

FACTORS AFFECTING DEVELOPMENT

TYPE	LOCATION	CLIMATE	VEGETATION & ANIMAL LIFE	LIFE & DEVELOPMENT
EQUATORIAL HOT, WET.	* 5° to 10° N & S * Amazon, Congo, Malaysia, W. India	<p><u>TEMP:</u> * Uniformity (all yr) * mean monthly : 27°C * no winters * cloudiness & heavy precipitation daily. * Regular land & sea breeze * diurnal range of temp is very small. and so is annual range</p> <p><u>RAINFALL:</u> * 60-100 inches * Max period : April & Oct Min period : June & Dec * double rainfall peaks coinciding with equinoxes is feature of equatorial type. * convectional rain cumulonimbus clouds * Relative humidity : 80% $2.54\text{cm} = 1\text{inch.}$</p>	<p><u>Vegetation:</u> Tropical rain forest ① Great variety of vegetation - evergreen trees, with tropical hardwood. Eg: mahogany, ebony, greenheart, cabinet wood palm trees and climbers are also available. ferns, orchids under tree ② distinct layer of canopy ③ Multiple species. - not found in purestands - many hardwood can't float on water hence many tropical countries are net timber importers ④ Forest clearings. - lumbering/shifting cultivation ⑤ Animals: Birds, reptiles</p> <p>When forest clearing is abandoned, less luxuriant secondary forests called belukar arises in Malaysia.</p>	<ul style="list-style-type: none"> - Sparsely populated. - hunters & collectors - Shifting cultivation - birds, reptiles - In Amazon forest Indian tribes collect wild rubber. - In Congo basin Pygmies gather nuts - In Malaysia Orang Asli make cane products & sell - crops: manioc, yam, maize, banana, groundnuts. - Plantations favoured <ul style="list-style-type: none"> * natural rubber - Cocoa: Ghana & Nigeria - Oil palm, coconuts, sugar, coffee, tea, tobacco, species, banana, pineapple, cinchona, sago. <p>① Equatorial climate & health. - excessive heat & high humidity affects physical & mental - Sun stroke, malaria, yellow fever - resistance weakened.</p> <p>② Prevalence of Bacteria and insect pests. - stimulates growth (hot & wet climate) wet condition transmits bacteria easily. - injurious to crops, animals & humans.</p> <p>③ Jungle hinders development & maintenance. - Rail, Road difficult - Lalang (tall grass) choke crops. - Infra encounters wild life, snakes etc</p> <p>④ Rapid deterioration of tropical soil. - undecomposed litter - torrential downpours washes nutrients.</p> <p>⑤ Difficulties in lumbering & livestock farming - transportation - commercial extraction - absence of meadow grasses - tsetse flies cause deadly disease ngora to domesticated animals</p>

TYPE	LOCATION.	CLIMATE.	VEGETATION	AGRICULTURE
TROPICAL MONSOON & TROPICAL MARINE	Indian Sub Continent, Burma, Thailand, Laos, Cambodia, Vietnam, S. China, N. Australia. Central America W. Indies, NE Am., Philippines, E. Africa, Madagascar, Guinea Coast & E Brazil	<p>① Basic cause of monsoon is diff. in rate of heating & cooling of land & sea.</p> <p><u>In Summer</u></p> <p>- Landmass of Northern hemisphere heated backed by Himalayas creates low pressure</p> <p>- In Southern hemisphere it is winter, a region high pressure winds blow outward as SE monsoon after crossing equator SW monsoon.</p> <p><u>In Winter</u></p> <p>- N. hemisphere high pressure NE monsoon towards Australia as NW monsoon</p> <p>② Seasons of T. Monsoon</p> <ul style="list-style-type: none"> * cool, dry winters Oct to Feb (10°C) Centre of H. Pressure Punjab. NE monsoon (TN) winter disturbances * hot, dry summer (March - June) (30°C), stifling heat & low humidity no rain, low pressure Dust storms frequent * rainy season (June to Sept) torrential downpours (950 mm) cong. heavy rain (pattern) is characteristic feature 	<ul style="list-style-type: none"> - deciduous forests during dry period they shed leaves - fewer species - valuable timber teak (Burma) Sal, acacia, eucalyptus. Bamboo thickets - decrease in rain forests turns out to Savanna. 	<ul style="list-style-type: none"> - forests cleared due to dense population resulting in soil erosion - dependent solely on rainfall & labour force. forms economy of the countries. <p>① Wet padi Cultivation</p> <ul style="list-style-type: none"> - Rice (staple) - Rain exceeds 70 inches - wet paddy grown on lowlands in flooded fields/terraced fields - Dry paddy grown in low rainfall. - Irrigation water extensively used. - Droughts & floods inseparable. - Maize, millet, wheat, Sorghum, gram, beans in drier & cooler areas where rice not grown. <p>② Irrigated Cash crops</p> <ul style="list-style-type: none"> - canes sugar ($\frac{1}{3}$ world prod) - India, Java, Cuba, Formosa, Jamaica, Trinidad, Barbados - Jute (India & Bng) - Indigo (Java, India) - Cotton, banana, coconuts, spices. <p>Tropical soil: Lateritic 1st crop bumper but latter harvests deteriorate.</p> <p>③ Highland plantations</p> <ul style="list-style-type: none"> - tea & coffee - coffee originated in Ethiopia & Arabia 2000-4500 ft - Tea (China) 15°C, 60 inches <p>④ Lumbering teak (Burma) In hilly district upto 3000 ft & moderate rains R. Chindwin & R. Irrawaddy transports to Rangoon.</p> <p>⑤ Shifting cultivation</p> <ul style="list-style-type: none"> - farmers use hoes & sticks for ploughing & seeding. - maize, paddy/ dry yams, tapioca, sweet potatoes, beans - Subsistence farming - local names shifting cultivation, ladang (Malaysia) taungya (Burma) tumai (Thailand) caing-in (Philippines) humah (Java) chen (SI) milpa (Africa & Caribbean)
T. Monsoon <u>Summer</u> Onshore wet monsoon, winter offshore dry monsoon				
T. Marine	Onshore trade winds give equally distributed rainfall full year.			
CLIMATE				
③ Retreating Monsoon mid Sept afterwards clear skies, cool & dry.				
④ T. marine climate. Along E ⁿ coast of Tropical lands. Orographic & convectional rain Summer more rain. No months without rain prone to T. cyclones, hurricanes/typhoons				

③ Trees height decreases & density decreases away from equator.

