



Mains Practice Question

Q. What do you understand by Western Disturbances? Discuss its impact on Indian weather systems. (250 words)

18 May, 2020 GS Paper 1 Geography

Reference: [Hindustantimes](#), [Drishtilas](#)

Approach

- In general explain the western disturbances as a geographical phenomena and its main effect on Indian weather systems.
- Mention the areas of its origin and influence and briefly explain its mechanism, it can also be illustrated in a suitable diagram.
- Explain the impact of western disturbances on India in various dimensions like climate, agriculture and disasters associated with it.
- Summarise the answer and mention some of the measures to augment the preparedness to deal with the western disturbances

Introduction

- The western cyclonic disturbances are weather phenomena of the winter months brought in by the westerly flow from the Mediterranean region.
- The word 'Western' refers to the direction from which they originate with regard to India.
- The word 'disturbance' is used because the air within the low pressure systems tends to be unstable or disturbed.
- They are **extratropical storms** that bring winter rain to the northwestern parts of the Indian subcontinent.

Body

Areas of Influence of western Cyclonic Disturbances

- The western cyclonic disturbances originate in the **Mid- latitude region** near the Atlantic ocean and Europe.
- The low pressure typically forms over the Mediterranean Sea and travels over Iran, Iraq, Afghanistan and Pakistan before entering India loaded with moisture.
- In India they usually influence the weather of the north and north-western regions.

Mechanism

- **Origin:** During winters, a high-pressure system develops in the regions around Ukraine which causes the cold air from polar regions to collide with the relatively warm and moist air at lower/temperate latitudes.
 - The warm air mass is usually a part of the westerlies and carries a lot of moisture. When the two air masses at different temperatures meet, a front is formed.

- **Eastward movement towards India:** The formation of a front leads to cloud formation and heavy rainfall in areas coming under the influence of the frontal activity. This leads to formation of temperate cyclones in the upper atmosphere.
 - At such heights, these cyclones come into contact with the subtropical westerly jet stream which carries them eastwards.
 - In the course of its travel, the cyclone gathers moisture from the Caspian Sea and the Persian Gulf. It enters India mainly through the states of Punjab, Haryana, and Rajasthan.

Impact

- **Climate:** Western Disturbances are the cause of the most winter and pre-monsoon season rainfall across North-West India.
 - This phenomenon is usually associated with cloudy sky, **higher night temperatures and unusual rain**. It is estimated that India gets close to 5-10% of its total annual rainfall from western disturbances.
 - In winter, western winds bring moderate to heavy rain in low lying areas and heavy snow to mountainous areas of the Indian subcontinent.
 - South west monsoon covers most of India but parts of North India don't get much rain from it. These regions depend upon rain from western disturbance during the winter season from November to March.
 - The snow from the western disturbances also feed the glaciers which are the source of most of the rivers in Northern India.
 - After winter the western disturbances help in the activation of monsoon in certain parts of northwest India.
 - The interaction of the monsoon trough with western disturbances may occasionally cause dense clouding and heavy precipitation.
- **Winter rainfall and agriculture:** An average of 4-5 western disturbances form during the winter season and the rainfall distribution varies in every western disturbance.
 - Precipitation during the winter season has great importance in agriculture particularly for **rabi crops** including wheat, which is one of the most important Indian crops.
 - The rainfall brought about by western disturbances have a direct impact on economies of wheat producing states like Haryana and Punjab.
 - Weak western disturbances are even associated with crop failure and water problems across north India.
 - Strong western disturbances can help residents, farmers and governments avoid many of the problems associated with water scarcity.
- **Disaster:** Unseasonable rainfall and hail brought about by western disturbances damages the crops in the North Indian states like Haryana, Punjab, Madhya Pradesh and Rajasthan.
 - These storms also bring about lightning in areas affected by it. Recently, in Rajasthan, a number of casualties have been caused by lightning brought about by western disturbances.
 - Natural disasters like cloudburst in Leh (2010), the Kashmir floods in 2014 and even 2013 floods in Uttarakhand were caused by the Western Disturbances.
 - These calamities killed thousands of people and caused a lot of destruction in towns and cities situated on the bank of flooded rivers.

Conclusion

Western Disturbances is a complex weather phenomena and has profound impact on climate and agriculture of India. It is also a source of a number of natural disasters that occur every year in India causing huge loss of lives and property.

Thus, western disturbances need to be studied in much more detail. Like tropical cyclones or monsoon, there needs to be an **end to end tracking** of western disturbances to make it less hazardous.

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