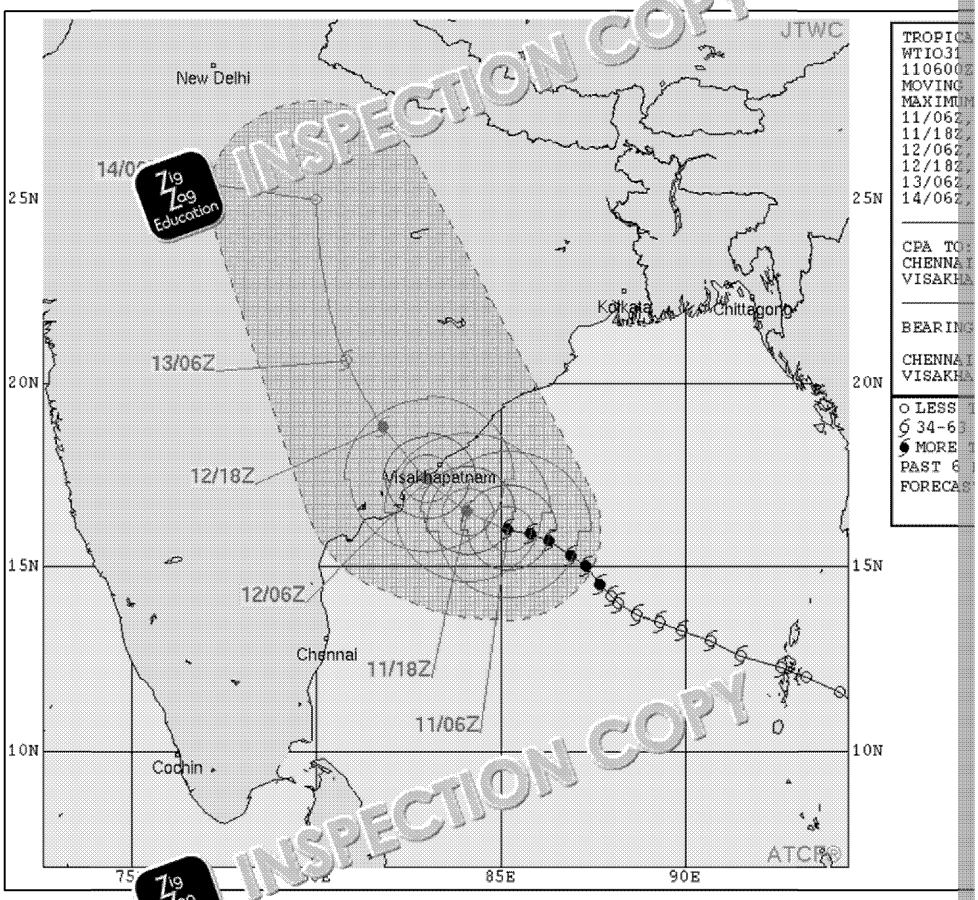
- **http://timesofin…imes.com/india/Hudhud-killed-46-in-Andh… hit/ar…ov…4932425.cms**

Cyclone Hudhud reaches the Himalayas – 16th October (after the storm):