LOCATION

transitional b/w equatorial forests and trade wind hot deserts.

1. W. African Sudan curves to E. Africa then to South above Tropic of Capricorn
2. Llanos & Campos of S. America.
3. S of Australian monsoon strip along the tropics.

CLIMATE

Rainfall: 32 inches. approx.

Seasons ① hot &

② Rainy (May - Sept)

③ cool & dry (Oct - March)

- does not drop temp.

Temp: 70°F to 90°F
21°C to 32°C
temp range = 20°F.

- days are hot (100°F) & nights are frost (50°F)
extreme diurnal range characteristic feature of this type of climate.

Winds: brings rains to coastal dist. but dry as they reach western continent hence grainy vegetation.

In W. Africa NE Trade wind blow offshore from Sahara and reach Guinea Coast as dry dust laden wind Harmattan (doctor). gives cooling effect.

SAVANNA/SUDAN TYPE

- * Both length of rainy season and annual total rainfall decreases from equator.
- * Region polewards towards desert fringes.
- * Temp range increases from equator to polewards

ANIMALS & NATURAL VEGETATION

- Tall Grasses & short trees (parkland/bush veld)

- deciduous (shed leaves)

- broad trunks with H₂O storing device to survive through prolonged drought eg: baobabs & bottle trees.

- 6-12 ft high elephant grases with long roots. There lie dormant till dry season and springs up again in rainy season

Animal life: Big game country

- Animals trapped & killed

- Skins, hide, horns, tusks bones or hair & even as 200 animals, Lab species or pets.

- grass eating herbivores and also carnivores.

④ Libra, antelope, giraffe, deer, gazelle, elephant, okapi. ⑤ lion, tiger, lynx, panther, leopard, hyaena, jaguar, jackal & puma.

- Along rivers reptiles & mammals like crocs, alligators, monitors & giant lizards, rhinos & hippos

- Birds, snakes, butterflies, moths & insects.

HUMAN LIFE

masai (E. Africa)
pastoralists

Hausa (Nigeria)
cultivators

⑥ masai - nomadic tribe Kenya, Tanzania, Uganda

- cattle, sheep & goats

- during drought they move up & cooler plateau

- They keep Zebu cattle (humps & long horns)

never slaughtered & beef consumed only when they die.

- They supply only milk & blood.

- Cattle - Symbol of wealth

⑦ Hausa - cultivators

- Bauchi plateau Nigeria advanced than other Negroes.

- No shifting agri

- Maize, millet, Guinea corn, groundnut, beans & bananas, cotton tobacco.

- They allow old plots fallow to regain fertility.

- rotate the crops.

- use domesticated animal

- cattle & goat (milk/meat) poultry (chicken & eggs)

PROBLEMS.

- population pressure builds as they are without freezing period & can grow tropical crops & have immense potential towards plantation crops like cotton, cane, coffee, oil palm, ground nuts & tropical fruits, cocoa, sisal
- Droughts are long & tiring as rainfall is unreliable.

- Irrigation, improved crop varieties, scientific farming techniques

- This type of wet & dry period deteriorates soil fertility.

Rains cause leaching Dry - evaporation hence poor latertic soil

- Cattle country is with zebu cattle which are bony & yield v. little milk & meat. Tropical diseases like ngara by tick is common.

Hence crossing with temperate English Shorthorn cattle.

Cattle breeding & disease control imp steps to be taken.

HOT DESERT & MID LATITUDE DESERT

LOCATION

- * aridity is due to offshore trade winds.
- * Western coasts 15° - 30° N & S
- * Sahara, Great Australian, Arabian, Iranian, Thar, Namib, Kalahari, Mohave, Atacama (not)
- * Gobi, Turkestan, Patagonian (cold) found on plateau

* annual range of temp 58°F .
Controllability accounts for extremes.

CLIMATE

- Rain: less than 10 inches
- * hot desert lies on ~~latitude~~ or high pressure belts where air descends (hence no rainfall)
- * Trade winds blow off shore.
- * Relative humidity is very low 60% coastal to 30% interior.
- * permanent drought
- * presence of cold currents gives mist/fog by chilling on coming air

Temp

- * No cold season.
- * Avg temp 86°F (30°C)
- * Reason for high temp clear, cloudless sky, intense insolation, dry air, rapid rate of evaporation
- * Cold currents has cooling effects on coastal desert
- * Temp range = 9°F
- * desert interior high temp Temp range = 44°F
- * diurnal range is very high $30/40^{\circ}\text{F}$

Death Valley, California - 74°F
Mid latitude desert

- * interior position cuts rain bearing winds, occasional depression (Asia) cause winter rain
- * unexpected conventional rain
- * summer (very hot) winter (below 0°C)

VEGETATION

- Grass, scrub, herbs, weeds, roots or bulbs lie dormant awaiting rain
- xerophytic/drought resistant scrub like bulbous cacti, thorny bushes, long rooted wiry grasses & scattered acacias.
- date palms in region of abundant ground water.
- Along western coast the mist/fog formed by cold currents moisten & nourish the vegetation.
- Intense evaporation makes salt to accumulate over top soil forming hard pans.
- Rate of decomposition is retarded due to low moisture hence very deficient in humus.
- No or few leaves & waxy, leathery, tiny or needle shaped leaves to avoid transpiration

- animals provide meat, milk, hide, hair, wool, these help in barter sys to get dates, grain, beverage, medicine, firearms and etc.

