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Western Disturbances: A 9,000km Journey to a Wheat Field

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Western Disturbances: A 9,000km Journey to a Wheat Field

A storm that forms near the Mediterranean can end up watering a wheat field in Punjab. It travels about 9,000 km to get there. This article explains how western disturbances form, why they matter and how they differ from the monsoon.

At a glance

Four key facts on this topic

01 **~9,000 km** Journey from the Mediterranean.

02 **Winter** Season when they reach India.

03 **Rabi** Crops that depend on the rain.

04 **Extratropical** Not a tropical storm.

What is a western disturbance?

1 What a Western Disturbance Is

1.1 What is a western disturbance?

A western disturbance is a winter storm system that reaches India from the west. Scientists call it an extratropical storm. That means it forms outside the tropics.

Down To Earth calls these storms the Indian winter monsoon. They bring rain to the plains and snow to the hills.

1.2 How often do they come?

Down To Earth says north India gets about seven of them a month in an average winter. Other sources give lower counts. The exact number depends on how a forecaster counts a storm.

IMD numbers each storm through the season as WD1, WD2 and so on. The numbers help farmers and disaster managers see how active a winter has been.

> 4. **Think it through:** Why do we call it a disturbance and not a cyclone? See answer ↓

> **Quick check 1.** True or false: A western disturbance is born inside India's own tropical zone. *(True or False?)* See answer ↓

Sources: downtoearth.org.in

Where does the moisture come from?

2 Where the Moisture Comes From

2.1 Where does the water come from?

These storms draw moisture from the Mediterranean, Caspian and Black seas. They are carried east by high-level winds. By the time they reach India they have crossed Iran, Afghanistan and Pakistan.

The journey is about 9,000 km long. That is why the headline calls it a journey to a wheat field.



Schematic map of a western disturbance's usual path. The disturbance moves east from the Mediterranean over Iran, Afghanistan and Pakistan. It reaches Jammu and Kashmir, Punjab and the Himalaya, where the wheat belt lies below. The numbers 1 to 5 mark the stages in that order. The jet stream is shown as a broad band. India's boundary follows the Government of India map, with all of Jammu and Kashmir, Ladakh, Aksai Chin and Arunachal Pradesh inside India. Other borders are not drawn, and sea and coast shapes are simplified.

2.2 What starts the trip?

A high-pressure area over Russia pushes cold air south. That cold air lifts warm, moist air from the Mediterranean. The lifted air forms a low-pressure trough that begins to travel east.

A moving disturbance is preceded by warm, moist air. Cold, dry air follows behind it. This is why a winter wet spell is usually followed by a sharp fall in temperature.

The trip in four steps

Step	What happens

Step	What happens
1	Cold Russian air pushes south
2	Warm Mediterranean air is lifted
3	A trough forms and moves east
4	Rain and snow fall over north India

Sources: downtoearth.org.in

How does the jet stream steer it?

3 The Jet Stream's Role

3.1 What is the subtropical westerly jet?

The jet stream is a fast river of air high above the ground. It blows from west to east. The subtropical westerly jet carries each disturbance towards India.

Down To Earth says the jet stream is most active over north-west India during winter.

3.2 Why only in winter?

In winter the jet dips south and flows over northern India. In summer it shifts north, over the Tibetan plateau and beyond. India then falls outside its path.

A northward shift in December cuts the chance of a storm striking India. Down To Earth links the dry December of 2025 to exactly this shift.

Winter and summer compared

Season	Jet stream position	Effect on India
Winter	Dips south over India	Disturbances arrive often
Summer	Moves north of the Himalaya	Disturbances are rare
December 2025	Shifted north early	Few storms reached India

Who gets the rain and snow?

4 Rain and Snow Regions

4.1 Which regions are affected?

The storms bring winter rain and snow to Jammu and Kashmir, Himachal Pradesh and Uttarakhand. They also water Punjab and Haryana. Down To Earth says they cause most of the winter rain in the north-west, parts of central India and the north-east.

In the hills the moisture falls as snow. Snowfall renews the Himalayan glaciers each winter.

4.2 What is Chillai Kalan?

Chillai Kalan is the harshest 40-day winter period in Kashmir. It runs from 21 December to 30 January. Kashmir Life ties heavy snow in this period to wet spells from western disturbances.