- **https://www.thethirdpole.net/2014/10/16/cyclone-reaches-himalayas-…**

Springboards

Springboard 1

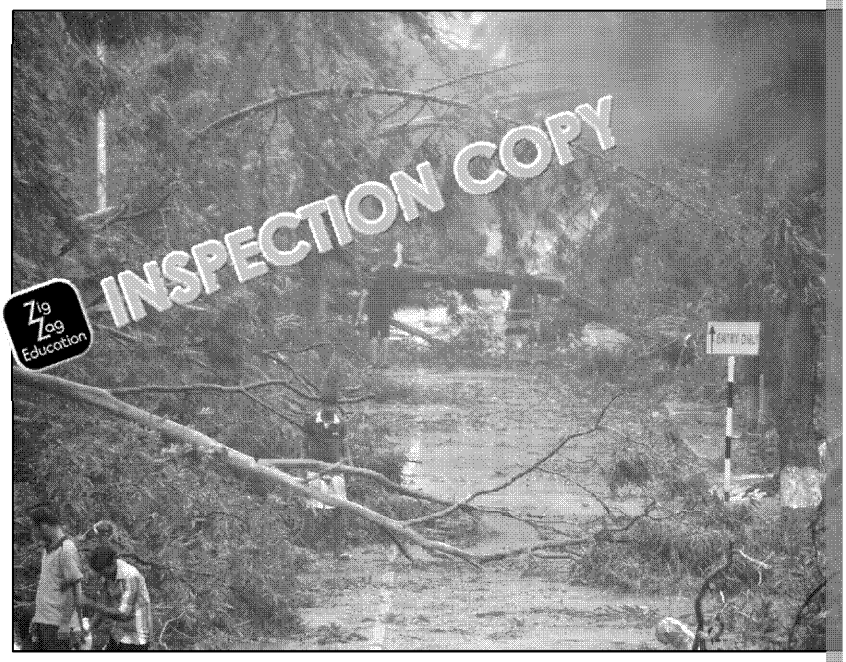


1. What does this map show?

2. Describe the track of Cyclone Hudhud.

3. How can people prepare for tropical storms such as Hudhud?

Springboard 2



1. What issues might arise as a result of the fallen trees in this photograp
2. Do you think that India has enough infrastructure not to require signi
3. How do you think fatalities were incurred due to Cyclone Hudhud?

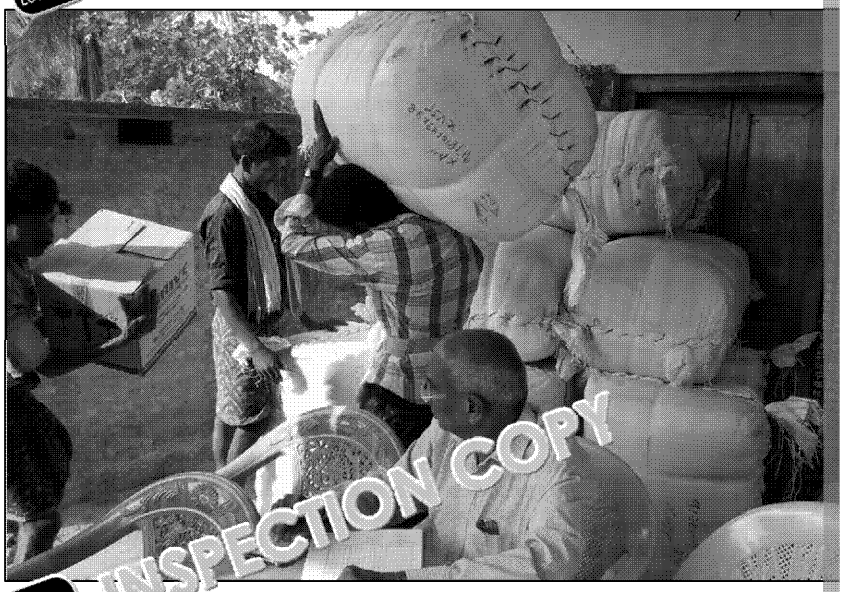
Springboard

1. Why d think that these houses were badly affected by the cyclon
2. Suggest how India's economy was affected by Cyclone Hudhud.
3. Suggest how the natural environment can be damaged by a tropical cy

Springboard 4

1. What area do you think this series of satellite images shows? Explain y
2. What damage could have been caused in this region?
3. Explain why the following safety measures could be effective:
   - GPS tracking
   - Registration prior to climbing in the region
   - Checkpoints
   - Registered guides

Springboard 5



1. Sugges[illegible]tems that might be necessary following a tropical revolvi
2. Suggest challenges in preparing for, and providing aid after, a tropical
3. How do you think that the effects of the cyclone made relief efforts dif

Springboard Suggested Answers

Springboard 1

1	• The track, intensity (wind speed), area affected by the cloud itself, and tim
2	• The cyclone is heading to the west into India, where the track wa • The storm passes over the Andaman Islands at less than 34 knots. The s throughout the Bay of Bengal, reaching at least 34 knots soon after pass As it approached the coast of India, intensity picked up, exceed , the cyclone was predicted to lose intensity.
3	• Seek shelter. • Stockpile supplies. • Evacuate if necessary. • Reduce flying debris. • Prepare for flooding. • Stop unnecessary travel.

Springboard 2

1	• Transport on that road is impassable until the route is fully cleared – th medical assistance cannot be transported on this road – alternative rout • The trees may have fallen on houses, causing damage or downed powe
2	• There was relatively little international assista required by India. • While criticism was aimed at the India gov nment, the country did h a large number of personnel to cope with the disaster.
3	• Falling trees and • Ava nch bar.