LIFE

- Egyptians, Bedouins, Arabs (sheep, goats, camel & horses)

Bushmen of Kalahari, Bindibu of Australia

① Primitive hunters & gatherers

- * Bushmen & Bindibu nomadic, growing no crops or domesticating no animals.
- * hunt antelope & smaller animals (use arrows)
- * women & children collect insects, rodents, lizards & gather honey, roots, grass & grubs.
- Dew is gathered from leaves & stored in ostrich shells.
- either wear loin cloth or naked.

② Bindibu (similar to Bushmen) (use bows and spears)

- domesticate dingo (wild dog) tracks kangaroos, rabbits and birds.
- women gather honey, insects, berries, seeds, roots, moles & grubs.
- distinct diff is they stay close to water supply as they are not endued to store water.

③ Nomadic herdsmen.

- ride on animals instead of walking (Bedouins of Arabia) (Tuaregs of Sahara) (Gobi Mongols)
- wander in search of green & water
- wealth (goat, camel, sheep, horse)

④ Caravan traders

- travelling merchants
- exchange/sell goods for hide, rugs, carpets etc.
- camels help in trade which also provides milk & hair, water is stomach & fat in hump
- modern road, air & rail helps even more

⑤ Settled cultivators

- Irrigation necessary canals, dams etc.
- Rice, cotton, wheat, barley, beans
- Oases also helps underground water reaches surface.
- Wall constructed to keep sand out of violent dust storms Simooms
- date palm grows maize, barley, wheat, cotton, cane, fruits & vegetables

⑥ Mining settlers

- Atacama (Gold)
- Kalgoorlie, Coolgardie
- Kalahari (Copper & diamond)
- Atacama (caliche) Sodium nitrate is extra & copper
- Chuquicamata world's largest Cu min
- N. America Mexico - silver, Utah - Uranium
- Nevada - Copper
- Sahara, Arabians - Oil (liquid gold) trading with advancement in infrastructure.

WARM TEMPERATE WESTERN MARGIN (MEDITERRANEAN) CLIMATE.

LOCATION

30° - 45° N & S
W part of continent
Basic cause of such climate is shifting of wind belts.
Winter rains unique feature
around Mediterranean Sea, central Chile, California, S. Africa, Southern Aus & SW Australia.

CLIMATE

- * ① dry warm summer with offshore winds - 76°F
 - In summer, sun on T. of Cancer shifts rain bearing Westerlies polewards & prevailing trade winds are offshore
 - Air is dry, intense heat & relative humidity is low.
 - prolonged droughts
- ② Cork oak. Rainfall is winter with onshore Westerlies.
 - Westerlies shift equator wards. (On shore). brings cyclonic rains
 - 25 inches mean annual rains.
 - normally heavy showers in b/w bright sunny periods. characteristic feature of Mediterranean rains.
 - Generally these regions are backed by mountains which are effective barriers.
 - snow rarely occurs.
- ③ Bright sunny weather with hot dry summers & wet mild winters.
 - famous for health & pleasure resort
 - transitional b/w hot deserts and cool temperate maritime
 - cloudless with abundant sunshine.
 - On shore winds & maritime breeze keeps temp moderate
 - Annual temp range 15° & 25° F

VEGETATION

- short, small trees
- absence of shade distinct feature.
- ① Mediterranean Evergreen forests.
- Open woodland with green oaks/cork oaks in Aus. Eucalyptus replace oaks
- Giant Sequoia/redwood typical California trees
- ② Evergreen Coniferous
 - pine, fir, cedar & cypress.
 - evergreen, needle shaped leaves, tall & st trunk.
- ③ Mediterranean bushes & shrubs.
 - Dry & hot summers develops shrubs & bushes
 - laurel, myrtle, lavender, arbutus, rosemary are strongly perfumed.
 - Overgrazing & deforestation
 - maquis (Southern France)
 - macchia (Italy)
 - chaparral (California)
 - mallee scrub (Australia)
- ④ Grass.
 - wiry & bushy they are not suitable for animal farming.
 - This has made bad by soil erosion & impoverished hilly slopes
 - dairy products are net imports
 - Olive oil famous.

ECONOMIC DEVELOPMENT

- favourable climate
- thus are cradle of world civilization
- fruit cultivation, cereal growing, wine making, agri industries, engineering & mining.
- ① Orchard farming
 - world's orchard lands.
 - citrus fruits (long roots - drought) irrigation also helps.
 - Sunkist Orange (California), Seville Orange (Spain), Jaffa Oranges (Israel), Mandarin Orange
- Olive tree (10 inches rain) oil, pickled, eaten fresh.
- Nut trees (chestnut, walnut, hazelnut, almond)
- peaches, apricot, pear, fig, plum
- ② Crop cultivation.
 - cereals, wheat (hard, winter), barley
 - summer crops raised by irrigation lowlands & terraced hill slopes
 - rice is also cultivated.
 - vegetables (beans) & flowers, cotton, tobacco
 - mountain pasture (sheep, goat) cattle Transhumance practiced.
- ③ Wine production (viticulture)
 - long sunny summer ripens grapes
 - Spain, Portugal, France, Italy national drink.
 - Quality depends on climate, quality of soil, vines grown & extent of fermentation.
 - Spain (Sherry), Portugal (Port wine)
 - Italy (Chianti, Asti & Marsala)
 - (Champagne) Paris, (Bordeaux)
 - (Grenoble) Burgundy, (Rhône)
 - Inferior grapes are dried & exported
 - fruit canning, flour milling & food processing are other indust

THE TEMPERATE CONTINENTAL (STEPPE) CLIMATE.