Folk names exist for the weaker spells after it, such as Chillai Khurd and Chillai Bachha. This article does not rely on their exact dates.

> 5. **Think it through:** Why do hill snow and plains rain come together? See answer ↓

> **Quick check 2.** True or false: March 2026 passed without any western disturbance. *(True or False?)* See answer ↓

Sources: downtoearth.org.in; kashmirlife.net

Why does wheat need it?

5 Why Wheat Needs the Rain

5.1 What is the Rabi season?

Rabi crops are sown in winter and harvested in spring. Wheat is the best-known Rabi crop. Down To Earth says western disturbances keep the soil moist for this season.

The storms help farmers grow their Rabi crop without extra irrigation. A good run of winter rain means a healthier wheat crop.



A wheat crop in Punjab, the kind of Rabi field that depends on winter rain. Photo: Satpal Dandiwal, Wikimedia Commons, CC BY-SA 4.0.

5.2 What happens when the rain is poor?

Down To Earth reports that high March temperatures and weak disturbances damaged 30 to 40 per cent of the wheat crop in one year. Residents in dry hill and plains areas said their Rabi crops, especially

wheat, were suffering.

Heat in March hits wheat when the grain is filling. A dry, warm spring shortens that stage and cuts the yield.

What happens when it fails?

6 When the Disturbances Fail

6.1 What went wrong in winter 2025-26?

Down To Earth counted 12 disturbances between 15 October and 17 December 2025. Most were feeble. Another report says there was no disturbance from mid-November to the last week of December.

The jet stream had shifted north. The usual December rain did not arrive across north India.

6.2 Is climate change involved?

Down To Earth reports that climate change is weakening western disturbances. The jet stream is shifting, and that lowers the chance of storms striking India. Researchers are still working out the full picture.

The lesson for students is simple. A good winter needs both a strong storm and a jet stream in the right place.

Good winter against weak winter

Feature	Good winter	Weak winter
Storms	Many, strong	Few, feeble
Jet stream	Over India	Shifted north
Hill snow	Heavy	Light

Feature	Good winter	Weak winter
Wheat	Healthy	Stressed

How is it different from a monsoon depression?

7 Not a Monsoon Depression

7.1 How is a western disturbance different?

A western disturbance is extratropical. It forms in the mid-latitudes and is active in winter. A monsoon depression is tropical. It forms over the Bay of Bengal and is active in summer.

The two systems differ in origin, season and region. They also bring rain to different parts of India.

The two systems side by side

Feature	Western disturbance	Monsoon depression
Origin	Mediterranean and nearby seas	Bay of Bengal
Type	Extratropical	Tropical
Season	Winter	Summer
Main benefit	Rabi crops, hill snow	Kharif crops, river flow

Quick check 3. True or false: A western disturbance is a tropical storm like a monsoon depression. *(True or False?)* See answer ↓

What happened in Nepal in August 2026?

8 An August Disturbance and Nepal

8.1 What happened in Nepal in August 2026?

A flash flood struck Rasuwa district in Nepal on 26 August 2026. It washed away a village near the Tibet border. Reports differ on how many people died.

Nepal's weather department said local rain was light and could not explain the surge. Reports point to an ice avalanche or glacial lake outburst in Tibet instead.

8.2 Was a western disturbance the cause?

A disturbance in August would be unusual, because these storms are mainly a winter feature. The reports we read do not establish a link between one and this flood.

The cause is still under study, so treat any single-cause claim with care.

> 6. **Think it through:** Why would a rare August disturbance still make news? See answer ↓

Sources: website-api.nrcs.org; theweek.in

What do exams ask?

9 What Exams Ask

9.1 Which real questions touched this topic?

Four real papers tested western disturbances or the jet streams that carry them. The cards below show each one.

9.2 Quick questions to revise

- **Where do they originate?** Near the Mediterranean, in the extratropical zone, about 9,000 km away.
- **Why do farmers care?** The winter rain keeps the soil moist for wheat.
- **How do they differ from monsoon depressions?** They are extratropical and winter-active.
- **What was odd in August 2026?** A rare out-of-season disturbance, and a Nepal flood it did not clearly cause.

