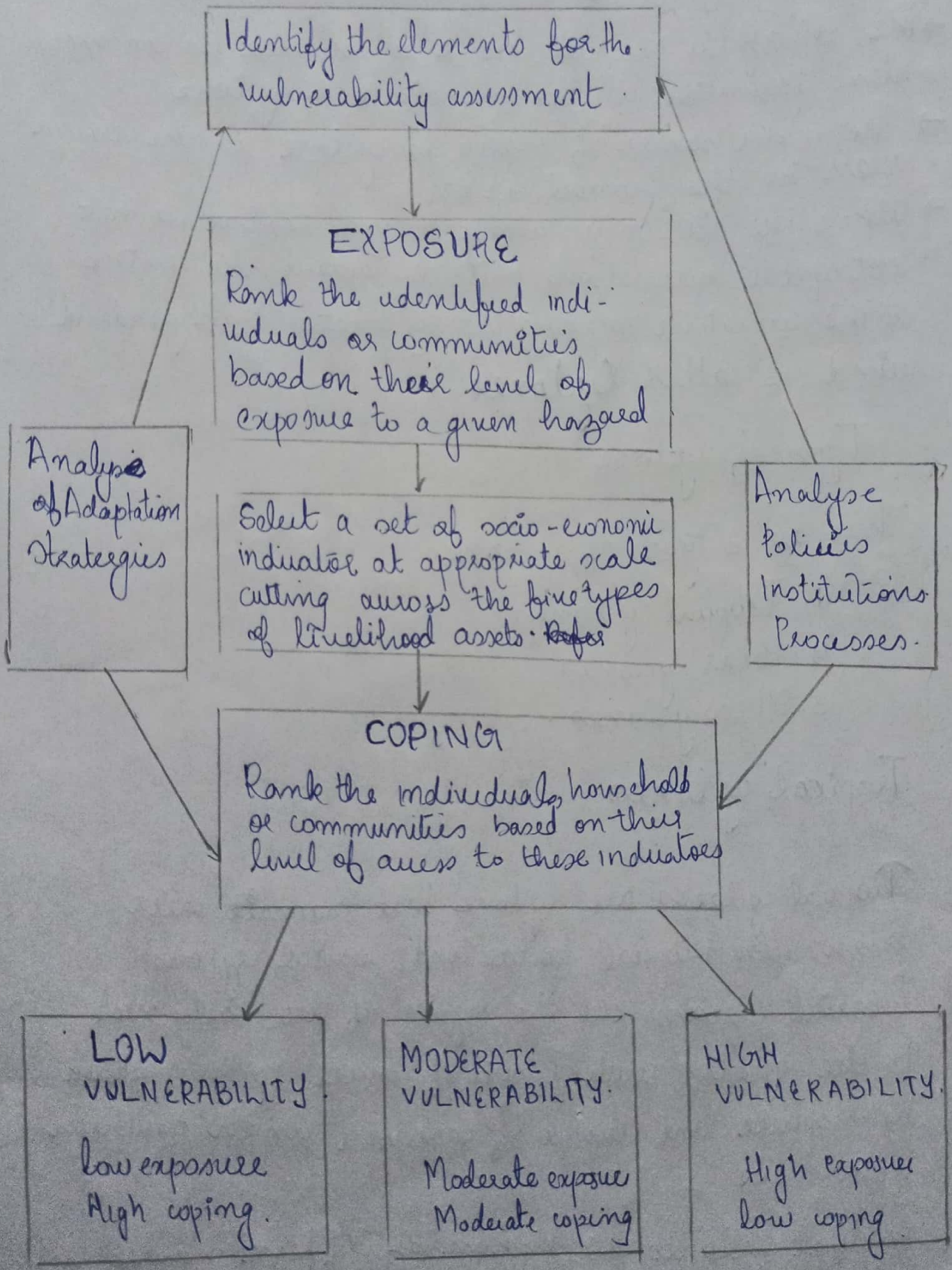
1. Methods of measuring physical vulnerability and socio-economic vulnerability.