LOCATION.

- * temperate grasslands treeless.
- Eurasia - Steppe
- N. America - Prairies
- Argentina - Pampas
- S. Africa - High Veld
- Australia - Downs

CLIMATE

temp: continental with extremes of temp.
Summer very warm 66°F
Winters very cold.

In Southern hemisphere it is never severe.
* Annual range of temp. ^{Continental} is great.

Rainfall: Annual rainfall light about 20 inches.

10 - 30 inches.

Summer max due to conventional sources.
winter rain due to depression of weather. June-July-Aug - drought affects sheep rearing.

* ~~Chinook~~ in USA & Canada, ~~comes~~ in Swiss Fohn comes to Prairies with depressions in winter & early spring.
It's a hot wind drains temp by 40°F. melts snow covers.

VEGETATION

* Scanty vegetation of sub arid lands.

temperate grasslands

* diff b/w Savannas & Steppes in the treeless nature of steppe & grasses are much shorter.

* Grasses are tall @ <20 inches rain called Prairie grasses.

* they require less moisture & can lie dormant during drought.

* Spring - green, fresh Summer - scorched, yellow, brown.

* Autumn - withers & die roots are alive & dormant (cold winter)
winter

ECONOMIC DEVELOPMENT.

* Grazing horses (steppes)
bison (Prairies)
buffaloes (Pampas)

* nomadic & semi-nomadic people like Kirghiz (pastoral farming) steppe). Red Indians (N. America) (hunters)

* extensive, mechanized wheat cultivation "grainiers of world"
wheat & maize

* lucerne/alfalfa grass for cattle & sheep rearing

① Nomadic herding

* Kirghiz, Kazakhs, Kalmyk for grass water for cattle
* milk, wool, hides, bone, horns: make products of it
* barter for guns, canned food, grains, beverages, sugar, medicine etc.

② Extensive mechanized wheat cultivation.

- moist spring stimulates early growth, warm summer for harvesting
- levelness of land helps in ploughing & harvesting.
- drawback: low yield.
- greatest wheat exporter
- winter wheat, but polarized, Spring wheat is grown.

③ Pastoral farming
- natural conditions suit animal farming
- cattle, sheep, pig, horses.
- beef, mutton, wool, hides export
- milk, butter, cheese & dairy products
- branches, meat packing industries improved

THE WARM TEMPERATE EASTERN MARGIN. (CHINA TYPE) CLIMATE.

LOCATION

- * Eastern margins of warm temperate latitude.
- * more rainfall than mediterranean type.
- * modified form of monsoonal type. Temperate Monsoon
- * Gulf of Mexico heating induces inflow of air from cooler Atlantic. Gulf type of climate
- * New South Wales Parana-Paraguay Uruguay basin - Natal type.

CLIMATE.

- * warm moist summer dry cool winter.
- * mean monthly temp 30°F to 78°F.
- * maritime influence
- * occasional cold winds from continental interior reduces temp.
- * relative humidity high
- * Rainfall - 25-60 inches
- * densely populated.
- * uniform distribution of rainfall (yearly).
- * convectional, Orographic or depressions.
- ① China type
 - * Central & North China, Japan.
 - * warm temperate Eⁿ margin.
 - * due to mountainous terrain induces great pressure changes b/w Summer & winter.
 - * Summer, heating, low pressure, SE Monsoon No downpour nor burst of monsoon
 - * Winter, pressure gradient b/w Mongolia & Siberia Hence continental polar air streams flow outward NW monsoon.
 - * great annual temp range
 - * Occurrence of typhoons in late summer. torrential downpours. (24 inches p/day)

- ② Gulf type.
 - * SE USA.
 - * Similar to China type except monsoonal characteristic.
 - * Summer - Winter range 34°F.
 - * narrow range due to on shore trade winds & Gulf Stream.
 - * Summers warm & pleasant.
 - * annual rainfall heavy 59 inches.
 - * no distinct dry period and abundant moisture.
 - Cotton & Corn extensive cultivation - world's leading.
 - * Thunderstorms & hurricanes, tornadoes. Cyclonic activities are great.
- ③ Natal type.
 - * Eⁿ coast of Southern continents.
 - * narrowness of continent & dominance of maritime influence eliminate monsoonal elements
 - * Even distribution of rain full year.
 - * annual rain 48 inches
 - * autumn/winter more. rains in prolonged shower
 - * well suited for agri as much water seeps down

NATURAL VEGETATION

- * heavier rainfall
- * evergreen broad leaved forest & deciduous.
- * On highlands: conifers pine & cypresses.
- * rich plant variety grass, ferns, lianas, bamboo, palms & forest
- * valuable timber species
- * Eⁿ Aus: Eucalyptus.
- * Brazil - Pararapire Quebracho, yerba mate
- * In Natal: palm trees, chestnut, ironwood, blackwood, wattle tree for commercial extraction of tanning
- * China type: oak, camphor, camellia, magnolia. Deforestation lead to soil erosion.
- * USA: deciduous walnut, oak, hickory, maple & pine
- * crops like cotton, maize & fruits.

ECONOMIC DEVELOPMENT.