Remember this

- **Origin:** extratropical storms from the Mediterranean region.
- **Carrier:** the subtropical westerly jet, over India in winter.
- **Benefit:** winter rain and snow, vital for Rabi wheat.
- **Not the same as:** a tropical monsoon depression.

Explain it back: Why does a storm born near the Mediterranean water wheat fields in Punjab?

Practice MCQs

1. Which seas supply most of the moisture that western disturbances carry towards north India?

A. Red Sea and Persian Gulf

B. Mediterranean, Caspian and Black seas

C. Baltic and North seas

D. Arabian Sea and Bay of Bengal

See answer ↓

2. Western disturbances matter most for which Indian cropping season?

A. No season, because they bring only snow

B. Zaid, because they cool summer fields

C. Kharif, because they bring monsoon rain

D. Rabi, because they keep winter soil moisture

See answer ↓

3. What change in the subtropical westerly jet stream is blamed for weaker western disturbances over India in December?

A. A northward shift

B. A shift to the Southern Hemisphere

C. A complete stop

D. A southward shift

See answer ↓

4. Western disturbances are responsible for most of the winter precipitation in which part of India?

A. The Thar desert only

B. North-west India

C. The Deccan interior

D. South India

See answer ↓

5. In which season is the jet stream most active over north-west India?

A. Winter

B. Post-monsoon only

C. Monsoon

D. Summer

See answer ↓

6. Down To Earth reports that high March temperatures linked to weak western disturbances damaged roughly how much of a wheat crop?

A. 80-90 per cent

B. 30-40 per cent

C. 1-2 per cent

D. 5-10 per cent

See answer ↓

Answer Key

1. **B.** The answer is **the Mediterranean, Caspian and Black seas**. Down To Earth says these extra-tropical storms typically draw moisture from those seas. Why the others fail: the Arabian Sea and Bay of Bengal feed the summer monsoon. The Red Sea and Gulf are not the main source. Memory hook: a WD is a Mediterranean-born storm. ↑ Q1
2. **D.** The answer is **Rabi**. Down To Earth calls WDs essential for the Rabi season because they maintain the moisture the soil needs. Why the others fail: Kharif depends on the south-west monsoon. Zaid is a summer crop. WDs bring rain as well as snow. Memory hook: winter rain, winter crop. ↑ Q2
3. **A.** The answer is **a northward shift**. Down To Earth names the northward shift of the subtropical westerly jet in December as the main reason. A jet parked too far north makes fewer WDs strike India. Why the others fail: a southward shift would pull storms towards India. The jet does not stop. Memory hook: jet north, rain not. ↑ Q3
4. **B.** The answer is **north-west India**. Down To Earth says WDs bring most winter precipitation in the north-west, and also in parts of central and north-east India. It calls them the Indian winter monsoon. Why the others fail: South India gets its winter rain from the north-east monsoon. Memory hook: west storm, north-west rain. ↑ Q4
5. **A.** The answer is **winter**. Down To Earth notes that the jet stream is typically most active over north-west India in winter. That is when it dips south and steers WDs in. Why the others fail: by summer it has moved north of the Himalayas. Memory hook: the jet visits India only in winter. ↑ Q5
6. **B.** The answer is **30-40 per cent**. Down To Earth says high temperatures in March, due to weak WDs, damaged 30-40 per cent of the wheat crop. Why the others fail: the loss was large, not marginal, and not near-total. Memory hook: weak WD, hot March, thin wheat. ↑ Q6

Quick-check answers

1. **False.** It forms outside the tropics and travels to India from the west. ↑ 1
2. **False.** IMD bulletins showed a fresh disturbance from 18 March and another on 26 March, with hail on some days. ↑ 2

3. **False.** It is extratropical and winter-active, while a monsoon depression is tropical and summer-active. ↑ 3
4. **Think it through.** Its main job is to disturb the usual dry winter air with a pocket of moisture. It rarely has the tight spinning eye of a tropical cyclone. The word describes a change in the weather pattern, not a violent storm. ↑ 4
5. **Think it through.** Moist air rises as it meets the mountains. Rising air cools and drops its water. High up the water falls as snow. Lower down it falls as rain. ↑ 5
6. **Think it through.** A storm outside its usual season still carries moisture. In a monsoon month the ground is already wet. Extra moisture can add to the risk, even if it is not the main cause. ↑ 6

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