Springboard 3

1	• Flimsy timber structures – not particularly permanent. • Made from cheap, readily available material – i.e. not stone or brick.
2	• Crops damaged. • Transport shut down for a brief time. • Time needed to rebuild. • Fishing industry declined temporarily.
3	• Trees and ecosystems damaged. • Coastal areas inundated by salty sea water. • Rivers burst their banks. • Landslides/mudflows

Springboard 4

1	• Shows the Himalayas – the snow-capped fold mountains. The mo snowfall on 14th October, and it was still lying on the ground the follow
2	• Avalanches and loss of life. • Damage to infrastructure.
3	• GPS tracking – so that rescuers can find an[illegible] over people trapped by • Registration prior to climbing in th[illegible] so that the exact numbe and they can be easily re[illegible]. • Checkpoints – so [illegible] know approximately where people are • Registered [illegible] – to ensure safety, as visitors are guided by people w [illegible] area well.

Springboard 5

1	• Food and water • Shelter supplies, blankets, etc. • Personal hygiene items • Sanitation items • Medicines, first aid, medical items, etc. • Communication devices • Torches • Electrical generators • Rescue equipment
2	• Logistics – quickly readying items and transport to arrive quickly. • Financial capability for supplies and to reb[illegible] • Roads may be blocked. • Require personnel and eq[illegible] – may need to travel from other cou available.
3	• Ro[illegible] • [illegible]ransportation systems are unavailable or damaged. • E[illegible]city supplies are lost. • Communication is lost – e.g. fallen telephone cables.

Summary

Cyclone Hudhud, 2014

Question	
What were the dates of the storm?	
What were the severity ratings of the storm on the Saffir–Simpson and IMD scales?	
On what date did the storm make landfall?	
What were the weather conditions experienced during the storm?	
How many people were affected in Andhra Pradesh?	
How were warnings issued to Indian citizens?	
How many trains were cancelled on the East Coast Railway?	
What initiative allowed for warnings for residents not to go to beaches to watch the sea?	
Approximately how many deaths were attributed to the storm?	
How did these deaths occur?	
How many houses were damaged in the city and surrounds of Visakhapatnam?	
What percentage of phone/communication lines were damaged in the worst affected region?	
What was the total cost of the damage caused?	
What types of house were badly damaged?	
How was the airport at Visakhapatnam damaged?	
How high was the storm surge?	
In Nepal, how many climbers and guides died?	
How many rupees were requested?	
How many army personnel were deployed?	
Which river were authorities concerned could flood?	
How many people were rescued in Nepal?	
How many permanent homes did the government commit to?	
What was the cost of building these homes?	
How many fishing boats were damaged by the storm?	
How many people were missing after a boat on the Khola River capsized?	

Question	
What were the dates of the storm?	*7th–14th October 2014*
What were the severity ratings of the storm on the Saffir–Simpson and IMD scales?	*Category 4 (Saffir–Simpso Storm (IMD)*
On what date did the storm make landfall?	*12th October*
What were the weather conditions experienced during the storm?	*winds, heavy rainfal*
How many people were affected in Andhra	*9.2 million*
How were warnings issued to	*TV and radio, the governm Red Cross Society*
How many	*38*
What initiative allowed for warnings for residents not to go to beaches to watch the sea?	*The Zero Casualty initiati*
Approximately how many deaths were attributed to the storm?	*125*
How did these deaths occur?	*Extreme weather, falling t*
How many houses were damaged in the city and surrounds of Visakhapatnam?	*112,850*
What percentage of phone/communication lines were damaged in the worst affected regions?	*70%*
What was the total cost of the damage caused?	*$3.4 billion*
What types of house were badly damaged?	*Houses with thatched roof shanty towns*
How was the airport at Visakhapatnam damaged?	*The runway was flooded a was blown off*
How high was the storm surge?	*Between one and two met*
In Nepal, how many climbers and	*21*
How many rupees were	*2,000 crore*
How many	*300*
Which river authorities concerned could flood?	*Bansadhara*
How many people were rescued in Nepal?	*400*
How many permanent homes did the government rebuild?	*9,000*
What was the cost of building these homes?	*$51 million*
How many fishing boats were damaged by the storm?	*500*
How many people were missing after a boat on the Khola River capsized?	*2*

Quick-fire Questions

1	When did Cyclone Hudhud make landfall in India?	
2	Which centre issued advice on 8th October?	
3	How many fatalities were caused by Cyclone Hudhud?	
4	When did Cyclone Hudhud dissipate?	
5	How was the NDRF readied?	
6	Which organisation provided updates on the storm's progress?	
7	How many people were evacuated?	
8	Provide an example of rescue equipment used as a result of the storm.	
9	How was transport affected?	
10	How many days' worth of supplies were stored in shelters?	
11	Why were hoardings removed from buildings?	
12	Why were people without power in many areas?	