- * no drought, adequate rain
warm cold season makes crop grow better.
 - * terraced hills, irrigated fields are most intensely tilled parts of earth.
 - * maize, cotton, fruit, tobacco. Rice, tea, mulberries, cane, coffee, dairying
- ① Farming in monsoon China.
- world's largest rice growing
 - wet paddy/swamp rice in flooded fields.
 - Subsistence farming
 - little mechanized due to cost.
 - double/treble cropping increased annual total rice prod.
 - milled rice forms deficient diet hence undernourished.
 - little deterioration in soil fertility. River bars silt & bring new soil to fields.
 - Organic waste to enrich fields like rice straw, cereal clippings, animal dung, refuse & human manure.
 - terraced lands are also used to grow rice.
 - tea, mulberry leaves for sericulture.

② Agriculture in Gulf States.

- lack of population pressure & urge to export.
 - Rice cultivation ~~not~~ imp
 - corn, cotton, tobacco are imp.
- ③ Cows - chief food crop.
- humid air, sunny sunns & heavy showers help.
 - 1/2 world's prod of cows
 - cows used for fattening animals (cattle & pig) (meat)
 - major prolific yield. gives twice the yield per acre as wheat or other cereals.

④ Cotton.

- Negroes were brought for cotton plantation.
- long hot 200 frost free days temp 75°F
- Rain: 40 inches.
- Cotton belt 20 inches Isohyte 77°F Isotherm.
- long stapled (1.5-2.3 inch) problems
- soil exhaustion & erosion due to prolonged cotton cultivation
- due to westward migration of cotton belt the pest attack is more.

⑤ Tobacco.

- Gulf type.
- native crop.
- Turkish tobacco to Havana cigar Virginia tobacco.
- humid atmosphere and well drained soil.
- 50% of tobacco is International trade.

⑥ Crop cultivation in Eⁿ margin of Sth hemisphere

- warm moist summers frost free winter supports crops & animals.
- cane sugar, cotton, tobacco & maize (for animals & humans)
- rapid rate of soil exhaustion in regions of maize monoculture. Scientific manuring and better methods would raise yields.
- 40 inches rain hence grassland supports cattle & sheep for wool, meat & hides. animals can be kept outdoor always due to mild winter.
- animal products, wheat & flax among major exports.

- Brazil - 40+ inches rain forest replaced by grass. hence yerba mate & lumbering of Parana pine & Araucaria. cattle, sheep reared maize & cane grown.
- moist trade winds in Aus cause rain. Hence hardwood coastal trees (Eucalyptus) dairying, cotton, cane & maize grown.

THE COOL TEMPERATE WESTERN MARGIN (BRITISH) CLIMATE.

LOCATION.

- * Under permanent influence of westerlies.
- * Regions of much cyclonic activity.
- * Britain to lowlands of NW Europe. Northern & W France, Belgium, Netherlands, Denmark, Norway, NW Iberia.
- * Much maritime influence on ppt & climate.
- NW European maritime climate.
- * In N. America its coastal lands of British Columbia.
- * In Southern hemisphere Chile, Tasmania & parts of NZ (S. Island)

CLIMATE.

- * Mean annual temp 40°F - 60°F
- * Annual range 24°F
- * monthly avg 65°F
- * Heat waves are warm summer days are welcomed.
- * Ideal climate.
- * Mild winters due to warming effect by North Atlantic drift & South westerlies.
- * Night frosts & winter snowfall occur.
- * Cold spells by invasion of cold polar continental air from interior.
- * S. Hemisphere lack of continental mass makes it free from extremes of climate.

Rainfall:

- * Winter maximum, adequate rain full year.
- * amt decreases eastward, around 25-30 inches a year on dry interior. Coasts abt 60-100 inches.
- * Winter - Snowfalls. Spring - dry & refreshing long sunny summer autumns - gusty winds & golden leaves.

NATURAL VEGETATION.

- * pure stands of deciduous, shed leaves in cold season. begins in autumn.
- * valuable temperate hardwood. Oak, elm, ash, birch, poplar & hornbeam.
- In wetter areas willows, alder & aspen.
- * chestnut, sycamore, maple lime.
- * Lumbering - open forest sparse undergrowth.
- * higher latitudes conifers

(B) - dense population & industrial situations makes wheat imports. & even the diversion to profitable farming.

- Barley - breweries & hops also grown.
- Crop rotation leguminous crop & root crop.
- Cattle crop in mixed farming supported by climate.
- Beef cattle & cattle used to produce the manure (dung).
- Poultry & pigs act as scavengers feed over root crops & dairy process.
- Sheep - wool & mutton.
- Mixed farming restricted to mountainous & thick forested areas.

(3) Sheep rearing

- home breeds - Leicesters, Lincoln & Southdowns
- wheat most extensively dual purpose mutton & wool cultivated.

ECONOMIC DEVELOPMENT

- * Lumbering - fuel, timber & agri
- * cereals, fruits & root crops raised.
- * Net importer of food crops wheat.
- * Industrial development machinery, chemicals, textiles & manufactured materials.
- * Fishing - Britain, Norway, British Columbia

(1) Market Gardening

- * fresh veges, green salads, eggs, meat, milk & fruits
- * climate, soil & other factors suit mg.
- * silty, loamy or podzolic maintains high fertility.
- * good network of transport to transport perishable goods. - truck farming
- * Poland - bulbs & flowers
- Denmark - milk products
- Netherlands - Eggs bacon
- * Horticulture industry

(2) Mixed Farming

- Arable farming & pastoral farming.
- Mixed farming (fruit trees and poultry).

(3) Sheep rearing

- Urbanisation & industrialisation pub sheep rearing to less favoured areas
- foothills, well-drained uplands, chalk limestone scarpans light & sandy soils
- Woolen textile Industry Pennine wool.
- Importer of British pedigree animals to newer sheep lands of world.
- Chief occupation is NZ & other southern hemisphere.