Methods of measuring physical vulnerability.

Group.	Method.	Description
	Analysis of observed damage.	Based on the collection and analysis of statistics of damage that occured in damage recent and historic event Relating vulnerability to different hazard intensities.
Empirical method	Expert opinion	Based on asking groups of expert on vulnerability to give their opinions. This is meant to come to a good assessment of vulnerability. Method is time consuming and subjective. Re-assessment of vulnerability after building upgrading or repair are difficult to accomodate.
	Score Assignment	Method using a questionnaire with different parameters to assess the potential damage in relation to different hazard level. The score assignment method is easie to

		update. eg. if we think about earthquake vulnerability before and after application of retrofitting
Analytical models.	Simple analytical models	Studying the behavior of building and structure based on engineering design criteria, analysing eg seismic load and to derive the likelihood of failure using computer based methods from geotechnical engineering. Using eg shake table and wind tunnels as well as computer simulation techniques.
	Detailed Analytical methods.	Using complex methods. It is time consuming, needs a lot of detailed data and will be used for assessment of individual structures.

Methods of measuring socio economic vulnerability.



2. Cyclone and types of cyclone.

→ The atmospheric pressure in a given area is an important parameter in the formation of cyclone

→ The main source of energy for cyclone is the warm ocean in the tropical region

→ When the air move along curved isobar, a net centripetal acceleration pulls it toward the centre of the curvature making air to rotate. Such gradient wind is called **Cyclones**

Types of cyclone.

There are 3 types of cyclones

1. Tropical cyclones.
2. Polar cyclones.
3. Mesocyclones.

Tropical cyclones.

Tropical cyclones are cyclone that originate over oceans in tropical areas and coastal regions

Tropical regions are the region of the earth near to the equator with Tropic of cancer in the northern hemisphere and tropic of capricorn in the southern hemisphere.

Tropical cyclones are known by different names, depending on region

In the Indian ocean, they are known by simply cyclones, if you go to the western pacific side or south pacific side, it is known as typhoons, likewise in western Australia, it is called Willy willies. All these are different name refer to the same type of storm.

Polar Cyclones.

→ Polar cyclones are known as Artic cyclone which are large area of low pressure. It occur in polar region like Greenland, Siberia and Antarctica.

→ Unlike Tropical cyclones, polar cyclones are usually stronger in winter month.

→ Polar cyclones are usually 1000 to 2000 km wide in which the air is moving in spiral counterclockwise fashion in the northern Hemisphere.

→ The reason for the rotation is same as tropical cyclone, the Coriolis effect.

Mesocyclone

→ A mesocyclone is a storm scale region of rotation of air, approximately 2 to 10 miles in diameter within a convective storm.

→ In a mesocyclone, air rises and rotates around a vertical axis, usually in the same direction as low pressure system.

→ They are most often associated with a localized low pressure region within a severe thunderstorm

→ Mesocyclone is a cyclone that occurs when part of a thunderstorm could start to spin, which may eventually lead to a tornado, 'Meso' means middle.

→ Counterclockwise in the northern and clockwise in southern hemisphere.

3. Atmospheric Circulation

Atmospheric circulation is the large-scale movement of air and together with ocean circulation is the means by which thermal energy is redistributed on the surface of earth.

When earth rotate on its axis, there occur rotation in wind due to Coriolis force.

The Earth's atmospheric circulation is varies from year to year, but the large scale structure of its circulation remains fairly constant. The smaller scale weather system mid-latitude depressions, or tropical convective cell occur randomly and

long range weather prediction of those cannot be made beyond 10 days in practice or a month in theory. the Earth's weather is a consequence of its illumination by the Sun. and the laws of thermodynamics.

The Coriolis force is the apparent curving of a wind flow. In addition to this a low pressure belt is formed over the tropical region, since the equatorial region is heated throughout the year. this belt is known as Inter-Tropical Convergent Zone (ITCZ) or doldrums.

→ This is discontinous belt, that fluctuates in its position and intensity, where air rises due to low pressure.