13	What was the cost of the storm?	
14	Name some of the crops destroyed by the storm.	
15	How was the fishing industry affected?	
16	How did the prime minister [illegible] the storm?	
17	Which branch [illegible] military were on standby?	
18	How did the government communicate with citizens following the storm?	
19	What form of sensing is provided by satellites?	
20	Why was rebuilding houses difficult?	
21	What happened on the Khola River?	
22	What was the storm that [illegible] which allowed lessons to be learnt?	
23	How could forecasting of cyclones be improved?	
24	How could roads be improved?	
25	How could the damage to crops be reduced?	

Quick-fire Answers

1	When did Cyclone Hudhud make landfall in India?	*Approximately m*
2	Which agency issued advice on 8th October?	*JTWC – Joint Ty*
3	How many fatalities were caused by Cyclone Hudhud?	*Approximately 1*
4	When did Cyclone Hudhud dissipate?	*14th October*
5	How was the NDRF readied?	*35 teams were pl*
6	Which organisation provided updates on the storm's progress?	*The Indian Regio*
7	How many people were evacuated?	*500,000*
8	Provide an example of rescue equipment used as a result of the storm.	*Boats and electri*
9	How was transport affected?	*Train services we and roads were b*
10	How many days' worth of supplies were stored in shelters?	*Three*
11	Why were hoardings removed from buildings?	*They could have death*
12	Why was electricity cut in many areas?	*Electricity cables down or collapse*

13	What was the cost of the storm?	*$3.4 billion*
14	Name some of the crops destroyed by the storm.	*Rice, sugarcane and peanu*
15	How was the fishing industry affected?	*Fewer fish were caught, an*
16	How did the prime minister assist after the storm?	*By providing money for the*
17	Which branches of the military were on standby?	*The army, navy and air for*
18	How did the government communicate with citizens following the storm?	*Several forms of social med*
19	What form of sensing is provided by satellites?	*Remote sensing*
20	Why was rebuilding houses difficult?	*Compensation funds were s*
21	What happened on the Khola River?	*A rescue boat capsized*
22	What was the storm that hit in 2013 which provided lessons to be learnt?	*Cyclone Phailin*
23	How could forecasting of cyclones be improved?	*The inclusion of wind veloc*
24	How could roads be improved?	*Improve the quality of emb*
25	How could the damage to crops be reduced?	*Increase protection of stand harvest crops prior to its ar*

Extension Questions

1. Evaluate the effectiveness of storm warnings prior to Cyclone Hudhud
2. Describe the development of Cyclone Hudhud
3. Suggest why the damage to many houses was so significant.
4. Suggest why the snowfall in Nepal was such a serious issue.
5. Evaluate whether the social or economic effects from the storm were gr
6. How effective do you think that the recommendations by the National Authority would be?
7. Explain whether a repeated incidence of tropical storms can help reduc
8. How effective do you think the Indian government was in releasing fu rebuilding process?
9. Why do tropical storms weaken over land?
10. Are tropical storms in the region a surprise?

Extension Answers

1. Warnings were successful because hundreds of thousands of people evacuate
However, there were reports that the media didn't fully discuss the extent of t
went to the coast to watch the raging sea, putting their lives in danger.

2.
- 6th October – high air circulation over the Andaman Sea.
- 7th October – beginning to form out at sea; alert of a tropical cyclone establish
- 8th October – classified as a severe cyclonic storm; advice issued by JTWC
- 9th October – classified as a very severe cyclonic storm; alert set up by the
- 10th October – classified as a Category 1 tropical cyclone, followed by an up
- 11th October – the eye was seen for the first time and the peak wind speed
three minutes).
- 12th October (Sunday) – made landfall at approximately midday at Visak
The cyclone moved north to Nepal, passing through Uttar Pradesh.
- 14th October – Cyclone Hudhud weakened over land and quickly dissipa
area of low pressure.