- extensive meadows, mild temperate climate, well-drained level ground, scientific animal breeding, better refrigeration.

(4) Other Agri. products

- * Potatoes (attack of blight)
- 2/3rd prod from Poland, UK, Germany, France
- Used for alcohol & fodder
- * Beet sugar - factory in 1801 it is crushed for sugar & green tops as fodder.
- highest yield in autumn & dry sunny season.
- most factories @ fens and E. Anglia.

THE COOL, TEMPERATE CONTINENTAL (SIBERIAN) CLIMATE

DISTRIBUTION.

- * Only Northern hemisphere with continents with broad East West spread.
- * Evergreen coniferous predominant vegetation. (taiga).
- * N. America, Europe & Asia.
- * In Southern hemisphere this climate is absent due to narrowness of Southern continents in high altitudes.
- * Interiors of coniferous forest belt are capable of supporting agriculture as the ground ploughed & leached, acidic podzolic soil is created.

CLIMATE

- Temp: long cold winter cool brief summer transitional spring & autumn.
- * Isotherm 50°F (10°C)
 - * annual range -54°F
 - * cold pole of earth Siberia at it records extremes.
 - * heavy snowfall, frost, frozen rivers, blizzards (Canada), bura (Europe).
- Rainfall: No maritime influence hence less rain. (15-25 inches)
- * Summer more convectional rains
 - * In winter - snowfall
 - * No month without some form of moisture.
 - * Relative humidity is high.
 - * altitude, latitude, proximity to poles, amt of exposure to westerlies & temperate monsoons & penetration of cyclones.
 - * Permanent snowfields absent as it melts with return of spring and cool warm summer.
 - * floods occur due to melting. R. Ob, R. Lena, R. Yenisey - marshy & ill drained.

NATURAL VEGETATION.

- Softwood trees (furniture, building construction, matches, paper, pulp, rayon & other branches of chemical industry)
 - World's greatest softwood producer USSR, USA, Canada, Finland, Sweden, Norway.
 - Pine (white pine, red pine, Scots pine, Jack pine, Lodgepole pine)
 - Fir, Spruce, Larch.
 - pure stands helps in commercial exploitation.
- ① Coniferous are of moderate density
- uniform & grow straight & tall upto 100ft.
- ② All coniferous are evergreens
- below freezing annual temp is the criterion.
 - food is trunk, thick bark to protect from cold.
- ③ Conifers are conical shape
- prevents snow accumulation
- ④ Leaves are small, thick, leathery & needle shaped.
- checks excessive transpiration
- ⑤ Little undergrowth
- podzolized soil is poor excessively leached.
 - very acidic, little humus due to low temp, short summers, absent sunlight

ECONOMIC DEVELOPMENT

- little lumbering (pine, fir) (Larch, Spruce)
 - little agriculture (long cold winter, frozen soil & low mean temperature resistant crops).
 - Cereals (barley, oats, rye) & root crops (potatoes)
 - Samoyeds & Yakuts of Siberia & some Canadians engaged in hunting trapping & fishing.
- ① Trapping - fur bearing animals.
- Muskrat, ermine, mink and sables for imp animals in Canada. Many fur farms are established in Canada.
 - few animals are caged & skinned
 - In Siberia Squirrels, Otters, bears, sables, lynxes, martens & foxes.
- ② Lumbering.
- (a) Saw milling (logs into saw timber)
 - (b) paper & pulp industry (Canada & US)
 - (c) As fuel (industrial use) Softwood - $\frac{1}{4}$, Hardwood - $\frac{3}{4}$
 - (d) As Industry raw material, matches, furniture, wood carvings, toys, crates & packing cases, from by products - rayon, turpentine, varnishes, paints, dyes, liquid resins, wood alcohol, disinfectant cosmetics.
- * limited species & pure stands
 - * lumbering replaces agriculture
 - * winter cereals Safflower, helps to grip & haulage, float downstream easily
 - * cheap hydroelectricity @ mountainous region helps running saw mills -

THE COOL TEMPERATE EASTERN MARGIN (LAURENTIAN).

LOCATION

- * Cool temperate Eastern margin b/w British type & Siberian type.
- * Features of both maritime & continental
- * Eⁿ Canada & NE USA, Eⁿ Siberia, N. China, Manchuria, Korea & N. Japan.
- * Absent in S^h hemisphere coz of small sections of land south of 40°S latitude only possibility is Eⁿ Patagonia but Andes acts as barrier for westerlies. with annual apt less than 10 inches.
- * Warm Kuroshio & Cold Oyashio makes fishing ground. & this reduces the extreme temp.

CLIMATE

- * cold dry winter (below 0) warm wet summer (70°-80°F)
- * off shore cold currents produce cooling effects in summer. to reduce temp.
- * more rain in summer 30-60 inches annual.
- ① North American Region
 - * uniform precipitation due to Atlantic influence and of Great Lakes. Warm Gulf Stream increases moisture content of Easterly winds.
 - * Westerlies across Rockies carry depressions over Great Lakes to England States. This promotes wet conditions in winter which is imp for agri.
 - * meeting of Gulf Stream & Labrador current creates mist & fog which gives ppt. (Newfoundland experience more drizzle than any part of world).
 - * Temp high in summer.
- ② Asiatic Region.
 - * less uniform distribution of rainfall (25 inches)
 - * cold winter & dry summer. Summers are warm & wet.
 - * intense heating - L' pressure moist winds SE monsoon (cool temperate monsoon climate)
 - * big annual range of temp more than 55°F
 - * Japan - two marine - Jure plus rain & Sept Typhoons

NATURAL VEGETATION

- * cool temperate forest
- * heavy rain, warm. Summers & damp air favour growth of trees.
- * Coniferous forests
- * lumbering & timber exports.
- * St Lawrence River heart of Canadian timber.
- * South of 50°N deciduous forests Oak, beech, maple, birch, purestands
- * Agri: Both food & cash crops grown.

- ③
- * St John's chief port has 1 lake headquarters of fishing industries
 - * sealing & whaling declined nowadays
 - * chief fishing & processing ports Halifax & Yarmouth.
 - * USA govt is working on fish conservation due to overfishing.

- ④ Fishing of Japan.
- * scarcity of meat due to less pasture tends people towards fishing.

- * Japanese use fish waste, fish meal, fish weeds as fertilizers

ECONOMIC DEVELOPMENT

- * lumbering (timber, paper pulp industry)
- * long severe winter hinders agri.

- * Potatoes & cereals are grown before onset of winter. Soya bean also grown with groundnuts, seans, rapeseeds, tung oil and mulberry.

- * dairy farming, hay cultivation, fruit growing
- * fertile Annapolis valley of Nova Scotia is world's famous apple growing area.

Fishing

① Grandbanks of Newfoundland

- plankton on gentle sloping continental shelves stretch for over 200 miles
- Only chief source of wealth
- Both pelagic & demersal are caught.
- Cod (cod liver oil), haddock, halibut, hake, herring, plaice and mackerel.
- modern trawlers, dragging nets, drifters. use radar and radio device to navigate in dense fog.
- Crabs, lobsters, shrimps
- Inland - freshwater fishes Salmon, trout, eels, sturgeons

- * Japan has taken Seaweed cultivation & pearl culture. (pearl oysters) and even shells are used for decorative purpose. and hence they also breed young oysters
 - * whaling @ arctic is also carried.
- Reasons for Japan's fishing highlights

- * 80% of land non agricultural
- * continental shelves rich in plankton
- * (Kuroshio & Oyashio) provides excellent breeding ground.
- * intended coastline ideal for fishing.
- * Hakodate & Kushiro Imp fishing ports.
- * lack of lowlands & pastures.
- * High scientific mechanisation, modern refrigeration & trawlers.
- * Japan is centre for marine fishing research.

Arctic/Polar Climate

LOCATION.	CLIMATE.	HUMAN ACTIVITIES	IMPORTANCE & RECENT DEVELOPMENT
<ul style="list-style-type: none"> * Arctic circle * Ice caps - Greenland & highlands of high altitude region. * Lowlands - tundra with ice cover. * Antarctica. 	<ul style="list-style-type: none"> * Summer 50°F (cool & brief) * Winter -35°F (long & severe) * frost & blizzards * thick fogs due to cold & warm current joining <u>Rainfall</u> - * Snow (10-12 inches) avg height * Summers more rains. * Convectional absent due to low rate of evaporation. * anticyclones in Summers bring rains * Winter more @ coastal where cyclone effect is felt. <p><u>TUNDRA VEGETATION</u></p> <ul style="list-style-type: none"> * deficiency of heat hence mosses, lichens and sedges grow. * drainage in soil is poor due to permanent ice. * hardy grass & reindeer moss only pasturage for herbivores. * Arctic prairies berry bearing bushes & Arctic flowers bloom. * Wolves, foxes, musk ox, arctic hare & lemmings 	<ul style="list-style-type: none"> * Confined to coast. * Semi nomadic * Eskimos (Greenland, Alaska & Nⁿ Canada) * Hunters, fishers & gatherers. * Live in Igloos (winter) * Portable tents (summer) * fish, seal, walrus & polar bears are food. & even caribou other animals provide dairy products. * Europeanisation of Eskimos (wooden houses, rifles, speed boats etc) * Commercial scale: fur bearing animals & fishing. * Lapps tribes of Nⁿ Finland & Scandinavia Somayeds of Siberia, Yakuts of Lena basin, Koryaks & Chuckchee of NE Asia. Large farms for rearing & breeding of fur bearing animals. 	<ul style="list-style-type: none"> * discovery of minerals Gold - Alaska Nickel - Tchimo (USSR) Petroleum - Kenai peninsula, Alaska Copper - Rankin Inlet, Canada. Coal - Spitsbergen, Alaska. Iron - around Lake Superior - Kiruna & Gällivare (Sweden) * Ports @ Arctic seaboard of Eurasia enabled shipping of timber & fur. * Igarka (Yenisey) (icebreakers) * healthy air & its preservative quality are factors prone to future colonisation

CORAL REEFS & ATOLL

- * formed due to lime secreting organisms skeleton accumulation.
- * Tropical oceans (25°N - 25°S)
- * Submarine platform extensive
- * Coral reefs have about 1 lac species of which only 10% is studied. Hence they are "Rainforests of Ocean".
- * Conditions for growth of coral polyp.
 - ① Annual temp (20°C - 25°C) 68°F - 70°F
 - ② 200-250ft below sea level, as they recieve sufficient sunlight & oxygen
 - ③ clean sediment free water.
as turbid water clogs mouth of polyps resulting in its death. But fresh water is also injurious hence they live away from river mouths.
 - ④ Ocean salinity - 27‰ & 30‰ ideal for its growth.
 - ⑤ Ocean currents & waves are favourable as they bring food supply. Hence they die in lagoons or small sea (lack of supply).
 - ⑥ extensive submarine platform.
 - ⑦ Corals are more susceptible to long term climate change.
- * Increase in temp causes bleaching when corals lose their algae and become white in color - coral bleaching. This causes death of corals. (Alfred Mayo)
- * Indian Ocean region most adversely affected
- * El-nino intensifies coral bleaching.
- * Human activities such as pollution of oceanic water through excess flux of sediments, industrial effluents (marine pollution), clearance of marine forest & filling of wetlands, mining coal rocks causes fatal disease to corals.