3. Many houses were poorly built of flimsy materials such as wood. There was a
settlements where the housing was not built to high standards.

4. The snowfall was rapid and deep – reaching 1.8 metres in places. This meant t
roads and infrastructure were buried and phone lines were down.

5. Allow the student to argue any valid case, providing that there are facts to su
people were affected by the storm; however, there were very few deaths becau
The economic damage was severe, given the damage to crops and the fishing

6. The recommendations would probably be very effective – for example, the inc
prediction, and the increased ease of dissemination to the public. The benefits
consumers would be easily felt; for example, the burying of cables and creatio
the impact of the storm and reduce the power loss after the event. Services wo
would be less overwhelmed, and the quality of shelters would be improved. F
mitigated, such as the agricultural losses and compensation to homeowners. H
debate the viability of the options, such as the funding – who would pay for th
that customers were required to pay for the repair of their TV satellite dishes

7. Yes – there is ample opportunity for the disaster management agencies to lear
likely to become familiar with advice and procedures.

8. Not particularly effective due to the delayed payment – it would be easy to b
however, the scale of the disaster should be taken into account.

9. Tropical storms lose their energy source of warm ocean water. There might al
altitude.

10. No – there have been 60 cyclones in the region since 1977, accounting for 10,0
favourable conditions out in the Bay of Bengal, allowing for the rising of warm

Exam-style Question

With r[illegible]nc[illegible] to a tropical storm you have studied, assess t[illegible] prepar[illegible] helped minimise the effects of the storm.

Level Mark Scheme

Indicative content:

- The student should offer an evaluation of the extent to which the effect by the preparation carried out in advance of the event.
- Students are likely to discuss the preparation carried out in terms of m protection and planning. Assessment of these el nts does not need
- Evaluation may lead to the student identif particular elements of pr role in reducing the effects.

Level	Mark	Description
1	1–3	• The student evidences basic knowled (AO1) • The student evidences limited understa exist between places, environments and • A limited ability to evaluate is evidence knowledge and understanding. (AO3)
2	4–6	• The student evidences some knowled (AO1) • The student evidences good understan exist between places, environments and • A reasonable ability to evaluate is e application of knowledge and understan
3	7–9	• The student evidences thorough knowle (AO1) • The student evidences a firm understan exist between places, environments and • A strong ability to evaluate is evidenced knowledge and understanding. (AO3)

Suggested Conte

Monitoring:

- Monitoring of the development of the storm led the government to issu Odisha and nine in Andhra Pradesh.
- Updates were provided by the Indian Regional Specialized Meteorolo

Prediction:

- TV and radio stations, the government, task forces and the Indian Red updates and the early warning system.

Protection:

- Thousands of people were evacuated (as many as 500,000). Some p camps by the government.
- Hoardings were removed from houses in case they blew off and caus
- Ships were moved offshore.
- In Odisha, the government (under the 'Z ro Casualty' initiative) warne beaches two days before the st

Planning:

- India's armed forces were put on alert.
- 35 Na Disaster Response Force (NDRF) teams were mobilised i Prade
- Shelters were set up with a three-day supply of goods, including wate
- Medicines and medical personnel were also readied.
- Rescue equipment such as inflatable boats and generators was provi

Evaluation of effectiveness:

- Deaths totalled 125, which could be evidence of relatively strong prepa in terms of evacuation of people.
- 112,850 houses were damaged, with some thatched cottages being co indicates poor preparation was carried out in terms of protecting infrast
- Damage to a radar station during the storm meant it was difficult to mo
- Some crops, including rice, sugar cane and peanuts, hadn't been harve were damaged. Improved preparation in this area could have prevented
- Poor sea defences meant that coastal roads were completely destroyed
- The fishing industry was poorly protected, with fish farms as well as fish

Spelling and Grammar (SPaG) – total of 3 marks

For 1 mark:

- Student shows some ability to spell and punctuate correctly.
- Student shows limited use of grammar to convey their argument.
- Student utilises a basic range of geographical phrases.

For 2 marks:

- Student generally uses good spelling and punctuation throughout.
- Student shows some accurate use of grammar to convey their argume
- Student utilises an adequate range of geographical phrases.

For 3 marks:

- Student uses correct spelling and punctuation throughout.
- Student shows accurate use of grammar to clearly convey their argum
- Student utilises a broad range of geographical phrases.