Types of coral Reefs

- * basis of nature, shape and mode of occurrence
 - i) fringing reef
 - along continental margin / islands
 - seaward slope - steep & vertical
 - landward slope - gentle.
 - usually attached to coastal land. Some the gap b/w forms lagoon called boat channel.
 - continuation of reef is broken wherever river drains into sea
 - ii) Barrier reef.
 - largest, most extensive, highest & widest reefs of all types.
 - Avg slope 45° but some 15° - 25° .
 - extensive & shallow lagoon b/w coastal land & reef. It has tidal inlet.
 - found in continuous chains
 - Great Barrier Reef largest in world.
 - iii) Atoll.
 - ring of narrow growing corals of horseshoe shape and crowned with palm trees is called atoll.
 - deep lagoon is between (240-250ft)
 - 3 types
 - True atoll
Circular reef enclosing shallow lagoon but without island.
 - Island atoll
Island in centre of lagoon, enclosed by reef.
 - Coral island / Atoll island
Initially no island but later formed due to erosion & deposition by waves.
- Antilles sea, Red sea, China sea, Australian sea, Indonesian sea
- Shallow lagoon reefs are minor reefs

features similar in shape & found in epicontinental seas (South China sea)

- **Faars** are chains of small atolls with small lagoons.
- **Coral Banks** are isolated shapeless reefs
- **coral pinnacles** are small ridges which rise within lagoons.
- * On basis of location
 - i) Tropical coral reefs ii) marginal belt coral reefs.
- ### Coral Bleaching

 - * Global warming main reason.
 - * 1997-98 warmest year in 1200 years with El Nino - Indian Ocean rise by 2°C hence catastrophic event for corals. (70% death) (Kenya, Maldives, Andaman, Lakshadweep, Seychelles marine park, Mafia marine plant off Tanzania)
 - * 4 levels of bleaching
 - a) Catastrophic bleaching
Affects 95% of shallow water corals
 - b) Severe bleaching
Affects 50-70% death of corals
 - c) Moderate bleaching
20-50% coral mortality.
 - d) Insignificant bleaching or no bleaching
 - * India has been estimated with an area of 18000 Sq Km coral coverage.
 - Lakshadweep, Andaman & Nicobar
 - Gulf of Kutch, Gulf of Mannar
 - * Corals of Gulf of Kutch are bleached due to siltation.
 - * Global warming (above 1°C rise temp)
 - * El Nino
 - * Coral diseases (black band, coral plague, acropora blasi, white band)
 - * marine pollution, destructive fishing practice

* coral & zooxanthellae (algae) live in symbiotic relationship.

① Zooxanthelle provides

- assistance in nutrients prod through photosynthesis.
- fixed carbon compound for energy
- enhance calcification
- mediate elemental nutrient flux.
- coral coloration as algae living within their tissues.

② coral polyp provides

- protected envir to live
- supply of carbon₂ for photosynthesis

* There are 2 types of corals

- i) hard corals - build reefs / hermatypic
- ii) soft corals such as sea fans ^{reef}

* coral reef is built up of layers of coral skeletons covered ultimately by living polyps.

* corals are also found in deep waters of colder regions (39 - 55°F)

Largest is Root Reef off Norway.

* most productive & complex coastal ecosystem with high biological diversity.

* corals are slow growing but zooxanthellae is fast growing (plants)

* Patch reefs are also type

There are isolated & discontinuous patches lying shoreward of offshore reef structures

Eg: Palmyra, Gulf of Mannar & Kutch

* Decreasing order of richness is diversity of species in India

- ① Andaman & Nicobar
- ② Lakshadweep
- ③ G. of Mannar
- ④ G. of Kutch

* functions of coral reefs

- natural protective barriers against erosion & storm surge
- capturing plankton for nutrients
- largest biogenic calcifiers carbonate produce
- provide substrate for mangroves
- provide habitat for animals & plants

* Threat

- Natural causes
 - outbreak of reef destroying marine
 - bleaching
 - depletion of essential symbionts
- Anthropogenic causes

* Coral Bleaching

- colour bleaching is due to
 - ① density of zooxanthellae declines
 - ② conc. of photosynthetic pigment within algae falls.

* Ecological causes of bleaching

- Temperature
- Solar Irradiance
(photosynthetic radiation, UV radiation)

- Sedimentation

- Subaerial Exposure
(low tides, tectonic uplift etc)
- Fresh water dilution.
(precipitation, runoff)

- Inorganic nutrients

- (ammonia & nitrate) increase algae by 2-3 times.

- Xenobiotics.
exposure to chemical contaminants, herbicides and oil
- Epizootics

* Key Initiative agencies

① Coastal Ocean monitoring & Prediction Sys (COMAPS)

- assess health of coastal water, manages pollution issues & monitors, regulates, legislates

② Land Ocean Interaction in Coastal Zone (LOICZ)

- investigates effects of global change on coastal zone & manages through scientific means.

③ Integrated coastal & marine area management (ICMAM).

- integrated management of C&M areas

④ Society of Integrated Coastal Management (SICOM)

- National initiative to protect coastal ecosystems. (professional body).

⑤ Institution for coastal management

- Coastal Regulation Zone (CRZ). 1991 protects coastal areas in India.
- National Coastal Management Authority State Coastal Management Authority for enforcement & monitoring CRZ
- EPA, 1986 for protecting & improving quality of coastal envir and prevent, abate & control envir pollution in coastal areas.